**HERE IS YOUR TEACHER'S RESOURCE KIT FOR**
**THE PRINCIPLES, THEORIES & PRECEPTS OF BIOLOGY**

This kit includes the *Black Line Masters* for:

1. Tables of Contents for Textbooks
2. Activity Answer Keys
3. Section Quizzes (18)
4. Chapter Tests (6)
5. Quiz Answer Keys
6. Chapter Test Answer Keys

You may reproduce the *Black Line Masters* as needed for your school.

Place the *Black Line Masters* in a three ring notebook for safekeeping.

Make a print copy of the *Activity Answer Keys* and place the copy in a three ring notebook for student access (if you allow students to score/grade daily activities).
Note: Be sure **to exclude** the Quizzes, Tests, and Keys from the three ring notebook which is accessed by **students**; students **should not** have access to Quizzes and Tests, or associated keys, except as assigned under supervision of a teacher for the purposes of measuring achievement.

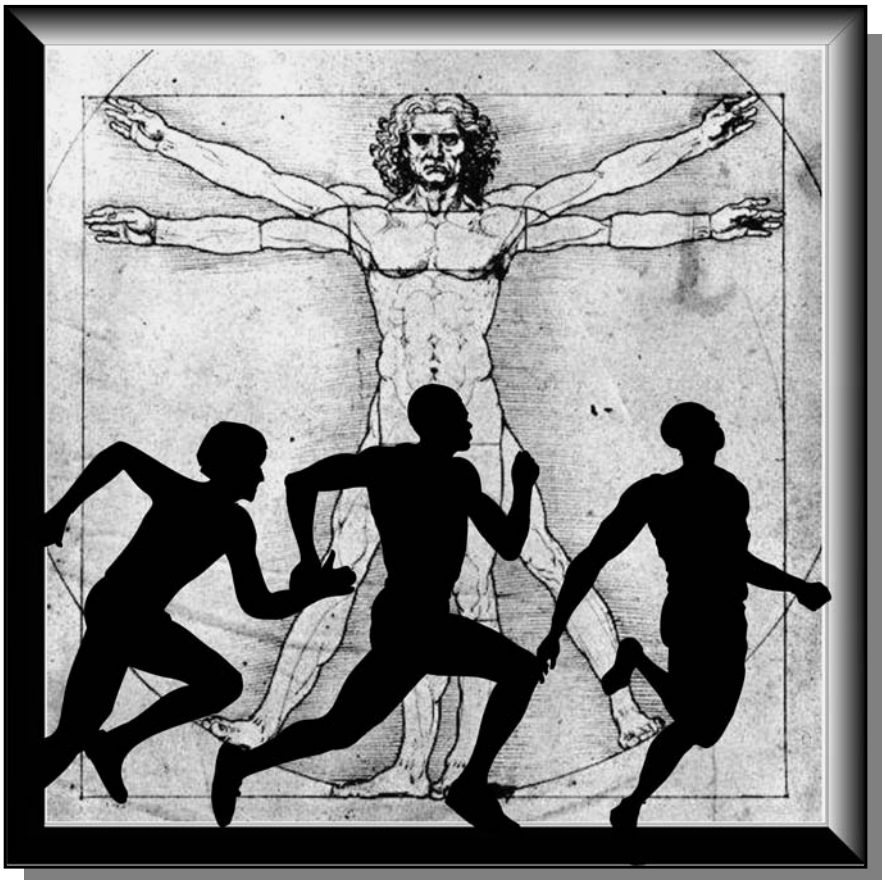
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PAC recommends that you use a 1½" three-ring binder with a clear plastic outer sleeve. Place the full color cover sheet inside the front slip pocket of the three ring notebook.

Cut out the spine label from the back sheet and place the spine label in the three ring notebook spine pocket.

# *The Principles, Theories & Precepts of Biology*

## TEACHER'S RESOURCE KIT



## *Black Line Masters*

BIO76243 Revision 090910

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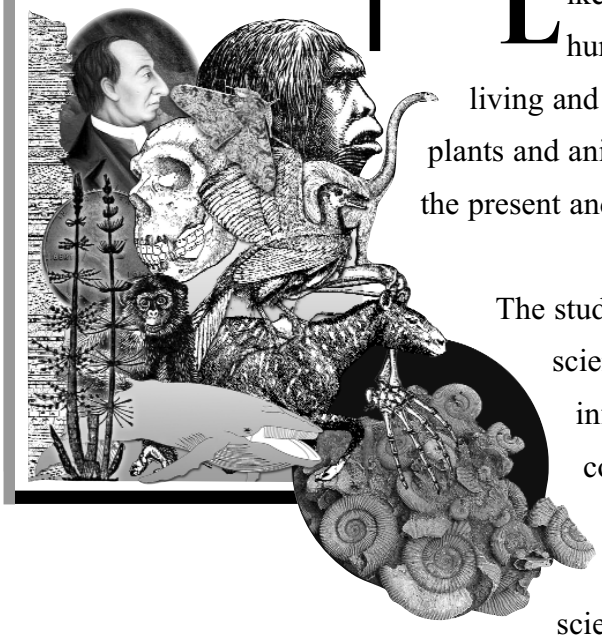
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# *The Principles, Theories & Precepts of Biology*
# INTRODUCTION



Like other sciences, the study of Biology is humanity's quest to understand life. Organisms, living and dead, are considered in assessment of humans, plants and animals in an effort to understand the past, occupy the present and project the future.

The study of Biology is not without controversy among scientists whose personal belief systems may influence interpretation of data. Scientists draw conclusions and proclaim theories according to research and personal beliefs. This course attempts to present information based on the scientific method of observation of data with admission that some theories simply cannot be subjected to the scientific method due to the absence of complete living or dead organisms with which to conduct comprehensive studies. Consequently, this Biology course focuses on the marvelous and astonishing evidence that life is a wonderful mystery to be explored and appreciated.



As you read the text and respond to activity questions, you will begin to embrace awareness that you are an intricate and special being. You will enjoy this course because it allows you to challenge theories, discuss precepts, question principles and engage in open dialog about the *Principles, Theories and Precepts of Biology*.

# *WHAT* AND *HOW* STUDENTS WILL LEARN FROM THIS COURSE

**This course consists of 90 lessons in six chapters. The format is designed for classroom or self-study settings. Students will be able to progress through the course individually or in class groups. The secret to doing well is for students to read the entire lesson first, then complete the activity questions as they read through the text again.**

Each Booklet contains one chapter. Each chapter is divided into three sections of five lessons each: (Chapter 1; Section 1; Lessons 1-5). The course is designed so students will enjoy learning science. Each lesson can usually be read in a few minutes. Students are encouraged to read each lesson completely, then respond to the activity questions which are packaged in a separate booklet labeled: *Activities*. Students may answer the questions directly on each activity page or answer the questions on a separate sheet of notebook paper. The teacher will inform students of local school policy.

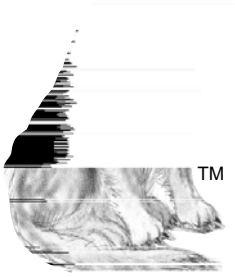
Activity questions identified with an underlined number (*example:* 17.) will appear on quizzes and may appear on chapter tests. Questions on the Life Principles and vocabulary will be included in quizzes and chapter tests. When students turn in their activity questions, they may be required to quote the Life Principles to the teacher.

A section quiz is provided for students to complete at the end of every 5 lessons. The teacher will issue a chapter test after students complete all 15 lessons (after the third section quiz). The chapter test is compiled from the three quizzes. Students who fail the quiz may be required to work the lessons from that section again. Students who score 85% or higher on the three section quizzes may not be required to take the chapter test; this is at the discretion of the teacher.

Answers to activities, quizzes and tests are found in this *Teacher's Resource Kit.* The activities keys are divided by chapter and section number. Students may be allowed to grade their own answers to activity questions. The teacher will inform students of local school policy.

If the teacher requires additional comprehensive exams, questions may be compiled from the chapter tests of this course.

***Vocabulary words are identified at the beginning of each lesson and are noted in bold, italics type within the text. Vocabulary words will appear on most quizzes.***




Meet ***Max Potential***, PAC curriculum's mascot. Max is an adolescent wolf who will be hanging around to encourage your students to reach their maximum potential as they read and work through their lessons.


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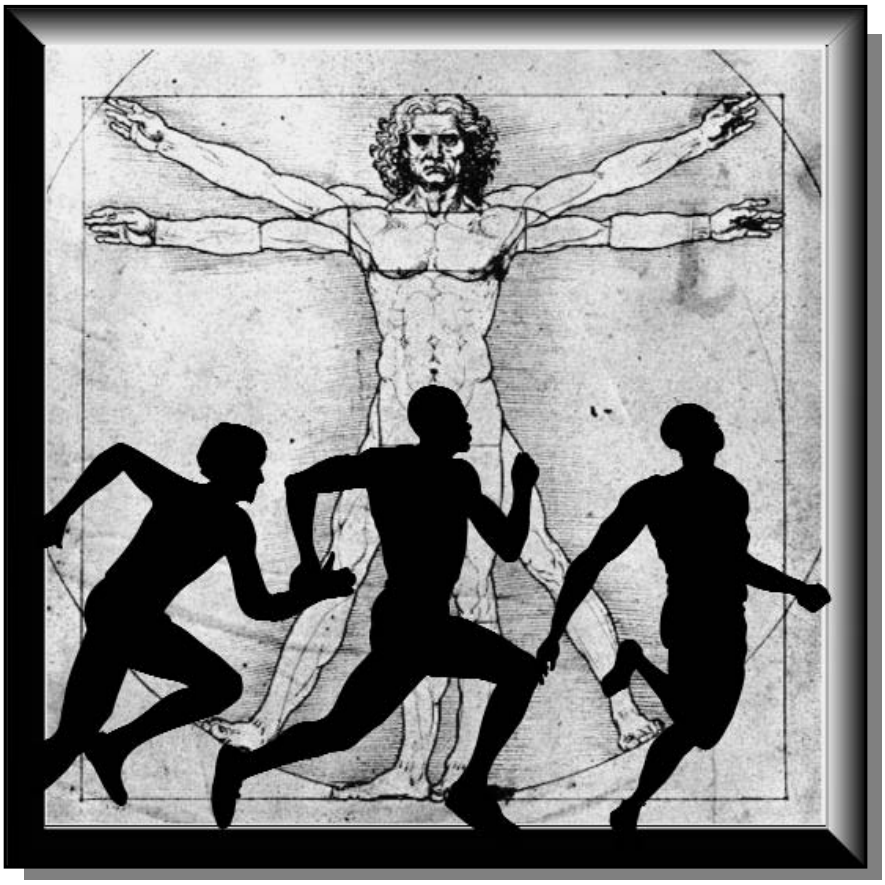
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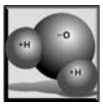
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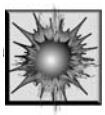
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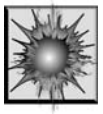
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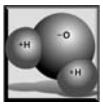
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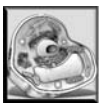
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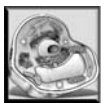
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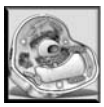


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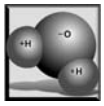


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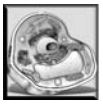


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*Decomposers and Recyclers; Fertilizers, Food Processing, Sewage Treatment, Mining, Health*



4. BACTERIA: PROBIOTICS YOUR PERSONAL PHARMACY . 15-20
*Probiotics and Health*



5. VIRUSES: A VERY STRANGE PHENOMENON . . . . . 21-24
*Discovery of Viruses; Viruses Infect Cells, Cause Disease; Retroviruses*

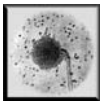
**SECTION 2**



6. PROTISTA: A WORLD OF ANIMAL-LIKE WONDERS . . . . . 25-30
*Single-Celled Eukaryotes, Animal-Like Protists: Flagellates, Sarcodines, Sporozoa, Ciliates*



7. PROTISTA: A WORLD OF PLANT-LIKE WONDERS . . . . . 31-34
*Euglenophytes, Pyrophytes and Chrysophytes*



8. SLIME AND WATER MOLDS: PROTISTA OR FUNGI? . . . . . 35-38
*Cellular Slime Mold, Acellular Slime Molds*

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9. PROTIST DISEASES . . . . . 39-42
*African Sleeping Sickness, Various Intestinal Diseases, Malaria, Whirling-Trout Disease*



10. THE SIMPLE THINGS IN LIFE . . . . . 43-46
*Haemophilus Infuenzae, Genome Map; The Flagella; The "Simple" Cell*

**SECTION 3**



11. FUNGI—PART I . . . . . 47-50
*General Features, Classifications; Zygomycota and Ascomycota*



12. FUNGI—PART II . . . . . 51-54
*Classifications: Bascidiomycota and Deuteromycota*



13. FUNGI AND DISEASE. . . . . 55-58
*Fungal Disasters of the Past; Candida Albicans*



14. ALGAE—PART I . . . . . 59-62
*General Characteristics; Brown, Red and Green Algae*

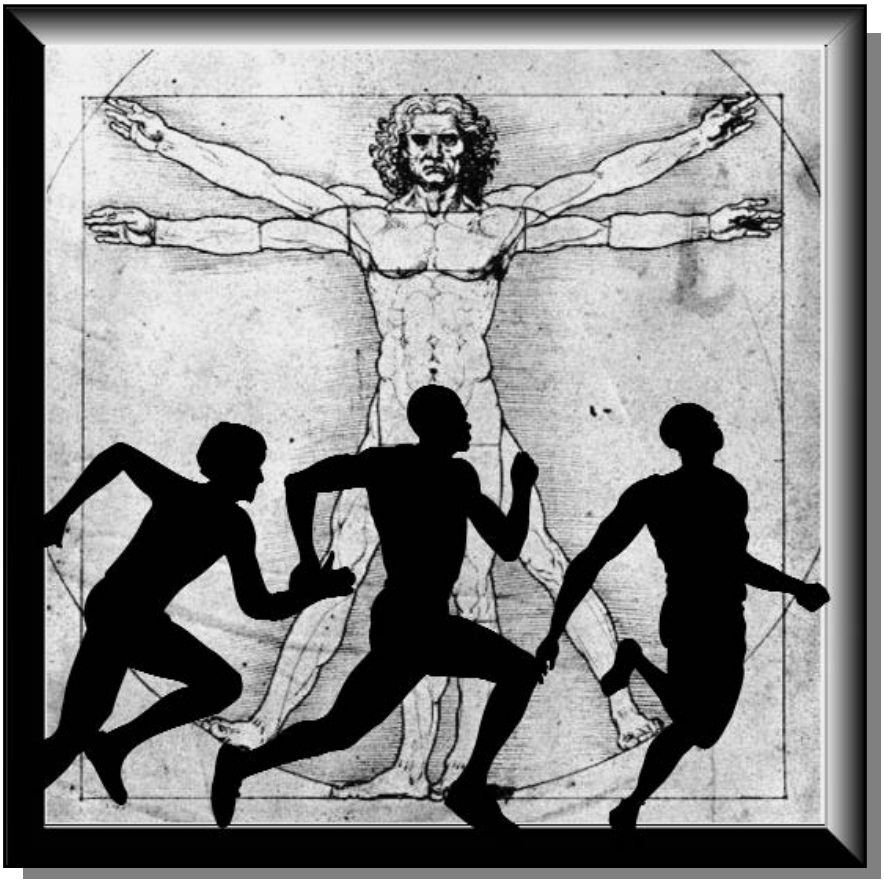


15. ALGAE—PART II . . . . . 63-66
*Patterns of Reproduction*


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# *The Principles, Theories & Precepts of Biology*

## *Activity Answer Keys*




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# ACTIVITY ANSWER KEY

## Chapter 1, Section 1

**Check your answers from the Answer Key. Answers separated by commas may be in any order. Answers separated by semicolons must be in stated order. Correct all errors, then complete your next goal.**



### Lesson 1: *A Look At Life*

*The Study of Biology*

1. (a) True
2. (b) False
3. (b) False
4. (d) neon
5. hydrogen, carbon, oxygen, nitrogen, phosphorus, sulfur
6. elements
7. (c) the breath of life
8. (a) True
9. (a) cell
10. (b) biology
11. DNA
12. *"There is no part of life that does not contain its lessons. If you are alive, there are lessons to be learned."*



### Lesson 2: *Scientific Laws*

*The Scientific Method*

1. scientific method
2. (c) an assumption made to test and prove a logical conclusion
3. (a) test evidence
4. scientific law
5. "What is the evidence?"
6. (c) wait to accept a theory until it withstands the test of time
7. (a) products accepted without thorough testing
8. (b) was prescribed without thorough testing
9. (a) True
10. (c) human germs are more easily transmitted to humans
11. (c) vigorously wash their hands in water and chlorinated lime prior to examining living patients
12. (c) They refused to believe that infections could result from invisible things.
13. (b) existence of God
14. (c) A person's reaction to something
15. (a) True
16. moral
17. Galileo Galilei
18. (d) all objects fall at the same speed regardless of weight
19. (b) False
20. *"Man will occasionally stumble over the truth but usually manages to pick himself up, walk over or around it and carry on."*



### Lesson 3: *Discoveries*

*Early History of Science*

1. (b) their knowledge of astronomy and architectural engineering
2. (d) based largely on superstition
3. Earth
4. (b) False
5. (b) phlogiston
6. oxygen
7. (b) False
8. (d) many important discoveries
9. (a) accept the teachings of earlier scholars

10. (c) God established the universe and put certain laws into existence.
11. (d) Roger Bacon
12. (b) faithfully accept traditional dogmas
13. (a) True
14. Law of Gravitation
15. (a) biblical concepts
16. (e) Antoni van Leeuwenhoek
17. (a) Robert Hooke
18. (b) Andreas Vesalius
19. (g) William Harvey
20. (f) John Ray
21. (h) Carolus Linnaeus
22. (c) Marcello Malpighi
23. (d) Ulisse Aldrovandi
24. Charles Darwin
25. *"In questions of science, the authority of a thousand is not worth the humble reasoning of a single individual."*



**Lesson 4: *Theories***
*Darwin & the Theory of Evolution*

1. evolution
2. (c) All species share a common ancestor.
3. (a) True
4. (a) sparked a rapid growth in biological research
5. England
6. (a) Cambridge University to become a clergyman
7. (c) a student of nature
8. Alfred Russel Wallace
9. (a) fish
10. "the book that shook the world"
11. Hitler
12. change
13. (b) False
14. (d) all of the above
15. (d) life is a competitive struggle to survive
16. (a) True
17. common ancestor
18. (a) True
19. (b) Darwin's theory has been modified
20. (d) all of the above
21. *"...There is more evidence to suggest an abrupt arrival of man rather than a gradual process of evolving..."*



**Lesson 5: *DNA***
*Features of Life*

1. non-living
2. (a) True
3. (c) orderly
4. _d_ some cats
5. _b_ octopuses
6. _c_ archerfish
7. _a_ some insects
8. _e_ peregrine falcons
9. (d) automatic ultraviolet protection
10. (a) True
11. (c) absurd in the highest possible degree
12. take
13. (d) all of the above
14. _X_ (a) It lives in waters near Oahu, Hawaii.
    ____ (b) It uses its ventral fin as a lure for other fish.
    _X_ (c) Its dorsal fin appears as a separate, smaller fish.
    ___ (d) It is destroyed when another fish approaches the lure.
15. (c) Within the brains of these birds is the inherited knowledge of how to identify latitude, longitude, and direction by the stars.
16. (a) True

17. _X_ (a) The Bull's Horn Acacia tree is inhabited by a species of ferocious stinging ants.
    ___ (b) Small bumps on the Bull's Horn Acacia tree provide shelter for ants.
    ___ (c) Ants living in the Bull's Horn Acacia tree are harmful to the health of the tree.
    _X_ (d) Ants living in the Bull's Horn Acacia tree help to provide the tree with plenty of sunlight and space
    _X_ (e) Without ants inhabiting the Bull's Horn Acacia tree, the tree would live for only two to fifteen months.
18. (a) True
19. DNA
20. inheritance (or heredity)
21. (b) DNA is located in the cell cytoplasm.
22. highly ordered and complex
23. take from their environment
24. actively to their environment
25. adapted to their environment
26. offspring of like kind
27. segregated within the organism and passed from each organism to its offspring
28. *"Chance favors the prepared mind."*



Ask for your QUIZ over Section 1.
**Reminder:** Students who score 85% or higher on the three section quizzes may be exempt from the chapter test!

# ACTIVITY ANSWER KEY

## Chapter 1, Section 2

**Check your answers from the Answer Key. Answers separated by commas may be in order. Answers separated by semicolons must be in stated order. Correct all errors, then complete your next goal.**

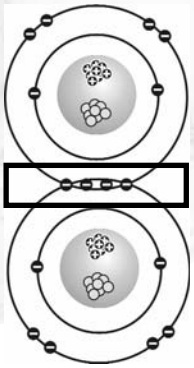
### Lesson 6: *Elements & Atoms*

*The Foundation of Life*

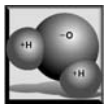
1. (b) does not split into other kinds of substances during ordinary chemical reactions
2. _b_ hydrogen
3. _d_ oxygen
4. _a_ carbon
5. _f_ chlorine
6. _c_ magnesium
7. _g_ potassium
8. _e_ sodium
9. 20
10. (b) False
11. silicon
12. (c) it is the most abundant element
13. (a) True
14. (d) all of the above
15. _c_ atom
16. _e_ nucleus
17. _f_ proton
18. _b_ neutron
19. _d_ mass
20. _a_ electron
21. _g_ electron orbital
22. attract
23. (a) atomic number
24. atomic mass
25. (a) 1
26. (a) neutrons; protons
27. (b) isotopes of carbon
28. (c) introduced the atomic structure model
29. _a_ innermost shell of atoms
30. _b_ outer shells of atoms
31. random motion
32. fill
33. (b) 4
34. (a) 2
35. (a) True
36. *"The things that exist are formed... from things which our eyes do not see."*

### Lesson 7: *Atomic Bonding*

*Knitting Life Together*

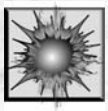
1. bond
2. (b) one atom gives up one or more of its outermost electrons to another atom
3. (c) an atom gains or loses electrons and acquires an electric charge
4. (a) sodium (Na) donating its outer electron to chlorine (Cl)
5. (b) +3
6. NaCl
7. (c) covalent bond
8. 

9. (a) strongest
10. _c_ double bond
11. _a_ single bond
12. _b_ triple bond
13. (a) True
14. (a) oxygen
15. _X_ (a) A positive hydrogen atom is covalently bonded to a strongly electronegative atom.
    ___ (b) A negative hydrogen atom is covalently bonded to a strongly positive atom.
    ___ (c) The partial charges of two atoms from polar covalent bonds repel each other.
    _X_ (d) Hydrogen bonds are weak but very important chemical bonds.
16. ionized
17. (c)
18. charged
19. _X_ (a) Both are ionic compounds.
    _X_ (b) Acids release $H^+$ in water.
    ___ (c) Hydrogen chloride (HCl) will produce $OH^-$ and $Cl^-$ in water.
    _X_ (d) bases release $OH^-$ in water.
    _X_ (e) Sodium hydroxide (NaOH) will produce $Na^+$ and $OH^-$ in water.
20. (b) hydroxyl ion concentration
21. _6_ (a) pH 2
    _3_ (b) pH 7
    _2_ (c) pH 8
    _5_ (d) pH 3
    _1_ (e) pH 10
    _4_ (f) pH 4
22. stomach, vinegar, soft drinks
23. tomatoes, meat, cheese, milk
24. soap, ammonia
25. blood, intestines, fruits, vegetables
26. pure water
27. (d) 7
28. buffers
29. *"I never learn anything by talking. I only learn things when I ask questions."*



**Lesson 8:** ***Compounds & Molecules***
*Building Blocks of Life*

1. compound
2. (c) molecule
3. (d) molecular formula
4. (a) H-O-H
5. (a) True
6. (a) sum the atomic masses of all its atoms
7. (c) 44 atomic mass units
8. gram molecular weight
9. _X_ (a) the number of molecules contained in one mole of any substance
   _X_ (b) $6.023 \times 10^{23}$ molecules
   ___ (c) the number of moles contained in $6.023 \times 10^{23}$ grams of any substance
   _X_ (d) formulated by Amendeo Avogadro
10. _b_ solution
11. _d_ solvent
12. _a_ solute
13. _c_ molarity
14. (d) $H_2O$
15. *"Great works are performed not by strength but by perseverance."*



**Lesson 9:** ***Chemical Reactions***
*Life's Critical Processes*

1. chemical reaction
2. (c) A + B → C + D
3. reactant

4. reactant
5. product
6. product
7. ___ (a) decreasing the concentration of reactants
   _X_ (b) raising the pressure on the reactants
   ___ (c) cooling the reactants
   _X_ (d) increasing the concentration of reactants
   _X_ (e) heating the reactants
8. (c) speeds up
9. (a) exergonic
10. (c) endergonic
11. (c) exergonic; endergonic
12. (a) True
13. (a) keep reactants and products from dwindling
14. (b) $\rightleftharpoons$
15. (c) the rates of forward and backward reactions are equal
16. equilibrium
17. irreversible reaction
18. (a) True
19. (b) irreversible, activation energy reaction
20. $CH_4 + \underline{\mathbf{2}}\ O_2 \longrightarrow CO_2 + \underline{\mathbf{2}}\ H_2O$
21. *"The great end of life is not knowledge, but actions."*



**Lesson 10: *Water***
*The Sea of Life*

1. (c) 80-90
2. (b) False
3. oxygen
4. hydrogen
5. hydrogen
6. (a) 105°




7. (b) Oxygen pulls electrons to itself.
8. tetrahedron
9. (c) It has an unequal charge distribution.
10. (b) a well-ordered lattice
11. (b) False
12. 100
13. (b) it is polar
14. (b) False
15. micelles
16. _b_ cohesion
17. _d_ adhesion
18. _c_ surface tension
19. _a_ capillary action
20. (c) surface tension
21. (c) Much heat must be gained to raise the temperature of water.
22. absorbs
23. (b) False
24. (b) a great deal of heat is needed
25. coolant
26. (d) ice to float in water
27. *"Water is the only drink for a wise man."*



Ask for your QUIZ over Section 2.
**Reminder:** Students who score 85% or higher on the three section quizzes may be exempt from the chapter test!

# ACTIVITY ANSWER KEY

## Chapter 1, Section 3

**Check your answers from the Answer Key. Answers separated by commas may be in any order. Answers separated by semicolons must be in stated order. Correct all errors, then complete your next goal.**



### Lesson 11: *Biological Chemistry*

*The Chemistry of Life*

1. hydrogen, oxygen, carbon, nitrogen
2. oxygen, silicon, aluminum, sodium
3. (c) carbon
4. (b) inorganic
5. carbon
6. (a) True
7. (a)
8. (d)
9. (d) as far apart as possible
10. polymers
11. (c) functional groups
12. (c) functional groups
13. (a) True
14. carboxyl
15. *"Nobody can think straight who does not work. Idleness warps the mind."*

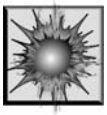


### Lesson 12: *Compounds*

*Carbohydrates, Lipids and Proteins*

1. _X_ (a) They are composed of carbon, hydrogen and oxygen.
   _X_ (b) They include sugars, starches, and related molecules.
   _X_ (c) They include cellulose.
   ____ (d) They have a ratio of 2 oxygen atoms for each hydrogen atom.
2. (b) apple
3. energy
4. (d) all of the above
5. blood stream
6. monosaccharides
7. (b) disaccharide
8. (a) starch; glycogen
9. ____ (a) They are made from carbon, oxygen, and nitrogen.
   _X_ (b) They are waxy, fatty or oily compunds.
   _X_ (c) They store and release energy.
   _X_ (d) They are formed from fatty acids and glycerol.
10. _a_ fatty acids
11. _c_ steroids
12. _b_ glycerol
13. (b) False
14. _X_ (a) They make up proteins.
    _X_ (b) They have a carboxyl group and an amino group attached to the same carbon.
    _X_ (c) Their side chains determine differences between the twenty amino acids.
    ____ (d) All proteins contain 50 amino acids.
    ____ (e) Amino acids always bond in the same sequence.
15. (a) The amino group of one amino acid is joined to the carboxyl group of another amino acid.
16. Hemoglobin
17. (a) True
18. hormone
19. (b) enzymes

20. *"Genius is one percent inspiration and ninety-nine percent perspiration."*



**Lesson 13: *Reactions***
*Enzymes — The Catalysts of Life*

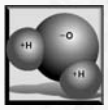
1. heat
2. (b) to lower the activation energy
3. enzymes
4. (a) True
5. _X_ (a) It catalyzes the conversion of urea to carbon dioxide and ammonia.
   ____ (b) It is the fastest working enzyme.
   _X_ (c) It is produced by bacteria in the air.
   _X_ (d) It speeds up the hydrolysis of urea by hundreds of thousands of times.
6. (b) False
7. (c) Enzymes only catalyze reactions in which the substrates "fit" the surfaces of the enzymes.
8. _b_ substrate
9. _c_ active site
10. _a_ induced fit
11. substrates
12. active site
13. enzyme
14. neutral
15. (d) 1.5-2.0
16. (c) disrupt enzyme structures so they cannot function
17. (a) True
18. _X_ (a) They transfer information.
    _X_ (b) They help to store and release energy.
    _X_ (c) They help to synthesize and break down compounds.
    _X_ (d) They regulate chemical pathways.

19. *"Things which you receive 'free' cost someone something."*



**Lesson 14: *DNA***
*Nucleic Acids — The Blueprint of Life*

1. _c_ nucleic acids
2. _b_ genetics
3. _d_ DeoxyriboNucleic Acid
4. _a_ RiboNucleic Acid
5. _e_ nucleotides
6. phosphate group, 5-carbon sugar, ring-shaped nitrogenous base
7. (a) the 5-carbon sugar found in nucleotides of DNA
8. energy
9. (c) AMP
10. (b) False
11. arrange amino acids in proteins
12. (a) blueprint; carrier
13. (b) two copies of the parent cell DNA
14. (c) all
15. (b) False
16. (a) True
17. (a) oxygen uptake as we breathe
18. amino acid
19. (a) True
20. *"Success is how high you bounce once you hit bottom."*



**Lesson 15: *Molecules***
*Mirror Images of Life*

1. three-dimensional structure
2. optical isomers
3. (c) they are mirror-images of each other
4. levo
5. dextra
6. (b) False
7. (a) equal amounts of both *L* and *D* isomers

8. (c) active; inactive
9. (b) False
10. (b) It is a primary energy source for the body.
11. *L*-type
12. *"The greatest homage we can pay to truth is to use it."*



Ask for your QUIZ over Section 3.
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# ACTIVITY ANSWER KEY

## Chapter 2, Section 1

**Check your answers from the Answer Key. Answers separated by commas may be in any order. Answers separated by semicolons must be in stated order. Correct all errors, then complete your next goal.**



### Lesson 1: *Cells*

*The Cell—A Brief History*

1. cells
2. microscope
3. magnified
4. (b) a system of several magnifying lenses at proper distances from each other
5. (b) It is bent through the lenses
6. (d) all of the above
7. X (a) published Micrographia
   X (b) observed microscopial pores
   X (c) coined the term "cell"...
   ___ (d) recognized that plants and animals were both made up of cells
8. (c) plants and animals are composed of cells
9. (b) False
10. (a) True
11. (a) Cells are the fundamental units of life, the smallest working units of living things.
    (b) All organisms are made up of cells.
    (c) Cells arise only by division of other cells.
    (d) Cells contain an organism's genetic information.
    (e) All cells have the same basic chemical composition.
    (f) All metabolism and biochemistry of life occurs in cells.
12. (a) True
13. one
14. biogenesis
15. 3 (a) boiled broths in flasks to kill microorganisms
    1 (b) placed nutrient broths into long necked flasks
    4 (c) microorganisms in the air were trapped in the curves of the neck
    2 (d) bent the necks of the flasks into curves
16. (a) the source of microorganisms that grew in the flasks was the air
17. protoplasm
18. (c) a large variety of structures
19. compound light microscope
20. (a) True
21. __ (a) uses a beam of protons to examine a sample
    X (b) magnifies up to one million times
    X (c) samples must be kept in a vacuum so that image will not be blurred
    __ (d) can be used to study living or non-living organisms
22. (b) False
23. (b) scanning probe microscope
24. "*If we all worked on the assumption that what is accepted is really true, there would be little hope of advance.*"



### Lesson 2: The *Cell*

*A Functional Miracle*

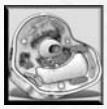
1. unicellular
2. (a) True
3. mycoplasma
4. nerve; giraffe
5. (d) cubes
6. (c) function

7. (a) red blood cell
   (b) paramecium
   (c) amaeba
   (d) nerve cell
   (e) plant cell
8. (a) True
9. X (a) independence
   X (b) communication
   X (c) cooperation
   ___ (d) isolation
10. 3 organs
    1 cells
    4 systems
    2 tissues
11. proteins, nucleic acids, carbohydrates, lipids
12. c absorption
13. b digestion
14. a respiration
15. respiration; biosynthesis
16. c excretion
17. b egestion
18. a secretion
19. movement
20. irritability
21. (d) maintaining order in the cell
22. (b) cytology
23. prokaryotic (a) no nucleus
    eukaryotic (b) cell membrane and membrane bound organelles
    prokaryotic (c) single compartment, protective cell wall
    eukaryotic (d) make up plants, animals, and fungi; larger size
24. (a) Prokaryote
    (b) DNA
    (c) Eukaryote
    (d) nucleus
    (e) organelles
    (f) protoplasm/cytoplasm
    (g) cell wall/membrane
25. "*Opportunity is missed by most people because it is dressed in overalls and looks like work.*"



**Lesson 3: *Cells***
*Cell Walls and Cell Membranes*

1. c cytoplasm
2. e cell membrane
3. a nucleus
4. d organelles
5. b cell wall
6. separate and protect the cell from its surroundings by controlling what enters and leaves the cell (wording may vary)
7. permeate
8. (d) phospholipids
9. outside
10. (d) all of the above
11. (b) lipids and proteins move freely
12. (a) lipid soluble substances
13. (b) animals
14. (b) False
15. (b) False
16. carbohydrate fibers, protein
17. cellulose
18. "*Since we cannot know all that where is to be known about anything, we ought to know a little about everything.*"



**Lesson 4: *Cells***
*The Cell's Traffic Control Center*

1. chemical homeostasis
2. (b) False
3. (b) cell membrane
4. (b) Active transport requires energy, and passive transport does not.
5. (b) diffusion
6. (c) diffusion
7. (a)
8. (d) the diffusion of water through a selectively permeable membrane

9. (a) transport specific substances across the cell membrane
10. (c) from the pure water into the sugar solution
11. (c) Specks of mold had fallen on the culture and killed bacteria.
12. (b) False
13. (b) It weakens the bacterium's cell wall.
14. osmotic pressure
15. c ***cytolysis***
16. d hypotonic
17. e isotonic
18. b hypertonic
19. a ***plasmolysis***
20. hypotonic
21. hypertonic
22. (a) hypertonic
23. (a) flow into the cell
24. (wording and order may vary)
    (a) They use a cell wall.
    (b) They pump out water.
    (c) They use blood to act as a buffer.
25. (c) its solute concentration is equal to that of animal cells
26. (c) move substances against a concentration difference
27. sodium-potassium pumps
28. endocytosis
29. exocytosis
30. c ***endocytosis***
31. a phagocytosis
32. b exocytosis
33. "*Never leave until tomorrow that which you can do today.*"



**Lesson 5: *Cells***
*Inside the Cell*

1. X (a) It contains almost all of the...
   ___ (b) It is the least important...
   X (c) It is a large, dense structure.
   ___ (d) It is found in all cells.
   X (e) It is essential to the life...
2. d ***chromatin***
3. a ***chromosomes***
4. e ***nucleolus***
5. c ***ribosome***
6. b nuclear envelope
7. f cytoplasm
8. organelles
9. (b) False
10. (d) all of the above
11. (c) ribosomes
12. Lipids
13. Golgi apparatus
14. (b) mailing service
15. (c) break down substances in the cell
16. d cytoskeleton
17. f microtubules
18. a microfilaments
19. e ***cilia***
20. b ***flagella***
21. c spindle
22. (a) vacuole
23. Golgi apparatus
24. nucleus
25. chloroplast
26. cell wall
27. cell membrane
28. vacuole
29. mitochondrion
30. endoplasmic reticulum
31. turgor pressure
32. (d) power house
33. X (a) synthesized in mitochondria
    X (b) serves as energy battery for...
    ___ (c) not required in muscle and...
34. Chloroplasts
35. "*Nothing just happens; someone or something must make things happen.*"

***Note: Ask your teacher for the quiz over Lessons 1-5 before proceeding to the next section. Reminder: If you score 85% or higher on the three section quizzes, you may be exempt from the chapter test!***



# ACTIVITY ANSWER KEY

## Chapter 2, Section 2

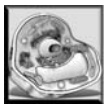
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### Lesson 6: *Energy*

*The Energy of Life*

1. (d) entropy in the universe must increase
2. disorder
3. entropy
4. energy
5. (b) False
6. Sun
7. heat, light, chemical, electrical
8. potential energy
9. kinetic energy
10. potential energy
11. (a) break
12. cellular respiration
13. ATP
14. ADP
15. (b) more energy than most chemical bonds
16. (b) a phosphate bond breaks
17. (a) store; release
18. "*Most human beings have an almost infinite capacity for taking things for granted.*"



### Lesson 7: *Cells*

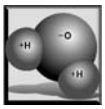
*Glycolysis*

1. (c) oxygen
2. _X_ the first part of cellular respiration
   ___ very slow process
   _X_ takes place in the cytoplasm of the cell
   ___ one molecule of glucose produces a net gain of four ATP molecules
   _X_ requires specific enzymes
3. (a) Additional molecules are required for an enzyme to catalyze a reaction.
4. _b_ $NAD^+$
5. _a_ FAD
6. _c_ CoA
7. (d) a six-carbon glucose phosphate
8. pyruvic acid
9. NADH
10. (b) False
11. anaerobic condition
12. (a) passes electrons from NADH back to the pyruvic acid molecule from which it came
13. lactic acid fermentation, alcoholic fermentation
14. lactic acid
15. (d) all of the above
16. alcohol, carbon dioxide
17. (c) bubbles in soda pop
18. (c) yeast
19. (b) will be overwhelmed by other yeast and bacteria that produce acetic acid
20. "*In everything, I believe the secret of success is prolonged effort.*"



**Lesson 8: *Cycles***
*Krebs Cycle*

1. (d) 95
2. outer; inner
3. cristae
4. (a) mitochondrial matrix
5. mitochondrial cristae
6. citric acid cycle
7. (d) oxaloacetic acid
8. exhale
9. (a) $NAD^+$
10. (c) the five pairs of electrons removed during the Kreb's cycle
11. (c) one
12. (b) two
13. enzymes
14. Glycolysis
15. Krebs Cycle
16. Pyruvic Acid
17. acetyl CoA
18. citric acid
19. oxaloacetic acid
20. "*The more we learn of science, the more we see that its wonderful mysteries are...so connected together and...dependent upon each other...*"



**Lesson 9: *Molecules***
*The Electron Transport Chain*

1. (b) in a very slow, controlled manner
2. ___ glycolysis
   ___ Kreb's Cycle
   _X_ electron transport chain
3. (c) high-energy electrons
4. (c) oxygen
5. $NAD^+$, $FAD^+$ (or electron carriers)
6. (b) return to the Kreb's Cycle
7. (d) all of the above
8. 4; 32
9. (b) 36
10. (b) False
11. 20
12. fructose
13. (b) False
14. (b) more food is ingested than is needed to build macromolecules and release energy
15. glucose
16. 2 ATP
17. pyruvic acid
18. Kreb's Cycle (or Citric Acid Cycle)
19. 32 ATP
20. "*The power of the unknown...drives us into nature's hidden powers and secrets, down to the immeasurably little world of the microscope...*"



**Lesson 10: *Photosynthesis***
*A Critical Process*

1. (a) True
2. (c) green plants use energy from sun light to convert carbon dioxide and water into glucose
3. oxygen
4. (d) amoebas
5. cellulose
6. (c) stored
7. (wording may vary) produce glucose or oxygen on their own
8. _c_ (a) Joseph Priestly
9. _a_ (b) Jan Ingen-Housz
10. _d_ (c) Jean Senebin
11. _b_ (d) Nicolas Theodore de Sanssure
12. chloroplast
13. thylakoids
14. thylakoid
15. chloroplast
16. (c) chlorophyll
17. green
18. (c) electrons
19. light-dependent reactions
20. (a) a release in energy from the electrons
21. (d) $NADP^+$, NADPH

22. (a) to turn high-energy electrons to chlorophyll
23. (b) convert energy from ATP and $NADP^+$ into sugars
24. PGA
25. (c) Calvin Cycle
26. 6
27. "*Most people say that it is the intellect that makes a great scientist. They are wrong: it is character.*"





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# ACTIVITY ANSWER KEY

## Chapter 2, Section 3

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### Lesson 11: *Cycles*

*Cell Growth, Division & Cycle*

1. (d) cells reproduce
2. (c) the more difficult it is to get materials in and out of the cell
3. cell division
4. (b) False
5. (a) it must make a complete copy of the genetic information in its nucleus
6. X (a) occurs in prokaryotic cells
   X (b) new wall material cuts through the cytoplasm and the nuclear area
   ___ (c) each new cell possesses one-half of the parent cell's genetic information
   X (d) genetic information is replicated
7. Walther Flemming
8. (b) mitosis
9. (d) cytokinesis
10. meiosis
11. one-half
12. (a) twice the number of chromosomes as one gamete
13. cell cycle
14. (d) M
15. (b) S
16. (a) G1
17. (c) G2
18. G1
19. S
20. G2
21. mitosis (or M)
22. cytokinesis
23. 20
24. (a) True
25. "*Listen to advice and accept instruction, and in the end you will be wise.*"



### Lesson 12: *Cells*

*Mitosis: The Continuity of Life*

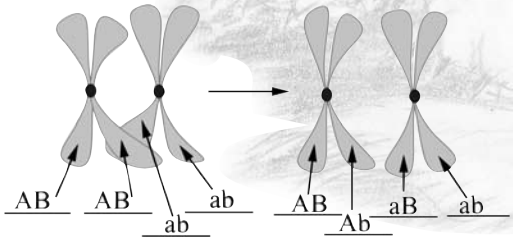
1. (c) mitosis
2. (d) fungi
3. (b) maintaining
4. muscle cells
5. (a) 46
6. interphase, mitosis, and cytokinesis (order may vary)
7. (c) G1, G2, S
8. (b) False
9. X (a) clearly visible nucleus
   ___ (b) clearly visible chromosomes
   X (c) most active phase for chromosomes
10. (a) prophase
11. (c) chromosomes organize and each consist of two chromatids
12. chromosome
13. centromere
14. chromatids
15. centriole
16. spindle
17. microtubule
18. (c) nuclear membrane
19. (b) metaphase
20. (c) the chromatids separate

21. X (a) mitotic spindle breaks down
    X (b) chromosomes unwind
    X (c) a nuclear membrane reforms around each new chromosome cluster
    __ (d) one distinct nucleus forms within the cell
22. cytokinesis
23. (c) cell plate
24. metaphase
25. telophase
26. anaphase
27. "*Every day, do something that will inch you closer to a better tomorrow.*"



**Lesson 13: *Cells***
*Meiosis: The Propagation of Life*

1. homologous chromosomes
2. mother
3. (d) all of the above
4. diploid
5. haploid
6. (a) the normal diploid number of chromosomes
7. X (a) chromosomes in gametes are reduced by half
   X (b) one diploid cell is converted into four haploid cells
   X (c) process is divided into meiosis I and meiosis II
8. (d) none of the above
9. a homologous chromosomes
10. d tetrad
11. b synapsis
12. c crossing over
13.




14. metaphase I
15. (b) homologous chromosomes
16. different
17. (b) one-half
18. (b) False
19. (b) 23
20. (b) chromatids
21. (a) True
22. puberty
23. four
24. polar bodies
25. (c) 46 single stranded chromosomes
26. (b) mitosis
27. "*Quality is never an accident; it is always the result of intelligent effort.*"



**Lesson 14: *Cycles***
*Regulating the Cell Cycle & the Aging Process*

1. (b) skin cells
2. (a) brain cells cannot be replaced once destroyed
3. (c) the regulation of the cell cycle is lost, resulting in uncontrolled division of cells
4. cyclins
5. (a) cell entry into mitosis
6. (c) the time required to make sufficient cyclin for the cell to enter mitosis
7. prevent
8. aging
9. (d) before complete devleopment
10. (c) genetically programmed
11. (a) True
12. "*Doing nothing for others is the undoing of one's self.*"



**Lesson 15: *Cells***
*Cell Order*

1. (c) specialized
2. biochemical
3. mechanical
4. nerve, brain
5. (a) hemoglobin, keratin
6. macrophage
7. (c) attack the cell walls of bacteria, killing them
8. phagocytosis
9. (d) neuron
10. brain
11. b epithelial tissues
12. c connective tissue
13. a muscle tissue
14. (c) organs
15. (b) eleven
16. (b) False
17. (a) cell
    (b) tissue
    (c) organ
    (d) organ system
18. c tissue
19. a organ
20. b organ system
21. "*Every part and tag of me is a miracle.*"

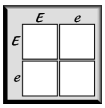


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# ACTIVITY ANSWER KEY

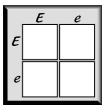
## Chapter 3, Section 1

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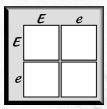

**Lesson 1:** ***Mendelian Genetics***
*Gregor Mendel and His Work: The History*

1. (c) heredity
2. Gregor (or Johann) Mendel
3. (c) his sister's dowry
4. (d) scientific achievement
5. (d) how to conduct an experiment
6. (b) pea plants
7. ignored
8. observation; speculation
9. (a) True
10. (b) False
11. (c) religious freedom
12. Father of Genetics
13. (d) all of the above
14. "*Lonliness and truth frequently travel hand in hand.*"




**Lesson 2:** ***Mendelian Genetics***
*Gregor Mendel and His Work: The Experiments*

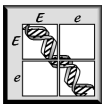
1. hereditary (or inherited) characteristics
2. passes its characteristics
3. (b) stamen; carpel
4. (a) pollen fertilizes egg cells on the same flower
5. (c) control cross-pollination
6. seven
7. (c) opposite
8. F1 generation
9. P generation
10. (b) False
11. (d) one-fourth
12. (b) False
13. (a) True
14. Choose pea-plants which normally self-fertilize.
15. Use pure breeding varieties.
16. Choose traits with distinctly contrasting forms.
17. Follow one characteristic at a time.
18. Obtain a large number of offspring.
19. Follow characteristics for many generations.
20. Analyze results using statistical methods.
21. "*Species do not transform one into the other. They show stability from generation to generation.*"




**Lesson 3:** ***Mendelian Genetics***
*Gregor Mendel and His Work: The Conclusions*

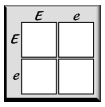
1. (c) the observable traits in his experiments did not blend
2. gene
3. alleles
4. (a) more than two alleles exist in a population for a particular characteristic
5. (c) two copies of the allele for tallness
6. one
7. (a) just as tall as the plants with two alleles for tallness
8. dominance
9. (c) dominant; recessive
10. _b_ phenotype

11. _c_ genotype
12. _d_ homozygous
13. _a_ heterozygous
14. (a) True
15. homozygous
16. (b) the Law of Segregation
17. (c) one-half of the gametes will carry the T allele and one-half will carry the t allele
18. (b) tt
19. (a) one-half Tt and one-half tt
20. independent assortment
21. "*Science without religion is lame, religion without science is blind.*"




**Lesson 4:** ***Mendelian Genetics***
*Principles of Heredity*

1. gene linkage
2. (c) remain together
3. (b) incomplete dominance
4. (d) pink
5. (b) False
6. (a) In co-dominance, both heterozygous alleles are completely expressed.
7. multiple alleles
8. (c) more than one gene
9. (c) polygenic inheritance
10. probability
11. (b) False
12. (b) False
13. (d) $^{1}/_{32}$
14. (b) 1/2
15. "*Most of the things worth doing in the world had been declared impossible before they were done.*"




**Lesson 5:** ***Mendelian Genetics***
*Human Genetics*

1. (b) 46
2. (a) It prevents cells from completing mitosis, keeping them in their condensed form
3. karyotype
4. (a) 22 pairs of homologous chromosomes
5. two X
6. (b) a haploid number of chromosomes; half that of somatic cells
7. (a) X and Y
8. (b) False
9. pedigree
10. (d) all of the above
11. (c) more likely than
12. (a) they usually have a dominant gene for vision on one of their X chromosomes
13. clot
14. (c) X; males
15. (c) Rh-/Rh-
16. (c) co-dominant
17. antigens
18. (a) both A and B antigens from the ABO gene and the negative allele from the Rh blood group
19. (a) draws blood from patients as a therapeutic or diagnostic measure
20. "*Every human is marvelously and wonderfully fashioned as a unique individual of inestimable worth.*"

Ask for your QUIZ over Section 1.
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# ACTIVITY ANSWER KEY

## Chapter 3, Section 2

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**Lesson 6:** ***Discovery***
*The Discovery of DNA*

1. DNA, protein
2. molecular genetics
3. X (a) Griffeth isolated two types of bacteria that are associated with pneumonia; smooth and rough.
   ___ (b) Mice injected with the rough bacteria alone developed pneumonia.
   ___ (c) Dead smooth bacteria were still virulent.
   X (d) Dead smooth bacteria mixed with rough bacteria caused pneumonia.
   X (e) Griffeth concluded that the rough bacteria in the presence of the dead smooth bacteria had transformed into smooth, virulent bacteria.
4. (b) False
5. transformation
6. X (a) Avery believed genetic material from smooth bacteria had been transformed to rough bacteria in Griffeth's experiment.
   X (b) Avery destroyed various molecules of heat-killed bacteria to determine which molecule was causing transformation.
   ___ (c) Transformation was blocked when proteins in the bacteria were destroyed.
   ___ (d) Avery concluded that proteins make up genes.
7. (d) viruses; bacteria
8. protein coat
9. DNA
10. bacteriophage
11. (a) injecting its genetic material into the bacterial cell
12. (d) make and release hundreds of viruses
13. radioactive isotope
14. (a) sulfur; phosphorus
15. phosphorus
16. DNA
17. protons; neutrons
18. (a) True
19. "*To raise new questions, new possibilities, to regard old problems from a new angle,... requires creative imagination and marks real advance in science.*"



**Lesson 7:** ***Molecular Genetics***
*DNA Structure & Replication*

1. nucleotide
2. phosphate group
3. nitrogenous base
4. five-carbon sugar
5. (c) uracil
6. guanine
7. thymine

8. adenine
9. cytosine
10. (c) DNA contains equal amounts of cytosine and guanine as well as adenine and thymine
11. X-ray diffraction
12. (b) Franklin and Wilkins
13. (c) double-helix
14. (a) A and T
15. (d) hydrogen
16. Nobel Prize
17. (b) DNA replication
18. (c) S phase
19. _2_ (a) New complementary strands are synthesized to match exposed bases.
    _3_ (b) A cell begins cell division.
    _1_ (c) Enzymes separate the DNA complementary strands.
20. _c_ chromatin
21. _a_ histones
22. _b_ nucleosomes
23. 6
24. _c_ Hershey and Chase
25. _d_ Erwin Chargaff
26. _a_ Franklin and Wilkins
27. _b_ Watson and Crick
28. "*Science is complex and speculative, and it's ever changing.*"



**Lesson 8:** ***Molecular Genetics***
*The DNA Replication Process*

1. (c) DNA duplicates
2. (d) the two strands of the parent DNA molecule separate and each acts as a template for a new strand
3. (a) one new and one parental strand
4. broken up into short segments (wording may vary)
5. (b) semi-conservative replication
6. (a) True
7. (a) True
8. (c) join nucleotides together during DNA replication
9. (b) pieces of DNA that are joined together to form a DNA strand
10. (d) DNA ligase
11. "*There are two ways to live your life. One is as though nothing is a miracle. The other is as though everything is a miracle.*"



**Lesson 9:** ***Molecular Genetics***
*Protein Synthesis*

1. DNA
2. (d) all of the above
3. _X_ twenty amino acids
   _X_ enzymes
   _X_ RNA
   _X_ DNA
   ___ insulin
4. transcription
5. translation
6. (c) RNA
7. (b) ribose; deoxyribose
8. (b) False
9. (a) uracil; thymine
10. ___ It is synthesized in the cytoplasm.
    _X_ It receives genetic information from the DNA molecule.
    _X_ It carries copies of genetic information to the rest of the cell.
    _X_ It carries a precise message.
11. (b) rRNA
12. (c) protein synthesis
13. (a) tRNA
14. (d) transcription
15. (a) True
16. uracil; thymine
17. (d) UUCG;AUGC
18. amino acids

19. (a) True
20. (c) codon
21. (b) False
22. (a) The AUG codon is the start codon for translation and it also codes for the amino acid methionine.
23. (b) UAG
24. (c) translation
25. 1 (a) *mRNA* arrives at ribosome.
    8 (b) A ribosome reaches a stop codon.
    3 (c) An *mRNA* molecule exposes its codons.
    4 (d) *tRNA* deposits the appropriate amino acid.
    2 (e) A *tRNA* moleule unites with specific amino acid.
    6 (f) Sequential amino acids are linked and amino acids are released from *tRNA*.
    7 (g) *tRNA* returns to cytoplasm for more amino acids.
    5 (h) *tRNA* molecules match their anticodons with *mRNA* codons.
26. anticodon
27. "*A little science estranges a man from God; a lot of science brings him back.*"



**Lesson 10:** ***Molecular Genetics***
*Gene Expression*

1. proteins
2. (a) True
3. (a) only as specific proteins are needed
4. (b) expressed; unexpressed
5. (d) lactose
6. (a) True
7. c operon
8. b repressor
9. a operator
10. (c) sense the presence or absence of lactose
11. (b) False
12. (b) the repressor protein falls off the DNA so lac genes can be transcribed
13. (b) Parts of an *mRNA* molecule are often removed and discarded, changing the protein sequence.
14. introns
15. exons
16. DNA
17. intron
18. exon
19. (a) True
20. "*What we see depends mainly on what we look for.*"



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# ACTIVITY ANSWER KEY

## Chapter 3, Section 3

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**Lesson 11: *Mutation Mechanics***
*Mutations & Human Genetic Disorders*

1. mutation
2. (d) all of the above
3. (b) False
4. (b) autosomes
5. __ (a) It is caused by a dominant allele on chromosome 11.
   X (b) Individuals with two copies of the recessive allele for albanism are unable to produce melanin.
   __ (c) It causes very dark skin pigmentation.
   X (d) It causes sensitivity to bright sunlight.
6. (a) color
7. (b) cystic fibrosis
8. X (a) It is caused by a recessive allele on chromosome 7.
   __ (b) One copy of the cystic fibrosis allele will cause the disease.
   X (c) It causes a defect in a cell membrane protein that interferes with the movement of chloride ions in and out of cells.
   X (d) It causes secretion of a thick mucus that clogs lungs and ducts of the pancreas and liver.
   __ (e) It usually does not cause death until about age 50.
9. (c) it prevents the nervous system from fully developing in embryos
10. (c) hemoglobin
11. __ (a) It is characterized by crescent or sickle-shaped white blood cells.
    X (b) It is caused by a recessive allele.
    X (c) It produces a mutated form of the red blood cell protein.
    __ (d) It is caused by a mutation of several amino acids.
    __ (e) It is most common among people of English ancestry.
12. dominant
13. (a) Symptoms are noticeable from birth.
14. zygote
15. (b) a chromosome pair fails to separate during meiosis
16. __ (a) It results from nondisjunction in autosomes.
    X (b) A sperm or egg is produced lacking a sex chromosome.
    X (c) Zygotes are designated XO.
    __ (d) It only affects males.
    X (e) It causes infertility.
17. (a) males have an extra sex chromosome, often resulting in mental retardation
18. (a) True
19. (c) Down syndrome
20. (d) all of the above

21. "*Our duty is to believe that for which we have sufficient evidence, and to suspend our judgement when we have not.*"



**Lesson 12: *Mutation Mechanics***
*Special Topics in Genetics*

1. mutagen
2. (a) True
3. (a) chromosomal mutation
4. (c) a whole set of chromosomes fail to separate during meiosis
5. (c) advantageous
6. (a) fatal
7. gene mutation
8. (b) point mutation
9. (c) frameshift mutation
10. point mutation
11. point mutation
12. frameshift mutation
13. frameshift mutation
14. Frameshift
15. (b) transposition
16. transposons
17. (a) True
18. large
19. (a) True
20. "*Our scientific power has outrun our spiritual power. We have guided missles and misguided men.*"



**Lesson 13: *Special Topics in Molecular Genetics***
*Genetic Engineering: Part I*

1. genetic engineering
2. X (a) It produces a new generation by mating individuals with desired characteristics.
   X (b) It is used in corn to increase kernel size and number.
   X (c) It is used in wheat and rice to produce higher yields.
   ___ (d) It orignally produced nearly all wild animals.
3. (c) hybridization
4. hybridization
5. inbreeding
6. (a) most members of a breed are genetically similar, increasing the likelihood that two recessive alleles will be brought together
7. restriction enzymes
8. (d) cut DNA molecules into smaller, precisely sized fragments for study
9. electrophoresis
10. (c) larger fragments move more quickly than smaller fragments
11. (a) True
12. (c) they form a single DNA molecule
13. recombinant DNA
14. (d) all of the above
15. "*To know the facts, to reason in reality and live wisely: these are essential to success in life.*"



**Lesson 14: *Special Topics in Molecular Genetics***
*Genetic Engineering: Part II*

1. cell transformation
2. (c) plasmids
3. (a) be taken up by the culture bacteria
4. (b) False
5. (d) form plasmids from new DNA
6. (b) have been transformed with genes from another organism
7. (a) the gene that codes for insulin is properly inserted into the bacteria
8. (c) removes sugars from the bloodstream
9. Interferon

10. (a) True
11. (b) egg cell
12. cloning
13. (a) True
14. (d) gene therapy
15. X (a) Pathogenic organisms used in recombinant DNA experiments could develop into infectious forms causing large epidemics.
    X (b) Genetically engineered bovine somatotropin may cause health problems in cows and humans.
    X (c) Weeds could breed with transgenic plants, becoming resistant to herbicides.
    X (d) Genetically modified crops could pose health and environmental risks.
16. "*I may disagree with what you have to say, but I shall defend, to the death, your right to say it.*"



**Lesson 15: *Special Topics in Molecular Genetics***
*DNA Fingerprinting*

1. (a) Today, biologists can look at the actual genes and not just their effects.
2. (b) fingerprinting
3. (b) repeating units of DNA that do not code for protein synthesis
4. restriction fragment length polymorphisms (RFLPs)
5. 2 (a) DNA is extracted from the cell.
   7 (b) Radioactivity is detected to allow the number of repeat units to be detected.
   4 (c) DNA fragments injected into a gel.
   5 (d) DNA fragments separated by electrophoresis.
   8 (e) Separated DNA fragments are identified and used to develop a fingerprinting.
   1 (f) DNA is obtained from an individual.
   3 (g) DNA is split into fragments by restriction enzymes.
   6 (h) Radioactive probes match up to repeat units and adhere to them.
6. law enforcement, medical
7. (c) nervous system
8. (b) determine if they carry the allele for Huntington disease
9. (d) all of the above
10. criminal justice system
11. (a) True
12. (b) False
13. (a) sequence all the nitrogenous bases in the human genome
14. "*The past should be appreciated by everyone; the door to the future should be guarded by people of moral character.*"



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# ACTIVITY ANSWER KEY

## Chapter 4, Section 1

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### Lesson 1: *Understanding Evolution*
*The Scientific Method and Unconfirmed Hypotheses*

1. Creation
2. evolution
3. (b) Charles Darwin
4. supernatural
5. (b) False
6. divine creator
7. (b) False
8. ___ (a) were founders...
   ___ (b) were very ...
   _X_ (c) did not ...
   _X_ (d) embraced...
9. 20; publicity
10. (b) False
11. (c) scientific law
12. (b) scientific method
13. theory
14. hypothesis
15. (c) “What is the evidence?”
16. paleontologist
17. (a) True
18. (c) silence; followed by a call not to teach evolution in high schools
19. design
20. "*Whatever the scientists may say, if we take the supernatural out of life, we leave only the unnatural.*"



### Lesson 2: *Understanding Evolution*
*The Development of an Hypothesis*

1. (a) theology
2. (c) naturalist
3. living diversity
4. (d) 50 million
5. Thomas Malthus
6. (a) the factors that determine which organisms survive and reproduce and which do not
7. (c) processes such as erosion, that are observable today, shaped the topography of the modern world
8. catastrophist theory
9. (c) survive, while those ill-suited to their environment will not survive
10. (d) all of the above
11. (c) self-proclaimed agnostic
12. Tierra del Fuego
13. (a) True
14. (a) True
15. (b) False
16. "*...a scientist...is a curious man looking through...the keyhole of nature, trying to know what's going on.*"



### Lesson 3: *Understanding Evolution*
*Darwin's Conclusions*

1. (a) each island having species that were distinctly different from each other
2. Alfred Russel Wallace
3. (c) adaptations
4. (c) eon
5. selective breeding
6. (b) best suited to the environment
7. competitive struggle
8. (d) compete for social acceptance

9. survival of the fittest
10. (a) remove defective organisms, thus conserving the health of the population
11. (c) less than ten thousand years in age
12. common descent
13. _X_ (a) chimpanzee
    _X_ (b) bacteria
    _X_ (c) non-living primordial mixture
14. (a) True
15. (a) True
16. "*Natural selection can explain the survival of the fittest, but not the arrival of the fittest.*"



**Lesson 4:** ***Understanding Evolution***
*Darwin & DNA...*

1. (b) False
2. species
3. (c) reproductive isolation
4. (b) gene pool
5. (b) False
6. (a) it does not change the relative frequency of alleles in the gene pool of a species
7. (c) gene shuffling
8. (d) alleles
9. (c) 5
10. (d) individuals migrate from one group to another and interbreed
11. (a) True
12. natural selection
13. (b) False
14. (c) long fur
15. (b) long-furred dogs will be unable to produce offspring with short fur
16. (c) two or more genes
17. normal distribution
18. _b_ disruptive selection
19. _a_ stabilizing selection
20. _c_ directional selection
21. normal distribution
22. directional selection
23. stabilizing selection
24. disruptive selection
25. genetic drift
26. founder effect
27. (d) all of the above
28. (a) True
29. better suited
30. "*To raise new questions, new possibilities, to regard old problems from a new angle, requires creative imagination and marks real advance in science.*"



**Lesson 5:** ***Understanding Evolution***
*Speciation – The Birth of a New Species*

1. speciation
2. (a) variation within a species; development of a new species
3. (b) False
4. taxonomist
5. (b) False
6. sterility
7. (d) none of the above
8. (a) True
9. (a) horizontal; vertical
10. (b) increase in beak size
11. (b) they returned to normal
12. (a) True
13. hybridization
14. adaptive radiation
15. convergent radiation
16. "*Each species is a materpiece, a creation assembled with extreme care and genius.*"

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# ACTIVITY ANSWER KEY

## Chapter 4, Section 2

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### Lesson 6: *Evolution - The Evidence*
*Mutations & Evolution*

1. (c) mutation
2. Neo-Darwinian hypothesis
3. (c) rare, and usually harmful
4. (c) adding genetic information
5. (d) weaker and at a disadvantage to compete for survival
6. (d) $3.6x10^{2738}$
7. $10^{50}$
8. ___ (a) natural populations
   _X_ (b) deterioration of viability
   _X_ (c) heredity diseases
   _X_ (d) monstrosities
   ___ (e) evolutionary building blocks
9. (b) pathogen
10. (a) the death of organisms lacking resistance
11. (b) False
12. (c) increased
13. (d) natural selection
14. (a) True
15. "*The great tragedy of science (is) the slaying of a beautiful hypothesis by an ugly fact.*"



### Lesson 7: *Evolution - The Evidence*
*Geologic Column & Index Fossils*

1. (b) paleontology
2. _b_ fossils
3. _d_ strata
4. _a_ sedimentary rocks
5. _c_ geologic column
6. (a) simple and unspecialized; higher and complex
7. (b) geology
8. uniformitarianism
9. James Hutton; Huttonian Theory
10. (a) True
11. (d) 4.6 billion
12. (a) macroevolution
13. index fossils
14. Precambrian, Paleozoic, Mesozoic, Cenozoic; 12; epochs
15. (a) Precambrian; Cambrian
16. (a) True
17. (a) True
18. (b) False
19. circular reasoning
20. (a) True
21. "*A lie told often enough becomes the truth.*"



### Lesson 8: *Evolution - The Evidence*
*Evolution & The Fossil Record*

1. (a) Each of the major invertebrate forms of life appear abruptly in the fossil record with no preliminary or intermediate forms leading up to them.
2. (c) evolution requires intermediate forms that are not provided by paleontology
3. (b) They have remained unchanged throughout the course of presumed evolutionary history.
4. (a) True

5. degenerated
6. (d) all of the above
7. (a) They display fossilized remains of animals from widely separate climates in tangled groups.
8. (d) all of the above
9. polystratic trees
10. (a) True
11. (c) It is evidence of a hydraulic catastrophe that kept tissues from decaying before fossilization could occur.
12. (b) denied
13. (c) teeth and claws; wings and feathers
14. (a) True
15. (a) True
16. (b) progression from a small multi-toed horse to a larger, one-toed horse
17. "*An honest man alters his ideas to fit the truth, and a dishonest man alters the truth to fit his ideas.*"



**Lesson 9:** ***Evolution - The Evidence***
*Evolution of Man - Fossil Evidence*

1. ape
2. (a) ancestors of monkeys, apes, and humans began their evolutionary journey some 50 million years ago
3. paleoanthropology
4. homnids
5. (b) False
6. (d) imagination
7. (a) True
8. (a) Millions of "ape-men" would have needed to live during the years it would have required for man to evolve to his present state.
9. (a) True
10. X (a) It was based on a single tooth found among ancient tools.
    X (b) It was claimed to be intermediate between men and apes.
    ___ (c) It was later proved that the tooth belonged to a member of the dog family.
11. X (a) It was heralded as "Darwin's missing link".
    X (b) It was based on fossils found in Piltdown Sussex, England.
    X (c) Bones, teeth, and tools were acclaimed to be 500,000 years old.
    X (d) It was proven to be a fraud.
    ___ (e) The jawbone was discovered to be from a very recent human.
    X (f) The teeth had been filed down to appear human.
12. homnid; 200 feet; 2 miles
13. (d) 99%
14. a Australopithecus
15. f Homo habilis
16. c Homo erectus
17. b Homo sapiens
18. d Neanderthals
19. e Cro-Magnons
20. Homo sapiens
21. Homo erectus
22. Homo habilis
23. "*No science is immune to the infection of politics and the corruption of power.*"



**Lesson 10:** ***Evolution - The Evidence***
*Evolution, Anatomy & Embryology*

1. homologous structures
2. (b) DNA sequencing
3. (a) True
4. vestigial organs

5. (a) True
6. (b) biogenetic law
7. ontogeny recapitulates phylogeny
8. (a) embryonic development; evolutionary development
9. (a) True
10. (d) essential for its development from a single cell into a highly-complex, ordered being
11. (a) True
12. (b) deliberately misleading
13. "*True science is more concerned with discovery of truth than with protection of held theories and hypotheses.*"





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# ACTIVITY ANSWER KEY

## Chapter 4, Section 3

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**Lesson 11:** ***Evolution-Special Topics***
*Evolution & Molecular Biology*

1. (b) a common ancestor at its root and modern species as its branches
2. (c) molecular phylogeny
3. (a) DNA and protein sequences
4. molecular clock
5. (c) phylogenic trees
6. (d) molecular clock calculations
7. (a) True
8. cytochrome C
9. (d) all of the above
10. (b) DNA sequences
11. (b) False
12. (b) organisms that are supposed to have evolved before humans have a greater number of chromosomes than do humans
13. "*Where we have strong emotions, we're liable to fool ourselves.*"



**Lesson 12:** ***Evolution-Special Topics***
*Evolution & Natural Law*

1. (a) Law of Energy and Mass Conservation
2. (c) energy and mass can neither be created nor destroyed
3. (b) the mass of matter cannot change as a result of state, density, or form
4. (d) Law of Energy Decay or Deterioration
5. (a) the amount of usefulness and availability of energy is always decreasing
6. (c) The Second Law of Thermodynamics
7. (c) a car that is not tuned regularly soon will no longer run
8. morpholysis
9. (c) order to disorder
10. (a) True
11. (b) the arrow continually points to death, as disorder of the universe increases
12. (a) True
13. (a) True
14. (b) failure
15. (a) about 15 million years ago, a "cosmic egg" exploded, creating the universe
16. (a) True
17. (b) It suggests that life and order happened without cause.
18. "*A fair result can be obtained only by fully stating and balancing the facts and arguments on both sides of each question.*"



**Lesson 13:** ***Evolution-Special Topics***
*Irreducible Complexity - The Dilemma*

1. (a) limbs that were eventually transformed into wings for flying
2. (a) gliders that eventually developed wings

3. (d) all of the above
4. (c) creatures with half-wing, half-leg characteristics would not fare well in nature
5. _X_ (a) It is furnished with automatic aiming, focusing, and aperture adjustment.
   _X_ (b) It functions from almost complete darkness to bright light.
   ___ (c) It only sees objects with a large diameter.
   _X_ (d) It produces colored, multi-dimensional pictures.
   ___ (e) It is fully understood by scientists.
   _X_ (f) It must be in constant communication with the brain to function.
   __ (g) It provides strong evidence of macroevolution.
6. (b) False
7. irreducible complexity
8. (d) all of the above
9. (a) the human body attacking its own cells
10. (c) loss of immune function
11. (c) simultaneously
12. (b) geologic strata
13. _X_ (a) mixes chemicals to produce an explosion when in danger
    _X_ (b) shoots benzoquinones at 212 degrees F from twin rear nozzles
    ___ (c) uses an anti-inhibitor to prevent its own destruction and an inhibitor to allow explosion
    _X_ (d) presents difficulty in explaining how it could have evolved without exploding
14. (b) the beetle would not recognize its need for an inhibitor until it had already exploded
15. "*It's harder to crack a prejudice than an atom.*"



**Lesson 14:** ***Evolution-Special Topics***
*Evolution & Mathmatics*

1. probability
2. (b) dependable
3. (b) False
4. (b) False
5. (d) $10^{375}$
6. (a) True
7. (b) thousands
8. hundred million
9. (c) is greater than we can measure
10. (a) if a watch was made by design, one should logically assume that the wrist that wears the watch was also made by design
11. (b) False
12. (c) DNA; DNA; protein
13. (d) all of the above
14. (b) a tornado in a junk-yard
15. "*He that answers a matter before he hears it is foolish.*"



**Lesson 15:** ***Evolution-Special Topics***
*Evolution Today*

1. (b) scientific law; hypotheses
2. scientific method
3. (c) hypothesis, theory, scientific law
4. (b) False
5. (a) True
6. _X_ (a) A small segment of a species becomes isolated and rapidly evolves.
   ___ (b) The parent species dominates over the newly evolved species.
   _X_ (c) It requires an increase in mutation rates.
   _X_ (d) It helps to explain absence of transitional fossils.
   __ (e) It is supported by several lines of hard evidence.

7. intelligent design
8. (a) True
9. (b) flagellum
10. "*Facts do not cease to exist because they are ignored.*"





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# ACTIVITY ANSWER KEY

## Chapter 5, Section 1

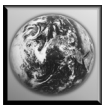
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**Lesson 1: *The Earth and Its Fullness***

*Earth: The "Right" Place for Life*

1. (c) calculate mathmatically for the possibility of life on other planets
2. (a) the distance between the star and the planet
3. (b) .001%
4. (c) they are too close to or too far from the Sun
5. (a) True
6. (a) age
7. (d) the Earth's tilting and revolution around the Sun
8. atmosphere (or ozone layer)
9. (c) the thickness of the Earth's crust and the depth of the oceans
10. (c) nitrogen; oxygen
11. (b) the ocean's tides
12. (a) severe electromagnetic storms
13. water
14. (d) one million trillion
15. "*Gaze at the stars and you must contemplate the origin of life*."



**Lesson 2: *The Earth & Its Fullness***

*Earth: An "Ageless" Planet*

1. uniformitarianism
2. (d) 4,600,000,000
3. (b) False
4. (d) can be used as evidence for macroevolution or a catastrophic flood
5. (a) True
6. radioactive dating
7. (b) the isotopes of carbon
8. (c) begins to decay; remains stable
9. half-life
10. (a) the amount of C-14 present in the organism before death
11. (b) the amount of C-14 in the organism after one half-life
12. (c) fewer C-14 molecules are dissipated with each half-life
13. X (a) scientists recognize that C-14 is rising
    X (b) past temperature changes in the oceans have affected C-14 concentration
    X (c) the burning of fossil fuels has changed the balance of C-12 to C-14
    ___ (d) tornadoes alter the Earth's C-14 concentration
14. b uranium
15. c potassium
16. a rubidium
17. (d) decaying exponentially
18. (a) True
19. (d) all of the above
20. (a) the Earth is 6,000 to 10,000 years old
21. (a) True
22. "*It is a capitol mistake to theorize before one has data*."



**Lesson 3: *Theories***
*The Miller-Urey Experiment*

1. (c) sheep
2. (a) True
3. (a) infections always spread from a donor
4. spontaneous generation
5. (b) it does not explain how life began
6. (d) all of the above
7. (b) Oxygen, although necessary for life, would have destroyed the first amino acids.
8. (c) free oxygen did not exist in the ancient Earth's atmosphere
9. X (a) Water vapor, ammonia, methane, and hydrogen were subjected to electric sparks.
   ___ (b) The experimental environment was oxygen enriched.
   X (c) Amino acids were formed.
   X (d) The experiment led to the proposal of the primordial soup theory.
10. X (a) It is unlikely that the young Earth was oxygen-free.
    X (b) Methane and ammonia concentrations in the experiment of Miller and Urey are not necessarily representative of a young Earth.
    X (c) Absence of oxygen would mean that no ozone layer existed.
    ___ (d) Lightening is considerably weaker than the Miller-Urey electric sparks.
11. (b) False
12. (a) True
13. (c) extremely tentative
14. (d) all of the above
15. "*A good soup can sustain life, but I know of no evidence that soup produced life.*"



**Lesson 4: *Classifications of Organisms***
*The Earth & Its Kingdoms*

1. (b) taxonomy
2. (c) Carolus Linnaeus
3. (c) morphology
4. (a) True
5. (d) species
6. Kingdom
   Phylum
   Class
   Order
   Family
   Genus
   Species
7. (c) genus; species
8. c genus
9. a species
10. e family
11. b order
12. d class
13. g phylum
14. f kingdom
15. (d) all of the above
16. Eubacteria
    Archaebacteria
    Protista
    Fungi
    Plantae
    Animalia
17. (c) creationist
18. (a) True
19. Felis
20. carnivora
21. mamalia
22. Phylum
23. Kingdom

24. (c) the genus name for maple trees is Acer
25. "*In all things of nature there is something of the marvelous.*"
24. "*Science may have found a cure for most evils; but is has found no remedy for the worst of them all—the apathy of human beings*."



**Lesson 5: *Kingdoms of Biology***
*The Six Kingdoms of Living Organisms*

1. (d) Plantae and Animalia
2. (d) it has characteristics belonging both to plants and animals
3. (b) capable of spontaneous movement
4. X (a) Monera
   X (b) Protista
   X (c) Fungi
   ___ (d) Eubacteria
   ___ (e) Archaebacteria
   X (f) Plantae
   X (g) Animalia
5. prokaryotic
6. (c) eukaryotic
7. (d) eukaryotes
8. (a) Eubacteria or Archaebacteria
9. (b) Protista
10. (c) They cannot make their own food.
11. (b) cellulose
12. (a) autotrophs
13. (c) heterotrophs
14. Fungi
15. Plantae
16. Animalia
17. Protista
18. Plantae
19. Eubacteria/Archaebacteria
20. (b) heterotrophs only
21. (d) neither autotrophs nor heterotrophs
22. (a) autotrophs only
23. (c) autotrophs and heterotrophs



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# ACTIVITY ANSWER KEY

## Chapter 5, Section 2

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### Lesson 6: *Kingdoms of Biology*

*Bacteria & Viruses*

1. (a) True
2. (d) all of the above
3. (b) adaptable
4. (b) False
5. (b) prokaryotic
6. X (a) They have cell membranes.
   ___ (b) They do not have cell walls.
   X (c) They contain single strands of circular DNA.
   X (d) They lack nuclear membranes.
   ___ (e) They contain membrane-bound organelles.
7. (c) Monera
8. (b) Eubacteria; Archaebacteria
9. (c) peptidoglycan
10. (d) Archaebacteria
11. peptidoglycan
12. (a) asexual reproduction
13. conjugation
14. (c) transformation
15. (d)
16. (a) True
17. (c) infect a host cell
18. (c) protein coat
19. "*Look deep into nature, and then you will understand everything better.*"



### Lesson 7: *Kingdoms of Biology*

*Kingdom Protista: An Overview*

1. (a) eukaryotic
2. (b) individually by different organelles
3. (b) False
4. (c) varied
5. (c) Algae and Protozoans
6. (a) algae
7. (c) 30-40%
8. (b) chlorine
9. (a) plankton
10. (d) protozoa
11. (d) all of these
12. (b) Sporozoa
13. (c) spores
14. (b) alteration of generations
15. Algae
16. Protozoa
17. Protozoa
18. Algae
19. Protozoa
20. ___ (a) Amoebic dysentery
    X (b) Malaria
    ___ (c) Giardias
    X (d) Sleeping sickness
    X (e) Chagas' disease
    X (f) Leishmaniasis
21. (b) Toxoplasmosis
22. (d) Plasmodium
23. Amoebic dysentery, Giardias
24. (c) red algae
25. (a) 0.3 mm

26. "*The most erroneous stories are those we think we know best—and therefore never scrutinize or question.*"



**Lesson 8: *Kingdoms of Biology***
*Kingdom Fungi: An Overview*

1. (a) 100,000
2. (b) False
3. _X_ (a) making bread
   _X_ (b) making cheese
   ___ (c) milk production
   _X_ (d) producing some medicines
   _X_ (e) spoiling of food
   ___ (f) decay of teeth
4. (b) False
5. (c) saprophytic
6. (c) parasitic
7. (c) Fungi digest food with secreted chemicals, then absorb the digested substance.
8. (b) Digested food is available for their absorption.
9. animals
10. (b) chitin
11. (b) glycogen
12. (b) hypha
13. mycelium
14. (d) reproduce
15. (a) True
16. _c_ Zygomycetes
17. _a_ Ascomycetes
18. _b_ Basidiomycetes
19. _d_ Deuteromycetes
20. morel
21. (b) truffle
22. Spores
23. (c) mycology
24. Basidiomycetes
25. Deuteromycetes
26. Ascomycetes
27. Zygomycetes

27. "*The nation plagued with inner moral decay will be persecuted with outer destruction*."



**Lesson 9: *Kingdoms of Biology***
*Kingdom Plantae: Overview I*

1. (c) 10
2. chlorophyll
3. (c) carbohydrates
4. ___ (a) unicellular
   _X_ (b) eukaryotic
   _X_ (c) photosynthetic
   ___ (d) cell walls of chitin
   _X_ (e) reproduce sexually
   _X_ (f) reproduce asexually
5. (d) all of these
6. (c) swamp
7. vascular tissue
8. (a) True
9. (d) they are considered bryophytes
10. gymnosperm
11. (c) seed
12. (a) True
13. angiosperms
14. cotyledon
15. (b) the number of the cotyledons
16. monocot
17. dicot
18. dicot
19. monocot
20. dicot
21. dicot
22. roots, leaves, and vascular tissues
23. (d) all of these
24. (a) capture light for photosynthesis
25. cuticle
26. stomata
27. (a) True
28. (a) True
29. (d) all of the above
30. "*I perhaps owe having become a painter to flowers.*"



**Lesson 10: *Kingdoms of Biology***
*Kingdom Plantae: Overview II*

1. alternation of generations
2. (b) False
3. (a) sporophyte generation
4. (b) gametophyte generation
5. (b) haploid
6. (c) pollen grain
7. embryo
8. (c) seed dispersal
9. 2 (a) bee visits flower to feed on nectar
   4 (b) bee carries the pollen from one flower to another as it fees on their nectar
   3 (c) pollen is dusted on bee's body
   1 (d) flower produces pollen and sweet secretions called nectar
10. vector pollination
11. (b) False
12. (d) night
13. X (a) wind
    X (b) wing-like seed encasement
    X (c) feathery seed attachment
    X (d) tiny hooks and barbs
    X (e) birds
14. apicuerists
15. "*Bloom where you are planted.*"



Ask for your QUIZ over Section 2.
**Reminder:** Students who score 85% or higher on the three section quizzes may be exempt from the chapter test!

# ACTIVITY ANSWER KEY

## Chapter 5, Section 3

**Check your answers from the Answer Key. Answers separated by commas may be in any order. Answers separated by semicolons must be in stated order. Correct all errors, then complete your next goal.**



### Lesson 11: *Kingdoms of Biology*

*Kingdom Animalia: The Invertebrates, Overview I*

1. (d) 97%
2. (a) a backbone
3. (b) Porifera
4. _X_ (a) found in ocean and fresh water
   _X_ (b) variety of shapes
   ___ (c) all very small
   _X_ (d) consist of independent cells
5. (d) jellyfish
6. (a) radial symmetry
7. (b) animal B
8. (c) flatworm
9. (a) bilateral symmetry
10. cephalization
11. tube-like
12. Annelida
13. ___ (a) segmented worms
    _X_ (b) clams
    _X_ (c) octopuses
    _X_ (d) scallops
    ___ (e) corals
    _X_ (f) snails
    ___ (g) sea urchins
14. (c) Echinodermata
15. (b) arthropods
16. (b) external skeleton and jointed legs
17. Cnidarians
18. Molluska
19. Arthropoda
20. Echinodermata
21. Arthropoda
22. Annelida
23. Porifera
24. "*Life emerged...not simple, but complex and whole, and has remained complex and whole ever since*."



### Lesson 12: *Kingdoms of Biology*

*Kingdom Animalia: The Invertebrates, Overview II*

1. _c_ hydrostatic skeleton
2. _a_ exoskeleton
3. _d_ chitin
4. _b_ endoskeleton
5. hydrostatic skeleton
6. endoskeleton
7. exoskeleton
8. exoskeleton
9. (c) intracellular digestion
10. (a) extracellular
11. (b) circulatory system
12. _X_ (a) blood pumped from heart
    ___ (b) blood contained entirely in blood vessels
    _X_ (c) blood released directly onto body tissues
    _X_ (d) blood flows through tissues and collects in sinuses
13. _X_ (a) blood contained in a system of closed vessels
    ___ (b) blood directly contacts tissues
    _X_ (c) oxygen and carbon dioxide diffuse in and out of blood through walls of tiny blood vessels

14. open circulatory system
15. closed circulatory system
16. (a) True
17. (c) gill
18. (b) trachea
19. (b) excretion
20. c flame cells
21. a nephridia
22. b Malpighian tubules
23. centralization
24. (d) head
25. (c) ganglia
26. (a) True
27. "*What the eye sees, the heart believes.*"



**Lesson 13: *Kingdoms of Biology***
*Kingdom Animalia: The Vertebrates, Overview I*

1. (c) Chordata
2. (b) notochord
3. (d) all of these
4. X (a) aquatic
   X (b) streamlined shape
   X (c) gills for gas exhange
   X (d) functional tail
   ___ (e) no lungs in any fish species
5. a Agnatha
6. c Chondrichthyes
7. b Osteichthyes
8. (a) water and land
9. (d) They tolerate dryness well.
10. ___ (a) They reproduce by external fertilization.
    X (b) They produce leathery-shelled eggs.
    X (c) They have dry, scaly skin.
    ___ (d) They have gills for gas exchange.
    X (e) Lizards and snakes most abundant.
11. (c) feathers
12. (b) hollow
13. (a) Mammalia
14. (c) mammary
15. b monotremes
16. c marsupials
17. a placental mammals
18. marsupium
19. placenta
20. "*Men love to wonder and that is the seed of science.*"



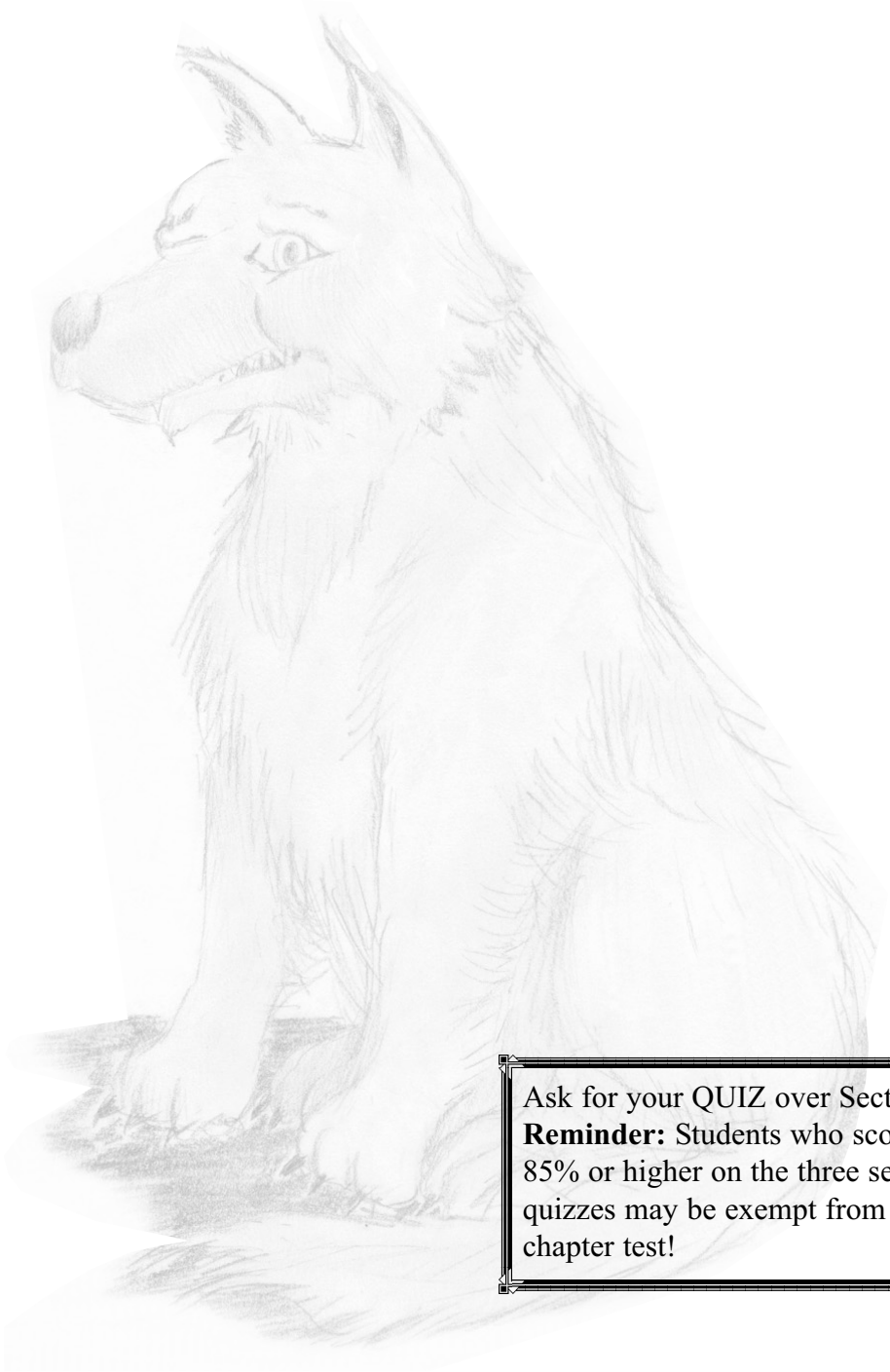
**Lesson 14: *Kingdoms of Biology***
*Kingdom Animalia: The Vertebrates, Overview II*

1. (c) vertebral column
2. (b) carnivores
3. (a) herbivores
4. (b) False
5. skin
6. gills
7. lungs
8. lungs
9. lungs
10. (c) metabollic rate
11. (d) bronchi
12. (b) alveoli
13. (a) air passageways in bird lungs connect to large air sacs in certain bones, resulting in a constant flow of fresh, oxygenated air reaching gas-exchange surfaces
14. (b) lungs; body
15. (d) kidney
16. urea
17. uric acid
18. (a) True
19. (a) ectotherms
20. (c) endotherms
21. (a) True
22. "*Every animal leaves traces of what it was; man alone leaves traces of what he created.*"



**Lesson 15: *The Earth and Its Fullness***
*A Review: Outer Space to Bacteria*

1. 1 (a) stars and planets came into being
   3 (b) prokaryotes evolved
   2 (c) Earth's crust formed
   4 (d) eukaryotes evolved
2. endosymbiotic
3. mitochondria
4. (a) True
5. Cambrian explosion
6. (b) False
7. (a) True
8. (b) False
9. harmful
10. Irreducible complexity
11. (b) order
12. "*Truth will alaways be truth, regardless of lack of understanding, disbelief, or ignorance.*"



Ask for your QUIZ over Section 3.
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# ACTIVITY ANSWER KEY

## Chapter 6, Section 1

**Check your answers from the Answer Key. Answers separated by commas may be in any order. Answers separated by semicolons must be in stated order. Correct all errors, then complete your next goal.**



**Lesson 1: *Bacteria***
*The Mysterious World of Bacteria*

1. (c) pathogens
2. (b) nitrogen from the air
3. (d) vitamins
4. cheese, sauerkraut, vinegar, butter, yogurt, buttermilk, antibiotics, chemicals, dyes, vitamins, enzymes, insecticides (only need four, order may vary)
5. tissues
6. toxins
7. (d) dead matter
8. (c) heterotrophic
9. (a) They recycle the materials necessary for life.
10. (d) the ability to digest nutrients
11. autotrophic
12. (a) photosynthesis uses sunlight for energy and chemosynthesis uses chemical reactions for energy
13. (b) False
14. (c) respiration
15. oxygen
16. (a) aerobic
17. X (a) They are prokaryotic.
    ___ (b) They contain membrane-bound organelles.
    ___ (c) They contain multiple circular DNA molecules.
    X (d) Their cell membranes are made of lipids and proteins.
18. (d) carbohydrates
19. (b) regulation of molecules entering and leaving the cell
20. Gram staining
21. gram-positive; gram-negative
22. (a) Gram-negative bacteria have an extra lipid-layer taht keeps out drugs used to fight bacterial infections.
23. spirilla
24. bacilli
25. cocci
26. flagellum
27. (d) all of the above
28. (b) False
29. Eubacteria
30. "*Controversy is only dreaded by the advocates of error.*"



**Lesson 2: *Bacteria***
*Reproduction Mechanisms & Colonization*

1. (d) two genetically identical daughter cells
2. (a) it does not involve the exchange of genetic information
3. 2 Cell wall elongates...
   1 DNA forms a loop...
   4 Cell reproduction...
   3 Cell wall and plasma membrane...
4. mutation
5. (c) steady state
6. (a) rapid growth
   (b) decreasing rapid growth rate
   (c) steady state: (equal growth/death rate)
   (d) rapid death rate
7. (b) conjugation

8. (c) conjugation tube
9. (b) plasmid
10. (b) It results in genetic variation, ensuring that some bacteria will always have the combinations needed for survival.
11. (a) transformation
12. (c) It is absorbed by other bacteria and incorporated into their own DNA.
13. (a) It is used in difficult conditions to produce a new individual either immediately or after a period of dormancy.
14. (c) resistant to harsh conditions
15. (c) It is a form of asexual reproduction.
16. (a) True
17. "*When we try to pick out anything in the universe, we find it is tied to everything else in the universe.*."



**Lesson 3: *Bacteria***
*The Roles They Play*

1. (a) True
2. (a) breaking down the tissues of dead plants and animals
3. (a) True
4. (b) nitrogen fixation
5. X (a) pickles
   X (b) cheese
   X (c) yogurt
   X (d) vinegar
   X (e) buttermilk
6. (d) all of the above
7. crop fertilizer
8. (b) sulfuric acid; copper sulfate
9. (a) it produces a copper-containing, water-soluble product that can be washed out of the ore as it forms
10. (b) Louis Pasteur; germ theory of disease
11. (d) strep throat
12. (b) breaking down cells and tissues for food
13. salmonella
14. antibiotic
15. (b) cell wall synthesis
16. (a) True
17. Sterilization
18. (d) digestive system
19. vitamins
20. "*...the only form of life we have created so far is purely destructive.*"



**Lesson 4: *Bacteria***
*Probiotics, Your Personal Pharmacy*

1. *The Prolongation of Life*
2. (c) phagocyte
3. (c) immune system
4. (b) maintain beneficial bacteria in the gastrointestinal tract
5. (b) intestine
6. (a) True
7. X (a) enhancing the function of the gastrointestinal tract
   X (b) protecting the body from harmful invaders
   X (c) producing hormones and vitamins
   X (d) help maintain growth, function, and immune response
8. (b) typhoid fever
9. (d) severe, prolonged muscle spasms
10. (c) bubonic plague; lyme disease
11. 400
12. (d) all of the above
13. (b) False
14. (c) 85%; 15%
15. autointoxication

16. (any 5) fatigue, nervousness, GI upset, impaired nutrition, skin problems, hormonal problems, circulatory problems, headaches, arthritis, low back pain, allergy, asthma, eye, ear, nose, and throat disease, heart irregularities, appendicitis, diverticulitis, irritable bowel syndrome, ulcerative colitis, Chrone's disease, diabetes, psoriasis, high blood pressure, high cholesterol, obesity, pathological changes in the breasts (need five, order may vary)
17. (b) taking certain supplements
18. (b) bioprospectors
19. (d) all of the above
20. (c) dysentery
21. "*The saddest aspect of life right now is that science gathers knowledge faster than society gathers wisdom.*"



**Lesson 5: *Viruses***
*A Very Strange Phenomenon*

1. (b) be living organisms
2. (a) True
3. (d) invisible particle
4. (b) DNA or RNA; protein coat
5. (a) True
6. _2_ (a) virus fuses with cell membrane
   _1_ (b) virus contacts cell
   _3_ (c) virus releases genetic information into cell
   _5_ (d) host cell makes copies of virus
   _6_ (e) new viruses infect other cells
   _4_ (f) virus expresses its genes in host
7. lytic infection
8. lysogenic infection
9. (d) Yellow fever
10. (c) AIDS
11. (d) all of the above
12. (b) massive hemorrhaging
13. (b) ribosome
14. bacteriophage
15. provirus
16. (a) assembly of new viruses
17. (c) parasitic
18. (b) mumps
19. (a) throat or nose
20. (a) True
21. RNA
22. (c) RNA; DNA
23. (b) proteins
24. "*Bad friends are like viruses—they infect and destroy your character.*"



Ask for your QUIZ over Section 1.
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# ACTIVITY ANSWER KEY

## Chapter 6, Section 2

**Check your answers from the Answer Key. Answers separated by commas may be in any order. Answers separated by semicolons must be in stated order. Correct all errors, then complete your next goal.**



### Lesson 6: *Protista*
*A World of Animal-Like Wonders*

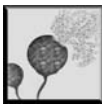
1. (d) none of the above
2. (a) True
3. (a) animal
4. (b) flagellates
5. flagellum
6. (b) digesting cellulose fibers in the wood
7. (a) mutualism
8. (b) African sleeping sickness
9. (c) body shape
10. (b) pseudopod
11. (b) foraminiferas
12. Heliozoans
13. (c) Sporozoans
14. spore
15. cilia
16. (d) lakes
17. (b) collect and expel water
18. metabolism
19. (a) stores copies of all the cell's genes
20. b gullet
21. d oral pore
22. a anal pore
23. e trichocysts
24. c conjugation
25. feces
26. micronucleus
27. oral pore
28. gullet
29. anal pore
30. macronucleus
31. contractile vacuole
32. cilia
33. "*Happy is he who gets to know the reason for things*."



### Lesson 7: *Protista*
*A World of Plant-Like Wonders*

1. (c) chloroplasts
2. chlorophyll
3. (c) single-celled photosynthetic organisms
4. red algae, green algae, brown algae
5. (c) flagella
6. (a) locate sufficient light for photosynthesis
7. (c) binary fission
8. (c) pellicle
9. (a) Pyrrophyta
10. (c) light
11. algal bloom
12. (b) red tide
13. (a) they are immune to the toxin released by the bloom
14. (d) all of the above
15. (b) pectin
16. (a) cell wall composition
17. (c) glass
18. (b) most abundant
19. (d) all of these
20. chloroplast
21. nucleus
22. eye spot
23. flagellum
24. pellicle

25. "*Man is not the creature of circumstances. Circumstances are the creatures of men..*"



**Lesson 8: *Molds***
*Slime Molds & Water Molds, Protista or Fungi*

1. (b) Fungi
2. (c) cell walls of chitin
3. plasmodium
4. (b) False
5. Acrasiomycota
6. (a) amoebas
7. spores
8. myxomycota
9. (b) one cell with thousands of nuclei
10. (c) under a moist dead tree
11. decomposers of dead plants, animals
12. (a) fresh water
13. (a) True
14. (d) all of the above
15. "*Wise people realize they don't know what they don't know.*"



**Lesson 9: *Protists***
*Protist Diseases*

1. (a) Trypanosoma
2. (c) tsete fly
3. (d) all of the above
4. ___ (a) Trypanosoma
   ___ (b) Toxoplasma
   _X_ (c) Entamoeba
   _X_ (d) Giardia
5. diarrhea
6. (a) in areas with poor sanitation
7. (a) True
8. (c) gall bladder disease
9. (a) thoroughly boil water when camping
10. (b) Malaria
11. Malaria
12. (a) Dr. Ronald Ross
13. (d) mosquito
14. (c) liver and blood
15. (a) True
16. DDT
17. (a) True
18. (c) Myxobolus cerebralis
19. (a) cartilage and nervous system
20. (c) resistant to whirling trout disease
21. "*The important thing is not to stop questioning.*"



**Lesson 10: *Discoveries***
*The Simple Things in Life*

1. 1,830,137
2. (b) False
3. (a) attachment to a solid object
4. bushing
5. hook
6. filament
7. outer membrane
8. inner membrane
9. rotor
10. rod
11. stator
12. (a) True
13. (c) Ernest Haekel
14. one hundred million
15. (a) design and complexity
16. (a) a tornado in a junkyard
17. "*The search for truth is the noblest occupation of man; its publication is a duty..*"

Ask for your QUIZ over Section 2.
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# ACTIVITY ANSWER KEY

## Chapter 6, Section 3

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### Lesson 11: *Fungi*
*Part I*

1. (b) decomposition
2. (a) heterotrophic
3. enzymes
4. (c) mycelium
5. hyphae
6. (b) False
7. (b) False
8. (a) fuse to form a diploid nucleus
9. Zygomycota, Ascomycota, Basidiomycota, Deuteromycota
10. (d) zygospore
11. (b) reproduce
12. (c) Rhizopus
13. (d) ascus
14. ascospores
15. yeasts
16. (b) saprophytic
17. (c) egg
18. (b) False
19. (a) storing beneficial vitamins
20. (b) Saccharomyces cerevisiae
21. (b) fermentation
22. "*Nature never breaks her own laws.*"



### Lesson 12: *Fungi*
*Part II*

1. (c) mushrooms
2. (c) fruiting body
3. (c) basidiospores
4. Amanita
5. (d) none of these
6. (b) the saprophytic nature of mushrooms
7. (c) imperfect fungi
8. (a) True
9. (a) True
10. Alexander Fleming
11. (a) kills bacteria associated with disease
12. antibiotic
13. (a) produce offspring that are immune to the antibiotic
14. (b) natural selection
15. "*The whole history of science has been the gradual realization that events do not happen in an arbitrary manner, but that they reflect a certain underlying order. . . .* "



### Lesson 13: *Fungi*
*Fungi & Disease*

1. (a) ringworm
2. (a) True
3. (d) Claviceps purpurea
4. (a) the Salem witch trials
5. (c) Phytophthora infestans
6. (a) True
7. (b) False
8. (d) Cryphonectria parasitica
9. (c) Ophiostoma ulmi
10. (b) Candida albicans
11. (a) help keep harmful bacteria under control

12. _X_ (a) Friendly flora are killed by antibiotics.
    _X_ (b) A person is chronically stressed.
    _X_ (c) An individual eats very acidic foods.
    _X_ (d) Steroids are used long term.
    _X_ (e) Oral contraceptives are used.
    _X_ (f) Sugary foods are common place.
13. oral thrush
14. (a) True
15. (a) exists in two different shapes and forms
16. non-invasive; fungal
17. (a) rhizoid
18. (b) allowing the introduction of antigenic substances from the gut into the blood stream
19. (a) True
20. (d) all of the above
21. "*It is possible to see the sacred in the science of life.*"



**Lesson 14: *Algae***
*Part I*

1. (b) algae
2. (a) soon there would not be enough oxygen to support life
3. (a) can exist on its own
4. Phaeophyta
5. carotenoids
6. (b) gather sunlight for photosynthesis
7. air bladder
8. (c) thickening agent
9. Rhodophyta
10. (b) phycoerythrin
11. (a) True
12. Agar
13. Chlorophyta
14. (b) False
15. (b) cellulose
16. starch
17. (c) Ulva
18. "*The real voyage of discovery consists not in seeking new landscapes, but in having new eyes.*"



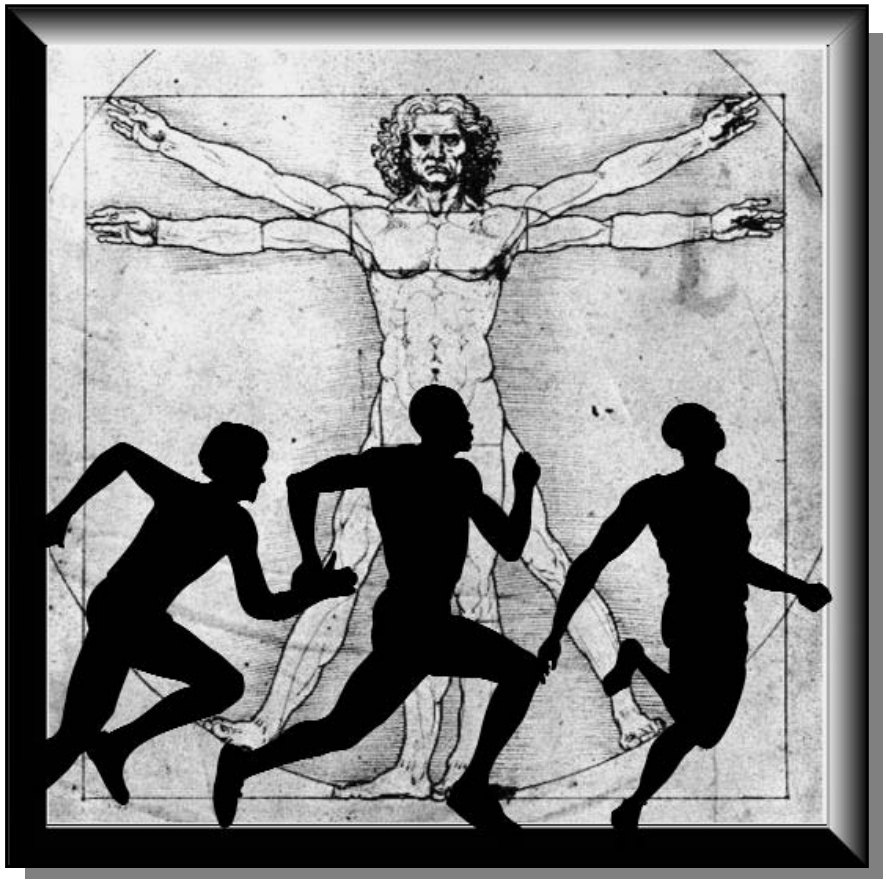
**Lesson 15: *Algae***
*Part II*

1. (a) True
2. (a) one
3. (b) zoospores
4. unfavorable
5. (c) gamete
6. husband; marriage
7. (d) zygote
8. (b) during
9. (b) diploid spore-bearing
10. (a) haploid gamete-bearing
11. (c) switches back and forth between diploid (2n) and haploid (n) forms
12. "*Everything is determined, the beginning as well as the end, by forces over which we have no control. It is determined for insects as well as for the stars. Human beings, vegetables or cosmic dust, we all dance to a mysterious tune. . . .*"

Ask for your QUIZ over Section 3.
**Reminder:** Students who score 85% or higher on the three section quizzes may be exempt from the chapter test!

# *The Principles, Theories & Precepts of Biology*

## *Quizzes*




PAC
TM
TM

# *SECTION QUIZ 1-1*





**Remember:**
Score an average of 85% or higher on all three quizzes, and you may be exempt from the chapter test!



*Congratulations! You have completed this section!*
***Answer the following questions to test your understanding of the material. When you are finished, hand in your quiz to your teacher. Each answer is worth 2 points.***

**Multiple choice: Choose the correct answer.**

1. The process by which a general statement is written and tested through experimentation in order to reach a conclusion regarding a hypothesis is known as the:_____.
   (a) scientific law (c) scientific method
   (b) scientific theory (d) observation theory

2. A scientific law:_____.
   (a) is a theory supported by many lines of evidence and years of successful experiments and observations
   (b) is the process by which a general statement is written and tested through experimentation in order to reach a conclusion regarding the hypothesis
   (c) is a theory that is not supported by evidence
   (d) is based on opinion

3. Which of the following cannot be evaluated by laboratory experiment?_____
   (a) intensity of a storm (b) gravity (c) existence of God (d) speed of light

4. The transmission of hereditary information through genetic material is called:_____.
   (a) natural selection (b) cell division (c) inheritance (d) reproduction

5. The belief that emerged from the intellectual awakening (the Renaissance) in Europe was that:_____.
   (a) God had established the universe and put certain laws into existence
   (b) men were in charge of their own destinies
   (c) people had evolved from lower life forms
   (d) science could explain everything about life

6. Which theory states that the Earth experienced a succession of creations of animal and plant life? _____
   (a) phlogiston theory (c) catastrophist theory
   (b) evolution theory (d) theory of natural selection

7. The *HMS Beagle* was the name of:_____.
   (a) a scientific journal about natural selection (c) a new species of dog
   (b) the ship on which Darwin sailed (d) none of these

8. A central component of the evolutionary theory is that all living organisms share: _____.
   (a) a common ancestor (c) the same defense mechanisms
   (b) an identical biological make-up (d) a common offspring

# *SECTION QUIZ 1-1*



9. What constitutes life?_____
   (a) certain basic elements
   (b) the "breath of life"
   (c) common ancestory
   (d) all of these
   (e) only a and b

10. In a symbiotic relationship:_____.
   (a) both species are benefited
   (b) one species is benefited
   (c) both species are harmed
   (d) one species is harmed

11. Which of the following represents the smallest unit of life?_____
   (a) cell (b) heart (c) water molecule (d) DNA

12. The key element needed for combustion is: _____.
   (a) nitrogen
   (b) oxygen
   (c) carbon
   (d) phosphorus

13. A student of nature is called a(n):_____.
   (a) biologist
   (b) geologist
   (c) naturalist
   (d) zoologist

14. The information store for our genetic material is:_____.
   (a) RNA (b) DNA (c) $NAD^+$ (d) $FAD^+$

15. _____ wrote *On the Origin of Species by Means of Natural Selection or the Preservation of Favored Races in the Struggle for Life.*
   (a) Galileo Galilei
   (b) Charles Darwin
   (c) Nicolaus Copernicus
   (d) Francis Bacon

**Matching: Choose the correct answers.**

16. _____ essential for life
17. _____ primordial soup
18. _____ sunlight
19. _____ decoy-fish
20. _____ white-throated warbler

(a) dorsal fin appears as a separate, smaller fish
(b) carbon, oxygen, nitrogen, sulfur, hydrogen, phosphorous
(c) inherited knowledge of latitude, longitude, and direction
(d) basic source of energy
(e) inorganic mixture from which life is supposed to have evolved
(f) elements

**True or False: Write the correct answer.**

21. _____ All living things breathe, move and reproduce.
22. _____ Scientists have suceeded in creating life from its basic elements.
23. _____ According to Galileo, the weight of an object influences the rate at which it falls.
24. _____ The Dark Ages were characterized by a decline in scientific learning.
25. _____ Darwin's theory of evolution by natural selection essentially holds that life evolved from inorganic matter.

# *SECTION QUIZ 1-1*



**True or False,** *continued*

26. _____ Living systems are organized, but very simple.
27. _____ Living things produce offspring that are of like kind.
28. _____ The tenants of Darwin's theory are the concepts of evolutionary change and natural selection.
29. _____ The theory of evolution has been upgraded to the category of scientific law.
30. _____ The catasrophist theory holds that life came into being by a series of catastrophes.

**Fill in the blank: Choose the correct answers from the WORD BANK.**

**WORD BANK**

| | | | |
|---|---|---|---|
| Galileo Galilei | hypothesis | geocentric | science |
| philogiston | Antoine Lavoisier | Francis Bacon | Carolus Linnaeus |
| Change | secular | Nicolaus Copernicus | scientific law |
| Sir Isaac Newton | Charles Darwin | heliocentric | phosphorus |
| Renaissance | biblical | | |

31. The _____ was a period of intellectual and scientific awakening in Europe.
32. An assumption made to test and prove a logical conclusion is known as a(n) _____ _____ _____.
33. _____ is generally considered to have established the modern scientific method.
34. The _____ theory held that the Earth was the center of the universe.
35. The phlogiston theory stated that every substance contained _____, which caused combustibility.
36. _____ discovered the key element for combustion.
37. _____ urged men to trust no statements without verification and to test all things with rigor.
38. _____ popularized the concept that the Earth moves around the Sun.
39. Newton's works were based primarily on _____ concepts.
40. _____ discovered the Law of Gravitation and other scientific laws that set a new direction in science.

# *SECTION QUIZ 1-1*



**Matching: Choose the correct answers.**

41. _____ Antoni van Leeuwenhoek
42. _____ John Ray
43. _____ Robert Hooke
44. _____ Ignaz Semmelweis
45. _____ Andreas Versalius

(a) discovered the presence of cells in biological material

(b) described the anatomy of the human body

(c) Ostracized by medical colleagues for promoting sanitation measures in hospitals

(d) described many microscopic organisms

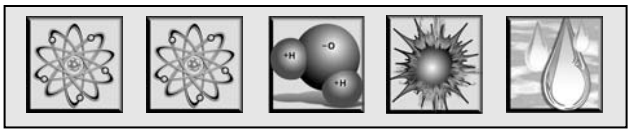
(e) explained fossils as the remains of organisms

**Complete the Life Principles.**

46. "*Chance favors the _____ mind*."
47. "*...there is more _____ to suggest an abrupt arrival of man rather than a gradual process of evolving...*"
48. "*There is no part of life that does not contain its lessons. If you are alive, there are _____ to be learned.*"
49. "*Man will occasionally stumble over _____ but usually manages to pick himself up, walk over or around it and carry on*."
50. "*In questions of science, the authority of a thousand is not worth the humble _____ of a single individual*."



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*Congratulations! You have completed this section!*
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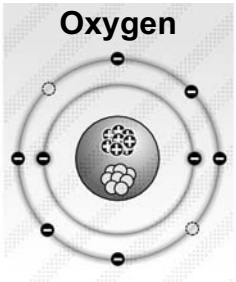
**Matching: Choose the correct answer.**

1. _____ element
2. _____ neutron
3. _____ mass
4. _____ atom
5. _____ electron orbital
6. _____ atomic mass
7. _____ nucleus
8. _____ electron
9. _____ proton
10. _____ atomic number
11. _____ molecule
12. _____ compound

(a) smallest unit of an element that retains the properties of the element
(b) particle in constant, random motion that carries a negative charge and has very little mass
(c) smallest unit of a compound that retains all of the properties of the compound
(d) dense core at the center of the atom that contains protons and neutrons
(e) substance that cannot be broken down into other substances by ordinary chemical means
(f) consists of two or more atoms of different elements, chemically combined
(g) particle that carries a positive charge and has a mass of 1 amu
(h) the number of protons in an atom
(i) particle that carries no charge and has a mass of 1 amu
(j) the number of protons plus the number of neutrons in an atom
(k) the region around the nucleus where electrons are found
(l) the amount of matter an object contains

**Multiple choice: Choose the correct answer.**

13. _____ is the most common element in the Earth's crust.
(a) carbon (b) silicon (c) oxygen (d) nitrogen

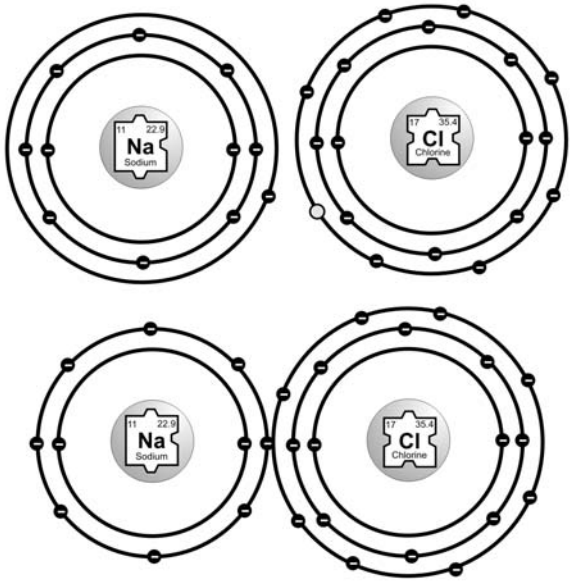



14. Using the figure to the right, determine the valence of oxygen:_____.
(a) 4 (b) 6 (c) 2 (d) 8

15. Examine the image on the following page to answer this question. The figure illustrates which of the following? _____
_____
(a) sodium (Na) attaining a negative charge of $^{-}1$
(b) sodium (Na) donating its outer electron to chlorine (Cl)
(c) chlorine (Cl) attaining a negative charge of $^{-}2$
(d) sodium (Na) donating a proton to chlorine (Cl)

16. If an atom has 25 protons and 23 electrons, what is its net charge? _____
(a) $^{+}2$ (b) $^{+}3$ (c) $^{-}2$ (d) $^{-}3$

**Use this figure to answer question 15.**




17. Acids release _____ in water, and bases release _____ in water.
(a) $OH^-$; $H^+$ (b)$H^+$; $H^+$ (c) $OH^-$; $OH^-$ (d) $H^+$; $OH^-$

18. Which of the following pH values is the most basic, or alkaline? _____
(a) 2 (b) 7 (c) 8 (d) 10

**CHEMICAL ELEMENTS FOUND IN ANIMALS, THEIR APPROXIMATE ABUNDANCE BY WEIGHT AND THEIR ATOMIC MASSES**

| ELEMENT | SYMBOL | WEIGHT, PERCENT | ATOMIC MASS UNITS |
|---|---|---|---|
| Oxygen | O | 62 | 16.0 |
| Carbon | C | 20 | 12.0 |
| Hydrogen | H | 10 | 1.0 |

19. Using the atomic masses from the table above, calculate the molecular weight of water, ($H_2O$): _____
(a) 12 amu (b) 34 amu (c) 18 amu (d) 20 amu

20. Which of the following represents an exergonic reaction? _____
(a) A + B + energy ⟶ C + D (c) A + B + C ⟶ D
(b) A + B ⟶ C + D + energy (d) energy ⟶ A + B

21. In a molecule of water, an atom of _____ is covalently bonded to two atoms of _____.
(a) hydrogen; oxygen (c) carbon; hydrogen
(b) oxygen; hydrogen (d) oxygen; carbon

22. Oxygen tends to pull electrons to itself in a molecule of water, because: _____.
(a) oxygen has a positive charge (c) oxygen has a negative charge
(b) hydrogen has a negative charge (d) none of these

# *SECTION QUIZ 1-2*



**Fill in the blank: Choose the correct answers from the Word Bank.**

| WORD BANK | | |
|---|---|---|
| non-polar | Amendeo Avogadro | hydrogen bond |
| isotopes | Avogadro's number | electronegativity |
| ionic bond | molecular weight | chemical reaction |
| polar bond | ion | covalent bond |
| Niels Bohr | compounds | |

23. The atomic structure model was first introduced in 1913 by physicist _____.

24. A(n) _____ occurs when one atom gives up one or more of its outermost electrons to another atom.

25. An atom that gains or loses electrons is called a(n) _____.

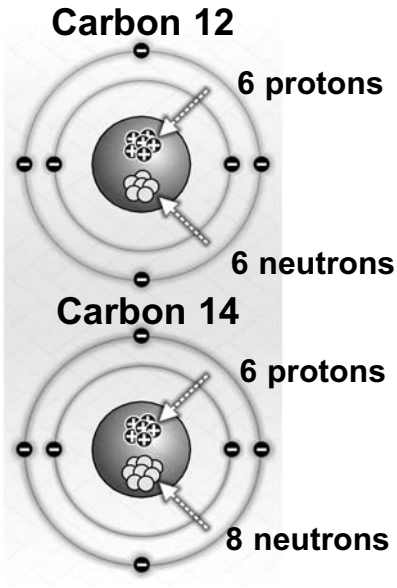
26. A(n) _____ occurs when two atoms share a pair of electrons so that each has a stable, complete outer-energy shell.

27. The tendency of an atom to pull electrons toward itself is called _____.

28. A(n) _____ occurs when the electrons of a bond are shared unequally.

29. The number of molecules contained in one mole of any substance is called _____ _____.

30. During a(n) _____, molecules or ions interact with one another to form new substances.




31. The atoms in the figure above are known as carbon _____.

32. If you sum the atomic masses of all of the atoms in a molecule, you will obtain the _____.

# *SECTION QUIZ 1-2*



**Matching: Choose the correct answers.**

33. _____ buffers
34. _____ water
35. _____ micelles
36. _____ cohesion
37. _____ adhesion
38. _____ surface tension
39. _____ capillary action
40. _____ sodium
41. _____ magnesium
42. _____ potassium
43. _____ solution
44. _____ solute
45. _____ solvent
46. _____ molarity

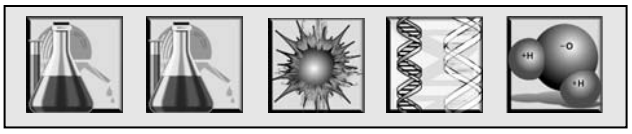
(a) the ability of water to move up through another substance
(b) Na
(c) minimize pH changes, help stabilize acids and bases in the system
(d) the number of moles of solute in one liter of solution
(e) the holding of one substance to a different type of substance
(f) Mg
(g) formed at the interfaces of polar and non-polar substances, such as oil and water
(h) K
(i) a substance that is dissolved in solution
(j) the holding together of like substances
(k) a measure of how difficult it is to stretch or break the surface of a liquid
(l) a homogeneous liquid mixture of two or more substances
(m) the most versatile solvent
(n) the dissolving agent in a solution

**Complete the Life Principles.**

47. "*The things that exist are formed...from things which our eyes* _____."
48. "*I never learn anything by talking. I only learn things when I* _____ _____."
49. "*Great works are performed not by* _____ *but by perseverance*."
50. "_____ *is the only drink for a wise man*."



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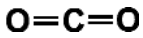
**Matching: Choose the correct answers.**

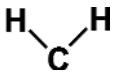
1. _____ organic compounds
2. _____ inorganic compounds
3. _____ hydrocarbons
4. _____ levo
5. _____ dextra

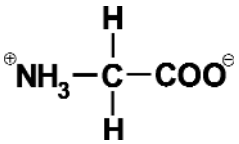
(a) compounds that consist only of carbon and hydrogen
(b) Latin for right-handed; used to designate optical isomers
(c) compounds that contain carbon, excluding carbon dioxide and carbonate compounds
(d) Latin for left-handed; used to designate optical isomers
(e) compounds that do not contain carbon

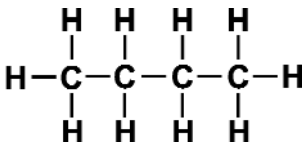
**Multiple choice: Choose the correct answer.**

6. Which of the following is a hydrocarbon?_____

(a) 


(b) 


(c) 


(d) 


7. An enzyme is _____ by the reaction it catalyzes.
   (a) consumed
   (b) not permanently changed
   (c) enriched
   (d) change permanently

8. A single enzyme can catalyze: _____.
   (a) two types of reactions
   (b) one specific type of reaction
   (c) all reactions involving proteins
   (d) any reaction in the body

9. Most proteins work best at a(n) _____ pH.
   (a) neutral (b) acidic (c) high (d) basic

10. The five-carbon sugar found in nucleotides of DNA is known as: _____.
    (a) ribose (b) fructose (c) deoxyribose (d) dextrose

# *SECTION QUIZ 1-3*



**Matching: Choose the correct answers.**

11. _____ carbohydrates
12. _____ lipids
13. _____ fatty acids
14. _____ steroids
15. _____ amino acids
16. _____ hormones
17. _____ catalysts
18. _____ enzymes
19. _____ substrates
20. _____ nucleic acids

(a) large lipids consisting of four carbon rings joined to one another
(b) molecules that lower the activation energy of a reaction
(c) chemical messengers between different parts of the body
(d) the substance on which an enzyme works
(e) molecules composed of carbon, hydrogen, and oxygen; includes sugars and starches
(f) information-carrying molecules of the cell
(g) long chains of carbon and hydrogen acids that have an acidic carboxyl group attached to the end
(h) catalysts in living systems
(i) building blocks of proteins
(j) waxy, fatty, or oily compounds that are formed from fatty acids and glycerol

**True or False: Write the correct answers.**

21. _____ Enzymes function in the regulation of chemical pathways, information transfer, storage and release of energy, plus synthesis and breakdown of compounds.
22. _____ The order of the DNA units tells the machinery of a cell how to arrange amino acids in proteins.
23. _____ The optical isomers of tryptophan are identical in structure and function.
24. _____ Amino acids found in living organisms are of the L-type isomer.
25. _____ More oxygen compounds exist than any other compounds of all other elements.

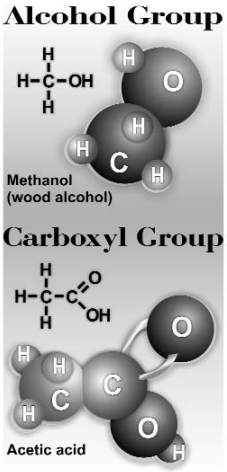
**Fill in the blank: Choose the correct answers from the WORD BANK.**

**WORD BANK**

| | | |
|---|---|---|
| nucleotide | Earth's crust | polymers |
| living organisms | functional groups | active site |
| peptide bond | genetics | induced fit |
| racemic mixture | dysfunctional groups | |

26. The four most abundant elements in _____ are hydrogen, oxygen, carbon and nitrogen.
27. The four most abundant elements in _____ are oxygen, silicon, aluminum and sodium.
28. Monomers link together to form _____, also called macromolecules, which may be long, straight, or branched chains.
29. Both of the groups in the image on the following page are known as _____ _____.

**Use this figure to answer question 29.**




30. When the amino group of one amino acid is joined to the carboxyl group of another amino acid, they form a(n) _____.

31. The portion of an enzyme that attaches to the substrate is known as the_____ _____.

32. The change in shape of the active site of an enzyme so it binds more snugly to the substrate is called _____.

33. The study of heredity is called _____.

34. A _____ is composed of a phosphate group, a 5-carbon sugar and a ring-shaped, nitrogenous base.

35. A mixture that contains equal amounts of both *L* and *D* isomers is called a(n)_____ _____.

**Matching: Choose the correct answers.**

36. _____ fructose
37. _____ glycerol
38. _____ hemoglobin
39. _____ energy
40. _____ starch
41. _____ glycogen
42. _____ DNA
43. _____ RNA
44. _____ nucleotides
45. _____ AMP

(a) protein that carries oxygen in the blood
(b) transmits genetic information from one generation to the next and codes for the production of proteins
(c) the simple sugar found in fruit
(d) intermediary in the function of some hormones
(e) polysaccharide form of excess sugar stored in animals and humans
(f) nucleic acid monomers
(g) provided by the breakdown of sugars in a cell
(h) carries out the instructions of the DNA code
(i) polysaccharide form of excess sugar stored in plants
(j) three carbon alcohol that contains three hydroxyl groups

# *SECTION QUIZ 1-3*



**Complete the Life Principles.**

46. "*Nobody can think straight who does not _____. Idleness warps the mind.*"

47. "*Genius is one percent inspiration and ninety-nine percent _____.*"

48. "*Things which you receive _____ cost someone something.*"

49. "*_____ is how high you bounce once you hit bottom.*"

50. "*The greatest homage we can pay to _____ is to use it.*"

# *SECTION QUIZ 2-1*



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*Congratulations! You have completed this section!*
***Answer the following questions to test your understanding of the material. When you are finished, hand in your quiz to your teacher. Each answer is worth 2 points.***

**Matching: Choose the correct answers.**

1. _____ absorption
2. _____ digestion
3. _____ respiration
4. _____ excretion
5. _____ egestion
6. _____ secretion
7. _____ endocytosis
8. _____ exocytosis
9. _____ phagocytosis
10. _____ irritability
11. _____ homeostasis
12. _____ cytology
13. _____ cytolysis
14. _____ plasmolysis

(a) release of biosythesized substance for use by other cells
(b) rupturing of a cell due to excess internal osmotic pressure
(c) process by which cells excrete or eliminate macromolecules through the plasma membrane
(d) the breakdown of substances for absorbtion
(e) removal of non-soluble waste material from the cell
(f) process by which cells take in substances by causing a part of the plasma membrane to surround the substance
(g) the ability of a cell to respond to its environment inside and out
(h) process of endocytosis in which a large particle is absorbed by the cell
(i) the transport of dissolved substances into cells
(j) the process of maintaining order in a cell
(k) collapse of a cell due to water flowing out of the cell
(l) oxidation of absorbed substances with a release of energy
(m) the study of cells
(n) removal of soluble waste material from the cell

**True or False: Write the correct answers.**

15. _____ The four major building blocks of cell structure are proteins, nucleic acids, carbohydrates, and lipids.
16. _____ Penicillin kills a bacterium by injecting toxins into it.
17. _____ The pressure that helps to keep a plant rigid is called *turgor pressure*.
18. _____ The microscope used in most biology classrooms and laboratories is the electron microscope.

**Multiple choice: Choose the correct answer.**

19. Which of the following is not part of the cell theory?_____
    (a) Cells are the fundamental units of life.
    (b) Cells arise only by division of other cells.
    (c) All organisms are made up of cells.
    (d) Cells are constantly changing.

***Multiple Choice** Continued*

20. Which of the following is true of a prokaryotic cell?_____
    (a) It contains membrane-bound organelles.
    (b) It has no nucleus.
    (c) It is highly compartmentalized.
    (d) It is surrounded by a cell membrane.

21. Channels in the lipid bilayer that move materials across the membrane are: _____.
    (a) polysaccharides (c) proteins
    (b) lipids (d) nucleic acids

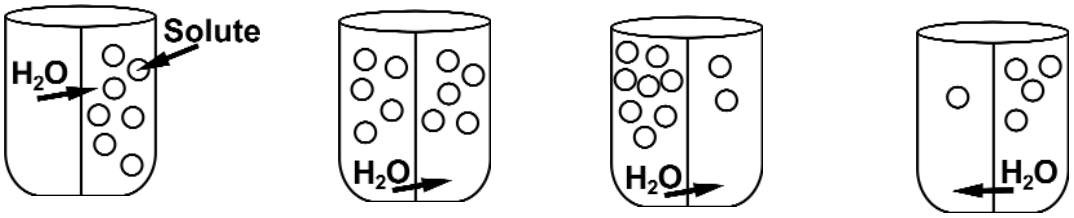
22. Substances that pass freely through the cell membrane are most likely:_____.
    (a) lipid soluble (c) water soluble
    (b) lipid insoluble (d) very large

23. _____ cells do not have cell walls.
    (a) plant (b) animal (c) algae (d) bacteria

24. Which of the following processes requires energy?_____
    (a) passive transport (c) diffusion
    (b) osmosis (d) active transport

25. Which of the following correctly depicts water movement?_____

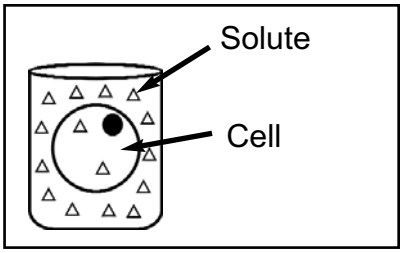
(a) (b) (c) (d)




26. If a cell is placed in a hypotonic solution, the water in the system will:_____.
    (a) flow out of the cell (c) stay constant
    (b) flow into the cell (d) plasmolyze the cell

27. Cells can control osmotic pressure by: _____.
    (a) using a cell wall (c) using blood as a buffer
    (b) pumping out water (d) all of the above

28. The solution in the illustration to the right is _____ in relation to the cell.
    (a) hypertonic (c) isotonic
    (b) hypotonic (d) none of these



# *SECTION QUIZ 2-1*



**Fill in the blank: Choose the correct answers from the WORD BANK.**

| WORD BANK | | |
|---|---|---|
| Louis Pasteur | Anton van Leeuwenhoek | Robert Hooke |
| Garth Nicolson | Matthias Schleiden | Rudolf Virchow |
| Jan Purkinje | | |

29. _____ discovered that a system of several magnifying lenses at proper distances from each other would greatly magnify small objects.
30. _____ coined the term "cell" to describe the tiny rectangular chambers in the woody parts of plants.
31. Theodore Schwann and _____ proposed that plants and animals are composed of cells.
32. _____ proposed that cells are produced only by the division of cells that already exist.
33. _____ proved the theory of biogenesis.
34. S.J. Singer and _____ proposed the fluid mosaic model for the cell membrane.

**Matching: Choose the correct answers.**

35. _____ cytoplasm
36. _____ cell membrane
37. _____ nucleus
38. _____ cell wall
39. _____ chromosome
40. _____ ribosome
41. _____ endoplasmic reticulum
42. _____ chloroplast
43. _____ vacuole
44. _____ lysosome
45. _____ cytoskeleton
46. _____ flagellum

(a) large, dense structure in cell that contains the DNA
(b) structure that forms from chromatin when cell divides
(c) breaks down substances in the cell
(d) converts light energy into glucose in plants
(e) stores materials in the cell
(f) portion of the cell outside of the nucleus
(g) supporting framework of a eukaryotic cell
(h) site of protein assembly in a cell
(i) whip-like projection for propulsion found on some cells
(j) processes and transports proteins in a cell
(k) part of cell's outer boundary; contains a lipid bilayer
(l) tough, porous boundary outside of cell membrane in plants and some bacteria, but not in animals

# *SECTION QUIZ 2-1*



**Complete the Life Principles.**

47. "_____ *is missed by most people because it is dressed in overalls and looks like work.*"

48. "*Never leave till* _____ *that which you can do today.*"

49. "*Nothing just*_____*; someone or something must make things happen.*"

50. "*If we all worked on the assumption that what is accepted is really* _____ *there would be little hope of advance.*"



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**Multiple Choice: Choose the correct answer.**

1. The Second Law of Thermodynamics states that:_____.
   (a) disorder in the universe is constantly decreasing
   (b) free energy in the universe is constantly increasing
   (c) order in the universe must increase
   (d) entropy in the universe must increase

2. When chemical bonds break, energy is: _____.
   (a) held constant (c) released
   (b) consumed (d) created

3. When phosphate bonds of the ATP molecule are broken, they release:_____
   _____.
   (a) more energy than most chemical bonds
   (b) less energy than most chemical bonds
   (c) the same amount of energy as most chemical bonds
   (d) no energy

4. Energy is stored in a cell when phosphate groups are _____ AMP and ADP.
   (a) removed from (c) held constant in
   (b) added to (d) none of the above

5. How many molecules of ATP are required to convert glucose into a six-carbon glucose phosphate? _____ (a) one (b) two (c) three (d) four

6. Under anaerobic conditions, the cell:_____.
   (a) passes electrons from NADH to oxygen
   (b) passes electrons from NADH to the Kreb's Cycle
   (c) passes electrons from NADH to pyruvic acid
   (d) passes electrons from NADH to carbon dioxide

7. A condition in which no oxygen is available to the cell is a(n): _____.
   (a) aerobic condition (c) cardiac condition
   (b) respiratory condition (d) anaerobic condition

8. The body often cannot supply enough oxygen to muscles to meet their needs. Without oxygen, the muscle cells would use _____ to gain ATP.
   (a) aerobic respiration (c) the electron transport chain
   (b) anaerobic respiration (d) oxygen storage

# *SECTION QUIZ 2-2*



***Multiple Choice** Continued*

9. In alcohol fermentation, yeasts produce alcohol and _____ from pyruvic acid.
   (a) oxygen (b) bacteria (c) acetic acid (d) carbon dioxide

10. How many molecules of ATP are formed for each glucose molecule during the Kreb's Cycle? _____ (a) four (b) one (c) three (d) two

11. Which of the following processes require oxygen? _____
    (a) glycolysis (c) Kreb's Cycle
    (b) fermentation (d) electron transport chain

12. Cellular respiration yields a net total of _____ molecules of ATP.
    (a) 38 (b) 36 (c) 32 (d) 40

13. In the electron transport chain, electrons are combined with hydrogen ions and oxygen to form: _____.
    (a) carbohydrates (b) lipids (c) water (d) acids

14. Which of the following are unable to produce glucose or oxygen on their own? _____
    (a) animals (b) green plants (c) algae (d) seaweed

15. In photosynthesis, water functions to _____.
    (a) initiate excitation of electrons (c) split enzymes in two
    (b) break chlorophyll apart (d) replace electrons to chlorophyll

**Matching: Choose the correct answers.**

16. _____ cellular respiration
17. _____ glycolysis
18. _____ cofactors
19. _____ lactic acid fermentation
20. _____ alcohol fermentation
21. _____ cristae
22. _____ Kreb's Cycle
23. _____ electron transport chain
24. _____ photosynthesis
25. _____ cellulose
26. _____ chloroplast
27. _____ thylakoids
28. _____ chlorophyll
29. _____ Calvin Cycle
30. _____ ATP

(a) process in which a molecule of glucose is broken down to produce a net gain of two ATP
(b) pyruvic acid is converted to alcohol and carbon dioxide in anaerobic conditions
(c) the structural material of plant cell walls
(d) disk-shaped compartments inside chloroplasts
(e) process by which a cell converts a food fuel into ATP in the presence of oxygen
(f) process by which energy from ATP and NADP+ is converted into sugars
(g) pyruvic acid that accumulates due to glycolysis is converted to lactic acid in anaerobic conditions
(h) inner, infolded membrane of a mitochondrion
(i) process by which green plants use energy from the sun to convert $CO_2$ and $H_2O$ into glucose
(j) green pigment in plants
(k) molecule of energy storage in the cell
(l) organelle in which photosynthesis occurs
(m) additional molecules needed for enzymes to function
(n) second stage of respiration
(o) series of molecules located in the inner membrane of the mitochondrion that receive high energy electrons from electron carriers

# *SECTION QUIZ 2-2*



**Fill in the blank: Choose the correct answers from the WORD BANK.**

| WORD BANK | | |
|---|---|---|
| pyruvic acid | NAD+ | kinetic energy |
| PhosphoGlyceric Acid | oxaloacetic acid | oxygen |
| FAD+ | Jean Senebin | Jan Ingen-Housz |
| potential energy | Joseph Priestly | Nicolas Theodore de Sanssure |

31. The energy of motion is known as _____.
32. A parked car on a steep hill possesses _____.
33. The end-product molecule of glycolysis is _____.
34. Glycolysis produces two pairs of high energy electrons that are passed to the coenzyme _____ to form NADH.
35. The four carbon intermediate compound (which, when combined with acetyl CoA, initiates the Kreb's Cycle) is known as: _____.
36. The electrons released when the carbon atoms in glucose are broken down and released as $CO_2$ are passed to NAD+ and _____.
37. The final electron acceptor of the electron transport chain is _____.
38. During the light-independent reactions of photosynthesis, carbon dioxide is combined to a 5-carbon sugar to produce two, three-carbon molecules called _____.
39. _____ demonstrated that green plants reverse the effects of breathing.
40. _____ showed the importance of sunlight for $O_2$ production.
41. _____ showed that photosynthesis was dependent on $CO_2$.
42. _____ showed that $H_2O$ is necessary for photosynthesis.

**True or False: Write the correct answers.**

43. _____ The cell utilizes 100% of the energy available in a glucose molecule through the process of cellular respiration.
44. _____ Fats and proteins are metabolized and eventually enter glycoysis or the Kreb's Cycle.
45. _____ The $CO_2$ produced by the mitochondria in your body is released when you inhale.
46. _____ An extremely important by-product of photosynthesis is oxygen.
47. _____ The source of energy for all animals can be traced back to plants.

## *SECTION QUIZ 2-2*



**Complete the Life Principles.**

48. "*Most human beings have an almost infinite capacity for taking things for* _____."

49. "*In everything, I believe the secret of success is* _____."

50. "*Most people say it is the intellect that makes a great scientist. They are wrong: it is* _____."

# *SECTION QUIZ 2-3*



**Remember:**
Score an average of 85% or higher on all three quizzes, and you may be exempt from the chapter test!





*Congratulations! You have completed this section!*
***Answer the following questions to test your understanding of the material. When you are finished, hand in your quiz to your teacher. Each answer is worth 2 points.***

**Multiple choice: Choose the correct answer.**

1. In order for a cell to divide and produce two cells identical to itself:_____
_____.
   (a) it must make a complete copy of the genetic information in its nucleus
   (b) it must give half of its genetic information to each daughter cell
   (c) it must mix its genetic material with that of another cell
   (d) it must borrow genetic information form a partner cell

2. Yeasts, molds, and mushrooms are classified as: _____.
   (a) animals (b) fungi (c) plants (d) protists

3. The nuclei of human somatic cells contain _____ chromosomes.
   (a) 8 (b) 16 (c) 48 (d) 46

4. The goal of meiosis is to produce two genetically _____ cells.
   (a) different (b) mutated (c) identical (d) superior

5. Why are alcohol, marijuana, and cocaine particularly dangerous to brain cells?_____
_____
   (a) It is difficult for brain cells to divide once they have been weakened by these drugs.
   (b) These drugs slow the mitotic process of brain cells.
   (c) These drugs enlarge brain cells and cause the brain to swell.
   (d) These drugs destroy brain cells that cannot be replaced.

6. The sum of changes that accumulate with time and eventually bring an organism to death is known as: _____.
   (a) puberty (b) aging (c) disease (d) life

7. Cancer results in uncontrolled: _____.
   (a) death of cells (c) swelling of cells
   (b) division of cells (d) inactivity of cells

8. Puberty is the development point at which an organism attains: _____ maturity.
   (a) physical
   (b) emotional
   (c) mental
   (d) sexual

# *SECTION QUIZ 2-3*



**Matching: Choose the correct answers.**

9. _____ cell division
10. _____ binary fission
11. _____ mitosis
12. _____ cytokinesis
13. _____ meiosis
14. _____ cell cycle
15. _____ M phase
16. _____ S phase
17. _____ G1 phase
18. _____ G2 phase
19. _____ interphase
20. _____ metaphase
21. _____ anaphase
22. _____ anaphase I
23. _____ anaphase II
24. _____ phagocytosis

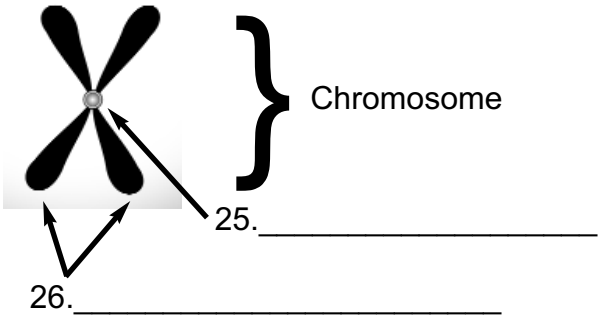
(a) the period of time from the beginning of one cell division to the beginning of the next
(b) meiotic phase in which homologous chromosomes separate
(c) process by which a cell divides into two individual daughter cells
(d) most cell growth and activity takes place during this phase of the cell cycle
(e) meiotic phase in which chromatids separate
(f) process of cell division in which each daughter cell has identical DNA to the parent cell
(g) process by which cells take in large substances
(h) mitosis and meiosis occur in this phase of the cell cycle
(i) mitotic phase in which chromatids separate
(j) the division of the cell's cytoplasm
(k) process that creates the gametes used for sexual reproduction
(l) phase of the cell cycle that includes G1, G2, and S
(m) chromosomes are copied during this phase of the cell cycle
(n) the cell makes final preparations for cell division during this phase of the cell cycle
(o) mitotic phase in which chromosomes line up across the center of the cell
(p) reproduction by the division of a cell into two equal parts by a simple, non-mitotic process

**Fill in the blank: Choose the correct answers from the WORD BANK.**

**WORD BANK**

| | | | | | |
|---|---|---|---|---|---|
| crossing over | diploid | centriole | chromatid | tetrad | spindle |
| microtubule | cell plate | homologous chromosome | | | haploid |
| centromere | synapsis | | | | |

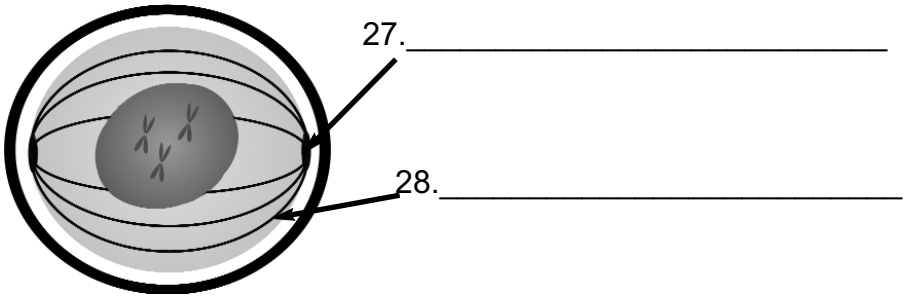
**Label the chromosome parts.**



# *SECTION QUIZ 2-3*



**Label the parts indicated, relevant to the first phase of mitosis.**




29. A(n) _____ is a cytoskeleton component that provides a tough, flexible framework of support for the cell.

30. When plant cells undergo cytoplasmic division, a structure called the _____ forms midway between the two new nuclei.

31. A(n) _____ is one of a pair of chromosomes of the same length and centromere position, containing the same kind of information.

32. Cells that contain two of each type of chromosome are _____.

33. Cells that contain one of each type of chromosome are _____.

34. The combination of four chromatids during synapsis is called a(n) _____.

35. The pairing of homologous chromosomes during meiosis I is called _____.

36. The exchange of parts of two homolgous chromosomes during meiosis is called_____.

**True or False: Write the correct answers.**

37. _____ Gametes that result from a meiotic division contain one-half the number of chromsomes of the parent cell.

38. _____ Cells of multicellular organisms seem to be highly specialized.

**Matching: Choose the correct answers.**

39. _____ gametes
40. _____ somatic cells
41. _____ tissues
42. _____ organs
43. _____ organ systems
44. _____ neurons
45. _____ macrophages
46. _____ cyclins
47. _____ polar bodies

(a) engulf bacteria and dead cells in tissue fibers
(b) all cells in the body except reproductive cells
(c) groups of similar cells that work together to perform certain functions
(d) groups of organs that perform several closely related functions
(e) reproductive cells
(f) carry impulses through the nervous system
(g) proteins that control cell division and regulate the timing of the cell cycle
(h) groups of tissues that work together to perform certain functions
(i) unneeded products that disintegrate; from meiosis II in human females

## *SECTION QUIZ 2-3*



**Complete the Life Principles.**

48. "*Listen to advice and accept _____, and in the end you will be wise.*"

49. "*Quality is never an accident; it is always the result of _____ effort.*"

50. "*Every day, do something that will inch you closer to a better _____.*"

Name: _____

Date: _____ Grade: _____

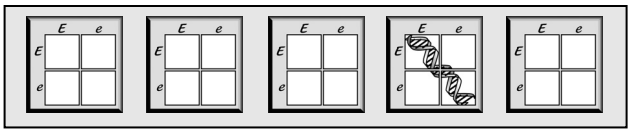


# *SECTION QUIZ 3-1*





**Remember:**
Score an average of 85% or higher on all three quizzes, and you may be exempt from the chapter test!



*Congratulations! You have completed this section!*
***Answer the following questions to test your understanding of the material. When you are finished, hand in your quiz to your teacher. Each answer is worth 2 points.***

**Multiple choice: Choose the correct answer.**

1. Gregor Mendel produced hybrid plants by crossing two parents that had _____ versions of a particular trait.
   (a) identical (b) opposite (c) similar (d) several

2. Mendel chose to study traits with: _____.
   (a) indistinguishable forms (c) distinctly contrasting forms
   (b) blending characteristics (d) multiple forms

3. Mendel's P generation tall plants contained: _____.
   (a) one allele for tallness and one allele for shortness
   (b) multiple alleles for tallness and shortness
   (c) two copies of the allele for tallness
   (d) two copies of the allele for shortness

4. Mendel observed from his F1 generation that the plants with one allele for tallness and one allele for shortness were: _____.
   (a) equal in height to the plants with two alleles for shrotness
   (b) slightly shorter than the plants with two alleles for tallness
   (c) equal in height to the plants with two alleles for tallness
   (d) slightly taller than the plants with two alleles for tallness

5. Use the Punnet square below to predict the genotypes of the offspring from a heterozygous tall parent (Tt) and a homozygous short parent (tt)._____
   (a) one-half homozygous tall and one-half heterozygous tall
   (b) one-fourth homozygous tall and three-fourths heterozygous tall
   (c) one-fourth homozygous tall and three-fourths homozygous short
   (d) one-half heterozygous tall and one-half homozygous short

| | T | t |
|---|---|---|
| t | Tt | tt |
| t | Tt | tt |

6. Use the Punnet square to the right to find the probability that a cross between two heterozygous purple flowers (Pp) will produce a phenotype for white flowers. _____
   (a) ¼ (b) ½ (c) 34 (d) 1

| | P | p |
|---|---|---|
| P | PP | Pp |
| p | Pp | pp |

## *SECTION QUIZ 3-1*



7. Colchicines function to make chromosomes:_____.
   (a) move faster through mitosis
   (b) remain in their condensed form
   (c) unwind to chromatin form
   (d) lose their genetic code

8. Human autosomes represent: _____.
   (a) one pair of sex chromosomes
   (b) 22 pairs of alleles
   (c) 22 pairs of homologous chromosomes
   (d) a complete karyotype

9. Egg cells contain _____ chromosomes.
   (a) X and Y (b) only X (c) only Y (d) neither X or Y

10. The _____ determines if an offspring will be male or female.
    (a) mother's egg (b) human autosome (c) father's sperm (d) X chromosome

11. Colorblindness usually does not occur in females because:_____
    _____.
    (a) females are capable of suppressing the recessive colorblindness gene from their DNA
    (b) the colorblindness allele is carried on the male sex chromosome
    (c) females cannot inherit the recessive allele on the female sex chromosome
    (d) females usually have a dominant gene for vision on one of their sex chromosomes

12. Individuals with hemophilia have blood that does not: _____.
    (a) carry oxygen (b) flow (c) fight disease (d) clot

13. The gene that causes hemophilia occurs on the _____ chromosome and usually occurs in _____.
    (a) Y; males (b) Y; females (c) X; males (d) X; females

14. A person who has AB-negative blood has:_____
    _____.
    (a) both A and B antigens from the ABO gene and the negative allele from the Rh blood group
    (b) O antigens from the ABO gene and the negative allele from the Rh blood group
    (c) both A and B antigens from the ABO gene and antibodies for A and B antigens
    (d) O antigens from the ABO gene and antibodies for O antigens

15. The male part of a flower is called the _____, and the female part of a flower is called the _____.
    (a) stalk; stamen
    (b) stamen; carpel
    (c) carpel; stalk
    (d) carpel; stamen

# *SECTION QUIZ 3-1*



**Matching: Choose the correct answers.**

16. _____ F1 generation
17. _____ alleles
18. _____ gametes
19. _____ antigens
20. _____ heterozygous
21. _____ P generation
22. _____ multiple alleles
23. _____ genotype
24. _____ homozygous
25. _____ genes
26. _____ phenotype

(a) molecules that stimulate the production of antibodies
(b) segments of DNA that code for specific traits and transmit hereditary information
(c) different forms of a gene; portions of DNA that carry information for contrasting forms of the same genetic trait
(d) a condition in which more than two alleles exist for a single trait in a population
(e) the true-breeding plants crossed to produce the F1 generation
(f) eggs or male sex cells that contain one copy of each gene
(g) the outward manifestation of a genetic trait
(h) the genetic composition and description of an organism
(i) the description of an organism that has an identical pair of alleles for a trait (TT)
(j) the description of an organism that has a mixed pair of alleles for a trait. (Tt)
(k) the first generation that results from the cross of two true breeding plants

**True or False: Write the correct answers.**

27. _____ Mendel's work was accepted by the scientific community with great enthusiasm.
28. _____ Mendel cut away the male parts of his flowers in order to increase self-pollination.
29. _____ Mendel and Darwin agreed on the matter of genetics.
30. _____ Two organisms with different genotypes can have the same phenotype.
31. _____ Diploid human cells have a total of 23 chromosomes.

**Fill in the blank: Choose the correct answers from the WORD BANK.**

**WORD BANK**

| | | | |
|---|---|---|---|
| gene linkage | Law of Dominance | co-dominance | polygenic inheritance |
| karyotype | Law of Segregation | self-pollination | cross-pollination |
| probability | independent assortment | pedigree | incomplete dominance |

32. In pea plants that contain both alleles for a specific trait, only the dominant allele is expressed. This is called the _____.
33. The principle that paired genes must separate from each other during meiosis is known at the _____.
34. The principle that different genes do not influence each other's segregation during gamete formation is known as _____.
35. The condition of genes being inherited together due to their close proximity on the same chromosome, is known as _____.
36. When neither allele is completely dominant or recessive resulting in a blending of the phenotype, it is called _____.

***Fill in the Blank** Continued*

37. In the condition of _____, both alleles in a heterozygote are fully expressed.

38. The principles of _____ are used to predict the likelihood of certain events.

39. A(n) _____ is a diagrammatic representation of individual chromosomes grouped together.

40. A(n) _____ tracks the inheritance of a single gene through several generations of a family.

41. The characteristics resulting from _____ are always determined by more than one gene.

42. Pollen fertilizing egg cells on the same flower, is known as _____ _____.

**Multiple choice: Choose the correct answer.**

43. Genetics is the study of: _____.
(a) immunity (b) heredity (c) development (d) metabolism

44. Today, _____ is known as the father of modern genetics.
(a) Charles Darwin (b) Aurelius Augustine (c) Gregor Mendel (d) Galileo Galilei

45. Basic rules of genetic experimentation include all of the following, **except:**_____ _____.
(a) obtain a large number of offspring
(b) follow characteristics for many generations
(c) analyze results using statistical methods
(d) follow more than one characteristic at a time

46. Genes that are close together on a chromosome tend to _____ during the crossing-over process.
(a) separate (b) remain together (c) switch places (d) exchange information

47. A cross between a homozygous red snapdragon flower and a homozygous white snapdragon flower will produce _____ flowers.
(a) white (b) red (c) pink (d) varigated

48. The IA and IB blood type alleles are _____ over the allele i.
(a) incompletely dominant (c) completely recessive
(b) Incompletely recessive (d) co-dominant

**Complete the Life Principles.**

49. "*Science without religion is _____; Religion without science is blind.*"

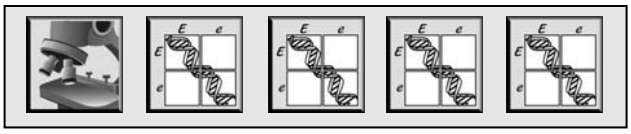
50. "*Most of the things worth doing in the world had been declared _____ before they were done.*"

51. "*Every human is marvelously and wonderfully fashioned as a unique _____ of inestimable worth.*"

52. *"Loneliness and _____frequently travel hand in hand."*



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*Congratulations! You have completed this section!*
***Answer the following questions to test your understanding of the material. When you are finished, hand in your quiz to your teacher. Each answer is worth 2 points.***

**Matching: Choose the correct answers.**

1. _____ DNA polymerase
2. _____ Okazaki fragment
3. _____ DNA ligase
4. _____ anticodon
5. _____ RNA polymerase
6. _____ codon
7. _____ operon
8. _____ repressor
9. _____ operator
10. _____ intron
11. _____ exon
12. _____ nucleotide

(a) compound made of a phosphate group, a nitrogenous base, and a 5-carbon sugar
(b) joins nucleotides together during DNA replication
(c) positions nucleotides in an RNA strand according to complementary base pairing
(d) sequence of three nucleotides that codes for an amino acid
(e) region of DNA that controls the gene regulation process
(f) piece of DNA that is joined to other pieces to form a DNA strand
(g) region of DNA to which a repressor binds to block a gene's transcription
(h) codes for a repressor protein that blocks a gene's transcription
(i) joins Okazaki fragments during DNA replication
(j) intervening sequence that is removed from mRNA
(k) matches a codon on an mRNA molecule allowing tRNA to deposit an amino acid into a polypeptide
(l) expressed sequence of mRNA that remains after intervening sequences are removed; forms new molecule

**Fill in the blank: Write the correct answers using the WORD BANK.**

**WORD BANK**

| | | | |
|---|---|---|---|
| semi-conservative replication | *mRNA* | radioactive isotope | RNA |
| x-ray diffraction | *tRNA* | molecular genetics | transcription |
| dispersive replication | *rRNA* | transformation | chromatin |
| conservative replication | bacteriophage | translation | |

13. The science based on the activity of DNA and the role of DNA in the production of proteins is called _____.
14. The process of reproduction in which genetic material is added to or replaces portions of a bacterium's DNA is called _____.
15. A(n) _____ is a virus that infects a bacterium.
16. A(n) _____ is a form of an element that has a nucleus that gives off particles and energy.

# *SECTION QUIZ 3-2*



***Fill in the Blank** Continued*

17. In the process of _____, a powerful x-ray beam is aimed at a sample, producing a pattern that is recorded on film.

18. The material of a chromosome that consists of DNA and proteins is called_____ _____.

19. The hypothesis of _____ suggests that the two strands of a parent DNA molecule act as templates for a completely new double-stranded molecule.

20. According to the hypothesis of _____, each daughter cell of DNA replication inherits a DNA molecule that consists of one new and one parental strand.

21. The hypothesis of _____ suggests that parental DNA is broken up into short segments and used as templates for the formation of two new double helices.

22. The principal type of nucleic acid that carries out the instructions coded in DNA is called _____.

23. The form of RNA molecule that carries out the instruction coded in DNA is known as _____.

24. The form of RNA molecule that carries copies of genetic information from the DNA to the rest of the cell is called _____.

25. The form of RNA that carries amino acids to the ribosomes during the assembly of a protein is called _____.

26. The nucleotide sequence of a DNA molecule is copied into an RNA molecule during _____.

27. The process by which the nucleotides of *mRNA* are decoded into an amino acid sequence to form a protein is known as _____.

**Multiple choice: Choose the correct answer.**

28. Which of the following statements is true concerning Fredrick Griffeth's bacteriological experiment? _____
    (a) Mice injected with rough bacteria alone developed pneumonia.
    (b) Dead smooth bacteria mixed with rough bacteria caused pneumonia.
    (c) Dead smooth bacteria were virulent.
    (d) Smooth bacteria in the presence of rough bacteria transformed into rough, virulent bacteria.

29. The term *virulent* means: _____.
    (a) capable of reproduction (b) single-celled (c) disease causing (d) mobile

30. Which of the following statements is true concerning the Avery experiments? _____
    (a) Transformation of bacteria was blocked when proteins in the bacteria were destroyed.
    (b) Avery concluded that genes are made of DNA.
    (c) Avery destroyed various molecules of normal bacteria to determine which molecule was causing transformation.
    (d) Avery believed that carbohydrates from smooth bacteria had been transferred to rough bacteria in Griffeth's experiment.

## *SECTION QUIZ 3-2*



31. A virus consists of a molecule of DNA (or RNA) inside a(n) _____ coat.
    (a) carbohydrate (b) lipid (c) nucleic acid (d) protein

32. A phage attacks a bacterium by: _____.
    (a) destroying the bacterium's cell wall
    (b) injecting its genetic material into the bacterium
    (c) injecting toxins into the bacterium
    (d) engulfing the bacterium

33. The main contribution of the Hershey-Chase experiment was that it convinced scientists around the world that: _____.
    (a) bacteriophages are viruses that attack bacteria
    (b) genes are made of DNA
    (c) sulfur and phosphorus have radioactive isotopes
    (d) most proteins contain sulfur but not phosphorus

34. The nucleotides that make up DNA include all of the following, ***except***: _____.
    (a) uracil (b) adenine (c) guanine (d) thymine

35. Chargaff's Rule states that: _____.
    (a) DNA contains equal amounts of all four of its nucleotides
    (b) DNA contains equal amounts of cytosine and guanine as well as adenine and uracil
    (c) DNA contains different amounts of all four of its nucleotides
    (d) DNA contains equal amounts of cytosine and guanine as well as adenine and thymine

36. The DNA double-helix was discovered by: _____.
    (a) Watson and Crick (c) Meselson and Stahl
    (b) Sharp and Berget (d) Hershey and Chase

37. Which of the following nucleotides make up a DNA base pair? _____
    (a) A and U (b) A and T (c) G and T (d) C and A

38. DNA base pairs are held together by _____ bonds.
    (a) covalent (b) hydrogen (c) ionic (d) peptide

39. _____ provided clues to the structure of DNA by x-ray diffraction.
    (a) Hershey and Chase (c) Watson and Crick
    (b) Erwin Chargaff (d) Franklin and Wilkins

40. RNA contains the nucleotide _____ instead of _____.
    (a) thymine; adenine (c) adenine; guanine
    (b) thymine; uracil (d) uracil; thymine

41. Protein synthesis occurs at the: _____.
    (a) cytoplasm (b) ribosome (c) Golgi apparatus (d) nucleus

42. Which of the following occurs first in protein synthesis? _____
    (a) *tRNA* molecules match their anticodons with *mRNA* codons
    (b) *tRNA* deposits the appropriate amino acid in the polypeptide chain
    (c) sequential amino acids are linked and amino acids are released from *tRNA*
    (d) a stop codon is reached

## *SECTION QUIZ 3-2*



43. The repressor protein in a bacterium falls off of the DNA so that lac genes can be transcribed when: _____.
    (a) the repressor protein binds to the operator gene on the DNA
    (b) RNA polymerase is blocked from reaching the lac genes
    (c) the repressor protein binds to lactose
    (d) the operon is defective

44. Ultimately, a phage causes a bacterium to: _____.
    (a) begin killing other bacteria
    (b) make and release hundreds of viruses
    (c) become a single phage
    (d) reproduce bacteria rapidly

45. Tiny particles that are formed by histones that help to fold and package DNA are known as: _____.
    (a) chromatin (c) isotopes
    (b) nucleosomes (d) nucleotides

**Complete the Life Principles.**

46. "*What we see depends mainly on what we* _____."

47. "*A little science estranges a man from God; a lot of science*_____ _____."

48. "*Science is complex and speculative, and it's* _____."

49. "*There are only two ways to live your life. One is as though nothing is a miracle. The other is as though* _____."

50. "*To raise new* _____*, new possibilities, to regard old problems from a new angle, . . . requires creative imagination and marks real advance in science*."



**Remember:**
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*Congratulations! You have completed this section!*
***Answer the following questions to test your understanding of the material. When you are finished, hand in your quiz to your teacher. Each answer is worth 2 points.***

**Multiple choice: Choose the correct answer.**

1. A mutation can be caused by which of the following?_____
   (a) alteration of a DNA nucleotide
   (b) insertion of a DNA nucleotide
   (c) deletion of a DNA nucleotide
   (d) all of the above

2. The majority of genetic mutations are carried on the: _____.
   (a) X chromosome (c) X and Y chromosomes
   (b) Y chromosome (d) autosomes

3. The most common fatal genetic disease in the United States is: _____.
   (a) albinism (c) Tay-Sachs disease
   (b) cystic fibrosis (d) sickle cell anemia

4. The most common form of trisomy is: _____.
   (a) Turner syndrome (c) Down syndrome
   (b) Klinefelter syndrome (d) Tay-Sachs disease

5. When two DNA fragments that have been cut by the same enzyme are mixed:_____
   _____.
   (a) they form a single DNA molecule
   (b) they replicate instantaneously
   (c) they repel each other
   (d) they form two complete DNA molecules

6. Pieces of DNA from two or more sources that are reassembled to act as a single DNA molecule are called: _____.
   (a) transposons (c) Okazaki fragments
   (b) RFLPs (d) recombinant DNA

7. Small, circular DNA molecules in some bacteria that can be used in cell transformation are called: _____.
   (a) plasmids (b) interferons (c) clones (d) RFLPs

## *SECTION QUIZ 3-3*



8. Transgenic organisms: _____.
   (a) only contain genes that originated within themselves
   (b) have been produced by a genetically identical organism
   (c) have been transformed with genes from another organism
   (d) are produced by mating organisms with similar genetic characteristics

9. The role of insulin in the body is to: _____.
   (a) carry carbon dioxide away from tissues to the lungs
   (b) regulate heart rate
   (c) remove sugars from the bloodstream
   (d) remove foreign substances from the body

10. A chemical produced in the body in tiny amounts that is an anti-viral agent is: _____.
    (a) somatotropin (b) furan (c) epinephrine (d) interferon

11. Dark bands that are revealed when pieces of DNA are separated and identified that can be used to identify and classify an individual's DNA are called: _____.
    (a) RFLPs (c) recombinant DNA
    (b) plasmids (d) radioactive probes

12. The Human Genome Project is an effort to:_____
    _____.
    (a) identify each individual in a society with DNA fingerprinting
    (b) observe the individual effects of all human genes
    (c) sequence all the nitrogenous bases in the human genome
    (d) label each amino acid in the human genome with a radioactive probe

**Matching: Choose the correct answers.**

| | |
|---|---|
| 13. _____ mutation | (a) mutation in which a nucleotide is added to or subtracted from a normal DNA sequence |
| 14. _____ mutagen | (b) a mutation that involves only a single gene |
| 15. _____ chromosomal mutation | (c) an agent that causes mutations |
| 16. _____ gene mutation | (d) the science of altering an organism's genetic code to eliminate undesirable characteristics and/or produce desirable ones |
| 17. _____ point mutation | (e) an inheritable alteration in a cell's genetic information |
| 18. _____ frameshift mutation | (f) produces a new generation by mating individuals with desired characteristics |
| 19. _____ transposition | (g) mutation in which long stretches of DNA move from one chromosome to another |
| 20. _____ genetic engineering | (h) a change in the number or structure of a cell's chromosomes |
| 21. _____ selective breeding | (i) mutation in which a single nucleotide is substituted for another in the DNA sequence |
| 22. _____ hybridization | (j) the mating of two organisms with dissimilar genetic characteristics |
| 23. _____ inbreeding | (k) the mating of individuals with similar characteristics |

# *SECTION QUIZ 3-3*



**Fill in the blank: Choose the correct word from the WORD BANK.**

**WORD BANK**

| | | | | |
|---|---|---|---|---|
| transposon | DNA fingerprinting | hemoglobin | electrophoresis | |
| zygote | gene therapy | melanin | cloning | |
| restriction enzyme | cell transformation | nondisjunction | polyploidy | RFLP |

24. _____ is the dark-brown pigment that gives skin its color.
25. The iron-containing protein found in red blood cells that transports oxygen to all parts of the body is called _____.
26. A fertilized egg is called a(n) _____.
27. The term used to describe a chromosome pair that fails to separate during meiosis is called _____.
28. When a whole set of chromosomes fail to separate during meiosis, the resulting in a condition is called _____.
29. The gene involved in transposition that can disrupt transcription and change the amino acids of a protein is called a(n) _____.
30. A protein that cuts DNA at a specific sequence of nucleotides is called a(n)_____ _____.
31. _____ is a technique used to separate DNA fragments by means of electrical fields.
32. _____ occurs when a cell's genetic makeup is changed by the insertion of DNA.
33. The process of artificially producing a genetically identical organism is called_____ _____.
34. In _____, a healthy gene is inserted into a person with a malfunctioning gene.
35. The technique used to identify an individual from its unique pattern of DNA is called_____ _____.

**True or False: Write the correct answers.**

36. _____ Polyploidy in animals is usually fatal.
37. _____ The cell contains some fifty specialized enzymes that locate faulty sequences in the DNA and clip them out.
38. _____ In electrophoresis, larger DNA fragments move faster toward the positive electrode than do smaller DNA fragments.

# *SECTION QUIZ 3-3*



**Matching: Choose the correct answers.**

39. _____ albinism
40. _____ cystic fibrosis
41. _____ Tay-Sachs disease
42. _____ sickle cell anemia
43. _____ Huntington disease
44. _____ Turner syndrome
45. _____ Klinefelter syndrome
46. _____ Down syndrome

(a) genetic disorder characterized by crescent shaped red blood cells
(b) dominant genetic disorder that breaks down the nervous system
(c) genetic disorder that prevents the production of melanin
(d) genetic disorder in which males have an extra sex chromosome
(e) genetic disorder that produces a defective cell membrane protein
(f) involves mental retardation
(g) recessive genetic disorder that causes a rapid breakdown of the nervous system
(h) genetic disorder in which zygotes are XO; missing one sex chromosome

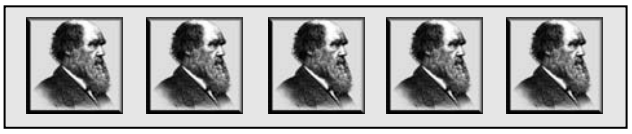
**Complete the Life Principles.**

47. "*I may disagree with what you have to say, but I shall defend, to the death, your right to*_____ _____."
48. "*To know the facts, to reason in reality and live wisely: these are essential to* _____ *in life.*"
49. "*Our scientific power has outrun our spiritual power. We have guided missles and* _____ *men.*"
50. "*Our duty is to believe that for which we have sufficient* _____*, and to suspend our judgement when we have not.*"
51. "*The past should be appreciated by everyone; the door to the future should be guarded by people of* _____ *character.*"

# *SECTION QUIZ 4-1*



**Remember:**
Score an average of 85% or higher on all three quizzes, and you may be exempt from the chapter test!



*Congratulations! You have completed this section!*

***Answer the following questions to test your understanding of the material. When you are finished, hand in your quiz to your teacher. Each answer is worth 2 points.***

**Multiple choice: Choose the correct answer.**

1. A theory supported by many lines of evidence and many years of successful experiments and observations is known as a(n): _____.
   (a) theory (b) hypothesis (c) scientific method (d) scientific law

2. The process by which a general statement is written and tested through experimentation in order to reach a conclusion regarding the statement is called the:_____.
   (a) theory (b) hypothesis (c) scientific method (d) scientific law

3. A scientifically acceptable and tested statement offered to explain observed facts is a(n): _____.
   (a) theory (b) hypothesis (c) scientific method (d) scientific law

4. A(n) _____ is an assumption made in order to test and prove a logical conclusion.
   (a) theory (b) hypothesis (c) scientific method (d) scientific law

5. Contemporary scholars estimate that the Earth is home to approximately _____ species of living things.
   (a) 5 thousand (b) 50 thousand (c) 5 million (d) 50 million

6. Darwin's interest in the Galapagos Archipelago centered around:_____ _____.
   (a) the islands being 600 miles west of Equador
   (b) species on each island being essentially the same
   (c) volcanic activity being responsible for the formation of the islands
   (d) each island having species that were distinctly different from each other

7. The largest division of geologic time is the: _____.
   (a) decade (b) eon (c) millineum (d) century

8. Sexual reproduction alone cannot be responsible for evolution because:_____ _____.
   (a) it does not change the relative frequency of alleles in the gene pool of a species
   (b) it removes alleles from the gene pool of a species
   (c) it does not change the combination of alleles in the gene pool of a species
   (d) it shuffles the alleles in the gene pool of a species

9. A scientist trained to classify organisms is a(n): _____.
   (a) paleontologist (b) taxonomist (c) geologist (d) naturalist

## *SECTION QUIZ 4-1*



10. Ample evidence exists for _____ evolution, but absolute evidence for _____ evolution is lacking.
    (a) vertical; horizontal (c) animal; plant
    (b) plant; animal (d) horizontal; vertical

11. A scientist who studies ancient existing things or ancient life forms is known as a(n): _____.
    (a) paleontologist (b) taxonomist (c) geologist (d) naturalist

12. Following a geology field trip in 1831, Darwin took a position as a(n) _____ on the *HMS Beagle*.
    (a) paleontologist (b) taxonomist (c) naturalist (d) sailor

**Matching: Choose the correct answers.**

13. _____ Charles Darwin
14. _____ Thomas Malthus
15. _____ Sir Charles Lyell
16. _____ Alfred Russel Wallace
17. _____ Edward Blyth

(a) authored *The Origin of Species*
(b) speculated that processes such as erosion, which are observable today, shaped the topography of the modern world
(c) believed that natural selection is used by nature to remove defective organisms, thus conserving the health of the population
(d) studied in Malaysia and published a work very similar to *The Origin of Species*
(e) author of *An Essay on the Principles of Evolution*

**Matching: Choose the correct answers.**

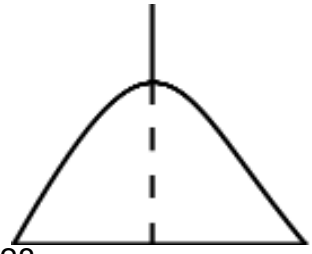
18. _____ evolution
19. _____ creation
20. _____ catastrophist theory
21. _____ natural selection
22. _____ adaptation
23. _____ artificial selection
24. _____ survival of the fittest
25. _____ common descent
26. _____ stabilizing selection
27. _____ vertical evolution

(a) states that the individuals or groups best suited to their environment will survive and reproduce
(b) natural selection process by which the environment continually eliminates individuals at extremes of a population
(c) method of selective breeding of organisms to produce offspring with desirable characteristics
(d) proposal that life evolved from a primordial mixture at its earliest beginnings to the complex diversity that exists today
(e) process by which the struggle for existence selects the fittest individuals in nature to survive and reproduce
(f) living creatures were designed and created in fully functional and completely developed form
(g) evolution of physical and behavioral traits that make an organism better suited to survive in its environment
(h) states that the Earth experienced a major catastrophe in which most creatures and plants were destroyed, and that the remaining creatures represented today have changed very little over time
(i) hypothesis suggesting that all species have descended from a common ancestor
(j) form of evolution characterized by one type of organism morphing into an entirely different species

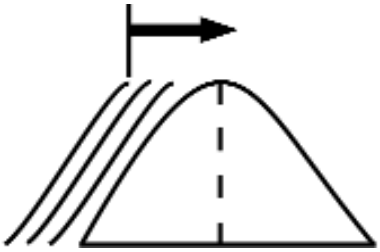
# *SECTION QUIZ 4-1*



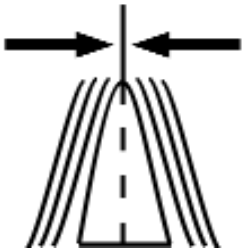
**Label each as "stabilizing", "disruptive", "directional selection", or "normal distribution".**



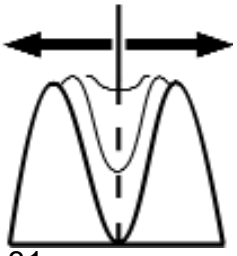
28._____



29._____



30._____



31._____

**Fill in the blank: Choose the correct answers from the WORD BANK.**

**WORD BANK**

| | | |
|---|---|---|
| reproductive isolation | gene flow | normal distribution |
| living diversity | gene shuffling | gene pool |
| speciation | founder effect | sterility |
| species | population | genetic drift |

32. A group of similar looking organisms that can breed with one another and produce fertile offspring is called a(n) _____.

33. Dogs cannot interbreed with cats. This is an example of _____ _____.

34. All the alleles of all the genes of the members of a population that interbreed are called a(n) _____.

35. The process that produces variations due to the crossing-over mechanism of gamete formation is known as _____.

36. When individuals of a population migrate from one group to another and interbreed, it results in _____.

37. The bell-shaped curve associated with the range of phenotypes in polygenic inheritance is known as a(n) _____.

38. A random change in allele frequency that often produces offspring by chance that will be different from the original population is called _____.

39. The change in allele frequencies produced when a new population arises from one or a few colonizing individuals is called the _____.

40. The formation of a new species through evolutionary processes is known as _____ _____.

41. When abnormal crosses are attempted between species, _____ is almost always the result.

## *SECTION QUIZ 4-1*



**True or False: Write the correct answers.**

42. _____ The theory of evolution has been validated by the scientific method and is therefore classified as a scientific law.

43. _____ With the pressure of natural selection, gene shuffling and gene flow can lead to a change in allele frequency.

44. _____ Mutations are the only method by which nature can add information to existing genetic material.

45. _____ Scientists have documented the macroevolution of several species.

**Complete the Life Principles.**

46. "A _____ *is a curious man looking through... the keyhole of nature, trying to know what's going on.*"

47. "*Whatever the scientist may say, if we take the* _____ *out of life, we leave only the unnatural.*"

48. "*Natural selection can explain the survival of the fittest, but not the* _____ *of the fittest.*"

49. "*Each species is a* _____*, a creation assembled with extreme care and genius.*"

50. "*To raise new* _____*, new possibilities, to regard old problems from a new angle, requires creative imagination and marks real advance in science.*"

# *SECTION QUIZ 4-2*





**Remember:**
Score an average of 85% or higher on all three quizzes, and you may be exempt from the chapter test!



*Congratulations! You have completed this section!*
***Answer the following questions to test your understanding of the material. When you are finished, hand in your quiz to your teacher. Each answer is worth 2 points.***

**Multiple choice: Choose the correct answer.**

1. Mutations could best be described as:_____.
   (a) rare; usually beneficial
   (b) common; usually beneficial
   (c) rare; usually harmful
   (d) common; usually harmful

2. In the peppered-moth study, the advance of the Industrial Revolution caused the percentage of dark-colored moths to: _____.
   (a) decrease (b) remain constant (c) increase (d) none of the above

3. A shift in the populations of dark versus light-colored moths in the peppered-moth study was the result of: _____.
   (a) new genetic information
   (b) increased complexity
   (c) evolutionary change
   (d) natural selection

4. In the geologic column, _____ forms of fossils are found in the lower strata and _____ forms of fossils are found near the surface of the Earth.
   (a) simple and unspecialized; higher and complex
   (b) smaller and fragile; larger and stronger
   (c) higher and complex; simple and unspecialized
   (d) larger and stronger; smaller and fragile

5. Why do the protozoa present a significant problem to the fossil record?_____
   _____
   (a) They are the life forms from which higher life forms evolved.
   (b) They have remained unchanged throughout the course of presumed evolutionary history.
   (c) They confirm that vertical evolution is the universal law of nature.
   (d) They are unicellular and their ancestors are multicellular.

6. Fossilization as found in the geological strata of the Earth seems to be evidence of a worldwide catastrophe involving water because:_____
   _____.
   (a) fossilization is taking place in mass today as found in the geological strata
   (b) fossilization requires rapid burial
   (c) fossilization is evidence of a slow burial
   (d) all of the above

## *SECTION QUIZ 4-2*



7. How do fossil graveyards suggest that a worldwide catastrophe involving water is responsible for the present topography of the earth?_____
   _____
   (a) They display fossilized remains of transitional animal forms in tangled groups.
   (b) They display fossilized remains of animals from widely separate climates in tangled groups.
   (c) They display fossilized remains of animals from similar climates in an orderly fashion.
   (d) none of the above

8. How do the mammoths of Siberia and Alaska support the occurrence of a sudden aquatic catastrophe?_____
   (a) They have been found in tact standing or kneeling with food in their mouths.
   (b) Their eyes and red blood cells have been preserved.
   (c) Their condition suggests abrupt and dramatic environmental changes.
   (d) all of the above

9. Even the oldest levels of the Earth's strata contain fossils with evidence of actual soft tissues. Why is this significant?_____
   _____
   (a) It is evidence of a normal and gradual process as described by the uniformitarianism model.
   (b) It is evidence that the fossils are very young.
   (c) It is evidence of a hydraulic catastrophe that kept tissues from decaying, thus facilitating fossilization.
   (d) all of the above

10. Fossils and fragments of jaws found in Africa and Java are used to suggest that: _____
    _____.
    (a) ancestors of monkeys, apes, and humans began their evolutionary journey some 50 million years ago
    (b) the origin of the human species is very different than that of every other species
    (c) the distinctive human features and brain capacities are products of design
    (d) every species has evolved from the Homo sapiens

11. Drawings of man's supposed progression from ape to human are largely the products of: _____.
    (a) fossil evidence
    (b) DNA sequencing
    (c) soft-tissue evidence
    (d) imagination

12. Comparative anatomy as proof of macroevolution became less valid with the introduction of: _____.
    (a) homologous structures
    (b) DNA sequencing
    (c) paleoanthropology
    (d) generational traits

13. Researchers have demonstrated conclusively that the various stages through which an embryo passes are: _____.
    (a) virtually identical to other classes of vertebrates in their earliest stages
    (b) essential for its development from a single cell to an ordered being
    (c) evidence of the organism's evolutionary history
    (d) excessive according to the basic needs of development

# *SECTION QUIZ 4-2*



**Matching: Choose the correct answers.**

14. _____ paleontology
15. _____ fossils
16. _____ strata
17. _____ sedimentary rocks
18. _____ geologic column
19. _____ geology
20. _____ index fossils
21. _____ paleoanthropology
22. _____ ontogeny
23. _____ phylogeny
24. _____ James Hutton
25. _____ Ernst Haeckel
26. _____ circular reasoning
27. _____ Eohippus

(a) study of fossils in which fossils are located, catalogued, and interpreted
(b) form when salt, sand, or clay builds up in the bottom of a river, lake, or ocean
(c) the study of homnid life based on fossil remains found in the earth
(d) authored series of fraudulent embryo drawings purported to retrace evolutionary development of organisms
(e) embryonic development of an organism
(f) preserved remains of once living organisms
(g) study of the history of the Earth's crust and surface features
(h) strata determines age of fossils therein; fossils determine age of strata in which they occur
(i) marker fossils which are easily recognized and assumed to have been widespread in occurance
(j) distinct layers of rock in the Earth's crust
(k) alleged evolutionary development of an organism
(l) a rodent-like creature at one time proposed to be the ancestor of the horse; has been discredited
(m) hypothetical continuum of geologic strata with a presumed time scale based on the types of fossils found in each strata
(n) first to introduce uniformitarianism, called Father of Geology

**Fill in the blank: Choose the correct answers from the WORD BANK.**

**WORD BANK**

| | | | |
|---|---|---|---|
| uniformitarianism | macroevolution | Cambrian explosion | Neo-Darwinism |
| hypothesis | biogenetic law | Precambrian explosion | Big Bang Theory |
| epochs | eras | periods | |

28. _____ is an updated Darwinian hypothesis that proposes that over eons of time mutations coupled with natural selection led to the evolution of simple life forms into modern complex life forms.

29. The hypothesis that minimizes the impact of catastrophic events and states that the origin and development of all thing can be explained exclusively in terms of the same natural laws and processes operating today is called _____.

30. _____ is the hypothesis that the same processes which works in microevolution can, over eons of time, transform an organism into a completely different species.

31. The term _____, is applied to the abrupt appearance in the fossil record of all the major invertebrate forms of life with no preliminary or intermediate forms leading up to them.

32. An invalidated hypothesis which once maintained that the development of an embryo retraced the evolutionary development of an organism was called the _____, or the *recapituation theory*.

# *SECTION QUIZ 4-2*



***Fill in the Blank** Continued*

33. Pre-cambrian, Paleozoic, Mesozoic and Cenozoic are the major _____, or divisions, of the geologic time scale.

**True or False: Write the correct answers.**

34. _____ Mutation is the only conceivable process that could add genetic material to a population, thereby contributing to a higher form of species.

35. _____ The validity of the geological column and its embedded fossils has been confirmed by radioactive dating.

36. _____ Polystratic trees were fossilized in upright positions and extend through several layers of strata.

37. _____ Paleoanthropology has produced verifiable fossils that suggest man has evolved from the apes.

**Matching: Choose the correct answers.**

38. _____ Cro-magnons
39. _____ Archaeopteryx
40. _____ homnids
41. _____ Nebraska Man
42. _____ Piltdown Man
43. _____ Australopithecus ("Lucy")
44. _____ Homo sapiens
45. _____ Neanderthals
46. _____ homologous structures
47. _____ vestigial structures

(a) structures in an organism that seem to have little or no function
(b) any of a family of two-legged primates including humans and closely related primates such as monkeys and apes
(c) based on a single tooth found among ancient tools
(d) heralded as "Darwin's missing link"; proved to be a fraud
(e) classification of modern humans, includes Neanderthals and Cro-Magnons
(f) proposed to be first Homo Sapien city builders
(g) structures that have a common origin but not necessarily a common function
(h) fossilized animal print having had teeth and claws like a reptile with wings and feathers like a bird; at first claimed to be an intermediary fossil, later disproved
(i) proposed to be one of the first homnids about 4 million years ago; bone fragments from questionable distances pieced together
(j) oldest fossils that are characterized as Homo Sapiens, called "cavemen"

**Complete the Life Principles.**

48. "*A lie told often enough becomes the* _____."

49. "*No science is immune to the infection of politics and the corruption of* _____."

50. "True _____ *is more concerned with discovery of truth than with protection of held theories and hypotheses.*"

51. "*The great tragedy of science (is) the slaying of a beautiful hypothesis by an ugly* _____."

52. "*An honest man alters his ideas to fit* _____*, and a dishonest man alters the truth to fit his ideas.*"



**Remember:**
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*Congratulations! You have completed this section!*
***Answer the following questions to test your understanding of the material. When you are finished, hand in your quiz to your teacher. Each answer is worth 2 points.***

**Multiple choice: Choose the correct answer.**

1. Darwin's "Great Tree of Life" was characterized by:_____
_____.
   (a) modern species at its root and a common ancestor as its leaves
   (b) a common ancestor at its root and modern species as its fruit
   (c) a common ancestor at its root and modern species as its branches
   (d) modern species as the tree and a common ancestor as its nourishing soil

2. The First Law of Thermodynamics is also known as the:_____
_____.
   (a) Law of Energy and Mass Conservation (c) Law of Mass Action
   (b) Law of Energy Decay or Deterioration (d) Law of Convergent Radiation

3. The respective chromosome numbers of various species present a problem in the theory of macroevolution because:_____
_____
_____.
   (a) organisms with the fewest number of chromosomes were the first to evolve, followed by organisms with a greater number of chromosomes
   (b) a human has 94 chromosomes and a chimpanzee only has 78 chromosomes, contrary to the trend of macroevolution
   (c) organisms that are supposed to have evolved before humans have a greater number of chromosomes than humans
   (d) none of the above

4. Which of the following does **not** illustrate the Law of Entropy Increase?_____
_____
   (a) a car that is not tuned regularly soon will no longer run
   (b) many ingredients are mixed together to produce a chocolate cake
   (c) a house that is not cleaned will become increasingly more messy
   (d) a child who will not put up his or her toys will eventually have a room in disarray

5. Left on its own, everything in life moves from:_____.
   (a) worse to better (c) death to life
   (b) order to disorder (d) smaller to larger

## *SECTION QUIZ 4-3*



6. Scientists agree that a cause exists for every effect. Why is this inconsistent with the Big Bang theory?_____
_____
(a) More than one cause exists for the introduction of life and order.
(b) Life and order are the cause, but no effect is apparent.
(c) It suggests that the Big Bang had no effect on the existing universe.
(d) It suggests that life and order happened without cause.

7. The macroevolutionary scenario of early reptiles wanting to eat insects that were out of reach supposedly led to:_____.
(a) limbs that were modified for flying
(b) limbs that were modified for jumping
(c) limbs that were modified for climbing
(d) limbs that were modified for gliding

8. The macroevolutionary scenario in which early reptiles were tree-dwellers that leaped supposedly led to:_____
_____.
(a) the transformation of limbs for increased leaping ability
(b) a change in the diet of reptiles from insects to meat
(c) a significant loss in reptilian bone mass
(d) fore legs that eventually developed into wings

9. According to some scientists, the evolution of reptile legs into bird wings defies the process of natural selection because:_____
_____.
(a) intermediate features would be so advantageous that further evolution would not occur
(b) creatures with half-wing, half-leg characteristics would not fare well in nature
(c) wings do not offer good benefits for survival
(d) reptile legs and bird wings are not similar at all

10. Which of the following is true concerning the human eye?_____
_____
(a) It only sees objects that have a large diameter.
(b) It is fully understood by scientists.
(c) It produces colored, multi-dimensional pictures.
(d) It is strong evidence for macroevolution.

11. Which of the following is an example of irreducible complexity?_____
(a) the monarch butterfly
(b) the immune system
(c) the human brain
(d) all of the above

12. Autoimmune diseases result in: _____.
(a) an overproduction of antigenic material
(b) an immune response toward invading bacteria
(c) a deficiency of white blood cells in the body tissues
(d) the human body attacking its own cells

13. The absence of antibodies in the immune system would result in: _____.
(a) autoimmunity
(b) loss of immune function
(c) increased immunity
(d) none of the above

## *SECTION QUIZ 4-3*



14. For organs such as the kidneys, liver, and heart to have developed through chance mutation, the mutations would have had to occur: _____.
    (a) simultaneously (c) slowly
    (b) in order (d) in different organisms

15. Which of the following statements is false concerning the Bombardier beetle? _____
    _____
    (a) It produces an explosion when in danger.
    (b) It prevents its own destruction with an anti-inhibitor.
    (c) It shoots benzoquinones at 212 degrees F.
    (d) It presents difficulty to evolutionary theory.

16. Evolution suggests that nothing evolves until it is needed. Why is this inconsistent with the development of the Bombardier beetle? _____
    _____
    (a) The beetle developed an explosive defense mechanism before it needed one.
    (b) The beetle had no need for a self-protective mechanism.
    (c) The beetle could not recognize its need for an inhibitor until it had exploded.
    (d) all of the above

17. The laws of probability are: _____.
    (a) arbitrary (b) abstract (c) dependable (d) undefined

18. What was William Paley's primary conclusion in his "Watchmaker Argument"? _____
    _____
    (a) Watches are products of design. (c) A rock is an evolutionary product.
    (b) A watch is more valuable than a rock. (d) Humans are products of design.

19. According to John Horgan, "...protein cannot form without _____, but neither can _____ form without _____."
    (a) DNA; DNA; protein (c) protein; protein; DNA
    (b) DNA; protein; DNA (d) protein; DNA; protein

20. Based on the scientific method, many aspects of the evolutionary theory are not _____, but remain _____.
    (a) hypotheses; scientific laws (c) scientific laws; theories
    (b) hypotheses; theories (d) scientific laws; hypotheses

21. Which of the following is the correct progression of an idea through the scientific method process? _____
    (a) hypothesis, theory, scientific law (c) scientific law, hypothesis, theory
    (b) theory, hypothesis, scientific law (d) hypothesis, scientific law, theory

22. Which of the following statements is false concerning punctuated equilibrium? _____
    _____
    (a) A small segment of a species becomes isolated and rapidly evolves.
    (b) It requires an increase in mutation rate.
    (c) A parent species dominates newly evolved species.
    (d) It helps to explain absence of transitional fossils.

## *SECTION QUIZ 4-3*



23. A(n) _____ is a microscopic, motor-like entity that gives bacteria the ability to move from place to place.
(a) pilum (b) flagellum (c) microvillus (d) receptor

**Matching: Choose the correct answers.**

24. _____ First Law of Thermodynamics
25. _____ Law of Mass Conservation
26. _____ Second Law of Thermodynamics
27. _____ Law of Entropy Increase
28. _____ Big Bang theory
29. _____ irreducible complexity
30. _____ punctuated equilibrium
31. _____ intelligent design theory

(a) states that the mass of matter cannot change as a result of state, density, or form
(b) condition that occurs when, by reducing the complexity of a functioning unit, the function is destroyed
(c) interchangeable with the Second Law of Thermodynamics
(d) pattern of long periods of stability interrupted by episodes of rapid evolutionary change
(e) states that energy and mass can neither be created nor destroyed
(f) states that 15 million years ago, a "cosmic egg" exploded, creating the universe
(g) states that the amount of usefulness and availability of energy is always decreasing
(h) states that an intelligent force is responsible for the origin of all life forms

**Fill in the blank: Choose the correct answers from the WORD BANK.**

**WORD BANK**

| | | | |
|---|---|---|---|
| scientific method | morpholysis | probability | polystratic trees |
| molecular clock | phylogenetic trees | molecular pylogeny | scientific law |

32. The evolutionary history of a group of organisms based on DNA and protein comparisons is known as _____.
33. The hypothesis that mutations in DNA occur at a constant rate that is used to estimate time frames of departure from a common ancestor is called the_____ _____.
34. The modern versions of the Darwinian tree of life are called_____ _____.
35. The principle of nature that means "breaking down of structure" is known as _____.
36. The mathematical calculation of the likelihood of an event occurring is called _____.
37. When we use observations in the natural world and experimental world to draw conclusions, we are using the _____.

# *SECTION QUIZ 4-3*



**True or False: Write the correct answers.**

38. _____ There is a confirmed macroevolutionary trend among the amino acid sequences of a single protein in varying species.
39. _____ The theory of macroevolution contradicts the Second Law of Thermodynamics.
40. _____ The Big Bang theory violates the first and second laws of thermodynamics.
41. _____ The laws of probability are strongly in favor of macroevolution.
42. _____ Anything with odds greater than one in $10^{50}$ is considered by mathematicians to be effectively impossible.
43. _____ Cells are irreducibly complex.
44. _____ Macroevolution is supported by solid evidence from the fossil record.
45. _____ Emile Zuckerkandl and Linus Pauling suggested that DNA and protein sequences could be used to determine how closely organisms are related.

**Complete the Life Principles.**

46. "_____ *do not cease to exist because they are ignored.*"
47. "*It's harder to crack a* _____ *than an atom.*"
48. "*A* _____ *result can be obtained only by fully stating and balancing the facts and arguments on both sides of each question.*"
49. "*Where we have strong* _____ *we're liable to fool ourselves.*"
50. "*He that answers a matter before he hears it is*_____."

# *SECTION QUIZ 5-1*



**Remember:**
Score an average of 85% or higher on all three quizzes, and you may be exempt from the chapter test!



*Congratulations! You have completed this section!*
***Answer the following questions to test your understanding of the material. When you are finished, hand in your quiz to your teacher. Each answer is worth 2 points.***

**Multiple Choice: Choose the correct answer.**

1. The distance between a star and a planet is the most important consideration when determining: _____.
   (a) the life span of the star (c) the speed of the planet's rotation around the star
   (b) the age of the planet (d) the planet's ability to support life

2. It has been estimated that only _____ of all stars could have planets capable of supporting advanced life.
   (a) 1.00% (b) .01% (c) .001% (d) .0001%

3. The Earth's tilting and revolution around the Sun causes:_____.
   (a) the ocean's tides (c) the vegetative growing seasons
   (b) the atmosphere's composition (d) a magnetic field

4. The Moon revolves around the Earth causing: _____.
   (a) ultraviolet radiation (c) the ocean's tides
   (b) the earth's seasons (d) twenty-four hour days

5. If the Earth's magnetic field were stronger_____ _____ would result.
   (a) severe electromagnetic storms (c) inadequate protection from solar radiation
   (b) a decrease in the force of gravity (d) intolerable surface temperatures

6. The amount of carbon-14 in a dead animal is: _____.
   (a) increasing (c) decreasing
   (b) staying constant (d) becoming C-12

7. According to Thomas G. Barnes, the Earth's magnetic field is:_____.
   (a) increasing slowly (c) decreasing slowly
   (b) increasing exponentially (d) decreasing exponentially

8. _____ proved that infections always spread from a donor.
   (a) Stanly Miller and H.C. Urey (c) Carolus Linnaeus and Robert Whittaker
   (b) Leslie Orgel and R.L. Wysong (d) Louis Pasteur and Joseph Lister

9. Oxygen, although necessary for life, would have destroyed the first amino acids. This fact presents a problem to the theory of: _____.
   (a) natural selection (c) spontaneous generation
   (b) intelligent design (d) survival of the fittest

# *SECTION QUIZ 5-1*



10. The most exclusive group in the hierarchy of living things is:_____.
    (a) species (b) class (c) family (d) kingdom

11. The correct order of the hierarchy of biological categories is:_____
    _____.
    (a) Kingdom, Class, Phylum, Order, Family, Genus, Species
    (b) Kingdom, Phylum, Class, Family, Order, Genus, Species
    (c) Kingdom, Phylum, Class, Order, Family, Genus, Species
    (d) Kingdom, Phylum, Class, Order, Genus, Family, Species

12. The domestic cat is called *Felis domesticus*. *Felis* refers to the_____ to which the cat belongs and *domesticus* refers to the _____ to which the cat belongs.
    (a) Kingdom; Species (c) Kingdom; Phylum
    (b) Genus; Species (d) Genus, Family

13. Members of the class Mammalia all: _____.
    (a) are cold-blooded (c) have hairless bodies
    (b) produce milk (d) all of the above

14. The six kingdoms of life are:_____
    _____.
    (a) Eubacteria, Archaebacteria, Protista, Fungi, Plantae, and Animalia
    (b) Monera, Insectae, Protista, Fungi, Plantae, Animalia
    (c) Eubacteria, Archaebacteria, Protista, Algae, Plantae, Animalia
    (d) Eubacteria, Archaebacteria, Paramecia, Fungi, Plantae, Animalia

15. One-celled eukaryotic organisms are classified as: _____
    (a) Animalia (b) Algae (c) Protista (d) Archaebacteria

16. How do fungi differ from plants?_____
    (a) They are motile. (c) They cannot make their own food.
    (b) They do not have cell walls. (d) They are not eatable.

17. Other planets in our solar system are not capable of supporting life because:
    _____.
    (a) they do not orbit the Sun (c) they are too close to or too far from the Sun
    (b) they are too small (d) they are not environmentally active

**Using the WORD BANK, identify the kingdom to which each of the following organisms belongs (18-21).**

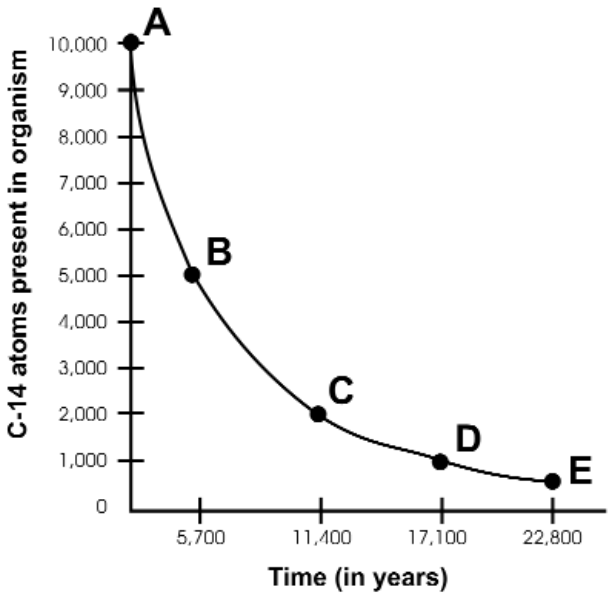
**WORD BANK**

| | | | | | |
|---|---|---|---|---|---|
| Eubacteria | Plantae | Protista | Plantae | Paramecia | Algae |
| Fungi | Insectae | Archaebacteria | Animalia | Monera | |

18. mushroom _____ 20. human _____

19. algae _____ 21. paramecium _____

**Use the figure below to answer questions #22-24.**




22. Point A on the graph represents which of the following? _____

_____

(a) the age of the organism at death
(b) the half-life of C-14
(c) the amount of C-14 present in the organism before death
(d) carbon's atomic weight

23. Point B represents which of the following? _____

_____

(a) the age of the organism at death
(b) the amount of C-14 in the organism after one half-life
(c) the organism's metabolic activity while alive
(d) the amount of C-14 in the organism that was converted to C-12

24. Which of the following can you observe from the graph? _____

_____

(a) 100% of the C-14 of the organism will be dissipated in 5,700 years
(b) the half-life of C-14 is very short
(c) fewer C-14 molecules are dissipated with each half-life
(d) point F will represent one-sixteenth of the C-14 atoms of point A

25. Use the chart on the right to answer this question. Which of the following can be deduced from this information?

_____

(a) The genus name for maple trees is Acer.
(b) The maple species nigrum, rubrum, and saccharinium produce different colored flowers.
(c) New species of maple trees will have names other than Acer.
(d) Acer saccharum makes the sweetest maple syrup.

| Scientific Name | Common Name |
|---|---|
| Acer saccharum | Sugar maple |
| Acer saccharirium | Silver maple |
| Acer rubrum | Scarlet maple |
| Acer platanoides | Norway maple |
| Acer campestre | Common maple |
| Acer nigrum | Black maple |

26. Which group depends on other organisms as a food source? _____
    (a) autotrophs only
    (b) heterotrophs only
    (c) autotrophs and heterotrophs
    (d) neither autotrophs nor heterotrophs

27. Which group can live without water? _____
    (a) autotrophs only
    (b) heterotrophs only
    (c) autotrophs and heterotrophs
    (d) neither autotrophs nor heterotrophs

28. Which group changes light energy into food energy? _____
    (a) autotrophs only
    (b) heterotrophs only
    (c) autotrophs and heterotrophs
    (d) neither autotrophs nor heterotrophs

29. Which group supplies food for other organisms? _____
    (a) autotrophs only
    (b) heterotrophs only
    (c) autotrophs and heterotrophs
    (d) neither autotrophs nor heterotrophs

**Matching: Choose the correct answers.**

30. _____ taxonomy
31. _____ morphology
32. _____ motile
33. _____ prokaryotic
34. _____ eukaryotic
35. _____ autotrophic
36. _____ heterotrophic

(a) cells that lack a nuclear membrane and have no membrane-bound organelles
(b) capable of spontaneous movement
(c) organisms that produce their own food
(d) science of naming and assigning organisms into groups
(e) organisms that are dependent on other organisms for food
(f) study of the structure of organisms
(g) this type of organism makes up the kingdoms Protista, Fungi, Plantae, and Animalia

**Multiple choice: Choose the correct answer.**

37. The shield that protects the Earth from solar ultraviolet radiation is the: _____.
    (a) cosmic shield (b) solar wind (c) ozone layer (d) oxygen sheet

38. The Earth's two primary atmospheric constituents are _____ (78%), and _____ (20%).
    (a) oxygen; nitrogen
    (b) nitrogen; carbon dioxide
    (c) nitrogen; oxygen
    (d) carbon dioxide; nitrogen

39. Uniformitarians promote the idea that the Earth is _____ years old.
    (a) 6,000 (b) 10, 000 (c) 1,000,000 (d) 4,600,000

40. A method using half-lives of radioactive isotopes to determine the age of fossils and rocks is called: _____.
    (a) stratification
    (b) isotopic timing
    (c) carbonic aging
    (d) radioactive dating

41. _____ invented the system that is used today to classify organisms.
    (a) Ernst Haekel
    (b) Carolus Linnaeus
    (c) Stanly Miller
    (d) Leslie Orgel

# *SECTION QUIZ 5-1*



**True or false: Write the correct answers.**

42. _____ C-14 has a half-life of 5,700 years.

43. _____ The properties of the Earth's magnetic field suggest that the Earth is older than 10,000 years.

44. _____ Although the Miller-Urey experiment produced some amino acids, many more organic molecules would need to be produced in a specific sequence for life to begin.

45. _____ All members of the plant kingdom have cell walls that contain cellulose.

**Complete the Life Principles.**

46. "*Gaze at the stars and you must contemplate the*_____ _____."

47. "*It is a capital mistake to* _____ *before one has data*."

48. "*A good soup can sustain life, but I know of no evidence that soup* _____ *life*."

49. "*In all things of* _____ *there is something of the marvelous*."

50. "*Science may have found a cure for most evils; but is has found no remedy for the worst of them all—the*_____of human beings."

Date: _____ Grade: _____

# *SECTION QUIZ 5-2*





**Remember:**
Score an average of 85% or higher on all three quizzes, and you may be exempt from the chapter test!



*Congratulations! You have completed this section!*
***Answer the following questions to test your understanding of the material. When you are finished, hand in your quiz to your teacher. Each answer is worth 2 points.***

**Multiple Choice: Choose the correct answers.**

1. All bacteria are: _____.
   (a) autotrophic (b) prokaryotic (c) heterotrophic (d) eukaryotic

2. Bacteria have all of the following except: _____.
   (a) cell membrane (c) nuclear membrane
   (b) circular DNA (d) cell wall

3. Today, bacteria are either placed in the kingdom _____ or _____.
   (a) Monera; Protista (c) Eubacteria; Archaebacteria
   (b) Fungi; Algae (d) Eubacteria; Monera

4. A virus contains a core of DNA or RNA surrounded by a(n):_____.
   (a) nucleic acid membrane (c) peptidoglycan shield
   (b) cellulose wall (d) protein coat

5. All organisms of the kingdom Protista are: _____.
   (a) unicellular (c) photosynthetic
   (b) eukaryotic (d) heterotrophic

6. The characteristics of protists could best be described as:_____.
   (a) predictable (b) consistent (c) rigid (d) varied

7. Algae and Protozoans are members of the kingdom: _____.
   (a) Protista (b) Fungi (c) Plantae (d) Animalia

8. Which of the following statements best describes extracellular digestion?_____
   _____
   (a) Food is digested with secreted chemicals and then absorbed.
   (b) Food is digested by other organisms and absorbed.
   (c) Food is ingested and then digested with chemicals.
   (d) none of the above

9. All of the following are characteristics of plants, **except:** _____
   (a) eukaryotic (c) unicellular
   (b) photosynthetic (d) sexual reproduction

10. Bryophytes would survive best in which of the following environments?_____
    (a) mountain (b) desert (c) arctic (d) swamp

# *SECTION QUIZ 5-2*



11. Which of the following is true concerning ferns?_____
    (a) They contain no vascular tissue. (c) They are considered bryophytes.
    (b) They can survive long droughts. (d) They have roots and stems but no leaves.

12. The distinction between monocots and dicots is the _____ of the cotyledons.
    (a) size (b) shape (c) number (d) composition

13. Roots function to: _____.
    (a) anchor plants (b) absorb water (c) absorb nutrients (d) all of these

14. Leaves function to: _____.
    (a) aid evaporation (b) capture light (c) anchor plants (d) all of these

**Matching: Choose the correct answers.**

15. _____ phloem
16. _____xylem
17. _____ spores
18. _____ hypha
19. _____ mycellium
20. _____ seed
21. _____ cuticle
22. _____ stomata
23. _____ vascular tissue
24. _____ peptidoglycan
25. _____ chitin
26. _____ chlorophyll

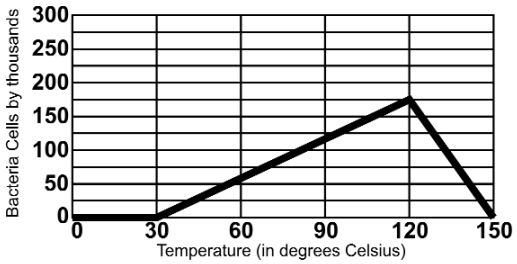
(a) pigment responsible for the green color of plants
(b) carbohydrate that makes up the thick, rigid walls of the members of the kingdom Eubacteria
(c) reproductive structure that includes a developing plant and a food reserve enclosed in a resistant outer cover
(d) waxy covering on plant leaves to keep plants from losing water by evaporation; plant "skin"
(e) carbohydrate that reinforces cell walls of the members of the Kingdom Fungi
(f) transports products of photosynthesis and substances from one part of the plant to another
(g) small, single-celled structures, each capable of producing a new individual
(h) threadlike, branching filament that is the most basic structure of a fungus
(i) openings in the epidermis of a plant that allow gas exchange
(j) mass of hyphae that grows in the food source and forms the body of the fungus
(k) carries water and nutrients from the roots to the branches and leaves of plants
(l) specialized tissue that transports water and nutrients throughout land plants

27. A solution of bacteria was slowly heated from 0 degrees Celsius to 90 degrees Celsius. The number of bacteria increased until the temperature reached 90 degrees Celsius, and then the bacteria began to die off. At 150 degrees Celsius, no living bacteria were left. Which graph (on the adjoining page) best represents these data? _____

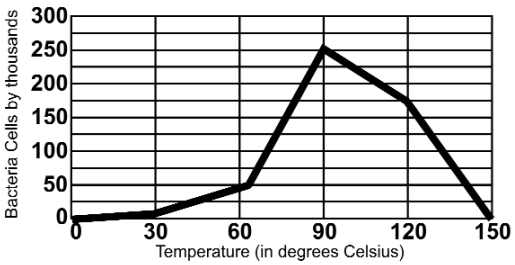
# *SECTION QUIZ 5-2*



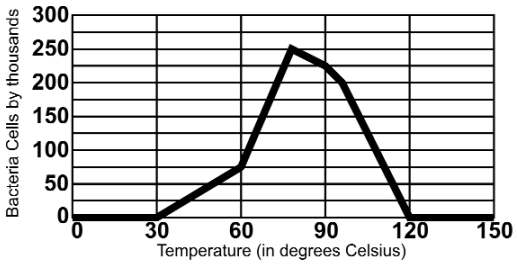
(a)



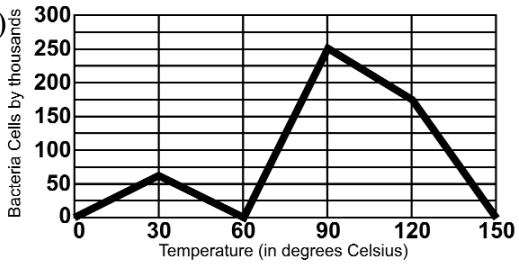

(c)




(b)




(d)




**Matching: Choose the correct answers.**

28. _____ Eubacteria
29. _____ Archaebateria
30. _____ Algae
31. _____ Protozoans
32. _____ gymnosperm
33. _____ angiosperm
34. _____ saprophyte
35. _____ parasite

(a) heterotrophic, motile protists
(b) organism that feeds on dead matter
(c) bacteria that live in volcanic hot springs, brine pools, and black organic mud
(d) seed plant in which seeds are exposed to the air, usually in cone-shaped structures
(e) single-celled photosynthetic protists
(f) organism that feeds on a living host
(g) bacteria with peptidoglycan cell walls
(h) flowering plants whose seeds develop within a matured ovary (fruit)

36. Which of the following diseases caused by protists is contracted by an insect bite? _____
(a) Amoebic dysentery (b) Late blight (c) Malaria (d) Toxoplasmosis

37. Which of the following diseases caused by protists is particularly dangerous to fetuses?
_____
(a) Chagas' disease (b) Giardias (c) Sleeping sickness (d) Toxoplasmosis

38. Which protist diseases result from drinking contaminated water? _____
_____
(a) Chagas' disease and Leishmaniasis (c) Amoebic Dysentery and Giardia
(b) Giardia and Malaria (d) Sleeping sickness and Toxoplasmosis

**Fill in the blank: Choose the correct answers from the WORD BANK (39-44).**

**WORD BANK**

| | | |
|---|---|---|
| extracellular digestion | conjugation | seed dispersal |
| vector pollination | sporophyte generation | alternation of generations |
| transformation | gametophyte generation | mycology |
| taxonomy | intracellular digestion | wind pollination |

# *SECTION QUIZ 5-2*



39. The form of sexual reproduction that results in new combinations of genes is _____ _____.

40. Bacteria that produce asexually can pick up new traits through the process _____ _____.

41. The process of digestion in fungi is called _____.

42. The variation in a life reproductive cycle that switches back and forth between the production of diploid (2n) and haploid (n) cells is called _____.

43. In plants, the diploid spore-bearing generation that reproduces by spores is called the _____.

44. Plants rely on the help of the wind, insects, and animals to carry out _____ _____.

**Identify each of the fungi according to phyla (45-48).**

45._____

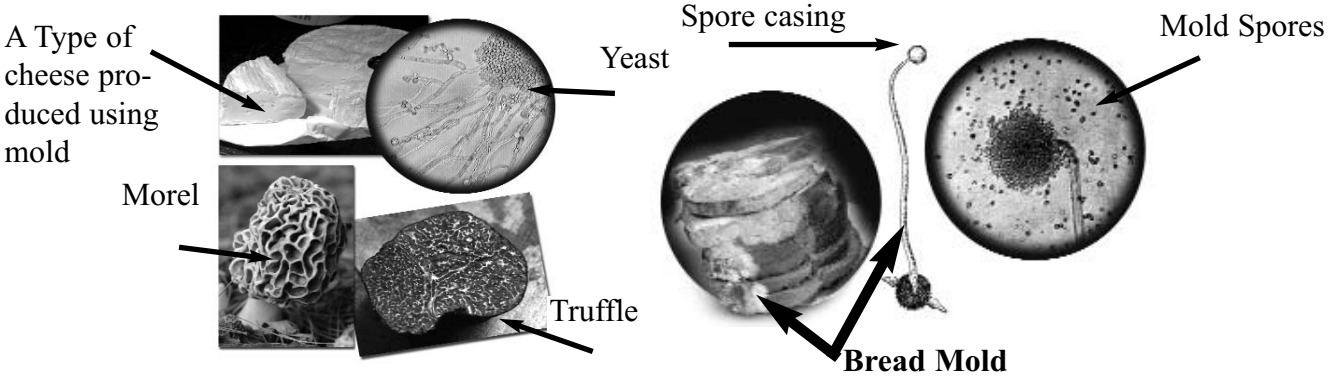


46. _____



47. _____

48. _____




**Complete the Life Principles.**

49. "*The most erroneous stories are those we think we know best—and therefore never scrutinize or* _____."

50. "*Bloom where you are* _____."

51. "*Look deep into* _____*, and then you will understand everything better*."

52. "*The nation plagued with inner moral* _____ *will be persecuted with outer destruction*."

# *SECTION QUIZ 5-3*





**Remember:**
Score an average of 85% or higher on all three quizzes, and you may be exempt from the chapter test!



*Congratulations! You have completed this section!*

***Answer the following questions to test your understanding of the material. When you are finished, hand in your quiz to your teacher. Each answer is worth 2 points.***

1. An invertebrate is an animal without a: _____.
   (a) skeleton (b) backbone (c) rib cage (d) pelvis

2. Which of the following statements is false concerning sponges?_____
   _____
   (a) They are found in ocean and fresh water.
   (b) They consist of independent cells.
   (c) They are all very small.
   (d) They exist in a variety of shapes.

3. The body form of an organism that has identical left and right sides, specialized front and back ends, and upper and lower sides is called:_____.
   (a) bilateral symmetry
   (b) radial symmetry
   (c) spherical symmetry
   (d) unilateral symmetry

4. In an open circulatory system:_____
   _____.
   (a) all of the blood is contained in a system of closed vessels
   (b) oxygen and carbon dioxide diffuse in and out of blood through the walls of tiny blood vessels
   (c) blood is released directly onto body tissues
   (d) the heart does not pump the blood to the systemic tissues

5. In a closed circulatory system:_____
   _____.
   (a) blood is released directly onto body tissues
   (b) blood flows through tissues and collects in sinuses
   (c) blood is contained entirely in a system of closed vessels
   (d) the heart does not pump the blood to the systemic tissues

6. The process of eliminating toxic waste products from the body is called: _____.
   (a) reabsorption (b) secretion (c) excretion (d) filtration

7. The concentration of nerve cells that form nerve cords or nerve rings around the mouths of some vertebrates is called: _____.
   (a) cephalization (b) centralization (c) mobilization (d) innervation

8. The concentration of nerve cells and sensory cells in the head of an organism is called:
   _____.
   (a) cephalization (b) centralization (c) mobilization (d) innervation

# *SECTION QUIZ 5-3*



9. The process by which food is digested inside the internal cells of a simple multicellular animal is called _____ digestion.
   (a) extracellular (b) multicellular (c) unicellular (d) intracellular

10. Invertebrates with a mouth and an anus perform which type of digestion?_____
    (a) extracellular (b) multicellular (c) unicellular (d) intracellular

**Matching: Choose the correct answers.**

11. _____ Porifera
12. _____ Cnidaria
13. _____ Platyhelminthes
14. _____ Annelida
15. _____ Molluska
16. _____ Echinodermata
17. _____ Arthropoda
18. _____ Chordata
19. _____ Agnatha
20. _____ Chondrichthyes
21. _____ Osteichthyes
22. _____ Mammalia

(a) phylum that includes segmented worms
(b) phylum that includes all vertebrates of the animal kingdom
(c) phylum made up of sponges
(d) class of chordates including jawless fish
(e) phylum characterized by spiny skin and five-part radial symmetry
(f) class of chordates including bony fish
(g) phylum that includes jelly fish
(h) class of chordates including fish with cartilagenous skeletons
(i) phylum that includes flatworms
(j) class of chordates including humans
(k) phylum characterized by an external skeleton and jointed legs
(l) phylum that includes clams

**Fill in the blank: Choose the correct answers from the WORD BANK.**

**WORD BANK**

| | | | |
|---|---|---|---|
| hydrostatic skeleton | mammary gland | marsupium | gill |
| placenta | ganglia | bronchus | urea |
| notochord | endoskeleton | alveolus | exoskeleton |

23. A skeletal system in which the muscles are supported by a water-filled body cavity is called a(n) _____.

24. An external skeletal system is called a(n) _____.

25. A skeleton located within the body of an organism is called a(n) _____ _____.

26. The feathery respiratory organ of many aquatic species that is used to obtain oxygen from the water is called a(n) _____.

27. Clumps of nerve cells in the head region of primitive organisms such as the flatworm are called _____.

28. A flexible, rod-like structure that provides body support to Chordates at some point in their development is a(n) _____.

# *SECTION QUIZ 5-3*



29. The structure that enables a female to nourish her young with milk is the _____ _____.

30. An abdominal pouch in which the young complete their development is called a(n) _____ _____.

31. The organ that connects a mother with her developing embryo and provides a place for the exchange of nutrients, oxygen, wastes, and carbon dioxide is called the _____ _____.

32. Air tubes that enter the lungs and branch off for air exchange are called:_____ _____.

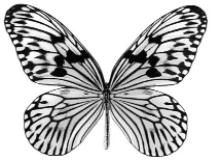
33. Tiny air sacs in the lungs appearing in a grape-like cluster surrounding a network of capillaries where gas exchange takes place are called _____.

34. Mammals convert ammonia to _____, a less toxic substance for excretion.

35. Which animal illustrates radial symmetry? _____

(a) 

(b) 

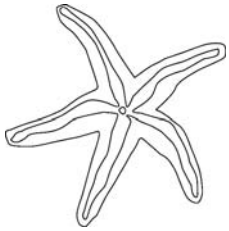
(c) 

**Label each organism according to phylum (36-39).**

36. _____



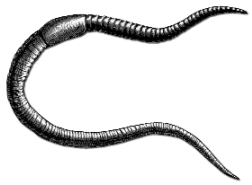
37. _____



38. _____



39. _____



## *SECTION QUIZ 5-3*



**True or false: Write the correct answers.**

40. _____ Amphibians lay their eggs in water, live on land as adults, and have moist skin.

41. _____ All organisms demonstrate the concept of irreducible complexity.

42. _____ Reptiles reproduce by external fertilization.

43. _____ Nature reflects a great sense of order.

44. _____ The hypothesis that billions of years ago, eukaryotic cells arose as a combination of different prokaryotic cells is called the endosymbiotic hypothesis.

**Matching: Choose the correct answers.**

45. _____ carnivores
46. _____ herbivores
47. _____ ectotherms
48. _____ endotherms

(a) organisms that rely on interactions with the environment to control body temperature, such as reptiles
(b) meat eating organisms
(c) organisms that generate and maintain body heat through chemical reactions in the body, such as mammals
(d) plant eating organisms

**Complete the Life Principles.**

49. "*Every animal leaves traces of what is was; man alone leaves traces of what he*_____."

50. "*Men love to* _____ *and that is the seed of science*."

51. "*Life emerged...not simple, but* _____ *and whole, and has remained complex and whole ever since.*"

52. "_____ *will always be truth, regardless of lack of understanding, disbelief, or ignorance.*"

# *SECTION QUIZ 6-1*





**Remember:**
Score an average of 85% or higher on all three quizzes, and you may be exempt from the chapter test!



*Congratulations! You have completed this section!*

***Answer the following questions to test your understanding of the material. When you are finished, hand in your quiz to your teacher. Each answer is worth 2 points.***

**Multiple Choice: Choose the correct answer.**

1. Bacteria that live on the roots of legume plants help to make which of the following available to the plant? _____
   (a) oxygen from the air (c) carbon dioxide from the air
   (b) nitrogen from the air (d) water vapor from the air

2. The major contribution of saprophytes to nature is to:_____
   _____.
   (a) remove diseased animals from the population
   (b) cause humans to use proper sanitation practices
   (c) recycle the materials necessary for life
   (d) preserve environmental energy

3. Chemosynthesis uses _____ for energy.
   (a) sunlight (b) glycogen (c) chemical reactions (d) starch

4. The _____ regulates the movement of molecules into and out of a bacterial cell.
   (a) endoplasmic reticulum (b) Golgi apparatus (c) vacuole (d) cell wall

5. Gram-negative bacterial infections are very serious because gram-negative bacteria:_____
   _____.
   (a) have an extra lipid-layer that keeps out drugs used to fight bacterial infections
   (b) are disease causing, whereas gram-positive bacteria are not
   (c) do not have a cell wall, enabling the toxic contents of the cell to freely infect all surrounding tissues
   (d) attack only the nervous system, the most important system of the body

6. One advantage of bacterial conjugation is that:_____
   _____.
   (a) it results in genetic variation, ensuring that some bacteria will always have the combinations needed for survival
   (b) it allows bacteria to dispose of their defective genes without harming the population
   (c) it results in genetically identical offspring, keeping good genes in the population
   (d) all of the above

7. _____ helps metallurgists to extract copper from ore because it produces a copper containing water soluble product that can be washed out of the ore as it forms.
   (a) Streptococcus pyrogenes (c) Thiobacillus ferroxidans
   (b) Bacillus Subtilis (d) Salmonella typhi

8. The germ theory of disease was established by: _____.
   (a) Joseph Lister (b) Isaac Newton (c) Francis Bacon (d) Louis Pasteur

9. The mechanism of penicillin function is to interfere with bacterial:_____.
   (a) motility (b) cell wall synthesis (c) protein packaging (d) signal transduction

10. The _____ system involves the process of phagocytosis.
    (a) digestive (b) immune (c) nervous (d) reproductive

11. Probiotics are found in the _____ of human beings.
    (a) intestine (b) liver (c) muscle (d) kidney

12. Soil based organisms are:_____
    _____.
    (a) helpful in the digestive tracts of humans and livestock
    (b) aggressive in crowding out pathogens from the digestive tract
    (c) being eliminated by the introduction of chemicals, pesticides and water chlorination
    (d) all of the above

13. Which of the following occurs first in a viral infection?_____
    _____
    (a) The virus releases genetic information into cell.
    (b) The virus expresses its genes in host.
    (c) The new viruses infect other cells.
    (d) The host cell makes copies of virus.

14. Which of the following is a viral disease? _____
    (a) Typhus (b) Diphtheria (c) Botulism (d) Mumps

15. The throat and nose are targets for the _____.
    (a) Hepatitis virus (b) Yellow fever virus (c) Polio virus (d) Smallpox virus

**Matching: Choose the correct answers.**

16. _____ saprophyte
17. _____ parasite
18. _____ autotroph
19. _____ plasmid
20. _____ spore
21. _____ phagocyte
22. _____ virus
23. _____ provirus
24. _____ retrovirus
25. _____ pathogen
26. _____ vitamin
27. _____ antibiotic

(a) small, circular section of DNA that is transferred in bacterial reproduction
(b) organism that uses energy from the Sun to change non-living nutrients into living tissue
(c) non-living particle consisting of only DNA or RNA surrounded by a protein coat, cannot reproduce itself
(d) used in difficult conditions to produce a new individual either immediately or after a period of dormancy
(e) bacterium that are responsible for causing illness
(f) viral DNA that has become part of the host cell's DNA
(g) organism that feeds on dead matter
(h) white blood cell that engulfs and destroys bacteria
(i) organism that relies on a living host for survival
(j) virus that contains RNA as its genetic material
(k) powerful drug that kills certain bacteria by interfering with critical cell processing
(l) synthesized by bacteria in the digestive tract

# *SECTION QUIZ 6-1*



**True or False: Write the correct answers.**

28. _____ Heterotrophs rely on other organisms for food.
29. _____ The protein bridge that forms between two bacteria during sexual reproduction is called a pilus.
30. _____ The point where the number of new bacteria being produced equals the number of bacteria that are dying is called the steady state of the population.
31. _____ Bacteria that absorb purple gram stain are called gram negative organisms.
32. _____ Archaebacteria survive in deep lakes, swamp mud, and digestive tracts of animals.
33. _____ Eubacteria is the largest and most diverse group of bacteria.
34. _____ The mass of living bacteria is greater than that of all other organisms combined.

**Fill in the blank: Choose the correct answers from the WORD BANK.**

**WORD BANK**

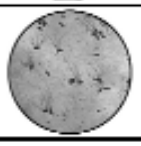
| | | | |
|---|---|---|---|
| respiration | aerobic respiration | lysogenic infection | sterilization |
| binary fission | conjugation | anaerobic respiration | transformation |
| lytic infection | nitrogen fixation | | |

35. The form of sexual reproduction in bacteria that results in new combinations of genes is called _____.
36. The process of bacterial reproduction in which genetic material is added to or replaces portions of a bacterium's DNA is called _____.
37. The process in which viral enzymes destroy a host cell's DNA, ribosomes and resources to reproduce is called _____.
38. The process in which viral genes combine with the host cell's DNA, produce viral mRNA, and gradually make new viruses is called _____.
39. The process by which bacteria convert nitrogen gas into a useable form for plants is called _____.
40. _____—the killing of bacteria with heat or chemicals- is the simplest way to control bacteria.
41. _____ converts food energy into useable energy for life processes.
42. _____ is the most common form of respiration.
43. _____ is respiration in the absence of oxygen.
44. Bacterial reproduction that results in two genetically identical daughter cells is called _____.

**Use the table on the following page to answer questions # 45-47.**

45. Which disease is transmitted by contaminated water or food? _____
    (a) tetanus (b) typhoid fever (c) diptheria (d) tuberculosis
46. Ticks transmit which bacterial disease? _____
    (a) thyphus (b) leprosy (c) bubonic plague (d) lyme disease
47. The symptoms of tetanus include: _____.
    (a) fever, sore throat, fatigue (c) sever, prolonged muscle spasms
    (b) nerve damage, skin lesions (d) rash, chills, fever

**Use the table below to answer questions 45-47.**

| Disease | Bacteria Involved | Bacteria, Carrier or Symptom | Symptoms/ Comments | Mode of Transmission |
|---|---|---|---|---|
| Pneumonia | Pneumococcus |  | Inflamed, infected, weakened lungs, persistent cough; can be fatal | Airborne water droplets |
| Tuberculosis | Tubercle bacillus |  | Fatigue, persistent cough, bleeding in lungs; can be fatal | Airborne water droplets |
| Cholera | Vibrio cholerae |  | Severe vomiting, diarrhea; often fatal | Contaminated water |
| Typhoid fever | Samonella typhi or typhosa |  | Fever, headaches, rash, diarrhea; often fatal | Contaminated food or water |
| Bubonic plague | Pasteurella pestis or yersinia (from infected rats) |  | Swollen glands, bleeding under skin; often fatal; killed nearly one third the population of Europe in the mid 1300's | Flea bites |
| Typhus | Rickettsia prowazekii |  | Chills, fever, rash; can be fatal | Lice bites (especially from body lice) |
| Lyme disease | Borrelia burgdorferi (from infected animals) |  | Often a large "bull's eye" rash, pain, swelling in joints | Tick bites, embedding |
| Syphilis | Treponema pallidum |  | Lesions, damages Central Nervous System if left untreated | Sexual contact |
| Tetanus | Clostridium tetani |  | Severe, prolonged muscle spasm; "lock-jaw" | Wounds, broken skin |
| Leprosy | Mycobacterium leprae |  | Skin lesions, tissue degeneration, nerve damage | Personal contact |

**Complete the Life Principles.**

48. "*Controversy is only dreaded by the advocates of* _____."

49. "*Bad friends are like viruses—they infect and destroy your* _____."

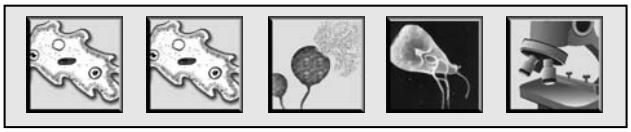
50. "*The only life form we have created so far is purely* _____."

# *SECTION QUIZ 6-2*





**Remember:**
Score an average of 85% or higher on all three quizzes, and you may be exempt from the chapter test!



*Congratulations! You have completed this section!*

***Answer the following questions to test your understanding of the material. When you are finished, hand in your quiz to your teacher. Each answer is worth 2 points.***

**Multiple choice: Choose the correct answer.**

1. Members of the Kingdom Protista could best be described as:_____.
   (a) plants (b) animals (c) fungi (d) none of these

2. Slime molds have characteristics of both the Protista and _____ kingdoms.
   (a) Animalia (b) Fungi (c) Plantae (d) Archaebacteria

3. The ground beneath a moist dead tree would best support the growth of:_____.
   (a) algae (b) protozoans (c) dinoflagellates (d) slime molds

4. A flagellate protist of the genus *Trypanosoma* causes:_____.
   (a) Giardiasis (b) Malaria (c) African sleeping sickness (d) Chagas' disease

5. The most serious infectious disease caused by protists in tropical and subtropical regions of the world is:_____.
   (a) Late blight disease (b) Malaria (c) Giardiasis (d) Amoebic dysentery

6. Plasmodium is transmitted through the bite of the: _____.
   (a) Tsetse fly (b) Anopheles mosquito (c) Common flea (d) Brown tick

7. Plasmodium attacks which of the following cells in the human body?_____
   (a) kidney and adipose (b) nerve and bone (c) liver and blood (d) skin and muscle

8. Algae is a general term used to describe all: _____.
   (a) single-celled photosynthetic organisms (c) multi-cellular photosynthetic organisms
   (b) single-celled heterotrophic organisms (d) multi-cellular heterotrophic organisms

9. _____ can undergo a chemical reaction that produces light.
   (a) dinoflagellates (b) chrysophytes (c) heliozoans (d) protozoans

10. Chrysophyta have cell walls that contain: _____.
    (a) chitin (b) starch (c) cellulose (d) pectin

11. _____, a compound found in diatoms, is the principle component of glass.
    (a) Carbon monoxide (b) Silicon dioxide (c) Copper nitrate (d) Magnesium sulfate

12. Zoomastigina benefit termites by:_____.
    (a) digesting cellulose fibers in the wood they eat
    (b) fighting off harmful bacteria that enter the gut
    (c) providing shelter for them
    (d) keeping the external environment free of predators

13. Flagella can be used by bacteria not only for locomotion, but for_____.
    (a) sensing hot or cold environments (c) protection from predators
    (b) reproductive purposes (d) attachment to a solid object

# *SECTION QUIZ 6-2*



**Matching: Choose the correct answers.**

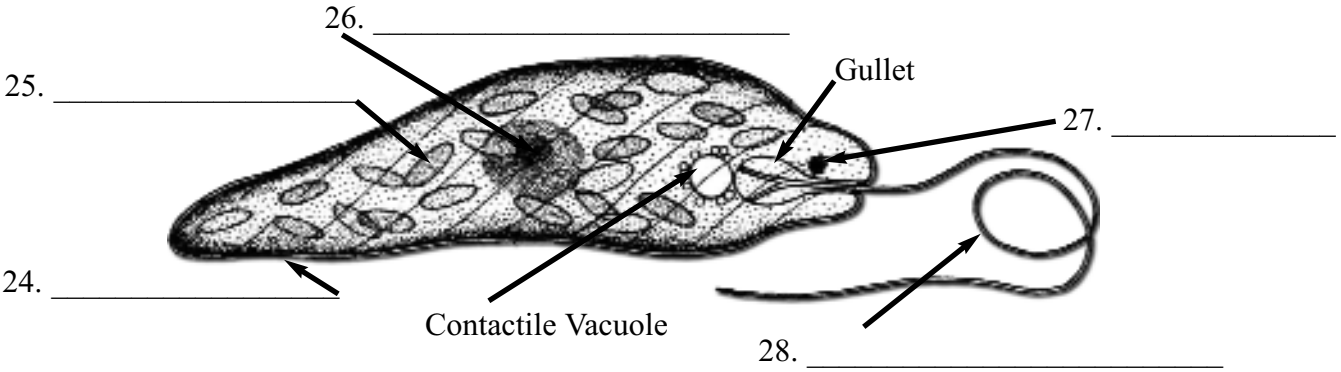
14. _____ spore
15. _____ cilia
16. _____ macronucleus
17. _____ micronucleus
18. _____ gullet
19. _____ oral pore
20. _____ anal pore
21. _____ trichocysts
22. _____ contractile vacuole
23. _____ chloroplasts

(a) organelle in the paramecium that collects and expels water
(b) controls metabolism in the paramecium
(c) stores copies of all the cell's genes in the paramecium
(d) small, single-celled structure capable of producing a new individual, either immediately or after a period of dormancy
(e) short, hairlike projections of some organisms by which they pull themselves through the water with coordinated rowing movements
(f) waste-discharging region on a paramecium
(g) depression on a paramecium used for the intake of food particles
(h) food intake end of a paramecium where the gullet is found
(i) tiny bottle-shaped structures embedded in the paramecium and discharged in time of need for defense
(j) organelles present in plant-like protists that function in photosynthesis

**Use the WORD BANK to label the figure below.**

**WORD BANK**

nucleus eyespot pellicle chloroplast flagellum




**Fill in the blank: Choose the correct answers from the WORD BANK.**

**WORD BANK**

Heliozoans Foraminiferas Zoomastiginas Diatoms Sporozoans Protozoans

29. _____ are the most abundant creatures on earth.
31. _____ are also called flagellates.
30. _____ are animal-like protists.
32. _____ produce thin shells of silica which is the substance used to make glass.
33. _____ do not have structures for movement.
34. _____ have produced huge deposits of microscopic shells on the bottom of the ocean floor.

# *SECTION QUIZ 6-2*



**Matching: Choose the correct answers.**

35. _____ mutualism
36. _____ conjugation
37. _____ eye spot
38. _____ pellicle
39. _____ algal bloom
40. _____ plasmodium
41. _____ fruiting body

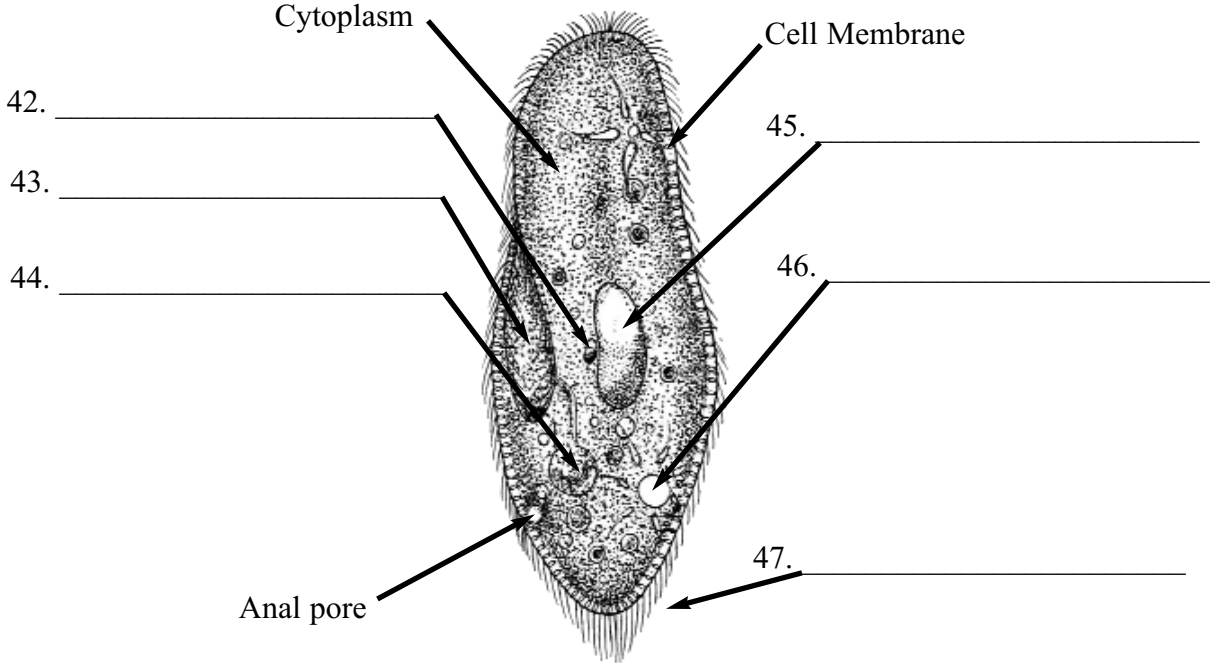
(a) form of sexual reproduction that results in new combinations of genes
(b) feeding stage mass of slime molds; also a name for the protist that causes Malaria
(c) reproductive structure in cellular slime molds that produces spores
(d) helps the euglena to locate sufficient light for photosynthesis
(e) firm, flexible coating outside the plasma membrane of the euglena
(f) phenomenon which occurs when algae reproduce so rapidly in aquatic environments that they take over their habitat, making the water appear the same color as the algae
(g) exemplified by the relationship between termites and zoomastigina

**Use the WORD BANK to label the figure below.**

**WORD BANK**

oral pore  cilia  macronucleus  contractile vacuole  gullet  micronucleus

**Paramecium**



## *SECTION QUIZ 6-2*



**Complete the Life Principles.**

48. "*Wise people realize they don't know what* _____."

49. "*The important thing is not to stop* _____."

50. "*The search for* _____ *is the noblest occupation of man; its publication is a duty.*"

# *SECTION QUIZ 6-3*





**Remember:**
Score an average of 85% or higher on all three quizzes, and you may be exempt from the chapter test!



*Congratulations! You have completed this section!*
***Answer the following questions to test your understanding of the material. When you are finished, hand in your quiz to your teacher. Each answer is worth 2 points.***

**Multiple choice: Choose the correct answer.**

1. An infection by a Deuteromycete of the genus *Tinea* causes which disease? _____
   (a) poison ivy (b) hay fever (c) ringworm (d) impetigo

2. Friendly organisms in the intestinal flora of humans: _____.
   (a) hinder the digestion of toxic materials
   (b) help keep harmful bacteria under control
   (c) hinder the intestine's function
   (d) none of the above

3. The introduction of antigenic substances from the intestines into the blood stream is caused by the _____ of Candida albicans penetrating the gastrointestinal lining.
   (a) fungal state (b) yeast-like state (c) algal state (d) amoeba state

4. Fairy rings are a result of: _____.
   (a) the colonial characteristics of mushrooms
   (b) the saprophytic nature of mushrooms
   (c) the magical properties of mushrooms
   (d) the chemical composition of mushrooms

5. Alexander Fleming discovered the drug: _____.
   (a) opium (b) amoxicillin (c) penicillin (d) morphine

6. The role of fungi is primarily that of:_____.
   (a) anabolism (b) commensalism (c) decomposition (d) photosynthesis

7. Fungi are all _____ organisms.
   (a) heterotrophic (b) mutualistic (c) autotrophic (d) photosynthetic

8. Yeasts can be beneficial to humans by: _____.
   (a) strengthening the immune system
   (b) cleansing the digestive tract
   (c) producing nitrogen gas in the GI tract
   (d) storing beneficial vitamins

9. Fermentation is the process responsible for:_____.
   (a) atmospheric oxygen production
   (b) making bread dough rise
   (c) yeast cell reproduction
   (d) signaling between yeast cells

10. Each cell in a colony of single-celled organisms:_____.
    (a) depends on other cells for survival
    (b) can exist on its own
    (c) specializes in an individual task
    (d) works together with other cells

# *SECTION QUIZ 6-3*

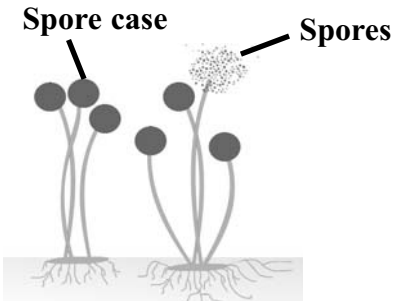


**Matching: Choose the correct answers.**

11. _____ mycelium
12. _____ hyphae
13. _____ zygospore
14. _____ ascospores
15. _____ yeast
16. _____ fruiting body
17. _____ basidiospores
18. _____ mushrooms
19. _____ imperfect fungi
20. _____ algae
21. _____ ascus

(a) common name for members of the phylum *Basidiomycota*
(b) haploid spores produced by the fruiting body of a basidiomycota
(c) common name for members of the phylum *Deuteromycota*
(d) mass of hyphae that grows in a food source and forms the living body of a fungus
(e) web of tiny filaments that make up the living body of a fungus
(f) tough sac of an Ascomycete that contains spores
(g) spores produced by sexual reproduction in an ascomycete
(h) single-celled members of the phylum *Ascomycetes*
(i) photosynthetic aquatic organisms that are classified as protists
(j) the visible structure of a Basidiomycete
(k) zygote surrounded by a protective covering found in Zygomycetes

22. A bread mold releases spores in order to: _____.
    (a) respire (c) absorb nutrients
    (b) reproduce (d) eliminate wastes



**Bread Mold**

**Fill in the blank: Choose the correct answers from the WORD BANK.**

| WORD BANK | | |
|---|---|---|
| Rhizopus stolonifer | Saccharomyces cerevisiae | Claviceps purpurea |
| Ophiostoma ulmi | Candida albicans | Cryphonectria parasitica |
| Phytophthora infestans | | |

23. The bread molds are contained in the genus _____.
24. Dry baker's yeast contains _____ spores.
25. The fungus _____, commonly known as "ergot of rye," can be deadly to humans.
26. The fungus that causes Dutch Elm disease is called _____.
27. The hyphae of _____ invade the roots, stems and leaves of the potato plant, eventually killing it entirely.
28. The fungus that causes Chestnut blight is called _____.
29. _____ is present in the intestinal flora of humans.

# *SECTION QUIZ 6-3*



**Matching: Choose the correct answers.**

30. _____ antibiotic
31. _____ dimorphic
32. _____ rhizoid
33. _____ carotenoids
34. _____ air bladder
35. _____ agar
36. _____ cellulose
37. _____ starch
38. _____ sporophyte generation
39. _____ gametophyte generation

(a) chemical secreted by a living organism that kills or reduces the reproduction rates of other organisms
(b) diploid spore-bearing generation in plants
(c) haploid gamete-bearing generation in plants
(d) yellow-orange pigments found in brown algae
(e) fills with air to allow an organism to float in the water
(f) food storage form in green algae
(g) food source from red-algae that is often used to culture bacteria
(h) cell wall composition of green algae
(i) existing in two different shapes and forms
(j) anchors fungus and absorbs water and nutrients from the environment

**True or false: Write the correct answers.**

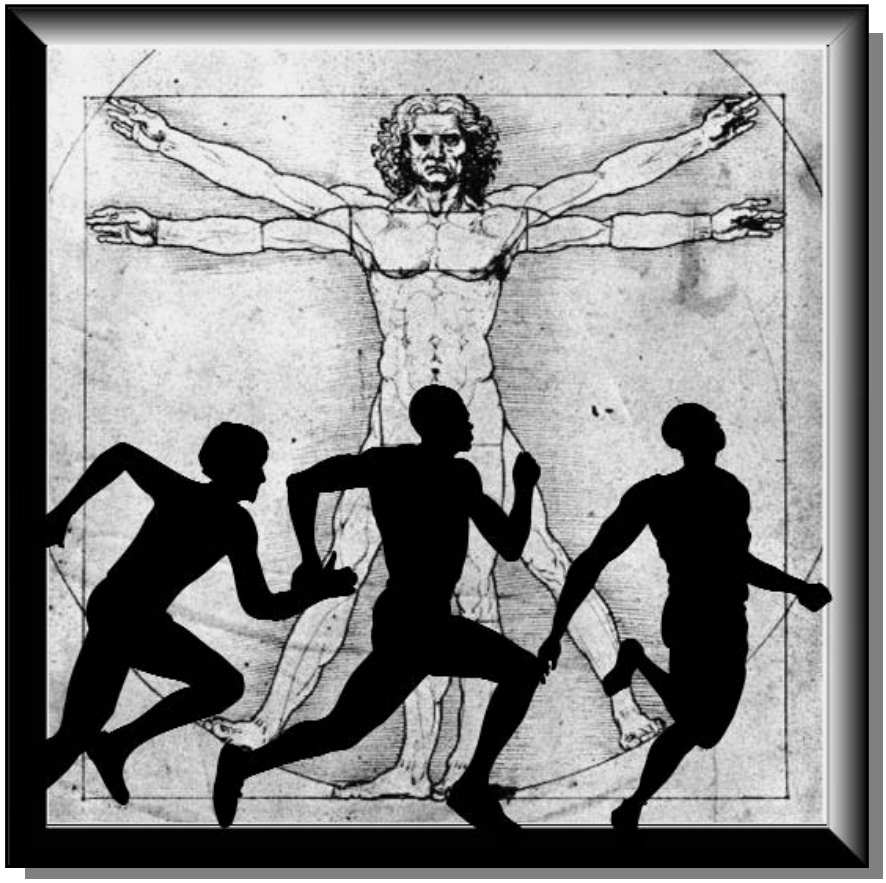
40. _____ Red algae belong to the phylum *Phaeophyta*.
41. _____ Brown algae belong to the phylum *Rhodophyta*.
42. _____ Green algae belong to the phylum *Chlorophyta*.
43. _____ *Claviceps purpurea* may have contributed to the Great Potato Famine.
44. _____ Antifungal medicines are very effective in curing *Tinea* infections.
45. _____ Penicillin mold produces a substance that causes many human diseases.
46. _____ A fertilized egg is called a *zoospore*.

**Complete the Life Principles.**

47. "*Nature never breaks her own* _____."
48. "*The real voyage of discovery consists not in seeking new landscapes, but in having new* _____."
49. "*Everything is* _____*, the beginning as well as the end, by forces over which we have no control. It is determined for insects as well as for the stars. Human beings, vegetables or cosmic dust, we all dance to a mysterious tune...*"

# *The Principles, Theories & Precepts of Biology*

## *Tests*




PAC
TM
TM

Name: _____



Date: _____ Grade: _____

# *The Principles, Theories & Precepts of Biology*

## CHAPTER 1 TEST

*Congratulations on completing this chapter!* ***Answer the following questions to test your understanding of the material. When you finish, hand in your test to your teacher for a final grade. Each answer is worth 2.0 points.***

---

**Multiple choice: Choose the correct answer.**

1. An assumption made to test and prove a logical conclusion is known as a(n): _____.
   (a) scientific law
   (b) scientific method
   (c) superstition
   (d) hypothesis

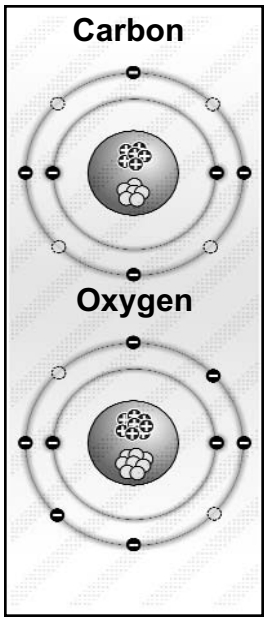


2. In a symbiotic relationship: _____ _____.
   (a) both species are benefited
   (b) one species is benefited
   (c) both species are harmed
   (d) one species is harmed

3. Which of the following theories states that in the beginning, the earth experienced a succession of creations of animal and plant life?_____
   (a) phlogiston theory
   (b) evolution theory
   (c) catastrophist theory
   (d) theory of natural selection

4. The transmission of hereditary information through genetic material is called:_____.
   (a) natural selection
   (b) inheritance
   (c) evolution
   (d) biology

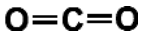
5. Using the figure to the right, determine the valence of carbon._____
   (a) 2
   (b) 4
   (c) 6
   (d) 8

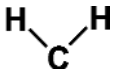


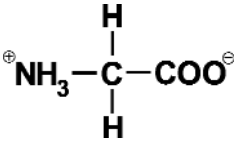
6. Which of the following represents an endergonic reaction?_____
_____

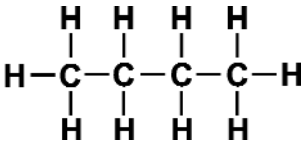
(a) A + B + energy ⟶ C + D
(b) A + B + C ⟶ D
(c) energy ⟶ A + B
(d) A + B ⟶ C + D + energy

7. Which of the following is a hydrocarbon?_____

(a) 

(b) 

(c) 

(d) 

8. The process by which a general statement is written and tested through experimentation in order to reach a conclusion regarding a hypothesis is known as the:_____
_____.

(a) scientific law
(b) scientific method
(c) scientific theory
(d) observation theory

9. A theory supported by many lines of evidence and years of successful experiments and observations is a(n): _____.

(a) scientific law
(b) scientific method
(c) scientific theory
(d) observation theory

10. _____ urged men to trust no statements without verification and to test all things with rigor.

(a) Marcello Malpighi
(b) Francis Bacon
(c) Ulisse Aldrovandi
(d) Carolus Linnaeus

11. A central component of the evolutionary theory is that all living organisms share:_____
_____.

(a) a common ancestor
(b) an identical biological make-up
(c) the same defense mechanisms
(d) a common offspring

**True or False: Write the correct answer.**

12. _____ Acids release $H^+$ in solution and bases release $OH^-$ in solution.

13. _____ The Dark Ages were characterized by an increase in scientific learning.

14. _____ Most organisms depend directly or indirectly on energy from the Sun.

**Matching:**

| | |
|---|---|
| 15. _____ carbohydrates | (a) long chains of carbon and hydrogen acids that have an acidic cargoxyl group attached to the end |
| 16. _____ lipids | (b) the tendency of an atom to pull electrons toward itself |
| 17. _____ fatty acids | (c) bond between the amino group of one amino acid and the carboxyl group of another amino acid |
| 18. _____ amino acids | (d) atoms with a different number of neutrons and the same number of protons |
| 19. _____ hormones | (e) polysaccharide form of excess sugar stored by plants |
| 20. _____ enzymes | (f) molecules composed of carbon, hydrogen, and oxygen; include sugars and starches |
| 21. _____ peptide bond | (g) carries out the instructions of the DNA code |
| 22. _____ covalent bond | (h) chemical messengers between different parts of the body |
| 23. _____ electronegativity | (i) polysaccharide form of excess sugar stored by animals and humans |
| 24. _____ polar bond | (j) transmits genetic information from one generation to the next and codes for the production of proteins |
| 25. _____ isotopes | (k) building blocks of proteins |
| 26. _____ starch | (l) bond in which two atoms share a pair of electrons so that each has a stable outer energy shell |
| 27. _____ glycogen | (m) catalysts in living systems |
| 28. _____ DNA | (n) bond in which electrons are shared unequally |
| 29. _____ RNA | (o) waxy, fatty, or oily compunds that are formed from fatty acids and glycerol |

**Fill in the blank: Choose the correct word from the WORD BANK.**

**WORD BANK**

| | | |
|---|---|---|
| Antoni van Leeuwenhoek | Robert Hooke | Andreas Versalius |
| Nicolaus Copernicus | Galileo GalileiJohn Ray | Sir Isaac Newton |

30. _____ established the modern scientific method.
31. _____ proclaimed that the Earth moves around the Sun.
32. _____ discovered the Law of Gravitation.
33. _____ described many microscopic organisms.
34. _____ explained fossils as the remains of organisms.
35. _____ discovered the presence of cells in biological materials.
36. _____ described the anatomy of the human body.

**Matching:**

| | |
|---|---|
| 37. _____ element | (a) particle that carries a negative charge, has very little mass and exhibits rapid, random movement. |
| 38. _____ atom | (b) a substance that is dissolved in solution |
| 39. _____ nucleus | (c) smallest unit of an element that retains the properties of the element |
| 40. _____ electron | (d) smallest unit of a compound that retains the properties of the compound |
| 41. _____ proton | (e) the number of moles of solute in one liter of solution |
| 42. _____ atomic number | (f) particle that carries a positive charge and has a mass of 1 amu |
| 43. _____ molecule | (g) the dissolving agent in a solution |
| 44. _____ organic compounds | (h) compounds containing carbon (excluding carbon dioxide and carbonate-containing compounds) |
| 45. _____ solute | (i) substance that cannot be broken down into other substances by ordinary chemical means |
| 46. _____ solvent | (j) the number of protons in an atom |
| 47. _____ molarity | (k) dense core at the center of the atom that contains protons and neutrons |

**Choose the best meaning for each Life Principle.**

48. "*Great works are performed not by strength but by perseverance.*"
    (a) Weak people can become strong if they are willing to work hard.
    (b) Strong people often have difficulty with perseverance.
    (c) More is often accomplished by determination than by strength alone.

49. *"In questions of science, the authority of a thousand is not worth the humble reasoning of a single individual."*
    (a) A scientist should question scientific theories of those in authority.
    (b) Authorities and "experts" can be wrong whereas the simple reasoning of a nonprofessional can prove to be accurate.
    (c) The reasoning of a single individual in scientific matters is not worth the authority of thousands of experts.

50. *"Things which you receive 'free' cost someone something."*
    (a) There is no such thing as "something for nothing"; someone has to pay.
    (b) You should be able to receive free things without cost.
    (c) No one should be responsible for providing things that are free of charge.

Name: _____



Date: _____ Grade: _____

# *The Principles, Theories & Precepts of Biology*

## CHAPTER 2 TEST

*Congratulations on completing this chapter!* ***Answer the following questions to test your understanding of the material. When you finish, hand in your test to your teacher for a final grade. Each answer is worth 2.0 points.***

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**Multiple choice: Choose the correct answer.**

1. The cell theory states all of the following, **except**:_____.
   (a) cells are the fundamental units of life
   (b) all organisms are made up of cells
   (c) cells are constantly changing
   (d) cells arise only by division of other cells

2. The cell membrane is freely permeable to _____ substances.
   (a) lipid soluble (c) water soluble
   (b) lipid insoluble (d) very large

3. Cell walls are not present in _____ cells.
   (a) plant (b) animal (c) algae (d) bacteria

4. Which of the following processes expends energy? _____
   (a) osmosis (b) diffusion (c) passive transport (d) active transport

5. Which of the following correctly depicts water movement?_____
   (a) (b) (c) (d)




6. If a cell is placed in a hypertonic solution, the water in the system will:_____.
   (a) flow into the cell (c) stay constant
   (b) flow out of the cell (d) cytolyze the cell

7. The principle that entropy in the universe is constantly increasing is stated by the:_____
   _____.
   (a) laws of thermal motion (c) Law of Mass Action
   (b) Second Law of Thermodynamics (d) First Law of Thermodynamics

8. Yeasts produce alcohol and carbon dioxide from pyruvic acid during the process of:
   _____.
   (a) lactic acid fermentation (c) alcohol fermentation
   (b) glycolysis (d) cellular respiration

9. Which of the following processes are oxygen dependent?_____
   (a) glycolysis (c) Kreb's Cycle
   (b) fermentation (d) electron transport chain

10. Cellular respiration yields a net total of _____ molecules of ATP.
   (a) 40 (b) 36 (c) 32 (d) 38

11. How many chromosomes are contained within the nuclei of human somatic cells? _____
   (a) 8 (b) 16 (c) 46 (d) 48

12. Cancer cells have lost the ability to control their own: _____.
   (a) division (b) secretion (c) respiration (d) absorption

13. _____ discovered that a system of several magnifying lenses at proper distances from each other would greatly magnify small objects.
   (a) Louis Pasteur (c) Rudolf Virchow
   (b) Theodor Schwann (d) Anton van Leeuwenhoek

14. _____ coined the term "cell" to describe the tiny rectangular chambers in the woody parts of plants.
   (a) Anton van Leeuwenhoek (c) Matthias Schleiden
   (b) Robert Hooke (d) Garth Nicolson

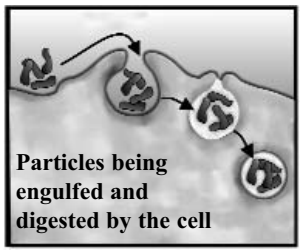
15. _____ proposed that cells are produced only by the division of cells that already exist.
   (a) Robert Hooke (b) Theodor Schwann (c) Rudolf Virchow (d) Louis Pasteur

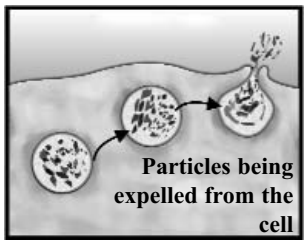
**Matching:**

16. _____ secretion — (a) the transport of dissolved substances into cells
17. _____ homeostasis — (b) the breakdown of food molecules with a release of energy
18. _____ cytokinesis — (c) removal of soluble waste material from the cell
19. _____ absorption — (d) removal of non-soluble waste material from the cell
20. _____ meiosis — (e) release of biosynthesized substances for use by other cells
21. _____ respiration — (f) the breakdown and absorbtion of substances
22. _____ cell cycle — (g) the ability of a cell to respond to its environment inside and outside
23. _____ mitosis — (h) the process of maintaining order in a cell
24. _____ egestion — (i) process of cell division in which each daughter cell has identical DNA as the parent cell
25. _____ irritability — (j) the division of the cell's cytoplasm
26. _____ digestion — (k) process that creates the gametes used for sexual reproduction
27. _____ excretion — (l) the period of time from the beginning of one cell division to the beginning of the next

**Label the processes in the illustrations below.**

28._____ 29._____




**Fill in the blank: Choose the correct word from the WORD BANK.**

**WORD BANK**

| | | | |
|---|---|---|---|
| gamete | centromere | cell membrane | chromatid |
| somatic cell | homologous chromosome | | diploid |
| cytoplasm | haploid | nucleus | vacuole |
| endoplasmic reticulum | | | |

30. The portion of the cell that is outside of the nucleus is called the _____.

31. A(n) _____ is a single chromosome strand that occurs in an identical pair.

32. The _____ is part of the cell's outer boundary that contains a lipid bilayer.

33. The part of a chromosome where two chromatids attach is known as the _____.

34. The _____ is a large, dense structure in a cell that contains the DNA.

35. A(n) _____ is one of a pair of chromosomes of the same length and centromere position, containing the same kind of information.

36. A cell that contains two of each type of chromosome is called a(n) _____ cell.

37. A reproductive cell such as the egg or sperm is called a(n) _____.

**Matching:**

38. _____ cellular respiration — (a) process by which a cell converts a food fuel into ATP in the presence of oxygen

39. _____ glycolysis — (b) series of molecules located in the inner membrane of the mitochondrion that receive electrons from electron carriers

40. _____ Kreb's Cycle — (c) the second stage of respiration

41. _____ electron transport chain — (d) process by which green plants use energy from the sun to convert $CO_2$ and $H_2O$ into glucose

42. _____ photosynthesis — (e) process by which a molecule of glucose is broken down to produce a net gain of two ATP

**True or False: Write the correct answer.**

43. _____ The energy of motion is known as potential energy.

44. _____ A parked car on a steep hill possesses kinetic energy

45. _____ Pyruvic acid is the end-product molecule of glycolysis.

46. _____ High energy electrons produced in glycolysis are passed to the coenzyme NAD+ to form NADH.

47. _____ FAD+ is the final electron acceptor of the elctron transport chain.

**Circle the letter of the statement which gives the best meaning of each Life Principle.**

48. "*In everything, I believe the secret of success is prolonged effort.*"
    (a) Prolonged effort is needed for keeping secrets.
    (b) Believing in the secret of success will help you demonstrate prolonged effort.
    (c) The key to success is perseverence.

49. "*If we all worked on the assumption that what is accepted is really true, there would be little hope of advance.*"
    (a) If we accept unproven assumptions as truth, we will be unable to progress in knowledge.
    (b) We should work on true assumptions so we can advance with hope.
    (c) neither of these

50. "*Nothing just happens; someone or something must make things happen.*"
    (a) People make things happen.
    (b) Some things just happen.
    (c) There is no effect without a cause.

Name: _____



Date: _____ Grade: _____

# *The Principles, Theories & Precepts of Biology*

## CHAPTER 3 TEST

*Congratulations on completing this chapter!* ***Answer the following questions to test your understanding of the material. When you finish, hand in your test to your teacher for a final grade. Each answer is worth 2.0 points.***

**Multiple choice: Choose the correct answer.**

1. An individual that has AB-negative type blood has:_____
_____.
   (a) both A and B antigens from the ABO gene and the negative allele from the Rh blood group
   (b) O antigens from the ABO gene and the negative allele from the Rh blood group
   (c) both A and B antigens and antibodies from the ABO gene and the negative allele from the Rh blood group
   (d) O antigens and antibodies for the A and B antigens from the Abo gene and the negative allele for the Rh blood group

2. _____ is known as the Father of Genetics.
   (a) Aurelius Augustine
   (b) Charles Darwin
   (c) Gregor Mendel
   (d) Johann Heinzendorf

3. Use the Punnet square below to find the probability that a cross between two heterozygous purple flowers (Pp) will produce a phenotype for white flowers._____
   (a) ¼
   (b) ½
   (c) ¾
   (d) 1

| | P | p |
|---|---|---|
| P | PP | Pp |
| p | Pp | pp |

4. The main contribution of the Hershey-Chase experiment was that it convinced scientists around the world that:_____
_____.
   (a) sulfur and phosphorus have radioactive isotopes
   (b) bacteriophages consist of a molecule of DNA inside a protein coat
   (c) most proteins contain sulfur and not phosphorus
   (d) genes are made up of DNA

5. Chargaff's Rule states that:_____
_____.
   (a) DNA contains equal amounts of all four of its nucleotides
   (b) DNA contains equal amounts of cytosine and guanine as well as adenine and thymine
   (c) DNA contains equal amounts of cytosine and guanine as well as uracil and thymine
   (d) DNA contains different amounts of all four of its nucleotides

6. The DNA double-helix was discovered by: _____.
   (a) Sharp and Gerget
   (b) Meselson and Stahl
   (c) Watson and Crick
   (d) Hershey and Chase

7. Which of the following nucleotides make up a DNA base pair?_____
   (a) A and U (b) U and T (c) C and A (d) A and T

8. RNA contains the nucleotide _____ instead of_____.
   (a) uracil; thymine
   (b) thymine; uracil
   (c) thymine; adenine
   (d) uracil; adenine

9. A mutation can be caused by which of the following?_____
   (a) alteration of a DNA nucleotide
   (b) deletion of a DNA nucleotide
   (c) insertion of a DNA nucleotide
   (d) all of the above

10. The most common fatal genetic disease in the United States is:_____.
    (a) albinism
    (b) cystic fibrosis
    (c) Down syndrome
    (d) sickle-cell anemia

11. Transgenic organisms:_____.
    (a) contain only the genes that originated within themselves
    (b) are produced by mating organisms with genetically similar characteristics
    (c) have been transformed with genes from another organism
    (d) have been produced by a genetically identical organism

**Matching: Choose the correct answers.**

12. _____ nondisjunction
13. _____ restriction enzyme
14. _____ frameshift mutation
15. _____ point mutation
16. _____ chromosomal mutation
17. _____ polygeneic inheritance
18. _____ transformation
19. _____ semi-conservative replication
20. _____ transcription
21. _____ translation
22. _____ independent assortment

(a) the principle that different genes do not influence each other's segregation during gamete formation
(b) a change in the number or structure of a cell's chromosomes
(c) mutation in which a single nucleotide is substituted for another in the DNA sequence
(d) mutation in which a single nucleotide is added or subtracted from a normal DNA sequence
(e) process of reproduction in which genetic information is added to or replaces portions of a bacterium's DNA
(f) process by which the nucleotide sequence of a DNA molecule is copied into an RNA molecule
(g) process by which the nucleotides of *mRNA* are decoded into an amino acid sequence to form a protein
(h) results in a characteristic that is determined by two or more genes
(i) failure of a chromosome pair to separate during meiosis
(j) protein that cuts DNA at a specific sequence of nucleotides
(k) hypothesis that each daughter cell of DNA replication inherits a DNA molecule that consists of one new strand and one parental strand

**Fill in the blank: Choose the correct answers from the WORD BANK.**

| WORD BANK | | | | |
|---|---|---|---|---|
| multiple alleles | F2 generation | alleles | F1 generation | homozygous |
| heterozygous | genes | genotype | phenotype | |
| P generation | gametes | antigens | gene linkage | |

23. The first generation that results from the cross of two true-breeding plants is called the _____.
24. A(n) _____ is the outward manifestation of a genetic trait.
25. Different forms of a gene that carry information for contrasting forms of the same genetic trait are called _____.
26. _____ are segments of DNA that code for specific traits and carry genetic information.
27. The term _____ describes an organism that has a mixed pair of alleles for a trait. (Tt)
28. The term _____ describes an organism that has an identical pair of alleles for a trait. (TT)
29. The true-breeding plants that are crossed to produce the F1 generation are called the _____.
30. The genetic composition and description of an organism is its _____.
31. The condition in which more than two alleles exist for a single trait in a population is called _____.

**Matching: Choose the correct answers.**

32. _____ albinism
33. _____ sickle-cell anemia
34. _____ Huntington syndrome
35. _____ Klinefelter syndrome
36. _____ Down syndrome

(a) dominant genetic disorder that breaks down the nervous system
(b) genetic disorder in which males have an extra sex chromosome
(c) genetic disorder that prevents the production of melanin
(d) the most common form of trisomy, involves mental retardation
(e) genetic disorder characterized by misshapen or crescent-shaped red blood cells

**Fill in the blank: Choose the correct answers from the WORD BANK.**

| WORD BANK | | | |
|---|---|---|---|
| Law of Dominance | RNA polymerase | co-dominance | nucleotide |
| Law of Segregation | RNA | exon | DNA ligase |
| intron | anticodon | RFLP | recombinant DNA |
| incomplete dominance | codon | DNA polymerase | |

37. The principle that paired genes must separate from each other during meiosis is known as the _____.
38. The condition of neither allele being completely dominant or recessive, resulting in a blending of the phenotype, is called _____.

39. In the condition of _____, both alleles in a heterozygote are fully expressed.

40. _____ joins nucleotides together during DNA replication.

41. A compound made of a phosphate group, a nitrogenous base, and a five-carbon sugar is called a(n) _____.

42. _____ joins Okazaki fragments during DNA replication.

43. A(n) _____ is a sequence of three nucleotides that codes for an amino acid.

44. _____ positions nucleotides in an RNA strand according to complementary base pairing.

45. A(n) _____ matches a nucleotide sequence on an *mRNA* molecule, allowing *tRNA* to deposit an amino acid into a polypeptide chain.

46. The principal type of nucleic acid that carries out the instructions coded in DNA is called _____.

47. Pieces of DNA from two or more sources that are recombined, or reassembled, to act as a single DNA molecule are called _____.

**Choose the best meaning of each Life Principle.**

48. "*Most of the things worth doing in the world had been declared impossible before they were done.*"
    (a) The only things that are worthwhile are seemingly impossible to accomplish.
    (b) Your motivation in any task should be to prove that you are right and your skeptics are wrong.
    (c) Things that appear to be impossible can become reality by means of hard work and perseverence.

49. "*A little science estranges a man from God, a lot of science brings him back.*"
    (a) A person who knows only a little science cannot believe in God.
    (b) An in-depth study of the complexities of nature and the universe often motivate a person to seek the Creator.
    (c) Science and religion cannot be reconciled because science eliminates a need for God.

50. "*Our duty is to believe that for which we have sufficient evidence, and suspend our judgment when we have not.*"
    (a) We should not jump to conclusions with only partial evidence and preconceived ideas.
    (b) Our judgment should suspend evidence in a matter.
    (c) Our duty is to believe enough evidence to suspend judgement.

Name: _____



Date: _____ Grade: _____

# *The Principles, Theories & Precepts of Biology*

## CHAPTER 4 TEST

*Congratulations on completing this chapter!* ***Answer the following questions to test your understanding of the material. When you finish, hand in your test to your teacher for a final grade. Each answer is worth 2.0 points.***

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**Multiple choice: Choose the correct answer.**

1. Sexual reproduction alone cannot cause evolution because:_____
_____.
   (a) it does not change the relative frequency of alleles in the gene pool of a species
   (b) it removes alleles permanently from the gene pool of a species
   (c) it does not change the combination of alleles in the gene pool of a species
   (d) it shuffles the alleles in the gene pool of a species

2. Ample evidence exists for _____ evolution, but absolute evidence for _____ evolution is lacking.
   (a) plant; animal
   (b) horizontal; vertical
   (c) past; present
   (d) chimpanzee; human

3. In the geologic column, _____ forms of fossils are found in the lower strata and _____ forms of fossils are found in the upper strata.
   (a) smaller and more fragile; larger and stronger
   (b) higher and more complex; simpler and less specialized
   (c) heavier and more dense; lighter and more porous
   (d) simpler and less specialized; higher and more complex

4. How do fossil grave yards suggest that a worldwide catastrophe involving water is responsible for the present topography of the earth?_____
_____
   (a) They display transitional fossils in tangled groups.
   (b) They display fossils of animals from similar climates in an orderly fashion.
   (c) They display fossils of animals from widely separate climates in tangled groups.
   (d) They display fossils of every known species in an orderly fashion.

5. How do the mammoths of Siberia and Alaska support the occurrence of a sudden aquatic catastrophe?_____
   (a) They have been found intact kneeling with food in their mouths.
   (b) Their eyes and red blood cells have been preserved.
   (c) Their condition suggests abrupt and dramatic environmental changes.
   (d) all of the above

6. The recapitulation theory states that:"_____."
   (a) exogeny recapitulates endogeny
   (b) oncology recapitulates myogeny
   (c) ontogeny recapitulates phylogeny
   (d) biology recapitulates pyrogeny

7. Researchers have demonstrated conclusively that the various stages through which an embryo passes are:_____.
   (a) essential for development from a single cell to an ordered being
   (b) evidence of the organism's evolutionary history
   (c) identical to other vertebrates in their earliest stages
   (d) all of the above

8. The evolution of reptile legs to bird wings defies the process of natural selection because _____.
   (a) advantages of the transitional forms would prevent further changes from occurring
   (b) intermediate forms would not fare well in nature
   (c) wings offer no advantages for survival
   (d) reptile legs and bird wings are too dissimilar

**Matching: Choose the correct answers.**

9. _____ vestigal organs
10. _____ natural selection
11. _____ adaptation
12. _____ survival of the fittest
13. _____ common descent
14. _____ horizontal evolution
15. _____ vertical evolution
16. _____ catastrophist theory
17. _____ uniformitarianism
18. _____ Big Bang theory

(a) evolution of physical and behavioral traits that make an organism better suited to survive in their environment
(b) hypothesis suggesting that all species have descended from common ancestors
(c) states that the individuals or groups best suited to their environment will survive and reproduce
(d) form of evolution characterized by variation within a species
(e) structures in an organism that seem to have little or no obvious use
(f) form of evolution characterized by development of a new species
(g) process by which the struggle for existence selects the fittest individuals in nature to survive and reproduce
(h) states that Earth experienced a major catastrophe in which most creatures/plants were destroyed, and that the remaining organisms represented today have changed very little over time
(i) states that 15 million years ago, a "cosmic egg" exploded, creating the universe
(j) states that origin and development of all things can be explained exclusively in terms of natural laws and processes operating today

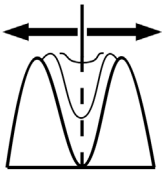
**Fill in the blank: Choose the correct answers from the Word Bank.**

**WORD BANK**

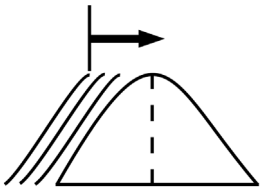
| | | |
|---|---|---|
| reproductive isolation | gene shuffling | Law of Mass Conservation |
| gene flow | gene pool | genetic drift |
| First Law of Thermodynamics | founder effect | biogenetic law |
| Second Law of Thermodynamics | | |

19. Dogs cannot interbreed with cats. This is an example of _____.
20. All the alleles of all the genes of the members of a population that interbreed are called a(n) _____.
21. The process that produces variations due to the crossing-over mechanism of gamete formation is known as _____.
22. Individuals of a population migrating from one group to another and interbreeding is called _____.
23. A random change in allele frequency that often produces offspring that will be different from the original population by chance is called _____.
24. An hypothesis that maintains that the development of an embryo retraces the evolutionary development of an organism is called the _____.
25. The _____ states that energy and mass can neither be created nor destroyed.
26. The _____ states that the mass of matter cannot change as a result of state, density, or form.
27. The _____ states that the amount of usefulness and availability of energy is always decreasing.

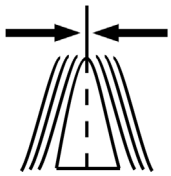
**Label the types of selection below as "stabelizing", "disruptive" or "directional".**



28. _____



29. _____



30. _____

**Matching: Choose the correct answers.**

31. _____ scientific law
32. _____ theory
33. _____ hypothesis
34. _____ species
35. _____ speciation
36. _____ molecular phylogeny
37. _____ probability
38. _____ irreducible complexity
39. _____ punctuated equilibrium
40. _____ homologous structures
41. _____ geologic column

(a) group of similar looking organisms that can breed with one another and produce fertile offspring
(b) evolutionary history of an organism based on DNA and protein comparisons
(c) condition that occurs when by reducing the complexity of a functioning unit, the function is destroyed
(d) theory supported by many lines of evidence and many years of successful experiments
(e) structures that supposedly have a common origin but not necessarily a common function
(f) continuum of geologic strata in the Earth's crust with a presumed time scale based on the types of fossils found in each strata
(g) scientifically acceptable and tested statement offered to explain observed facts
(h) alleged formation of a new species through evolution
(i) pattern of long periods of stability interrupted by episodes of rapid, evolutionary change
(j) an assumption made to test and prove a logical conclusion
(k) mathematical calculation of the likelihood of an event occurring

**Matching: Choose the correct answers.**

42. _____ Ernst Haeckel
43. _____ Charles Darwin
44. _____ Thomas Malthus
45. _____ Sir Charles Lyell
46. _____ Alfred Russel Wallace
47. _____ Edward Blyth

(a) author of *An Essay on the Principles of Evolution*
(b) studied in Malaysia and published a work very similar to *The Origin of Species*
(c) author of *The Origin of Species*
(d) believed that natural selection is used by nature to remove defective organisms, preserving the health of the population
(e) speculated that only the natural processes observable today shaped the topography of the modern world
(f) authored series of fraudulent embryo drawings purported to retrace evolutionary development of organisms

**Choose the best meaning of each Life Principle.**

48. "*True science is more concerned with discovery of truth than with protection of held theories and hypotheses.*"
    (a) Honest scientists are always willing to challenge the validity of their own hypotheses as new evidence emerges.
    (b) Good scientists protect their held theories and hypotheses in the quest for truth.
    (c) True science is the only way to hold theories and hypotheses.

49. "*The great tragedy of science (is) the slaying of a beautiful hypothesis by an ugly fact.*"
    (a) Science is often slain by ugly facts.
    (b) Scientific hypotheses can be beautiful or ugly, depending on how they are viewed.
    (c) Cherished hypotheses are often "shot down" by the introduction of new facts, much to the dismay of some scientists.

50. "*No science is immune to the infection of politics and the corruption of power.*"
    (a) Fortunately, scientific immunity protects against corruption of power.
    (b) Unfortunately being a scientist carries no guarantee of integrity and honesty.
    (c) Scientists should be of high character and immune to temptations and corruption.

Name: _____



Date: _____ Grade: _____

# *The Principles, Theories & Precepts of Biology*

## CHAPTER 5 TEST

*Congratulations on completing this chapter!* ***Answer the following questions to test your understanding of the material. When you finish, hand in your test to your teacher for a final grade. Each answer is worth 2.0 points.***

1. The Earth's tilting and revolution around the Sun causes:_____.
   (a) a magnetic field (c) ultraviolet radiation
   (b) the ocean's tides (d) Earth's seasons

2. The Moon revolves around the Earth causing: _____.
   (a) Earth's seasons (c) twenty-four hour days
   (b) ocean tides (d) ultraviolet radiation

3. The correct order of the biological hierarchy is:_____
   _____.
   (a) Kingdom, Phylum, Class, Order, Family, Genus, Species
   (b) Kingdom, Class, Phylum, Order, Family, Genus, Species
   (c) Kingdom, Phylum, Class, Family, Order, Genus, Species
   (d) Kingdom, Phylum, Class, Order, Genus, Family, Species

4. The domestic cat is called *Felis domesticus*. *Felis* refers to the _____ to which the cat belongs, and *domesticus* refers to the _____ to which the cat belongs.
   (a) Kingdom; Species (b) Genus; Species (c) Kingdom; Phylum (d) Genus; Family

5. The six kingdoms of biology are:_____
   _____.
   (a) Eubacteria, Archaebacteria, Protista, Fungi, Plantae, and Animalia
   (b) Monera, Insectae, Protista, Fungi, Plantae, and Animalia
   (c) Eubacteria, Archaebacteria, Protista, Algae, Plantae, Animalia
   (d) Eubacteria, Archaebacteria, Paramecia, Fungi, Plantae, Animalia

6. Cells that lack a nuclear membrane and have no membrane-bound organelles are called:
   _____.
   (a) heterotrophic (b) prokaryotic (c) eukaryotic (d) photosynthetic

7. The type of organism that makes up the kingdoms Protista, Fungi, Plantae, and Animalia is a(n): _____.
   (a) autotroph (b) heterotroph (c) prokaryote (d) eukaryote

8. _____ invented the system that is used today to classify organisms.
   (a) Ernst Haekel (b) Stanley Miller (c) Carolus Linnaeus (d) Leslie Orgel

9. Bacteria have all of the following, except:_____.
   (a) a cell membrane (c) a cell wall
   (b) circular DNA (d) a nuclear membrane

10. A virus contains a core of DNA or RNA surrounded by a(n):_____.
    (a) nucleic acid membrane (c) protein coat
    (b) cellulose wall (d) peptidoglycan shield

11. When food is digested with secreted chemicals and then absorbed, it is called: _____.
    (a) extracellular digesiton (c) intracellular digestion
    (b) intercellular digestion (d) multicellular digestion

12. Monocots and dicots are distinguished based on the _____ of their cotyledons.
    (a) size (b) number (c) shape (d) composition

13. Plant roots function to: _____.
    (a) absorb light energy (c) absorb water and nutrients
    (b) aid evaporation (d) protect the plant

14. In a closed circulatory system, blood:_____.
    (a) is released directly onto body tissues
    (b) flows through tissues and collects in sinuses
    (c) is contained entirely in a system of closed vessels
    (d) is pumped by an organ other than the heart

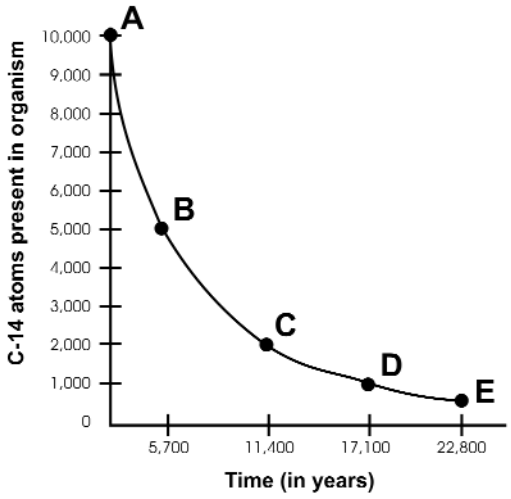
15. The concentration of nerve cells and sensory cells in the head of an organism is called: _____.
    (a) cephalization (b) mobilization (c) centralization (d) innervation

16. The process by which food is digested inside the internal cells of a simple multicellular animal is called _____ digestion.
    (a) extracellular (b) intracellular (c) intercellular (d) multicellular

17. Organisms that rely on interactions with the environment to control body temperature are called: _____.
    (a) carnivores (b) ectotherms (c) herbivores (d) endotherms

18. Organisms that generate and maintain body heat through chemical reactions in the body are called: _____.
    (a) carnivores (b) ectotherms (c) herbivores (d) endotherms

**Use the figure to the right to answer questions #19-20.**



19. Point B represents which of the following?_____
_____

(a) the age of the organism at death
(b) the amount of C-14 in the organism after one half-life
(c) the organism's metabolic activity while alive
(d) the amount of C-14 in the organism that was converted to C-12

20. Which of the following can you observe from the graph?_____
_____

(a) 100% of the C-14 of the organism will be dissipated in 5,700 more years.
(b) The half-life of C-14 is very short.
(c) Fewer C-14 molecules are dissipated with each half-life.
(d) Point F will represent one-sixteenth of the C-14 atoms at point A.

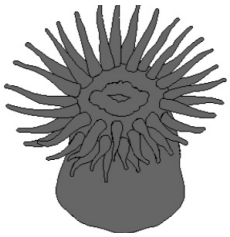
21. Use the chart to the right to answer this question. Which of the following can be deduced from this information?_____
_____

(a) The genus name for maple trees is Acer.
(b) The maple species nigrum, rubrum, and saccharinium produce different colored flowers.
(c) New species of maple trees will have names other than Acer.
(d) Acer saccharum makes the sweetest maple sugar.

| Scientific Name | Common Name |
|---|---|
| Acer saccharum | Sugar maple |
| Acer saccharirium | Silver maple |
| Acer rubrum | Scarlet maple |
| Acer platanoides | Norway maple |
| Acer campestre | Common maple |
| Acer nigrum | Black maple |

**Label each organism in questions # 22-24 as having either a hydrostatic skeleton, endoskeleton, or exoskeleton.**

22. _____



23._____



24. _____



**Matching: Choose the correct answers.**

25. _____ Eubacteria
26. _____ Archaebacteria
27. _____ Algae
28. _____ Protozoans
29. _____ gymnosperms
30. _____ angiosperms
31. _____ Porifera
32. _____ Cnidaria
33. _____ Platyhelminthes
34. _____ Chordata
35. _____ Mammalia

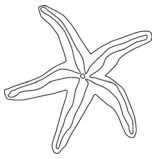
(a) seed plant in which seeds are exposed to the air, usually in a cone shaped structure
(b) bacteria with a peptidoglycan cell wall
(c) single-celled photosynthetic protists
(d) phylum made up of sponges
(e) phylum that includes flatworms
(f) bacteria that live in volcanic hot springs, brine pools, black organic mud and ice
(g) phylum that includes all the vertebrates of the animal kingdom
(h) heterotrophic, motile protists
(i) flowering plants in which seeds develop within a matured ovary or fruit
(j) phylum that includes jellyfish
(k) class includes humans

**Label each organism in questions # 36-39 according to phylum.**

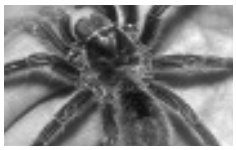
36. _____



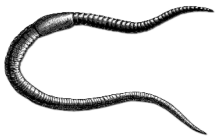
37. _____



38. _____



39. _____



40. Which group depends on other organisms as a food source? _____
    (a) autotrophs only
    (b) heterotrophs only
    (c) autotrophs and heterotrophs
    (d) neither autotrophs nor heterotrophs

41. Which group changes light energy into food energy? _____
    (a) autotrophs only
    (b) heterotrophs only
    (c) autotrophs and heterotrophs
    (d) neither autotrophs nor heterotrophs

42. Which group supplies food for other organisms? _____
    (a) autotrophs only
    (b) heterotrophs only
    (c) autotrophs and heterotrophs
    (d) neither autotrophs nor heterotrophs

**Fill in the blank: Choose the correct answers from the WORD BANK.**

| **WORD BANK** | | | |
|---|---|---|---|
| notochord | vascular tissue | spore | hypha |
| stomata | seed | mycellium | cuticle |

43. A small, single-celled structure that is capable of producing a new individual is called a(n) _____.

44. A threadlike, branching filament that is the most basic structure in a fungus is a(n)_____ _____.

45. A flexible, rod-like structure that provides body support to Chordates at some point in their development is a(n) _____.

46. Specialized tissue that transports water and nutrients throughout a land plant is called_____ _____.

**Choose the best meaning of each Life Principle.**

47. "*I perhaps owe having become a painter to flowers*."_____
    (a) We are not immune to the negative influences of our peers.
    (b) One who loves flowers will become an artist.
    (c) We are all influenced by things on which we focus.

48. "*The most erroneous stories are those we think we know the best—and therefore never scrutinize or question*."_____
    (a) Most of what we have been taught is not correct.
    (b) We can inadvertantly embrace error by not questioning common teachings.
    (c) We can always trust our own intellect.

49. "*Truth will always be truth, regardless of lack of understanding, disbelief, or ignorance.*"_____
    (a) Truth is negotible.
    (b) One who disbelieves truth is ignorant.
    (c) Truth is an absolute.

50. "*It is a capital mistake to theorize before one has data*."_____
    (a) We should avoid forming opinions before we have examined the facts.
    (b) There will usually be visible evidence to prove a true theory.
    (c) Capital judgement is usually helpful in reaching the truth.

Name: _____



Date: _____ Grade: _____

# *The Principles, Theories & Precepts of Biology*

## CHAPTER 6 TEST

*Congratulations on completing this chapter!* ***Answer the following questions to test your understanding of the material. When you finish, hand in your test to your teacher for a final grade. Each answer is worth 2.0 points.***

---

**Multiple choice: Choose the correct answer.**

1. Bacteria that live on the roots of legume plants help to make _____ available to the plant.
   (a) water vapor from the air
   (b) nitrogen from the air
   (c) oxygen from the air
   (d) carbon dioxide from the air

2. Saprophytes help to:_____.
   (a) remove diseased animals from the population
   (b) cause humans to use proper sanitation practices
   (c) recycle the materials necessary for life
   (d) preserve environmental energy

3. Gram- negative bacteria have an extra _____ that helps them to resist antibiotics.
   (a) nuclear membrane
   (b) membrane protein
   (c) membrane lipid layer
   (d) flagellum

4. The germ theory of disease was established by:_____.
   (a) Louis Pasteur
   (b) Joseph Lister
   (c) Alexander Fleming
   (d) Isaac Newton

5. Ringworm is caused by a Deuteromycete of the genus:_____.
   (a) Tinea
   (b) Trypanosoma
   (c) Typhi
   (d) Subtilis

6. Friendly organisms in the intestinal flora of humans:_____
   _____.
   (a) hinder the digestion of toxic materials
   (b) help keep harmful bacteria under control
   (c) hinder the intestine's function
   (d) facilitate most of the digestion of macromolecules

7. Penicillin was discovered by: _____.
   (a) Louis Pasteur
   (b) Joseph Lister
   (c) Alexander Fleming
   (d) Isaac Newton

8. Each cell in a colony of single-celled organisms:_____.
   (a) depends on other cells for survival
   (b) can exist on its own
   (c) specializes in an individual task
   (d) works together with other cells

9. The most serious disease caused by protists in tropical and subtropical regions of the world is: _____.
   (a) Giardiasis
   (b) Late blight disease
   (c) Amoebic dysentery
   (d) Malaria

10. Plasmodium attacks the _____ cells of the body.
   (a) nerve and bone
   (b) skin and muscle
   (c) kidney and adipose
   (d) liver and blood

11. Ticks transmit which of the following bacterial diseases?_____
   (a) bubonic plague
   (b) typhus
   (c) leprosy
   (d) lyme disease

12. _____ is transmitted by contaiminated water and food.
   (a) tetanus (b) diphtheria (c) typhpoid fever (d) tuberculosis

13. Severe, prolonged muscle spasms are symptoms of _____.
   (a) diptheria (b) cholera (c) tetanus (d) leprosy

**Matching: Choose the correct answers.**

14. _____ saprophyte
15. _____ parasite
16. _____ autotroph
17. _____ mycelium
18. _____ phagocyte
19. _____ virus
20. _____ pathogen
21. _____ zygospore
22. _____ ascospore
23. _____ basidiospore
24. _____ hyphae

(a) haploid spores produced by the fruiting body of a Basidiomycota
(b) mass of hyphae that grows in a food source and forms the living body of a fungus
(c) spores produced by sexual reproduction in an ascomycete
(d) web of tiny filaments that make up the living body of a fungus
(e) zygote surrounded by a protective covering found in Zygomycetes
(f) bacterium that is responsible for causing illness
(g) organism that relies on a living host for survival
(h) white blood cell that engulfs and destroys bacteria
(i) organism that feeds on dead matter
(j) non-living particle consisting of only DNA or RNA surrounded by a protein coat
(k) organism that uses energy from the Sun to change non-living nutrients into living tissue

**Fill in the blank: Choose the correct answers from the WORD BANK.**

**WORD BANK**

| | | | |
|---|---|---|---|
| binary fission | conjugation | transformation | lysogenic infection |
| lytic infection | nitrogen fixation | antibiotic | cilia |
| gullet | contractile vacuole | chloroplasts | algal bloom |

25. The process by which bacteria convert nitrogen gas into a useable form for plants is called _____.

26. A chemical secreted by a living organism that kills or reduces the reproduction rates of other organisms is called a(n) _____.

27. The form of sexual reproduction in bacteria that results in new combinations of genes is called _____.

28. The process by which viral genes combine with the host cell's DNA, produce viral *mRNA*, and gradually make new viruses is called_____ _____.

29. The organelle in the paramecium that collects and expels water is called the_____ _____.

30. Short, hairlike projections of some organisms that pull them through the water with a coordinated rowing movement are called_____ _____.

31. The process by which viral enzymes destroy a host cell's DNA, ribosomes and resources to reproduce is called _____.

32. The process of bacterial reproduction in which genetic material is added to or replaces portions of a bacterium's DNA is called_____ _____.

33. The depression on a paramecium used for the intake of food particles is called a(n)_____ _____.

34. Organelles present in plant-like protists that function in photosynthesis are called_____ _____.

35. _____ is the phenomenon that occurs when algae reproduce so rapidly in aquatic environments that they take over their habitat, making the water appear the same color as the algae.

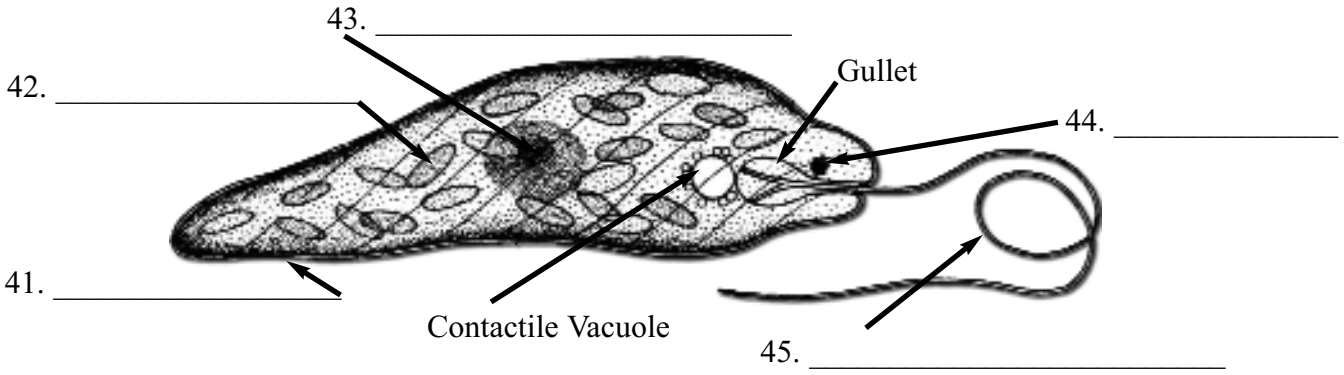
**Matching: Choose the correct answers.**

36. _____ *Thiobacillus ferroxidans*
37. _____ *Rhizopus stolonifer*
38. _____ *Claviceps purpurea*
39. _____ *Phytophthora infestans*
40. _____ *Candida albicans*

(a) commonly known as “ergot of rye”
(b) kills potato plants
(c) present in the intestinal flora of humans
(d) includes bread molds
(e) helps metallurgists to extract copper from ore

**Use the WORD BANK to label the figure on the following page (questions #41-45).**

| WORD BANK | | | | |
|---|---|---|---|---|
| nucleus | eyespot | pellicle | chloroplast | flagellum |




**True or false: Write the correct answers.**

46. _____ Algae are photosynthetic aquatic organisms that are classified as fungi.

47. _____ The point where the number of new bacteria being produced equals the number of bacteria that are dying is called the steady state of the population.

**Choose the best meaning of each Life Principle.**

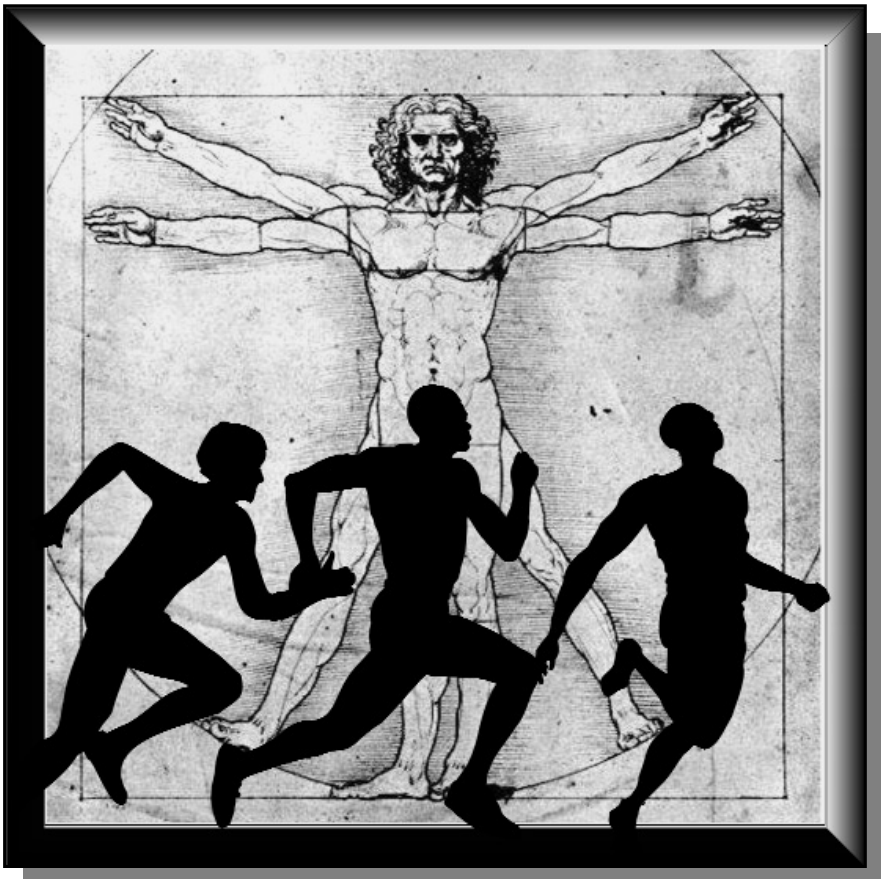
48. "*It is possible to see the sacred in the science of life.*" _____
    (a) Scientific truth can be a reflection of sacred truths.
    (b) Investigating the science of life is a sacred endeavor.
    (c) Investigating the science of life eliminates sacredness.

49. "*The important thing is not to stop questioning*." _____
    (a) It is best to ignore people who tell you to stop asking questions
    (b) Asking questions is important in order to grow in knowledge and wisdom.
    (c) Asking questions in a conversation is better than answering them.

50. "*The real voyage of discovery consists not in seeking new landscapes, but in having new eyes*."
    _____
    (a) Where you are in your voyage is not as important as where you perceive you are.
    (b) Seeking new landscapes has only temporary value.
    (c) Looking at things from another perspective can yield some wonderful discoveries.

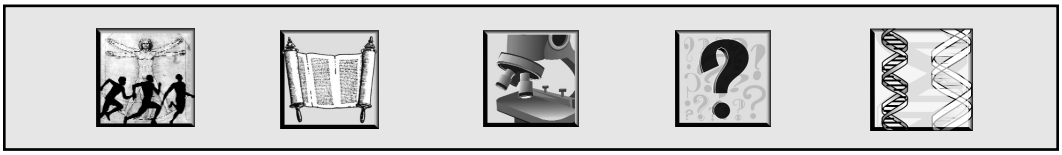
# *The Principles, Theories & Precepts of Biology*

## *Quiz Answer Keys*



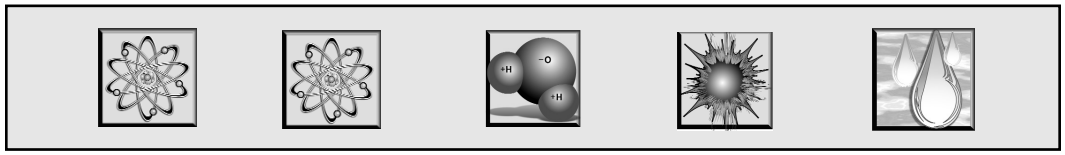

PAC
TM
TM

# *Quiz 1-1 Answer Key*



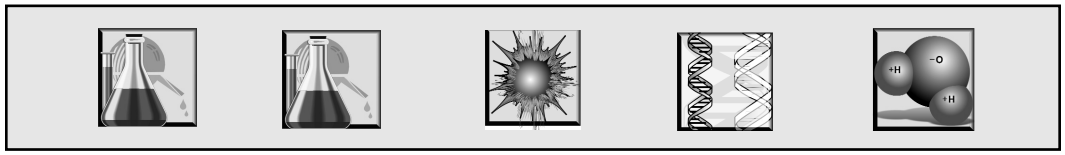
1. (c) scientific method
2. (a) is a theory supported by many lines of evidence and years of successful experiments and observations
3. (c) existence of God
4. (c) inheritance
5. (a) God had established....
6. (c) catastrophist theory
7. (b) the ship on which Darwin sailed
8. (a) a common ancestor
9. (e) only a and b
10. (a) both species are benefited
11. (a) cell
12. (b) oxygen
13. (c) naturalist
14. (b) DNA
15. (b) Charles Darwin
16. _b_ essential for life
17. _e_ primordial soup
18. _d_ sunlight
19. _a_ decoy-fish
20. _c_ white-throated warbler
21. False
22. False
23. False
24. True
25. True
26. False
27. True
28. True
29. False
30. False
31. Renaissance
32. hypothesis
33. Galileo Galilei
34. geocentric
35. phlogiston
36. Antoine Lavoisier
37. Francis Bacon
38. Nicolaus Copernicus
39. biblical
40. Sir Isaac Newton
41. _d_ Antoni van Leeuwenhoek
42. _e_ John Ray
43. _a_ Robert Hooke
44. _c_ Ignaz Semmelweis
45. _b_ Andreas Versalius
46. *prepared*
47. *evidence*
48. *lessons*
49. *the truth*
50. *reasoning*

# *Quiz 1-2 Answer Key*



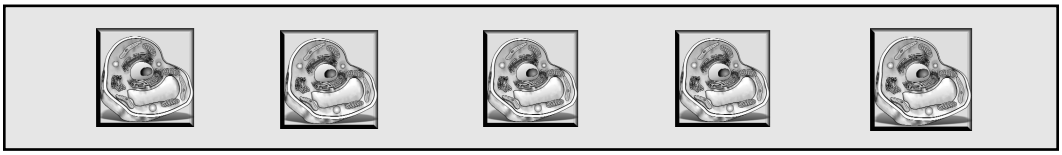
1. _e_ element
2. _i_ neutron
3. _l_ mass
4. _a_ atom
5. _k_ electron orbital
6. _j_ atomic mass
7. _d_ nucleus
8. _b_ electron
9. _g_ proton
10. _h_ atomic number
11. _c_ molecule
12. _f_ compound
13. (b) silicon
14. (c) 2
15. (b) sodium (Na) donating its outer electron to chlorine(Cl)
16. (a) $^{+}2$
17. (d) $H^{+}$; $OH^{-}$
18. (d) 10
19. (c) 18 amu
20. (b) A + B ⟶ C + D + energy
21. (b) oxygen; hydrogen
22. (c) oxygen has a negative charge
23. Niels Bohr
24. ionic bond
25. ion
26. covalent bond
27. electronegativity
28. polar bond
29. Avogadro's number
30. chemical reaction
31. isotopes
32. molecular weight
33. _c_ buffers
34. _m_ water
35. _g_ micelles
36. _j_ cohesion
37. _e_ adhesion
38. _k_ surface tension
39. _a_ capillary action
40. _b_ sodium
41. _f_ magnesium
42. _h_ potassium
43. _l_ solution
44. _i_ solute
45. _n_ solvent
46. _d_ molarity
47. *do not see*
48. *ask questions*
49. *strength*
50. *water*

# *Quiz 1-3 Answer Key*



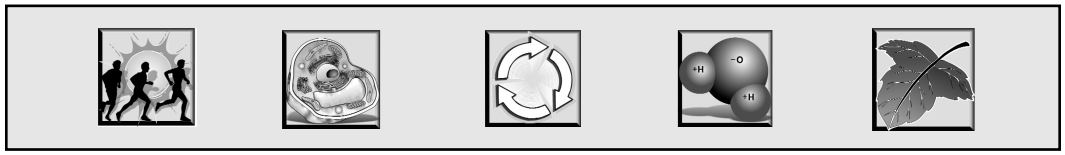
1. _c_ organic compounds
2. _e_ inorganic compounds
3. _a_ hydrocarbons
4. _d_ levo
5. _b_ dextra
6. (d)
7. (b) not permanently changed
8. (b) one specific type of reaction
9. (a) neutral
10. (c) deoxyribose
11. _e_ carbohydrates
12. _j_ lipids
13. _g_ fatty acids
14. _a_ steroids
15. _i_ amino acids
16. _c_ hormones
17. _b_ catalysts
18. _h_ enzymes
19. _d_ substrates
20. _f_ nucleic acids
21. True
22. True
23. False
24. True
25. False
26. living organisms
27. Earth's crust
28. polymers
29. functional groups
30. peptide bond
31. active site
32. induced fit
33. genetics
34. nucleotide
35. racemic mixture
36. _c_ fructose
37. _j_ glycerol
38. _a_ hemoglobin
39. _g_ energy
40. _i_ starch
41. _e_ glycogen
42. _b_ DNA
43. _h_ RNA
44. _f_ nucleotides
45. _d_ AMP
46. *work*
47. *perspiration*
48. *free*
49. *success*
50. *truth*

# *Quiz 2-1 Answer Key*



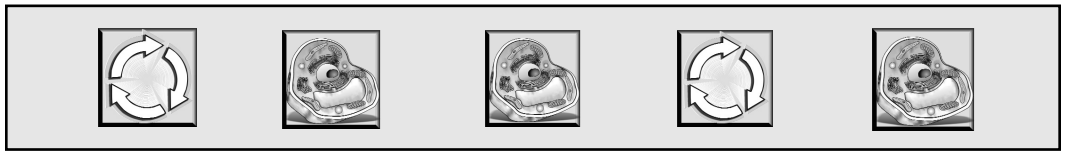
1. _i_ absorption
2. _d_ digestion
3. _l_ respiration
4. _n_ excretion
5. _e_ egestion
6. _a_ secretion
7. _f_ endocytosis
8. _c_ exocytosis
9. _h_ phagocytosis
10. _g_ irritability
11. _j_ homeostasis
12. _m_ cytology
13. _b_ cytolysis
14. _k_ plasmolysis
15. True
16. False
17. True
18. False
19. (d) Cells are constantly changing.
20. (b) it has no nucleus
21. (c) proteins
22. (a) lipid soluble
23. (b) animal
24. (d) active transport
25. (a)
26. (b) flow into the cell
27. (d) all of the above
28. (a) hypertonic
29. Anton van Leeuwenhoek
30. Robert Hooke
31. Matthias Schleiden
32. Rudolf Virchow
33. Louis Pasteur
34. Garth Nicolson
35. _f_ cytoplasm
36. _k_ cell membrane
37. _a_ nucleus
38. _l_ cell wall
39. _b_ chromosome
40. _h_ ribosome
41. _j_ endoplasmic reticulum
42. _d_ chloroplast
43. _e_ vacuole
44. _c_ lysosome
45. _g_ cytoskeleton
46. _i_ flagellum
47. *opportunity*
48. *tomorrow*
49. *happens*
50. *true*

# *Quiz 2-2 Answer Key*



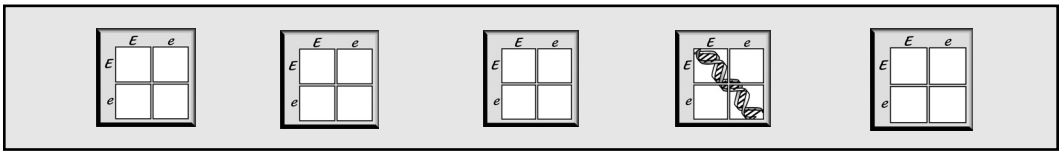
1. (d) entropy in the universe must increase
2. (c) released
3. (a) more energy than most chemical bonds
4. (b) added to
5. (b) two
6. (c) passes electrons from NADH to pyruvic acid
7. (d) anaerobic condition
8. (b) anaerobic respiration
9. (d) carbon dioxide
10. (d) two
11. (d) electron transport chain
12. (b) 36
13. (c) water
14. (a) animals
15. (d) replace electrons to chlorophyll
16. _e_ cellular respiration
17. _a_ glycolysis
18. _m_ cofactors
19. _g_ lactic acid fermentation
20. _b_ alcohol fermentation
21. _h_ cristae
22. _n_ Kreb's Cycle
23. _o_ electron transport chain
24. _i_ photosynthesis
25. _c_ cellulose
26. _l_ chloroplast
27. _d_ thylakoids
28. _j_ chlorophyll
29. _f_ Calvin Cycle
30. _k_ ATP
31. kinetic energy
32. potential energy
33. pyruvic acid
34. NAD+
35. oxaloacetic acid
36. FAD+
37. oxygen
38. PhosphoGlyceric Acid (or PGA)
39. Joseph Priestly
40. Jan Ingen-Housz
41. Jean Senebin
42. Nicolas Theodore de Sanssure
43. False
44. True
45. False
46. True
47. True
48. *granted*
49. *prolonged effort*
50. *character*

# *Quiz 2-3 Answer Key*



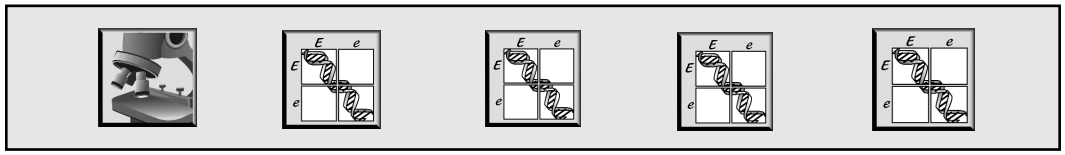
1. (a) it must make a complete copy of the genetic information in its nucleus
2. (b) fungi
3. (d) 46
4. (a) different
5. (d) These drugs destroy brain cells that cannot be replaced.
6. (b) aging
7. (b) division of cells
8. (d) sexual
9. _c_ cell division
10. _p_ binary fission
11. _f_ mitosis
12. _j_ cytokinesis
13. _k_ meiosis
14. _a_ cell cycle
15. _h_ M phase
16. _m_ S phase
17. _d_ G1 phase
18. _n_ G2 phase
19. _l_ interphase
20. _o_ metaphase
21. _i_ anaphase
22. _b_ anaphase I
23. _e_ anaphase II
24. _g_ phagocytosis
25. centromere
26. chromatids
27. centriole
28. spindle
29. microtubule
30. cell plate
31. homologous chromosome
32. diploid
33. haploid
34. tetrad
35. synapsis
36. crossing over
37. True
38. True
39. _e_ gametes
40. _b_ somatic cells
41. _c_ tissues
42. _h_ organs
43. _d_ organ systems
44. _f_ neurons
45. _a_ macrophages
46. _g_ cyclins
47. _i_ polar bodies
48. *instruction*
49. *intelligent*
50. *tomorrow*

# *Quiz 3-1 Answer Key*




1. (b) opposite
2. (c) distinctly contrasting forms
3. (c) two copies of the allele for tallness
4. (c) equal in height to the plants with two alleles for tallness
5. (d) one-half heterozygous tall and one-half homozygous short
6. (a) ¼
7. (b) remain in their condensed form
8. (c) 22 pairs of homologous chromosomes
9. (b) only X
10. (c) father's sperm
11. (d) females usually have a dominant gene for vision on one of their sex chromosomes
12. (d) clot
13. (c) X; males
14. (a) both A and B antigens from the ABO gene and the negative allele from the Rh blood group
15. (b) stamen; carpel
16. _k_ F1 generation
17. _c_ alleles
18. _f_ gametes
19. _a_ antigens
20. _j_ heterozygous
21. _e_ P generation
22. _d_ multiple alleles
23. _h_ genotype
24. _i_ homozygous
25. _b_ genes
26. _g_ phenotype
27. False
28. False
29. False
30. True
31. False
32. Law of Dominance
33. Law of Segregation
34. independent assortment
35. gene linkage
36. incomplete dominance
37. co-dominance
38. probability
39. karyotype
40. pedigree
41. polygenic inheritance
42. self-pollination
43. (b) heredity
44. (c) Gregor Mendel
45. (d) follow more than one characteristic at a time
46. (b) remain together
47. (c) pink
48. (d) co-dominant
49. *lame*
50. *impossible*
51. *individual*
52. *truth*

# *Quiz 3-2 Answer Key*



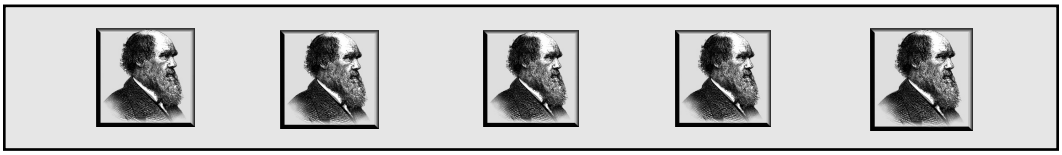
1. _b_ DNA polymerase
2. _f_ Okazaki fragment
3. _i_ DNA ligase
4. _k_ anticodon
5. _c_ RNA polymerase
6. _d_ codon
7. _e_ operon
8. _h_ repressor
9. _g_ operator
10. _j_ intron
11. _l_ exon
12. _a_ nucleotide
13. molecular genetics
14. transformation
15. bacteriophage
16. radioactive isotope
17. X-ray diffraction
18. chromatin
19. conservative replication
20. semi-conservative replication
21. dispersive replication
22. *RNA*
23. *rRNA*
24. *mRNA*
25. *tRNA*
26. transcription
27. translation
28. (b) dead smooth bacteria mixed with rough bacteria caused pneumonia
29. (c) disease causing
30. (b) Avery concluded that genes are made of DNA
31. (d) protein
32. (b) injecting its genetic material into the bacterium
33. (b) genes are made of DNA
34. (a) uracil
35. (d) DNA contains equal amounts of cytosine and guanine as well as adenine and thymine
36. (a) Watson and Crick
37. (b) A and T
38. (b) hydrogen
39. (d) Franklin and Wilkins
40. (d) uracil; thymine
41. (b) ribosome
42. (a) *tRNA* molecules match their anticodons with *mRNA* codons
43. (c) the repressor protein binds to lactose
44. (b) make and release hundreds of viruses
45. (b) nucleosomes
46. *look for*
47. *brings him back*
48. *ever changing*
49. *everything is a miracle*
50. *questions*

# *Quiz 3-3 Answer Key*



1. (d) all of the above
2. (d) autosomes
3. (b) cystic fibrosis
4. (c) Down syndrome
5. (a) they form a single DNA molecule
6. (d) recombinant DNA
7. (a) plasmids
8. (c) have been transformed with genes from another organism
9. (c) remove sugars from the bloodstream
10. (d) interferon
11. (a) RFLPs
12. (c) sequence all the nitrogenous bases in the human genome
13. _e_ mutation
14. _c_ mutagen
15. _h_ chromosomal mutation
16. _b_ gene mutation
17. _i_ point mutation
18. _a_ frameshift mutation
19. _g_ transposition
20. _d_ genetic engineering
21. _f_ selective breeding
22. _j_ hybridization
23. _k_ inbreeding
24. melanin
25. hemoglobin
26. zygote
27. nondisjunction
28. polyploidy
29. transposon
30. restriction enzyme
31. electrophoresis
32. cell transformation
33. cloning
34. gene therapy
35. DNA fingerprinting
36. True
37. True
38. False
39. _c_ albinism
40. _e_ cystic fibrosis
41. _g_ Tay-Sachs disease
42. _a_ sickle cell anemia
43. _b_ Huntington disease
44. _h_ Turner syndrome
45. _d_ Klinefelter syndrome
46. _f_ Down syndrome
47. *your right to say it*
48. *success*
49. *misguided*
50. *evidence*
51. *moral*

# *Quiz 4-1 Answer Key*



1. (d) scientific law
2. (c) scientific method
3. (a) theory
4. (b) hypothesis
5. (d) 50 million
6. (d) each island having species that were distinctly different from each other
7. (b) eon
8. (a) it does not change the relative frequency of alleles in the gene pool of a species
9. (b) taxonomist
10. (d) horizontal; vertical
11. (a) paleontologist
12. (c) naturalist
13. a Charles Darwin
14. e Thomas Malthus
15. b Sir Charles Lyell
16. d Alfred Russel Wallace
17. c Edward Blyth
18. d evolution
19. f creation
20. h catastrophist theory
21. a natural selection
22. g adaptation
23. c artificial selection
24. e survival of the fittest
25. i common descent
26. b stabilizing selection
27. j vertical evolution
28. normal distribution
29. directional selection
30. stabilizing selection
31. disruptive selection
32. species
33. reproductive isolation
34. gene pool
35. gene shuffling
36. gene flow
37. normal distribution
38. genetic drift
39. founder effect
40. speciation
41. sterility
42. False
43. True
44. True
45. False
46. *scientist*
47. *supernatural*
48. *arrival*
49. *masterpiece*
50. *questions*

# *Quiz 4-2 Answer Key*



1. (c) rare; usually harmful
2. (c) increase
3. (d) natural selection
4. (a) simple and unspecialized; higher and complex
5. (b) They have remained unchanged throughout the course of presumed evolutionary history.
6. (b) fossilization requires rapid burial
7. (b) They display fossilized remains of animals from widely separate climates in tangled groups.
8. (d) all of the above
9. (c) It is evidence of a hydraulic catastrophe that kept tissues from decaying, thus facilitating fossilization.
10. (a) ancestors of monkeys, apes, and humans began their evolutionary journey some 50 million years ago
11. (d) imagination
12. (b) DNA sequencing
13. (b) essential for its development from a single cell to an ordered being
14. a paleontology
15. f fossils
16. j strata
17. b sedimentary rocks
18. m geologic column
19. g geology
20. i index fossils
21. c paleoanthropology
22. e ontongeny
23. k phylogeny
24. n James Hutton
25. d Ernst Haeckel
26. h circular reasoning
27. l Eohippus
28. Neo-Darwinism
29. uniformitarianism
30. macroevolution
31. Cambrian Explosion
32. biogenetic law
33. eras
34. True
35. False
36. True
37. False
38. f Cro-magnon
39. h Archaeopteryx
40. b homnids
41. c Nebraska Man
42. d Piltdown Man
43. i Australopithecus
44. e Homo sapiens
45. j Neanderthals
46. g homologous structures
47. a vestigial organs
48. *truth*
49. *power*
50. *science*
51. *fact*
52. *the truth*

# *Quiz 4-3 Answer Key*



1. (c) a common ancestor at its root and modern species as its branches
2. (a) law of energy and mass conservation
3. (c) organisms that are supposed to have evolved before humans have a greater number of chromosomes than humans
4. (b) many ingredients are mixed together to produce a chocolate cake
5. (b) order to disorder
6. (d) It suggests that life and order happened without cause.
7. (a) limbs that were modified for flying
8. (d) fore legs that eventually developed into wings
9. (b) creatures with half-wing, half-leg characteristics would not fare well in nature
10. (c) it produces colored, multi-dimensional pictures
11. (d) all of the above
12. (d) the human body attacking its own cells
13. (b) loss of immune function
14. (a) simultaneously
15. (b) It prevents its own destruction with an anti-inhibitor.
16. (c) The beetle could not recognize its need for an inhibitor until it had exploded.
17. (c) dependable
18. (d) Humans are products of design.
19. (a) DNA; DNA; protein
20. (d) scientific laws; hypotheses
21. (a) hypothesis, theory, scientific law
22. (c) A parent species dominates newly evolved species.
23. (b) flagellum
24. e First Law of Thermodynamics
25. a Law of Mass Conservation
26. g Second Law of Thermodynamics
27. c Law of Entropy Increase
28. f Big Bang theory
29. b irreducible complexity
30. d punctuated equilibrium
31. h intelligent design
32. molecular phylogeny
33. molecular clock
34. phylogenetic trees
35. morpholysis
36. probability
37. scientific method
38. False
39. True
40. True
41. False
42. True
43. True
44. False
45. True
46. *facts*
47. *prejudice*
48. *fair*
49. *emotions*
50. *foolish*

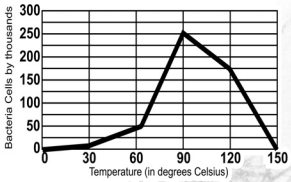
# *Quiz 5-1 Answer Key*



1. (d) the planet's ability to support life
2. (c) .001%
3. (c) the vegetative growing seasons
4. (c) the ocean's tides
5. (a) severe electromagnetic storms
6. (c) decreasing
7. (d) decreasing exponentially
8. (d) Louis Pasteur and Joseph Lister
9. (c) spontaneous generation
10. (a) species
11. (c) Kingdom, Phylum, Class, Order, Family, Genus, Species
12. Genus; Species
13. (b) produce milk
14. (a) Eubacteria, Archaebacteria, Protista, Fungi, Plantae, and Animalia
15. (c) Protista
16. (c) They cannot make their own food.
17. (c) they are too close to or too far from the Sun
18. Fungi
19. Plantae
20. Animalia
21. Protista
22. (c) the amount of C-14 present in the organism before death
23. (b) the amount of C-14 in the organism after one half-life
24. (c) fewer C-14 molecules are dissipated with each half-life
25. (a) The genus name for maple trees is Acer.
26. (b) heterotrophs only
27. (d) neither autotrophs nor heterotrophs
28. (a) autotrophs only
29. (c) autotrophs and heterotrophs
30. d taxonomy
31. f morphology
32. b motile
33. a prokaryotic
34. g eukaryotic
35. c autotrophic
36. e heterotrophic
37. (c) ozone layer
38. (c) nitrogen; oxygen
39. (d) 4,600,000
40. (d) radioactive dating
41. (b) Carolus Linnaeus
42. True
43. False
44. True
45. True
46. *origin of life*
47. *theorize*
48. *produced*
49. *nature*
50. *apathy*

# *Quiz 5-2 Answer Key*

1. (b) prokaryotic
2. (c) nuclear membrane
3. (c) Eubacteria; Archaebacteria
4. (d) protein coat
5. (b) eukaryotic
6. (d) varied
7. (a) Protista
8. (a) Food is digested with secreted chemicals and then absorbed.
9. (c) unicellular
10. (d) swamp
11. (b) They can survive long droughts.
12. (c) number
13. (d) all of the above
14. (b) capture light
15. f phloem
16. k xylem
17. g spores
18. h hypha
19. j mycelium
20. c seed
21. d cuticle
22. i stomata
23. l vascular tissue
24. b peptidoglycan
25. e chitin
26. a chlorophyll
27. (c)




28. g Eubacteria
29. c Archaebacteria
30. e Algae
31. a Protozoans
32. d gymnosperm
33. h angiosperm
34. b saprophyte
35. f parasite
36. (c) Malaria
37. (d) Toxoplasmosis
38. (c) Amoebic dysentery and Giardia
39. conjugation
40. transformation
41. extracellular digestion
42. alteration of generations
43. sporophyte generation
44. seed dispersal
45. Basidiomyctes
46. Dueteromycetes
47. Ascomycetes
48. Zygomycetes
49. *question*
50. *planted*
51. *nature*
52. *decay*

# *Quiz 5-3 Answer Key*

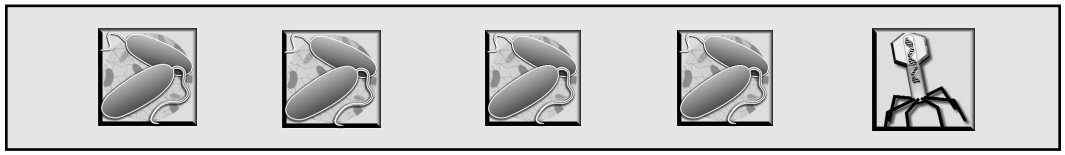


1. (b) backbone
2. (c) they are all very small
3. (a) bilateral symmetry
4. (c) blood is released directly onto body tissues
5. (c) blood is contained entirely in a system of closed vessels
6. (c) excretion
7. (b) centralization
8. (a) cephalization
9. (d) intracellular
10. (a) extracellular
11. c Porifera
12. g Cnidaria
13. i Platyhelminthes
14. a Annelida
15. l Molluska
16. e Echinodermata
17. k Arthropoda
18. b Chordata
19. d Agnatha
20. h Chondrichthyes
21. f Osteichthyes
22. j Mammalia
23. hydrostatic skeleton
24. exoskeleton
25. endoskeleton
26. gill
27. ganglia
28. notochord
29. mammary gland
30. marsupium
31. placenta
32. bronchus
33. alveolus
34. urea
35. (b)



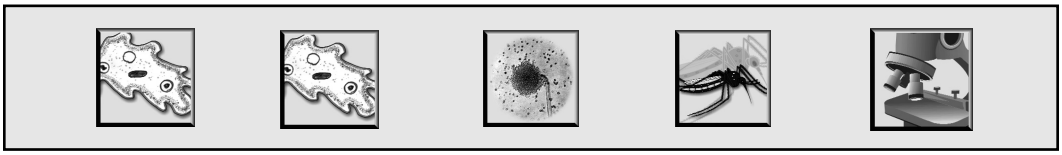
36. Molluska
37. Echinodermata
38. Arthropoda
39. Annelida
40. True
41. True
42. False
43. True
44. True
45. b carnivores
46. d herbivores
47. a ectotherms
48. c endotherms
49. *created*
50. *wonder*
51. *complex*
52. *Truth*

# *Quiz 6-1 Answer Key*



1. (b) nitrogen from the air
2. (c) recycle the materials necessary for life
3. (c) chemical reactions
4. (d) cell wall
5. (a) have an extra lipid-layer that keeps out drugs used to fight bacterial infections
6. (a) it results in genetic variation, ensuring that some bacteria will always have the combinations needed for survival
7. (c) Thiobacillus ferroxidans
8. (d) Louis Pasteur
9. (b) cell wall synthesis
10. (b) immune
11. (a) intestine
12. (d) all of the above
13. (a) the virus releases genetic information into cell
14. (d) Mumps
15. (c) Poliovirus
16. g saprophyte
17. i parasite
18. b autotroph
19. a plasmid
20. d spore
21. h phagocyte
22. c virus
23. f provirus
24. j retrovirus
25. e pathogen
26. l vitamin
27. k antibiotic
28. True
29. False
30. True
31. False
32. True
33. True
34. True
35. conjugation
36. transformation
37. lytic infection
38. lysogenic infection
39. nitrogen fixation
40. sterilization
41. respiration
42. aerobic respiration
43. anaerobic respiration
44. binary fission
45. (b) typhoid fever
46. (d) lyme disease
47. (c) severe, prolonged muscle spasms
48. *error*
49. *character*
50. *destructive*

# *Quiz 6-2 Answer Key*



1. (d) none of the above
2. (b) fungi
3. (d) slime molds
4. (c) African sleeping sickness
5. (b) Malaria
6. (b) Anopheles mosquito
7. (c) liver and blood
8. (a) single-celled photosynthetic
9. (a) dinoflagellates
10. (d) pectin
11. (b) Silicon dioxide
12. (a) digesting cellulose fibers in the food they eat
13. (d) attachment to solid objects
14. d spore
15. e cilia
16. b macronucleus
17. c micronucleus
18. g gullet
19. h oral pore
20. f anal pore
21. i trichocysts
22. a contractile vacuole
23. j chloroplasts
24. pellicle
25. chloroplast
26. nucleus
27. eyespot
28. flagellum
29. diatoms
30. protozoans
31. zoomastiginas
32. heliozoans
33. sporozoans
34. foraminiferas
35. g mutualism
36. a conjugation
37. d eye spot
38. e pellicle
39. f algal bloom
40. b plasmodium
41. c fruiting body
42. micronucleus
43. oral pore
44. gullet
45. macronucleus
46. contractile vacuole
47. cilia
48. *they don't know*
49. *questioning*
50. *truth*

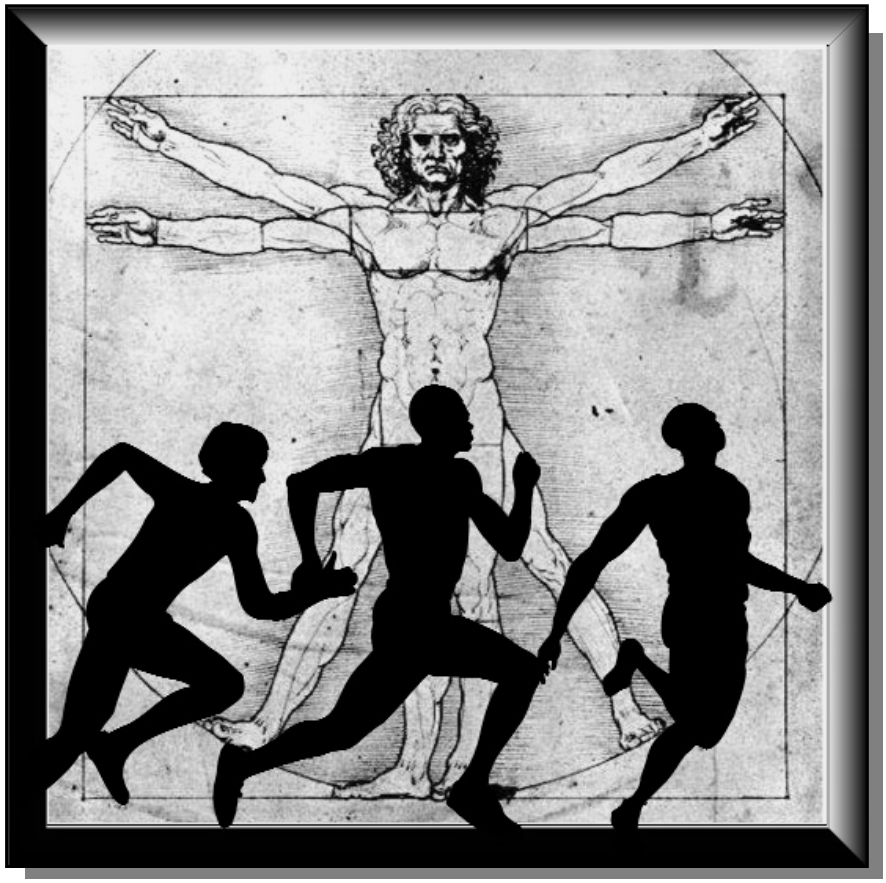
# *Quiz 6-3 Answer Key*



1. (c) ringworm
2. (b) help keep harmful bacteria under control
3. (a) fungal state
4. (b) the saprophytic nature of mushrooms
5. (c) penicillin
6. (c) decomposition
7. (a) heterotrophic
8. (d) storing beneficial vitamins
9. (b) making bread dough rise
10. (b) can exist on its own
11. d mycelium
12. e hyphae
13. k zygospore
14. g ascospore
15. h yeast
16. j fruiting body
17. b basidiospores
18. a mushrooms
19. c imperfect fungi
20. i algae
21. f ascus
22. (b) reproduce
23. Rhizopus stolonifer
24. Saccharomyces cervisiae
25. Claviceps purpurea
26. Ophiostoma ulmi
27. Phytophthora infestans
28. Cryphonectria parasitica
29. Candida albicans
30. a antibiotic
31. i dimorphic
32. j rhizoid
33. d carotenoids
34. e air bladder
35. g agar
36. h cellulose
37. f starch
38. b sporophyte generation
39. c gametophyte generation
40. False
41. False
42. True
43. False
44. True
45. False
46. False
47. *laws*
48. *eyes*
49. *determined*

# *The Principles, Theories & Precepts of Biology*

## *Test Keys*




PAC
TM
TM

# Chapter 1 Test Key

1. (d) hypothesis
2. (a) both species are benefited
3. (c) catastrophist theory
4. (b) inheritance
5. (b) 4
6. (a) A + B + energy ⟶ C+D
7. (d)
8. (b) scientific method
9. (a) scientific law
10. (b) Francis Bacon
11. (a) a common ancestor
12. True
13. False
14. True
15. _f_ carbohydrates
16. _o_ lipids
17. _a_ fatty acids
18 _k_ amino acids
19. _h_ hormones
20. _m_ enzymes
21. _c_ peptide bond
22. _l_ covalent bond
23. _b_ electronegativity
24. _n_ polar bond
25. _d_ isotopes
26. _e_ starch
27. _i_ glycogen
28. _j_ DNA
29. _g_ RNA
30. Galileo Galilei
31. Nicolaus Copernicus
32. Sir Isaac Newton
33. Antoni van Leeuwenhoek
34. John Ray
35. Robert Hooke
36. Andreas Versalius
37. _i_ element
38. _c_ atom
39. _k_ nucleus
40. _a_ electron
41. _f_ proton
42. _j_ atomic number
43. _d_ molecule
44. _h_ organic compounds
45. _b_ solute
46. _g_ solvent
47. _e_ molarity
48. (c) More is often accomplished by determination than by strength alone.
49. (b) Authorities and "experts" can be wrong, whereas the simple reasoning of a nonprofessional can prove to be accurate.
50. (a) There is no such thing as "something for nothing"; someone has to pay.

# Chapter 2 Test Key

1. (c) cells are constantly changing
2. (a) lipid soluble
3. (b) animal
4. (d) active transport
5. (a)
6. (b) flow out of the cell
7. (b) Second Law of Thermodynamics
8. (c) alcohol fermentation
9. (d) electron transport chain
10. (b) 36
11. (c) 46
12. (a) division
13. (d) Anton van Leeuwenhoek
14. (b) Robert Hooke
15. (c) Rudolf Virchow
16. _e_ secretion
17. _h_ homeostasis
18. _j_ cytokinesis
19. _a_ absorption
20. _k_ meiosis
21. _b_ respiration
22. _l_ cell cycle
23. _i_ mitosis
24. _d_ egestion
25. _g_ irritability
26. _f_ digestion
27. _c_ excretion
28. endocytosis
29. exocytosis
30. cytoplasm
31. chromatid
32. cell membrane
33. centromere
34. nucleus
35. homologous chromosome
36. diploid
37. gamete
38. _a_ cellular respiration
39. _e_ glycolysis
40. _c_ Kreb's Cycle
41. _b_ electron transport chain
42. _d_ photosynthesis
43. False
44. False
45. True
46. True
47. False
48. (c) The key to success is perseverence.
49. (a) If we accept unproven assumptions as truth, we will be unable to progress in knowledge.
50. (c) There is no effect without a cause.

# Chapter 3 Test Key

1. (a) both A and B antigens from the ABO gene and the negative allele from the Rh blood group
2. (c) Gregor Mendel
3. (a) ¼
4. (d) genes are made up of DNA
5. (b) DNA contains equal amounts of cytosine and guanine as well as adenine and thymine
6. (c) Watson and Crick
7. (d) A and T
8. (a) uracil; thymine
9. (d) all of the above
10. (b) cystic fibrosis
11. (c) have been transformed with genes from another organism
12. i nondisjunction
13. j restriction enzyme
14. d frameshift mutation
15. c point mutation
16. b chromosomal muation
17. h polygenic inheritance
18. e transformation
19. k semi-conservative replication
20. f transcription
21. g translation
22. a independent assortment
23. F1 generation
24. phenotype
25. alleles
26. genes
27. heterozygous
28. homozygous
29. P generation
30. genotype
31. multiple alleles
32. c albinism
33. e sickle cell anemia
34. a Huntington syndrome
35. b Klinefelter syndrome
36. d Down syndrome
37. Law of Segregation
38. incomplete dominance
39. co-dominance
40. DNA polymerase
41. nucleotide
42. DNA ligase
43. codon
44. RNA polymerase
45. anticodon
46. RNA
47. recombinant DNA
48. (c) Things that appear to be impossible can become reality by means of hard work and perseverence.
49. (b) An in-depth study of the complexities of nature and the universe often motivates a person to seek the Creator.
50. (a) We should not jump to conclusions with only partial evidence and preconceived ideas.

# Chapter 4 Test Key

1. (a) it does not change the relative frequency of alleles in the gene pool of a species
2. (b) horizontal; vertical
3. (d) simpler and less specialized; higher and more complex
4. (c) they display fossils of animals from widely separate climates in tangled groups
5. (d) all of the above
6. (c) ontogeny recapitulates phylogeny
7. (a) essential for development from a single cell to an ordered being
8. (b) intermediate forms would not fare well in nature
9. e vestigal organs
10. c natural selection
11. a adaptation
12. g survival of the fittest
13. b common descent
14. d horizontal evolution
15. f vertical evolution
16. h Neo-Darwinian hypothesis
17. j uniformitarianism
18. i Big Bang theory
19. reproductive isolation
20. gene pool
21. gene shuffling
22. gene flow
23. genetic drift
24. biogenetic law
25. First Law of Thermodynamics
26. Law of Mass Conservation
27. Second Law of Thermodynamics
28. disruptive selection
29. directional selection
30. stabilizing selection
31. d scientific law
32. g theory
33. j hypothesis
34. a species
35. h speciation
36. b molecular phylogeny
37. k probability
38. c irreducible complexity
39. i punctuated equilibrium
40. e homologous structures
41. f geologic column
42. f Ernst Haeckel
43. c Charles Darwin
44. a Thomas Malthus
45. e Sir Charles Lyell
46. b Alfred Russel Wallace
47. d Edward Blyth
48. (a) Honest scientists are always willing to challenge the validity of their own hypotheses as new evidence emerges.
49. (c) Cherished hypotheses are often "shot down" by the introduction of new facts, much to the dismay of some scientists.
50. (b) Unfortuanately, being a scientist carries no guarantee of integrity and honesty.

# Chapter 5 Test Key

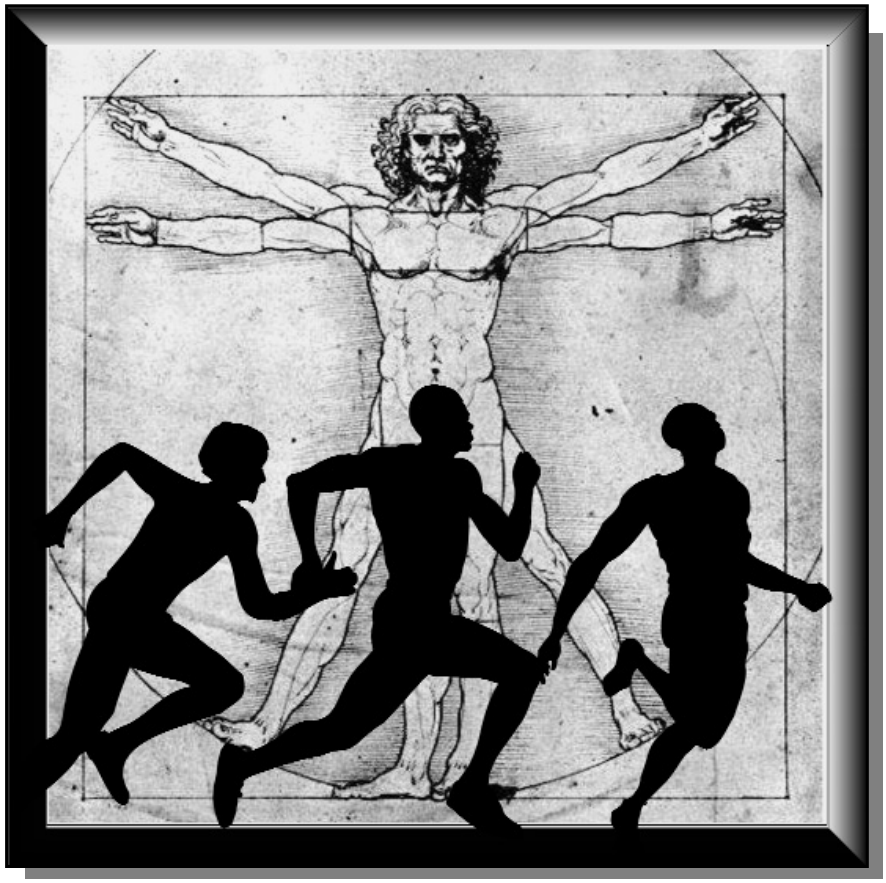
1. (d) Earth's seasons
2. (b) ocean tides
3. (a) Kingdom, Phylum, Class, Order, Family, Genus, Species
4. (b) Genus; Species
5. (a) Eubacteria, Archaebacteria, Protista, Fungi, Plantae, and Animalia
6. (b) prokaryotic
7. (d) eukaryote
8. (c) Carolus Linnaeus
9. (d) a nuclear membrane
10. (c) protein coat
11. (a) extracellular digestion
12. (b) number
13. (c) absorb water and nutrients
14. (c) is contained entirely in a system of closed vessels
15. (a) cephalization
16. (b) intracellular
17. (b) ectotherms
18. (d) endotherms
19. (b) the amount of C-14 in the organism after one half-life
20. (c) fewer C-14 molecules are dissipated with each half-life
21. (a) the genus name for maple trees is Acer
22. hydrostatic skeleton
23. endoskeleton
24. exoskeleton
25. b Eubacteria
26. f Archaebacteria
27. c Algae
28. h Protozoans
29. a gymnosperms
30. i angiosperms
31. d Porifera
32. j Cnidaria
33. e Platyhelminthes
34. g Chordata
35. k Mammalia
36. Molluska
37. Echinodermata
38. Arthropoda
39. Annelida
40. (b) heterotrophs only
41. (a) autotrophs only
42. (c) autotrophs and heterotrophs
43. spore
44. hypha
45. notochord
46. vascular tissue
47. (c) We are all influenced by things on which we focus.
48. (b) We can inadvertantly embrace error by not questioning common teachings.
49. (b) Truth is an absolute.
50. (a) We should avoid forming opinions before we have examined the facts.

# Chapter 6 Test Key

1. (b) nitrogen from the air
2. (c) recycle the materials necessary for life
3. (c) membrane lipid layer
4. (a) Louis Pasteur
5. (a) Tinea
6. (b) help to keep harmful bacteria under control
7. (c) Alexander Fleming
8. (b) can exist on its own
9. (d) Malaria
10. (d) liver and blood
11. (d) lyme disease
12. (c) typhoid fever
13. (c) tetanus
14. i saprophyte
15. g parasite
16. k autotroph
17. b mycelium
18. h phagocyte
19. j virus
20. f pathogen
21. e zyospore
22. c ascospore
23. a basidiospore
24. d hyphae
25. nitrogen fixation
26. antibiotic
27. conjugation
28. lysogenic infection
29. contractile vacuole
30. cilia
31. lytic infection
32. transformation
33. gullet
34. chloroplasts
35. algal bloom
36. e Thiobacillus ferroxidans
37. d Rhizopus stolonifer
38. a Claviceps purpurea
39. b Phytophthora infestans
40. c Candida albicans
41. pellicle
42. chloroplast
43. nucleus
44. eye spot
45. flagellum
46. False
47. True
48. (a) Scientific truths can be a reflection of sacred truths.
49. (b) Asking questions is important in order to grow in knowledge and wisdom.
50. (c) Looking at things from another perspective can yield wonderful discoveries.

# *The Principles, Theories & Precepts of Biology*

## *Forms*




PAC
TM
TM

# ACADEMIC CONTRACT

Date:_________

This is an academic contract for the 20___-- 20___ school year for _____ who has enrolled in the Paradigm Alternative Center with the full understanding that academic progress is determined by the personal initiative and effort of the student, and that promotion to the next grade level will be determined by progress in the individual learning program. The following minimum academic objectives are established as noted:

| SUBJECT | TEXT | PAGES /SECTIONS TO BE COMPLETED BY THE END OF THE YEAR | QUANTITY OF PAGES/SECTIONS TO BE COMPLETED DAILY |
|---|---|---|---|
| _____ | _____ | _____through_____=_____ | _____ |
| _____ | _____ | _____through_____=_____ | _____ |
| _____ | _____ | _____through_____=_____ | _____ |
| _____ | _____ | _____through_____=_____ | _____ |
| _____ | _____ | _____through_____–_____ | _____ |
| _____ | _____ | _____through_____=_____ | _____ |

Signature of Student:_____

Signature of Staff:_____

Review progress each grading period and adjust daily pages (objectives) in pencil as necessary to earn credit.

1. Date_________ Staff Initial:_____
2. Date_________ Staff Initial:_____
3. Date_________ Staff Initial:_____
4. Date_________ Staff Initial:_____
5. Date_________ Staff Initial:_____
6. Date_________ Staff Initial:_____

**NOTE:** This form is filled out at the induction orientation involving the student and school counselor or administrator

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# ACADEMIC CONTRACT

WHO? Supervisor

WHAT? An Academic Contract between staff and student establishes an agreement that the student will accomplish the daily pages set forth and that the staff will do everything necessary to assure the student is able to fulfill daily contracted pages.

WHERE? The blank Academic Contract is retained in the Staff Work Area where it is filed with Learning Center forms. A current original of the contract is retained in the student's permanent file and a copy is given to the student to display at his/her success station.

WHEN? The supervisor and student discuss the contract during registration and fill it out after academic prescriptions are made. At the end of each six weeks grading period, the student and staff re-evaluate the contract and adjust the minimum pages to accommodate the student's progress (or lack thereof).

WHY? The Academic Contract is one of the most important devices used to calculate the student's daily minimum pages of work necessary to complete prescribed courses for credit toward graduation. The total textbook pages needed to complete each course are divided by the number of days remaining in the year at time of student enrollment. This number (usually rounded up) will identify the student's daily number of target pages to finish the course by the end of the year (or target date).

HOW? Contract pages are determined by referring to the student transcript grades and a diagnostic procedure (as available) to assess realistic academic goals in the specific courses and textbooks which the student is "targeted" to complete during the current school year. Use a calculator and calendar to determine daily page quotes: divide the number of school days remaining into the number of prescribed pages in the textbook.

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# HIGH SCHOOL TRANSCRIPT PLANNER
# 200__ -- 200__

Name:_____

Date:___/___/___

(24 Credits Required for Diploma)

| (4 Credits of English) Credits | Date | School | Subject _____ | Textbook and # |
|---|---|---|---|---|
| 1. English 1 _____ | _____ | _____ | PEIMS # _____ | _____ |
| 2. English 2 _____ | _____ | _____ | Credit to be earned _____ | Publisher |
| 3. English 3 _____ | _____ | _____ | Prescription _____ | _____ |
| 4. English 4 _____ | _____ | _____ | _____ | |
| (3 Credits of Math) Write Subject Name | | | Subject _____ | Textbook and # |
| 1. _____ _____ | _____ | _____ | PEIMS # _____ | _____ |
| 2. _____ _____ | _____ | _____ | Credit to be earned _____ | Publisher |
| 3. _____ _____ | _____ | _____ | Prescription _____ | _____ |
| | | | _____ | |
| (3 Credits of Soc. Studies) Write the Subject | | | Subject _____ | Textbook and # |
| 1. _____ _____ | _____ | _____ | PEIMS # _____ | _____ |
| 2. _____ _____ | _____ | _____ | Credit to be earned _____ | Publisher |
| 3. _____ _____ | _____ | _____ | Prescription _____ | _____ |
| | | | _____ | |
| (3 Credits of Science) Write the Subject | | | Subject _____ | Textbook and # |
| 1. _____ _____ | _____ | _____ | PEIMS # _____ | _____ |
| 2. _____ _____ | _____ | _____ | Credit to be earned _____ | Publisher |
| 3. _____ _____ | _____ | _____ | Prescription _____ | _____ |
| | | | _____ | |
| (Required Subjects) | | | Subject _____ | Textbook and # |
| 1. Speech (.5 Credit) _____ | _____ | _____ | PEIMS # _____ | _____ |
| 2. Computer ( 1 Credit) _____ | _____ | _____ | Credit to be earned _____ | Publisher |
| 3. Health (.5 Credit) _____ | _____ | _____ | Prescription _____ | _____ |
| 4. P.E. (1.5 Credits) _____ | _____ | _____ | _____ | |

Elective Credit Earned

| Subject | Date | School |
|---|---|---|
| 1. _____ | ____ | _____ |
| 2. _____ | ____ | _____ |
| 3. _____ | ____ | _____ |
| 4. _____ | ____ | _____ |
| 5. _____ | ____ | _____ |
| 6. _____ | ____ | _____ |
| 7. _____ | ____ | _____ |
| 8. _____ | ____ | _____ |
| 9. _____ | ____ | _____ |
| 10. _____ | ____ | _____ |
| 11. _____ | ____ | _____ |
| 12. _____ | ____ | _____ |
| 13. _____ | ____ | _____ |
| 14. _____ | ____ | _____ |
| 15. _____ | ____ | _____ |
| 16. _____ | ____ | _____ |
| 17. _____ | ____ | _____ |

(Elective Courses to be completed)

| Subject | PEIMS # | Credit to be earned | Prescription |
|---|---|---|---|
| 1. _____ | _____ | _____ | _____ |
| 2. _____ | _____ | _____ | _____ |
| 3. _____ | _____ | _____ | _____ |
| 4. _____ | _____ | _____ | _____ |
| 5. _____ | _____ | _____ | _____ |
| 6. _____ | _____ | _____ | _____ |

Student's Signature _____ Administrator's Signature_____

[The school counselor, parent, and student use this form to plan the student's high school path leading toward a diploma.
Make current entries in pencil. The form is updated whenever courses are completed.]
PEIMS= Public Education Information Management System

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# TRANSCRIPT PLANNER (HIGH SCHOOL)

WHO? Administrator

WHAT? The Transcript Planner is used to plan courses which are to be completed during current school term. Credits previously earned by the student are entered on this form.

WHERE? The Transcript Planner for high school is stored in the administrator's files with students forms. The completed form is filed in the student's permanent file.

WHEN? The Transcript Planner is filled out by the administrator after the student is enrolled. The Academic Contract is based on the Transcript Planner prescription. Anytime the academic prescription for a student changes, the Transcript Planner should be updated.

WHY? The Transcript Planner outlines the required credits for a diploma. Starting with the left column, required courses and credits earned should be entered from previous transcripts. The next column should list the school where previous credit was given. The Textbook column should list which textbook(s) the student will complete to earn credit. The final column should begin with the subject name, PEIMS number, and credit to be earned. The Prescription then lists the chapters, units, papers, etc. that are required to fulfill credit in the given subject. The Elective Credits Earned section should list any elective credits previously earned. Total credits earned to date are calculated by adding all credits earned in the student's high school studies. Add total credits earned, then project credits to be earned during the current year to plan total credits to be earned this year. When the prescription is complete, the student and administrator should review, understand, and sign, the form. A copy should be mailed to the parent and/or discussed at the first staff-parent home visit.

RESOURCES NEEDED: Academic Contract, Transcript, Report Card, List of electives and required courses for high school diploma, school textbooks, calendar, calculator, notepad.

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# ACADEMIC OBJECTIVES CHART
## WEEK _____

STUDENT NAME_____ DATE:______ to ______

| | MATH | ENGLISH | SOC. STU. | SCIENCE | | | Total |
|---|---|---|---|---|---|---|---|
| MONDAY | | | | | | | |
| TUESDAY | | | | | | | |
| WEDNESDAY | | | | | | | |
| THURSDAY | | | | | | | |
| FRIDAY | | | | | | | |

# WEEKLY WISDOM QUOTES
for week _____

| | | Supervisor's signature | |
|---|---|---|---|
| | | Written | Recited |
| Monday | "If it's to be, it's up to **me**." — M. Crowley | | |
| Tuesday | "What we become in life is a matter of **choice**." | | |
| Wednesday | "The rotten apple spoils his companion<br>**Choose your friends carefully**." | | |
| Thursday | "The price of greatness is **responsibility**." | | |
| Friday | "If **better is possible**, good is not enough." | | |

[NOTE: This form is issued each Friday before dismissal. Students fill in actual page numbers to be completed on Monday (based on the *Academic Contract*). Academic goals (objectives) for Tuesday are entered as soon as goals for Monday are completed. This process is followed throughout the week.]

New wisdom quotes should be assigned weekly. Quotes are available in the Teacher's Resource Kit (Administrative Forms section).
Students say wisdom quote to teachers daily before dismissal.

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# DAILY ACADEMIC OBJECTIVE CHART

WHO? Supervisor

WHAT? The Daily Academic Objective Chart is a student's daily planner for a week of course work. The Weekly Wisdom Quotes are part of the school's Positive Lifestyle Management training program, and meets some memorization, punctuation, and sentence structure requirements for English.

WHERE? The Academic Objective Charts are prepared at the beginning of the year, then filed with Learning Center forms in the Staff Work Area. Each student keeps the Daily Academic Objective Chart in his/her success station. Once completed and turned in, the Daily Academic Objectives Chart is filed in the student's "Test Taken" file.

WHEN? The Daily Academic Objectives Chart is issued at the beginning of each week. The completed chart is turned in and placed in the student's "Test Taken" file. A chart is considered completed when all objectives, including corrections and Weekly Wisdom Quotes, have been signed-off by staff.

WHY? Daily minimum pages for each prescribed course are entered on the chart under each day and subject title according to the Academic Contract. Upon completion of each particular subject objective (specified pages), the student marks one diagonal line through the completed text page numbers and enters the next day's page numbers before proceeding to the next academic subject. By the end of each day, all academic objectives should be completed. Staff daily inspect the Objective Chart to monitor student progress. Do not take the student's word for completion of pages. Check the student's work. Ask to see Academic work; compare it with corresponding textbook pages.

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# DAILY/WEEKLY WISDOM QUOTES

| | |
|---|---|
| "**Excuses** are monuments to nothing. They build bridges to nowhere; those who use these tools are not wise." —TX Boot Camp | "Reflect upon your present **blessings**, of which every man has many; not upon your past **misfortunes**, of which all men have some." |
| "That which we **love**, we come to **resemble**." | "You can't get much done by starting **tomorrow**." |
| "**Excuses** are nails which build houses of **failure**."—TX Boot Camp | "Doing what is **right** is never wrong." |
| "Be a problem **solver**, not a problem maker." | "What you do not want done to **yourself**, do not do to **others**." |
| "The most important thing you can give someone is a **chance**." | Attitude + Ambition = **Achievement** |
| "Don't just do it. **Do it right**!" | "To **know** the road ahead, **ask** those coming back."—Chinese proverb |
| "It takes no more time to see the **good side of life** than it takes to see the bad." | "Be served by others as little as possible, and **serve others** as much as possible." |
| "Giving up always leads to failure. Success comes from persistence." | "If it's to be, it's up to **me**." |
| "What we become in life is a matter of **choice**." | "The price of greatness is **responsibility**." |
| "The rotten apple spoils his companion. **Choose your friends carefully**." | "Wasting **time** is the most extravagant and costly of all expenses." |
| **"If better is possible**, good is not enough." | "**Rise** every time you fall." |
| **"Learn** from defeat, and you haven't really lost." | "A poor man is not that one without a cent. A poor man is that one without a **dream**." |
| "Failure is an **opportunity** to begin again more **intelligently**." | "Of all human resources, the most **precious** is the desire to **improve**." |
| "It's what's **inside** you that will make you succeed." | "Man was **born to win**, but conditioned to lose." |
| "No one can make you feel inferior without your **consent**." | "The **company you keep** will determine the trouble you meet." |
| "Be quick to **listen**, slow to **speak**, and slow to get **angry**." | "If there is no **light** at the end of the tunnel, **change** the light bulb." |
| **"**We are what we repeatedly **do**." | "Take each day and work to make it **good**." |
| "The person who **controls his mouth** keeps himself from many problems." | "**Blame** is a waste of time. It does not solve the problem." |
| **"Choice**, not chance, determines **destiny**." | "It is better to be alone than in bad company." |
| "We make a **living** by what we get. We make a life by what we **give**." | "Don't worry about **tomorrow** because **tomorrow** has enough of its own problems." |
| "Don't put off 'til **tomorrow** what you can do **today**." | "I complained that I had no shoes until I met a man who had no feet." |
| "A clear conscience gives **peace** of mind and **strength**." | "When you pursue **goodness**, you find **life, prosperity** and **honor**." |
| "Real leaders are **ordinary** people with **extraordinary** determination." | "Learning to **obey now**, means you can **command** later on." |
| "To **have** a friend, you must **be** a friend." —R.W. Emerson | "Real love is not selfish or easily provoked." |

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| | |
|---|---|
| "You cannot **win** if you do not **begin**." | "**Think consequentially**." |
| "It's the **little things** in life that determine the big things." | "**Small opportunities** are often the beginnings of great enterprises." |
| "T.A.L.K—Try a Little **Kindness** with each person you know." | "A **positive attitude** overcomes the tallest obstacle." |
| "Your rewards in life are due more to your **behavior** than your birth." | "A minute of **anger** robs you of 60 seconds of happiness." |
| "**Encouragement** is oxygen to the soul." | "The hardest **victory** is victory over **self**." |
| "Earn your successes based on **service to others**, not at the expense of others." | "Society is like a **body**—some of us are hands, some of us are feet. We all **count**, and we all fit in somewhere." |
| "I can learn the hard way by experience or the easy way by **taking good advice**." | "The surest way to go **broke** is to sit around waiting for a break." |
| "An attitude of **gratitude** brings more blessings your way." | "Life is like an **echo**, what you send out comes back." |
| "**Act like where you are going** in life, not where you came from." | "People don't usually plan to **fail**, they just fail to **plan**." |
| "If criticism is necessary, **criticize the performance –not the performer**." | "To change a man's **mind** is better than rearranging his face." |
| "To realize **you don't have all the answers** is the first step toward becoming wise." | "Hold fast to your **dreams**. Remove only the barriers to those dreams." |
| "There is not substitute for **paying attention**." | "**Laziness** and **poverty** are cousins." |
| "When things go wrong, **don't go wrong** with them." | "Every job is a **self-portrait** of the person who did it." |
| "**A good reputation** is more valuable than money." | "The best way to break a **bad habit** is to drop it." |
| "The simplest way to demonstrate love is to **be kind**." | "The best way to get the **last word** is to say, 'You're right.'" |
| "Every person is the architect of his own **character**." | "**Our deeds determine us** as much as we determine our deeds." |
| "The **way of escape** is only effective when we are willing to take it." | "Being sincere isn't enough–**you can be sincerely wrong**!" |
| "A sincere act of **kindness or acceptance** can be a turning point in a person's life." | "If at first you don't succeed, **try following the instructions**!" |
| "I think I can. (Repeat 5 times) I thought I could! (Repeat 5 times)" | "**Life without limits** presently seems like fun, but later results in **grief** and **misery**." |
| "**Temper** gets us into trouble. **Pride** is what keeps us there." | "**Reputation** takes a long time to build, but only an unguarded moment to destroy." |
| "**Hating a person** is like letting that person live rent free in your head." | "It is better to **avoid the bait** than to struggle on the hook." |
| "As iron sharpens iron, so one person helps develop the **knowledge and skills** of another." | "Most people succeed because they are **determined**." |
| "People can alter their lives by **altering their attitudes**." | "It is wise to **direct your anger toward the problems**–not people." |
| "Don't make excuses. **Make improvements**." | "You don't know what you can do until you **try**." |
| "Focus your energies on **answers** not problems." | "If you expect **respect**, be the first to show it." |

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| | |
|---|---|
| "Would you live with **ease**? Do what you **ought**, and not what you please."—Benjamin Franklin | "Those who want to **get to the top** must first get off their bottoms!" |
| "One person with **courage** makes a majority." | "Before **honor** there is **humility**." |
| "Take what you have and use it, and your **talent** will be increased." | "Everything in life has its **advantages** and **disadvantages**." |
| "**Optimism** sees every hurdle as a challenge." | "Where there is a **will** there is **a way**." |
| "He who chooses the **beginning of a road**, also chooses its outcome." | "Instead of pointing an accusing finger, why not hold out a **helping hand**?" |
| "To avoid being **accused** of doing wrong, stop the **appearance** of wrong doing." | "People with **goals** succeed because they know where they're going." |
| "God gives all birds their **food**, but does not drop it into their **nests**."—Danish proverb | "No matter what your **past** has been, your **future** is spotless." |
| "You can't always **judge** a book by its cover." | "**Failure** is not the worst thing in the world. Not trying is worse." |
| "**Never**, never, never, never quit! —Winston Churchill | "Every time you speak, your **mind** is on parade." |
| "Things turn out best for people who **make the best** out of the way things turn out." | "A **wise person** foresees problems and steers clear of them." |
| "**My attitude** toward myself will determine my attitude toward others and life." | "Anything I have learned, practiced, or become I can change!" |
| "**Forgiveness** is a funny thing. It warms the heart and **cools the sting**." | "**You do affect others**—either for the good or for the bad—positively or negatively." |
| "The best bridge between hope and despair is often **a good night's sleep**." | "Keep your conscience uncluttered, for it is your **internal compass**." |
| "The most valuable gift you can give another is a **good example**." | "You already have every characteristic necessary for **success**." |
| "**Truth** does not cease to exist because we ignore it." | "If you roll up your sleeves and **work**, you won't lose your shirt." |
| "Early to bed, early to rise, makes a man **healthy**, **wealthy**, and **wise**."—Benjamin Franklin | "The more you **give of yourself**, the more you receive from others." |
| "**Success** doesn't come to you . . . You go get it." | "'Luck' is when **preparation** meets opportunity." |
| "The most important thing about **goals** is to have them." | "As a dog returns to its vomit, so a **fool** returns to his folly." |
| "There is power in **words**. What you say is what you get." | "Who is strong? Those who can **conquer their habits**." |
| "Give the world the **best** you have, and the best will come back to you." | "**Maturity** does not come with age–it comes with acceptance of **responsibility**." |
| "**Do what you can** where you are with what you have. You have a lot!" | "A **wise person** does not team up with companions intent on wrong doing." |
| "The thing to try when all else fails is to **try again**." | "We cannot direct the wind . . . but we can **adjust the sails**." |
| "Today's **preparation** determines tomorrow's **achievements**." | "An old broom knows the dirty corners best." —Irish proverb |
| "What counts is not the number of hours you put in, but **how much you put in the hours**." | "**Work hard** and become a **leader**, be lazy and never succeed." |

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| | |
|---|---|
| "Success is a **commitment**, not a wish." | "**Education is fuel** for your future." |
| "You are **valuable**. Don't let anyone make you believe differently." | "Life is more than winning or losing; it's **choosing to do what's right**." |
| "You **earn respect** by how you live, not by what you demand." | "**Learn** from the past, **live** in the present, and **plan** for the future." |
| "Life is more than winning or losing; it's **choosing to do what's right**." | "You may not have chosen your **circumstances**, but you can **choose to overcome** them." |
| "**Doing what is right** isn't always easy, but it's always right." | "Of all the things you wear, your **expression** is the most important." |
| "You are who you **choose** to be." | "All things are **difficult** before they are easy." |
| "**Become** the kind of person you want to live with the rest of your life." | "What is **popular** is not always **right**; what is right is not always popular." |
| "**Winners** make the grade. **Whiners** make excuses." | "**Never settle for less** than your best!" |
| "The choices we make **today** determine the life we'll lead **tomorrow**. **Every move counts**." | "**Respect** is contagious. Give it. Got it." |
| "Never let yesterday's **disappointments** overshadow today's **goals** and tomorrow's **dreams**." | "A good **attitude**, strong **motivation** and firm **discipline** are the keys to graduation." |
| "We can choose to **throw** stones, to **stumble** on them, to **climb** over them, or to **build** with them."—W.A. Ward | "People may doubt what you **say**, but they will always believe what you **do**." |
| "I must **walk straight** and **stay focused** in order to be a defender of my generation." | "It is better to **look ahead and prepare**, than to look back and regret." |
| "**Practice makes perfect**, so be careful what you practice." | "**Kindness** is the ability to love people more than they deserve." |
| "**Stand up for what is right**, even if you're standing alone." | "The three D's to succeed: **Desire, Discipline, Dedication**." |
| "**Be responsible**. Actions have consequences." | "Conquer conflict with **cooperation**." |
| "To change your world, you must first **change yourself**." | "Success takes **purpose**, **planning**, **practice** and **patience**." |
| "Think **big**. Think **positive**. Think **originally**." | "For success, **attitude** is as important as ability." |
| "Real love seeks one thing only: the **good** of the one loved." | **"Hope** is not the belief that something good **might** happen–it is the belief that it **will** happen." |
| "**Live with care**; life has no spare." | A sour attitude = a weak character. |
| "**Character** is who you are in the dark or when no one is watching." | "It is wise to put your **brain** in gear before opening your **mouth**." |
| "There are dreamers; there are planners. **Planners** make their dreams come true." | "**Prayer should be the key** of the morning and the lock of the night." |
| "Forget what is behind; push **toward the goal** ahead." | "The secret to **happiness** is not so much in doing what one likes, but in **liking** what one does." |

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# STUDENT SUCCESS CHART

Name _____ YEAR _____

Place a ☆ in the block in which the worktext or computer test is passed.

| 1st SEMESTER | 1st REPORT PERIOD | | | | | | 2ND REPORT PERIOD | | | | | | 3RD REPORT PERIOD | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCHOOL WEEK | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| MATH | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| ENGLISH | | | | | | | | | | | | | | | | | | |
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| LITERATURE | | | | | | | | | | | | | | | | | | |
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| SOCIAL STUDIES | | | | | | | | | | | | | | | | | | |
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| SCIENCE | | | | | | | | | | | | | | | | | | |
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| PE | | | | | | | | | | | | | | | | | | |
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| 2ND SEMESTER | 4TH REPORT PERIOD | | | | | | 5TH REPORT PERIOD | | | | | | 6TH REPORT PERIOD | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCHOOL WEEK | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |
| MATH | | | | | | | | | | | | | | | | | | |
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| ENGLISH | | | | | | | | | | | | | | | | | | |
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| LITERATURE | | | | | | | | | | | | | | | | | | |
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| SOCIAL STUDIES | | | | | | | | | | | | | | | | | | |
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| SCIENCE | | | | | | | | | | | | | | | | | | |
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# STUDENT SUCCESS CHART

WHO? Supervisor

WHAT? The Student Success Chart is a visual display of academic achievement.

WHERE? The Student Success Chart is stored in the staff work area with the Learning Center forms. The student's name should be written on the chart, then the chart is displayed in the student's Success Station.

WHEN? The Student Success Chart is issued to each student at enrollment. The student may take the chart home when he/she withdraws or at the end of the school year.

WHY? The Student Success Chart is a visual reminder to the student and staff of the student's academic progress. Each time a student earns a chapter or unit grade a star is issued to the student along with a Praise Slip. The star is posted on the Success Chart in the subject area and the week in which it was earned.

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# PRAISE SLIP

**_____ has completed the following tests and has earned praise from the staff and parents/guardians.**

| SUBJECT | CHAPTER | SCORE | COMMENTS |
|---|---|---|---|
| MATH | _____ | _____ | _____ |
| ENGLISH | _____ | _____ | _____ |
| SOC. STUDIES | _____ | _____ | _____ |
| SCIENCE | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ |

**Date ___/___/___ Week ____ Signature _____**

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# PRAISE SLIP

**_____ has completed the following tests and has earned praise from the staff and parents/guardians.**

| SUBJECT | CHAPTER | SCORE | COMMENTS |
|---|---|---|---|
| MATH | _____ | _____ | _____ |
| ENGLISH | _____ | _____ | _____ |
| SOC. STUDIES | _____ | _____ | _____ |
| SCIENCE | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ |

**Date ___/___/___ Week ____ Signature _____**

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# PRAISE SLIP

WHO? The staff issues the Praise Slip to students who successfully complete section quizzes and chapter tests.

HOW? The teacher announces the student's name and subject, but avoids calling out grades or quiz/chapter identifications.

WHERE? Blank Praise Slips are retained in a file at the teacher's desk. Praise Slips are issued to students during morning announcements. Students take slips to their parents.

WHEN? Praise Slips are issued the next day after quizzes/tests are completed and graded.

WHY? Praise Slips are public praise for responsible action. Students need quick public acknowledgment of academic achievement, and parents want and deserve frequent positive communication from school staff.

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