The Principles, Theories & Precepts of Biology

ACTIVITIES



Chapter 5

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The Principles, Theories & Precepts of Biology

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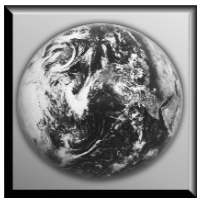
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ACTIVITIES
Lesson 1:

EARTH: THE "RIGHT" PLACE FOR LIFE

You are making progress! ***Answer the following questions. Circle the correct answers or fill in the blanks with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. Frank Drake, Carl Sagan and Iseof Shklovskii were the first scientists to do what?_____
_____
(a) live for extended periods on other planets
(b) measure the distances between stars in our galaxy
(c) calculate mathematically the possibility of life on other planets
(d) count the number of species that live on planet Earth

2. The most important consideration when determining if a star (sun) has a planet capable of supporting life is:_____.
(a) the distance between the star and the planet
(b) the life span of the star
(c) the speed of the planet's rotation around the star
(d) the size of the planet relative to the star

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

4. According to astronomers, other planets in our solar system are not capable of supporting life because: _____.
(a) their orbits around the sun are eliptical
(b) they are too small or too large
(c) they are too close to or too far from the Sun
(d) they are not environmentally active

5. Any appreciable change in the rate of rotation of the Earth would make life on the planet impossible. _____ (a) True or (b) False

6. According to your text, the _____ of the Earth may influence the rate at which it rotates.
(a) age (b) size (c) density (d) weight

7. The vegetative growing seasons of the Earth are caused by:_____.
(a) the age of the Earth
(b) the distance of the Earth from the Sun
(c) the ocean's tide
(d) the Earth's tilting and revolution around the Sun

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8. The shield that protects the Earth from solar ultraviolet radiation is called the Earth's_____ _____.

9. According to your text, the absorption of free oxygen and carbon dioxide necessary for plant and animal life on earth is maintained by:_____ _____.
   (a) the Earth's temperature and humidity
   (b) the Earth's orbit and its tilt
   (c) the thickness of the Earth's crust and the depth of the oceans
   (d) all of the above

10. The Earth's two primary constituents in the atmosphere are _____ (78%) and _____ (20%).
   (a) oxygen; nitrogen
   (b) nitrogen; carbon dioxide
   (c) nitrogen; oxygen
   (d) carbon dioxide; oxygen

11. The Moon revolves around the Earth causing:_____ _____.
   (a) the Earth's seasons
   (b) the ocean's tides
   (c) the Earth's rotation around the Sun
   (d) ultraviolet radiation

12. If the Earth's magnetic field were stronger, it would result in:_____ _____.
   (a) severe electromagnetic storms
   (b) inadequate protection from solar radiation
   (c) intolerable surface temperatures
   (d) great variation in temperature

13. According to your text, the key substance of life is _____.

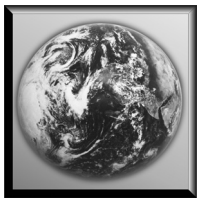
14. ***Astrophysicist*** Hugh Ross calculated the probability of one planet occurring with perfect conditions for life to be one chance in: _____.
   (a) one million
   (b) one trillion
   (c) one billion
   (d) one million trillion

15. Write the **Life Principle**: "_____ _____ _____."

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Name: _____

Date: _____ Grade: _____



ACTIVITIES
Lesson 2:

EARTH: AN "AGELESS" PLANET

You are making progress! ***Answer the following questions. Circle the correct answers or fill in the blanks with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. _____ is the hypothesis that minimizes the impact of catastrophic events and states that the origin and development of all things can be explained exclusively in terms of the same natural laws and processes that operate today.

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

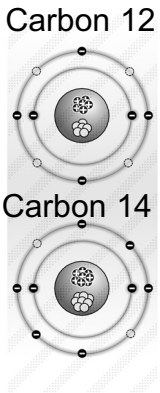
3. Scientists are aware of many more evidences for an ***old Earth theory*** than for a ***young Earth theory***. _____ (a) True or (b) False

4. The geologic column:_____
   _____.
   (a) provides evidence for macroevolution and discredits a catastrophic flood
   (b) provides evidence for a catastrophic flood and discredits macroevolution
   (c) discredits a catastrophic flood and macroevolution
   (d) can be used as evidence for macroevolution or a catastrophic flood

5. Researchers that use the scientific method do not include the geologic column as solid evidence for determining the age of the Earth. _____ (a) True or (b) False

6. A method using half-lives of radioactive ***isotopes*** to determine the age of fossils and rocks is called _____.

7. The diagram to the right illustrates:_____.
   (a) the ionic bonding of carbon (c) the half-life of carbon
   (b) the isotopes of carbon (d) the decay of C-14 to nitrogen

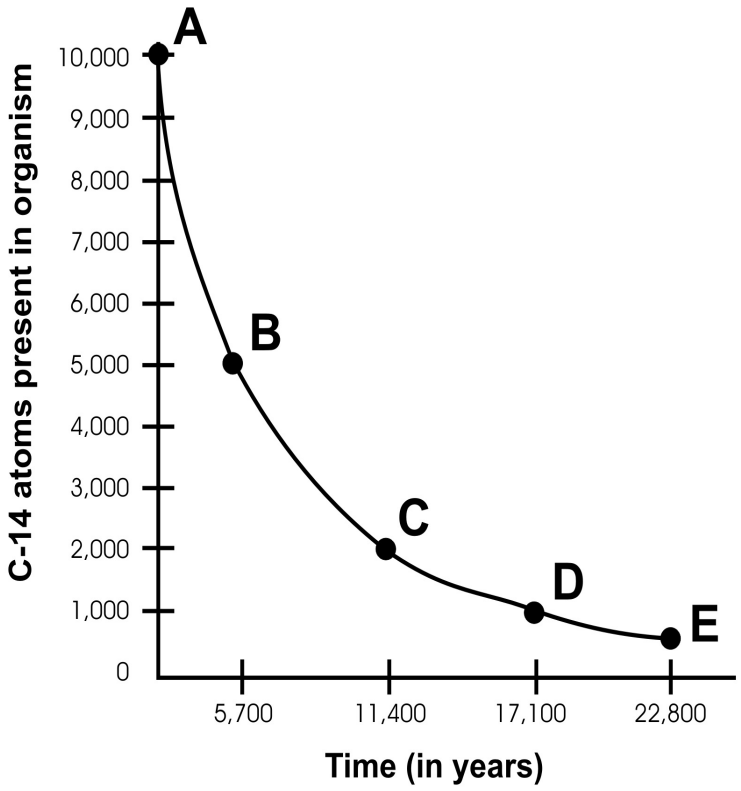


8. When a plant or animal dies, the C-14 in its tissues _____
   _____, while the C-12_____
   _____.
   (a) remains stable; begins to decay
   (b) remains stable; changes isotope forms
   (c) begins to decay; remains stable
   (d) changes isotope forms; remains stable

9. C-14 has a(n) _____ of 5,700 years.

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Use the graph below to answer questions #10-12.



10. Point A represents which of the following?_____

_____

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

11. What does point B represent?_____

_____

(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

12. 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

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13. Place an "X" in front of each of the following statements that cast doubt on the assumption that C-14's atmospheric concentration has always been constant.
_____ (a) scientists recognize that C-14 is rising
_____ (b) past temperature changes in the oceans have affected C-14 concentration
_____ (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

Matching:

14. _____ uranium (a) strontium
15. _____ potassium (b) lead
16. _____ rubidium (c) argon

17. Thomas G. Barnes has demonstrated that the strength of the Earth's magnetic field is: _____.
(a) increasing exponentially (c) staying constant
(b) increasing slowly (d) decaying exponentially

18. The properties of the Earth's magnetic field suggest that the Earth is younger than 10,000 years. _____ (a) True or (b) False

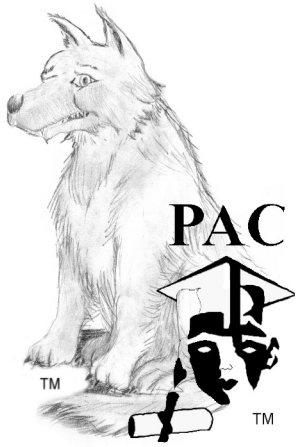
19. The studies of A.A. Humphreys and H.L. Abbot suggest that:_____ _____.
(a) the Mississippi River is about two million years old
(b) the Mississippi River delta is about 4,400 years old
(c) the Mississippi River began to advance into the gulf some 4,400 years ago
(d) all of the above

20. The shape of the Earth and its rotation speed suggest that:_____ _____.
(a) the Earth may be only 6,000 to 10,000 years old
(b) the Earth is fully 4.6 million years old
(c) the Earth's continents will soon be sent to the equatorial regions
(d) none of the above

21. Human reproduction growth rates do not support the old-Earth hypothesis. _____
(a) True or (b) False

22. Write the **Life Principle**: "_____ _____ _____."

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ACTIVITIES
Lesson 3:

THE MILLER-UREY EXPERIMENT

You are making progress! ***Answer the following questions. Circle the correct answers or fill in the blanks with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. Dolly is a(n): _____.
   (a) dog (b) cow (c) sheep (d) lady

2. After Dolly was cloned, researchers began requesting the authority to clone humans as a means of discovering the origins of life. _____ (a) True or (b) False

3. Louis Pasteur and Joseph Lister proved that:_____
   _____.
   (a) infections always spread from a donor
   (b) about half of all surgical patients died from infection
   (c) infections arose spontaneously
   (d) sterile techniques are of little use in preventing infection

4. The theory that life arose spontaneously from a "primordial soup" is called_____
   _____.

5. According to your text, one problem with the theory of natural selection is that it:_____
   _____.
   (a) does not attempt to explain how living things evolved
   (b) does not explain how life began
   (c) is not well thought out
   (d) is misrepresented in text books

6. Ernst Haeckel's description of the cell as a "simple little lump of **albuminous** combination of carbon" suggests that:_____
   _____.
   (a) scientists of Haeckel's time were unaware of cellular complexity
   (b) scientists of Haeckel's time were unaware of the mathematical odds against cellular formation by chance
   (c) scientists of Haeckel's time had little evidence to cast doubt on the theory of spontaneous generation
   (d) all of the above

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7. How does the presence of oxygen in the atmosphere present a problem in the theory of spontaneous generation?_____
_____
(a) Oxygen was present to aid in the formation of the first amino acids.
(b) Oxygen, although necessary for life, would have destroyed the first amino acids.
(c) The first amino acids were oxygen dependent, whereas today they are not.
(d) none of the above

8. Soviet biochemist A.I. Oparin proposed that: _____
_____.
(a) hydrogen was the only gas that existed in the ancient Earth's atmosphere
(b) the Earth is billions of years old
(c) free oxygen did not exist in the ancient Earth's atmosphere
(d) the chance formation of life was highly improbable without oxygen

9. Place an "X" in front of each of the following statements that are true concerning the experiment of Stanley Miller and H.C. Urey.
_____ (a) Water vapor, ammonia, methane, and hydrogen were subjected to electric sparks.
_____ (b) The experimental environment was oxygen enriched.
_____ (c) Amino acids were formed.
_____ (d) The experiment led to the proposal of the primordial soup theory.

10. Place an "X" in front of each of the following statements that present problems in the experiment of Miller and Urey and the primordial soup theory.
_____ (a) It is unlikely that the young Earth was oxygen-free.
_____ (b) Methane and ammonia concentrations in the experiment of Miller and Urey are not necessarily representative of a young Earth.
_____ (c) The absence of oxygen would mean that no ozone layer existed.
_____ (d) Lightening is considerably weaker than the Miller-Urey electric sparks.

11. Life was produced in the Miller-Urey experiment. _____ (a) True or (b) False

12. 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. _____
(a) True or (b) False

13. According to Dr. Leslie Orgel, attempts to reconstruct an evolutionary process are:
_____.
(a) very hopeful
(b) progressing nicely
(c) extremely tentative
(d) nonexistent

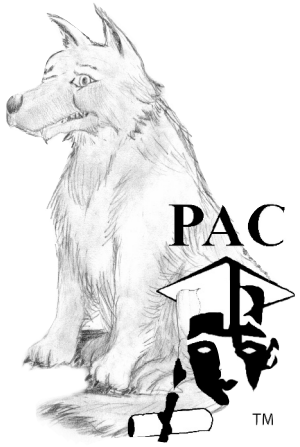
14. R.L. Wysong describes the hope to produce life by experimentation as:_____
_____.
(a) a bizarre aspiration
(b) futile
(c) moths reaching for the stars
(d) all of these

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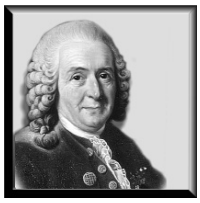
15. Write the **Life Principle**:

"_____
_____
_____."

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ACTIVITIES
Lesson 4:

THE EARTH AND ITS KINGDOMS

You are making progress! ***Answer the following questions. Circle the correct answers or fill in the blanks with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. The science of naming and assigning organisms into groups is called:_____ _____.
   (a) biology (b) taxonomy (c) paleontology (d) phylogeny

2. _____ invented the system that is used today in classifying organisms.
   (a) Ernst Haekel (c) Carolus Linnaeus
   (b) Stanley Miller (d) Leslie Orgel

3. The study of the structure of organisms is called: _____.
   (a) taxonomy (c) morphology
   (b) genealogy (d) cardiology

4. Each level of the ***hierarchy*** pictured on page 16 of your text is contained within and is partly determined by all the levels above it. _____ (a) True or (b) False

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

6. State the hierarchy of biological categories in order.
   K_____
   P_____
   C_____
   O_____
   F_____
   G_____
   S_____

7. The house cat is called *Felis domesticus*. The first part of the name, *Felis* refers to the _____ to which the cat belongs. The second part of the name, *domesticus* refers to the _____ to which the cat belongs.
   (a) kingdom; species (c) genus; species
   (b) kingdom; phylum (d) genus; family

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Matching:

8. _____ ***genus*** (a) smallest group in the classification system that share similar characteristics and interbreed in nature
9. _____ ***species*** (b) classification of several families of similar organisms
10. _____ ***family*** (c) the classification of a major group of closely related organims
11. _____ ***order*** (d) classification of related orders
12. _____ ***class*** (e) classification group of closely related genera
13. _____ ***phylum*** (f) highest ranking classification of living organisms
14. _____ ***kingdom*** (g) category made up of several classes of different organisms that share important characteristics

15. Members of the class Mammalia all: _____.
    (a) are warm-blooded (c) produce milk
    (b) have body hair (d) all of these

16. List the six kingdoms of life.
    E_____
    A_____
    P_____
    F_____
    P_____
    A_____

17. Carolus Linnaeus was a(n): _____.
    (a) evolutionist (c) creationist
    (b) generationist (d) uniformitarianist

18. Carous Linnaeus believed that variation could occur within a kind, but not from one kind to another kind. _____ (a) True or (b) False

Review Question: Use the taxonomy on page 16 of your text to fill in the blanks for the classification of the domestic cat.

Species: **Domesticas**_____
Genus: 19. _____
Family: **Felidae**_____
Order: 20. _____
Class: 21. _____
22. _____: Chordata
23. _____: Animalia

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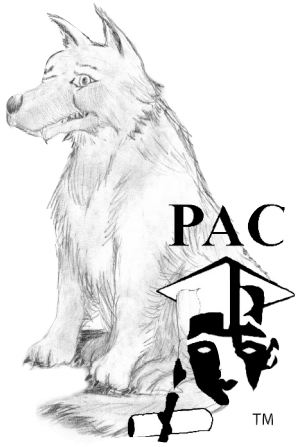
Scientific Name	Common Name
Acer saccharum	Sugar maple
Acer saccharirium	Silver maple
Acer rubrum	Scarlet maple
Acer platanoides	Norway maple
Acer campestre	Common maple
Acer nigrum	Black maple

24. Which statement can be deduced from the information in the chart above?_____
_____

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

25. Write the **Life Principle**:
"_____
_____
_____."

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ACTIVITIES
Lesson 5:

THE SIX KINGDOMS OF LIVING ORGANISMS

You are making progress! ***Answer the following questions. Circle the correct answers or fill in the blanks with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. The two kingdoms in Linnaeus' system of classification were:_____ _____.
   (a) Monera and Plantae
   (b) Protista and Animalia
   (c) Fungi and Animalia
   (d) Plantae and Animalia

2. Euglena cannot be classified as plant or animal because:_____ _____.
   (a) it does not have the characteristics of either one
   (b) it is not a living organism
   (c) it is microscopic
   (d) it has characteristics belonging both to plants and animals

3. A bacterium that is ***motile*** is: _____.
   (a) capable of photosynthesis
   (b) capable of spontaneous movement
   (d) part of the animal kingdom
   (e) capable of causing disease

4. Place an "X" in front of all of the kingdoms recognized by Robert Whittaker in 1968.
   _____ (a) Monera
   _____ (b) Protista
   _____ (c) Fungi
   _____ (d) Eubacteria
   _____ (e) Archaebacteria
   _____ (f) Plantae
   _____ (g) Animalia

5. A cell that lacks a nuclear membrane separating DNA from the cytoplasm, and has no other membrane bound organelles is called _____.

6. The kingdoms Protista, Fungi, Plantae, and Animalia are made up of_____ organisms.
   (a) photosynthetic
   (b) prokaryotic
   (c) eukaryotic
   (d) microscopic

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7. Organisms with cells that have a nuclear membrane and various membrane-bound organelles are called: _____.
   (a) bacteria (c) animals
   (b) prokaryotes (d) eukaryotes

8. All ***prokaryotic*** organisms are classified as:_____
   _____.
   (a) Eubacteria or Archaebacteria (c) Animalia or Plantae
   (b) Plantae or Protista (d) Fungi or Eubacteria

9. One-celled ***eukaryotic*** organisms are classified as: _____.
   (a) Animalia (b) Protista (c) Fungi (d) Plantae

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

11. All members of the plant kingdom have cell walls that contain:_____.
    (a) starch (b) cellulose (c) chitin (d) lipids

12. Organisms that produce their own food are called: _____.
    (a) autotrophs (b) herbivores (c) heterotrophes (d) fungi

13. Animals are _____, which means they are dependent on other organisms for food.
    (a) autotrophs (b) herbivores (c) heterotrophs (d) insectivores

Identify the Kingdom to which each of the following organisms belongs.

14. _____ mushrooms

15. _____ algae

16. _____ humans

17. _____ paramecia

18. _____ grass

19. _____ bacteria

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Use the chart on page 21 of your text to answer questions #20-23.

20. Which group depends on other organisms as a food source?_____
_____

(a) autotrophs only
(b) heterotrophs only
(c) autotrophes and heterotrophes
(d) neither autotrophs nor heterotrophs

21. Which group can live without water? _____

(a) autotrophs only
(b) heterotrophs only
(c) autotrophes and heterotrophes
(d) neither autotrophs nor heterotrophs

22. Which group changes light energy into food energy?_____
_____

(a) autotrophs only
(b) heterotrophs only
(c) autotrophes and heterotrophes
(d) neither autotrophs nor heterotrophs

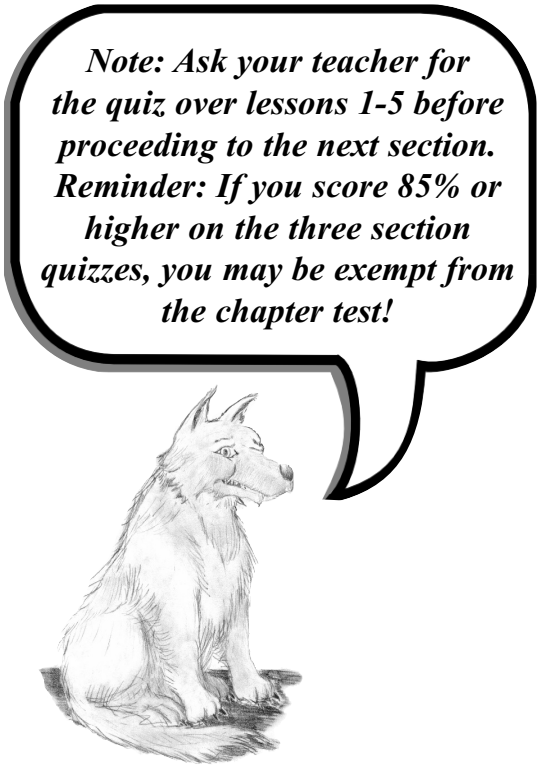
23. Which group supplies food for other organisms? _____

(a) autotrophs only
(b) heterotrophs only
(c) autotrophes and heterotrophes
(d) neither autotrophs nor heterotrophs

24. Write the **Life Principle**:

"_____
_____
_____."

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ACTIVITIES
Lesson 6:

BACTERIA KINGDOMS

You are making progress! ***Answer the following questions. Circle the correct answers or fill in the blanks with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. The combined weight of all microscopic organisms far exceeds the combined weight of all other living organisms on Earth. _____ (a) True or (b) False

2. ***Bacteria*** are capable of living in which of the following environments?_____ _____
   (a) mountain top (c) volcanic hot spring
   (b) ocean floor (d) all of these

3. As a group, bacteria could be described as: _____.
   (a) fragile (b) adaptable (c) isolated (d) endangered

4. All bacteria are harmful to humans. _____ (a) True or (b) False

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

6. Place an "X" in front of each of the following statements that correctly describes bacteria.
   _____ (a) They have cell membranes.
   _____ (b) They do not have cell walls.
   _____ (c) They contain single strands of circular DNA.
   _____ (d) They lack nuclear membranes.
   _____ (e) They contain membrane-bound organelles.

7. All bacteria were once placed in the Kingdom: _____.
   (a) Protista (b) Animalia (c) Monera (d) Plantae

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

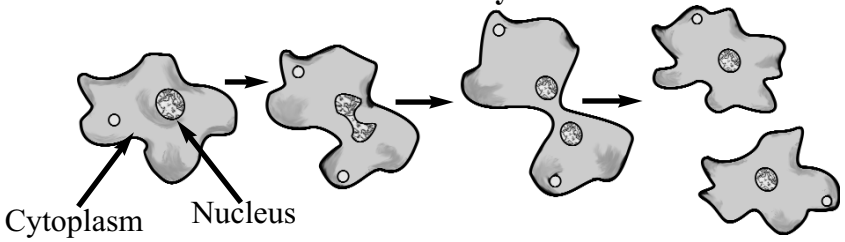
9. The carbohydrate that makes up the thick rigid walls of the members of the Kingdom Eubacteria is: _____.
   (a) cellulose (b) chitin (c) peptidoglycan (d) thioglycollate

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10. Bacteria that live in volcanic hot springs, brine pools, and black organic mud are members of the Kingdom: _____.
    (a) Protista (c) Monera
    (b) Eubacteria (d) Archaebacteria

11. Cell walls of the members of the Kingdom Archaeobacteria do not contain_____ _____.

Binary Fission in Bacteria



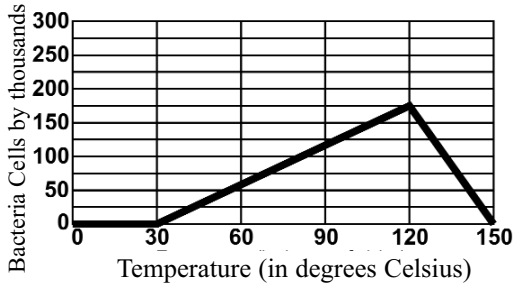
12. According to the illustration above, binary fission is a method of:_____ _____.
    (a) asexual reproduction (c) cytoplasm reduction
    (b) waste removal (d) cellular respiration

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

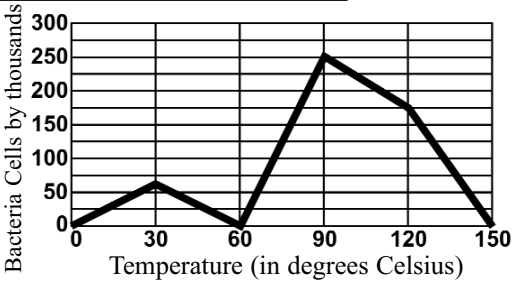
14. Bacteria that produce asexually can pick up new traits through the process of: _____.
    (a) translation (c) transformation
    (b) transcription (d) translocation

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

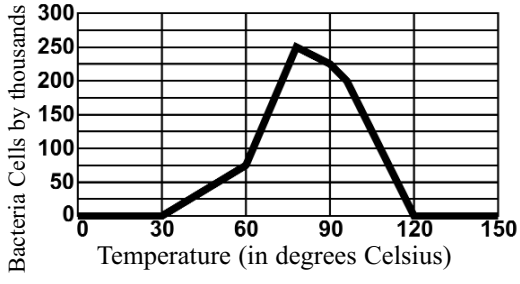
(a)



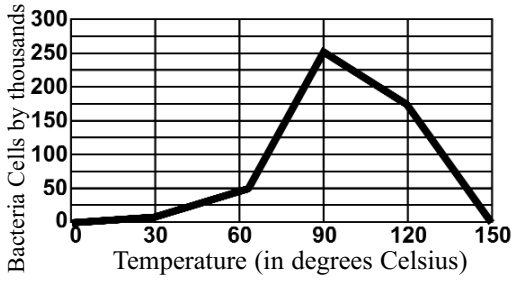
(c)



(b)



(d)



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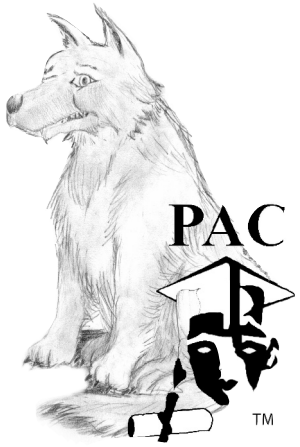
16. Viruses are not considered to be alive because they are not cells and are not composed of cells. _____ (a) True or (b) False

17. Viruses must only _____ in order to produce an effect.
    (a) enter the body (c) infect a host cell
    (b) engulf cells (d) none of the above

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

19. Write the **Life Principle**:
    "_____ _____ _____."

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Name: _____

Date: _____ Grade: _____





KINGDOM PROTISTA: AN OVERVIEW

You are making progress! ***Answer the following questions. Circle the correct answers or fill in the blanks with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. Organisms of the Kingdom Protista are all:_____.
   (a) eukaryotic (b) photosynthetic (c) heterotrophic (d) prokaryotic

2. In a member of the Kingdom Protista, each cellular task is carried out:_____
   _____.
   (a) by the whole cell
   (b) individually by different organelles
   (c) in one organelle, the nucleus
   (d) in opposition to other tasks

3. All protists are unicellular. _____ (a) True or (b) False

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

5. The Kingdom Protista has been divided by scientists into two subkingdoms:_____
   _____
   (a) Algae and Fungi (c) Algae and Protozoans
   (b) Paramecia and Protozoa (d) Bacteria and Algae

6. Single-celled photosynthetic organisms that are classified as protists are: _____.
   (a) algae (b) bacteria (c) fungi (d) protozoa

7. What percentage of photosynthesis on Earth is performed by autotrophic protists?
   _____
   (a) 10-20 % (b) 20-30 % (c) 30-40 % (d) 40-50 %

8. The chemical often used to remove algae from water tanks is:_____.
   (a) hypochlorite (b) chlorine (c) acetic acid (d) ammonia

9. Tiny algae organisms that float in the water are known as:_____.
   (a) plankton (b) kelp (c) barnacles (d) crustaceans

10. Heterotrophic and mobile protists are members of the sub-kingdom:_____.
    (a) algae (b) fungi (c) plantae (d) protozoa

11. The feeding strategies of ***protozoans*** classify them as: _____.
    (a) predators (b) decomposers (c) parasites (d) all of these

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12. Malaria is caused by one species of the phyla: _____.
    (a) Entamoeba (b) Sporozoa (c) Giardia (d) Trypanosoma

13. Small, typically single-celled structures capable of producing new individuals, either immediately or after a period of dormancy are called: _____.
    (a) vacuoles (b) micelles (c) spores (d) zygotes

14. Variation in a life reproductive cycle that switches back and forth between the production of diploid (2n) and haploid (n) cells is called:_____.
    (a) spontaneous generation (c) generational heredity
    (b) alteration of generations (d) polymorphic generation

Review Questions: Identify the organisms in quesions #15-19 as members of the sub-kingdom Algae or Protozoa.

15. ***plankton*** _____

16. amoeba _____

17. euglena _____

18. kelp _____

19. paramecium _____

Use the chart on page 29 of your text to answer questions # 20-22.

20. Place an "X" in front of each of the following diseases caused by protists that is contracted by an insect bite.
    _____ (a) Amoebic dysentery
    _____ (b) Malaria
    _____ (c) Giardiasis
    _____ (d) Sleeping sickness
    _____ (e) Chagas' disease
    _____ (f) Leishmaniasis

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

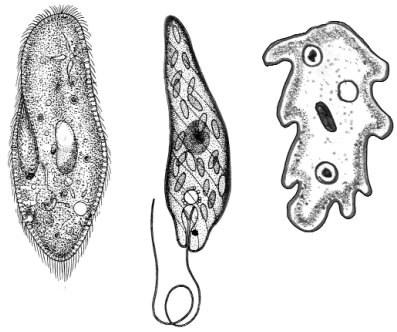
22. Which protist causes Malaria? _____
    (a) Phytophthora (c) Entamoeba histolytica
    (b) Trypanosoma (d) Plasmodium

23. _____ and _____ are protist diseases carried in contaminated water.

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Review and apply what you know for numbers 24-25.

Protists (Magnified 100 Times)



24. Which organism below is sometimes classified with the protists above? _____

(a)



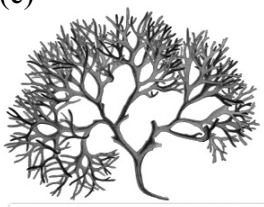
jellyfish

(b)



cicada

(c)



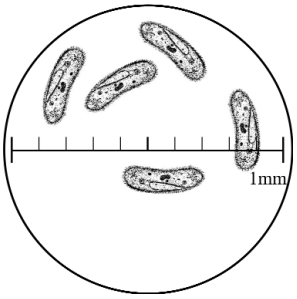
red algae

(d)



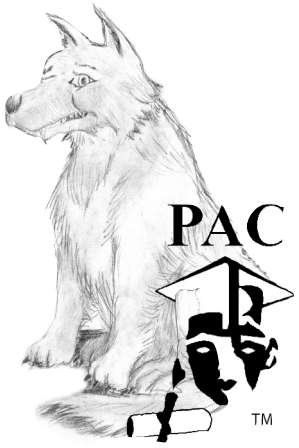
round worm

25. What is the approximate length of each of these paramecia? _____
(a) 0.3 mm (b) 0.7 mm (c) 1.0 mm (d) 5.0 mm



26. Write the **Life Principle**: "_____
_____
_____."

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ACTIVITIES
Lesson 8:

KINGDOM FUNGI: AN OVERVIEW

You are making progress! ***Answer the following questions. Circle the correct answers or fill in the blanks with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. About _____ known species of fungi exist and hundreds of new ones are described each year.
   (a) 1,000 (b) 10,000 (c) 100,000 (d) 1,000,000

2. All fungi are harmful to humans. _____ (a) True or (b) False

3. Place an "X" in front of all of the following processes that can involve fungi.
   _____ (a) making bread
   _____ (b) making cheese
   _____ (c) milk production
   _____ (d) producing some medicines
   _____ (e) spoiling of food
   _____ (f) decay of teeth

4. All fungi are autotrophic. _____ (a) True or (b) False

5. Organisms that feed on dead matter are called: _____.
   (a) parasitic (c) saprophytic
   (b) carnivorous (d) mutualistic

6. Organisms that feed on living hosts are called: _____.
   (a) herbivorous (c) parasitic
   (b) saprophytic (d) mutualistic

7. Which of the following statements best describes ***extracellular digestion*** in fungi?_____
   _____
   (a) Fungi ingest food and then digest it with chemicals.
   (b) Food is digested by other organisms and then absorbed by fungi.
   (c) Fungi digest food with secreted chemicals, then absorb the digested substance.
   (d) none of the above

8. How can extracellular digestion in fungi benefit other organisms?_____
   _____
   (a) Digested food is removed from their environment.
   (b) Digested food is available for their absorption.
   (c) Excreted chemicals stimulate their photosynthetic properties.
   (d) Fungi produce food for other organisms as a result of digestion.

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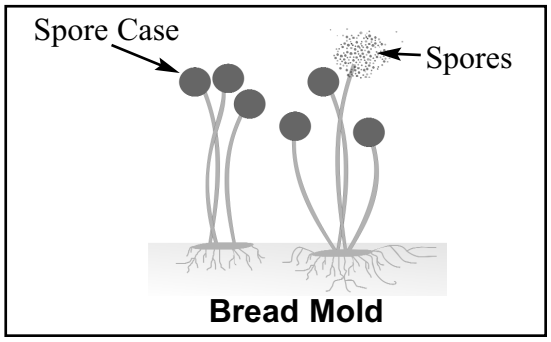
9. Several characteristics indicate that fungi are more similar to _____ than to plants.

10. The cell walls of fungi contain _____, a complex carbohydrate found in insect skeletons.
(a) cellulose (c) peptigoglycan
(b) chitin (d) cholesterol

11. Many fungi store energy in the form of _____, as do animals.
(a) starch (b) glycogen (c) glucose (d) galactose

12. A threadlike, branching filament that is the most basic structure in a fungus is called: _____.
(a) chitin (b) hypha (c) mycelium (d) truffle

13. The mass of ***hyphae*** that grows in the food source and forms the body of a fungus is its _____.



14. In the above illustration, the release of spores enables the bread mold to: _____
(a) absorb nutrients (c) respirate
(b) eliminate wastes (d) reproduce

15. Fungi are classified into four phyla based on their life cycles. _____
(a) True or (b) False

Matching:

16. _____ Zygomycetes (a) largest phylum of fungi
17. _____ Ascomycetes (b) include mushrooms
18. _____ Basidomycetes (c) include black mold
19. _____ Deuteromycetes (d) include "imperfect" fungi

20. Any of several pitted edible fungi is called a(n) _____.

21. A dark and wrinkled edible fruit of an underground European fungi is celled a(n): _____.
(a) date (b) truffle (c) mushroom (d) morel

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22. _____ are single-celled structures each capable of asexually producing a new individual.

23. The study of fungi is called: _____.
(a) ecology (b) botany (c) mycology (d) parasitology

Review Questions: Identify #24-27 according to phyla.

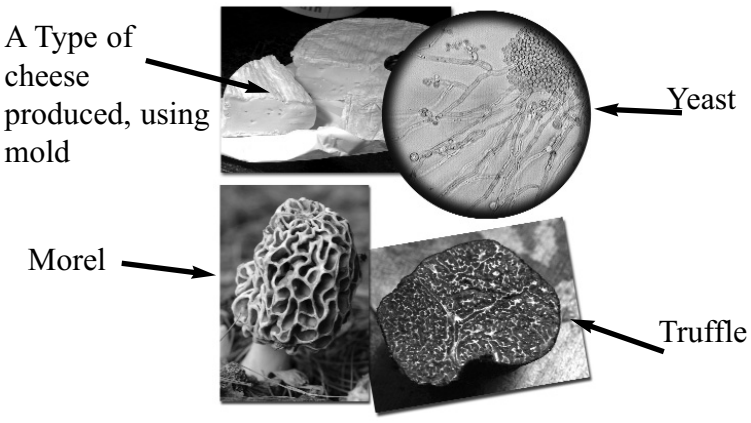
24. _____



25. _____

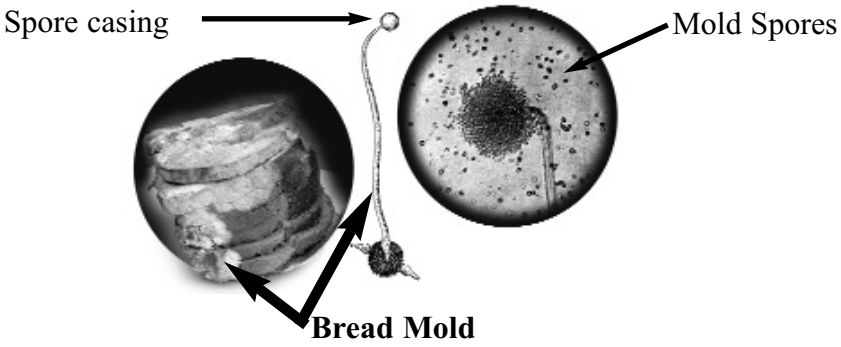


26. _____



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27. _____



28. Write the **Life Principle**:
"_____
_____
_____."

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ACTIVITIES
Lesson 9:

KINGDOM PLANTAE: OVERVIEW I

You are making progress! ***Answer the following questions. Circle the correct answers or fill in the blanks with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. Plants are classified into _____ phyla.
   (a) 8 (b) 12 (c) 10 (d) 14

2. The pigment _____ is responsible for the green color of plants.

3. Plants capture light energy, which fuels the manufacture of:_____.
   (a) lipids (b) proteins (c) carbohydrates (d) nucleic acids

4. Place an "X" in front of each of the following that is characteristic of plants.
   _____ (a) unicellular
   _____ (b) eukaryotic
   _____ (c) photosynthetic
   _____ (d) cell walls of chitin
   _____ (e) reproduce sexually
   _____ (f) reproduce asexually

5. Bryophytes include: _____.
   (a) mosses (b) hornworts (c) liverworts (d) all of these

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

7. A specialized tissue that transports water and nutrients throughout a land plant is a(n) _____.

8. Tracheophytes grow larger than bryophytes and live in a wider range of environments.
   _____ (a) True or (b) False

9. All of the following are true concerning ferns, **except:**_____
   _____.
   (a) they contain vascular tissue
   (b) they have roots, stems and leaves
   (c) they can survive long droughts
   (d) they are considered bryophytes

10. A seed plant in which the seeds are exposed to the air, usually in a cone-shaped structure is a(n) _____.

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11. A reproductive structure that includes a developing plant and a food reserve enclosed in a resistant outer covering is a(n): _____.
(a) spore (b) vacuole (c) seed (d) cone

12. The most common ***gymnosperms*** are conifers. _____ (a) True or (b) False

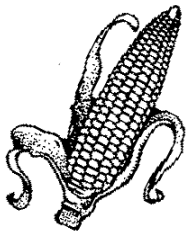
13. Flowering plants whose seeds develop within a matured ovary (fruit) are called_____ _____.

14. A tiny seed leaf found inside a plant embryo is a(n) _____.

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

Classify #16-21 as originating from a monocot or dicot plant.

16. _____



17. _____



18. _____



19. _____



20. _____



21. _____



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22. Name the three important features that help tracheophytes thrive on land:_____
_____
_____

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

24. Leaves function to: _____.
(a) capture light for photosynthesis
(b) aid evaporation
(c) support plants
(d) all of the above

25. The waxy covering on plant leaves to keep plants from losing water by evaporation is called the _____.

26. In the ***epidermis*** of a plant, _____ allow gas exchange.

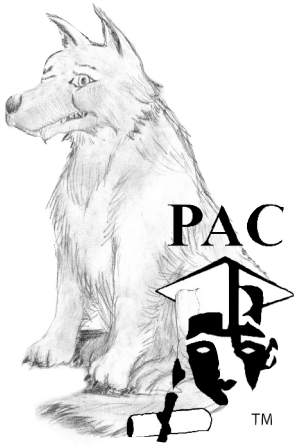
27. ***Phloem*** in a plant transports products of photosynthesis and substances from one part of the plant to another. _____ (a) True or (b) False

28. ***Xylem*** in a plant carries water and nutrients from the roots to the branches and leaves of plants. _____ (a) True or (b) False

29. Stems function to: _____.
(a) hold leaves up to sunlight and position leaves to capture light
(b) conduct water
(c) conduct nutrients
(d) all of the above

30. Write the **Life Principle**: "_____
_____
_____."

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ACTIVITIES
Lesson 10:

KINGDOM PLANTAE: OVERVIEW II

You are making progress! ***Answer the following questions. Circle the correct answers or fill in the blanks with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

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

2. Most animal life cycles have a multicellular diploid and a multicellular haploid phase.
_____ (a) True or (b) False

3. In plants, the diploid spore-bearing generation that reproduces by spores is called the: _____.
(a) sporophyte generation (c) zygotophyte generation
(b) gametophyte generation (d) embryophyte generation

4. In plants, the haploid gamete-bearing generation that reproduces by fertilization is called the: _____.
(a) sporophyte generation (c) zygotophyte generation
(b) gametophyte generation (d) embryophyte generation

5. Cells that contain one set of chromosomes are called _____ cells.
(a) zygote (b) haploid (c) diploid (d) polyploid

6. The tiny spore that contains the male reproductive cells of a plant is called a(n):_____ _____.
(a) egg grain (b) sperm grain (c) pollen grain (d) gamete grain

7. In the early stage of development, an organism resulting from fertilization is called a(n) _____.

8. Plants rely on the help of the wind, insects, and animals to carry out:_____ _____.
(a) seed germination (c) seed dispersal
(b) water absorption (d) all of these

9. Place the following events of pollination in chronological order.
_____ (a) bee visits flower to feed on nectar
_____ (b) bee carries pollen from one flower to another as it feeds on their nectar
_____ (c) pollen is dusted on bee's body
_____ (d) flower produces pollen and sweet secretions called nectar

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10. The spread of pollen from one plant to another by an insect or an animal is called_____ _____.

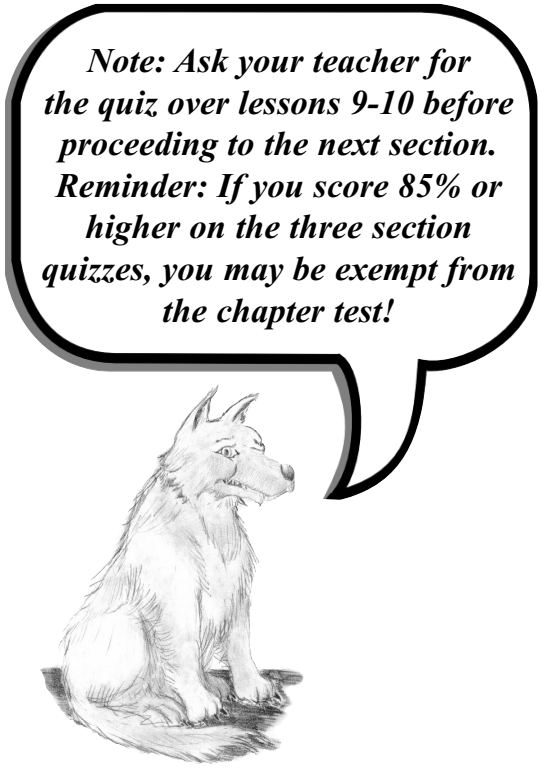
11. Pollination by the wind is much more efficient than ***vector pollination***. _____
(a) True or (b) False

12. Nocturnal animals are active mostly during the: _____.
(a) winter (b) day (c) summer (d) night

13. Place an "X" in front of each of the following that aid in the process of seed dispersal.
_____ (a) wind
_____ (b) wing-like seed encasement
_____ (c) feathery seed attachment
_____ (d) tiny hooks and barbs
_____ (e) birds

14. Bee-keeping professionals who derive income from the sale of queen bees, packaged bees, honey and other bee products are called _____.

15. Write the **Life Principle**:
"_____
_____
_____."



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ACTIVITIES
Lesson 11:

KINGDOM ANIMALIA: THE INVERTEBRATES, OVERVIEW I

You are making progress! ***Answer the following questions. Circle the correct answers or fill in the blanks with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. About _____ of all the animal species on earth are ***invertebrates***.
   (a) 10% (b) 35% (c) 78% (d) 97%

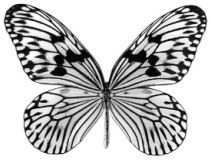
2. An invertebrate is an animal without: _____.
   (a) a backbone (b) a tail (c) a skeleton (d) appendages

3. Sponges make up the phylum: _____.
   (a) Nematoda (b) Porifera (c) Annelida (d) Cnidaria

4. Place an "X" in front of all of the following that are true concerning sponges.
   _____ (a) found in ocean and fresh water
   _____ (b) variety of shapes
   _____ (c) all very small
   _____ (d) consist of independent cells

5. Which of the following is a member of the phylum Cnidaria? _____
   (a) roundworm (b) starfish (c) clam (d) jellyfish

6. The arrangement of body parts that repeat around an imaginary line drawn through the center of an organism is called: _____.
   (a) radial symmetry (c) spherical symmetry
   (b) bilateral symmetry (d) unilateral symmetry

(a)  (b)  (c) 

7. Which of the animals in the above figure illustrates ***radial symmetry***?_____
   _____
   (a) animal A (b) animal B (c) animal C (d) none of these

8. Which of the following is a member of the phylum *Platyhelminthes*?_____
   _____
   (a) roundworm (b) earthworm (c) flatworm (d) squid

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

10. The concentration of nerve and sensory cells in the head of an organism is called_____ _____.

11. Nematodes have a(n) _____ digestive system, with a mouth at one end and an anus at the other.
   (a) cup-like (b) flat (c) tube-like (d) vase-like

12. Segmented worms belong to the phylum: _____.
   (a) Nematoda (b) Annelida (c) Molluska (d) Cnidarians

13. Place an "X" in front of each of the following that are members of the phylum Molluska.
   _____ (a) segmented worms
   _____ (b) clams
   _____ (c) octopuses
   _____ (d) scallops
   _____ (e) corals
   _____ (f) snails
   _____ (g) sea urchins

14. Spiny skin and five-part radial symmetry are characteristics of which phylum? _____
   (a) Arthropoda (b) Cnidarians (c) Echinodermata (d) Nematoda

15. The largest and most diverse of all the animal phyla are: _____.
   (a) mollusks (b) arthropods (c) annelids (d) sponges

16. The most important characteristics of arthropods are:_____ _____.
   (a) bilateral symmetry and cephalization
   (b) external skeleton and jointed legs
   (c) tube-like digestive system and hard shells
   (d) radial symmetry and spiny skin

Classify each of the following with the appropriate phylum

17. _____



18. _____

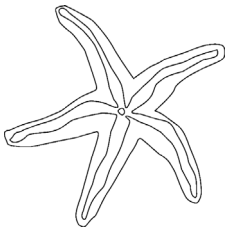


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19. _____



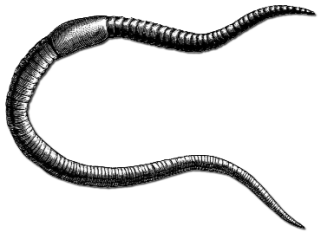
20. _____



21. _____



22. _____



23. _____



24. Write the **Life Principle**:

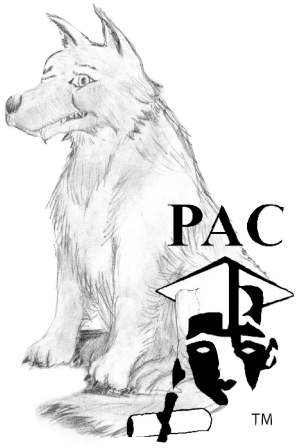
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ACTIVITIES
Lesson 12:

KINGDOM ANIMALIA: THE INVERTEBRATES, OVERVIEW II

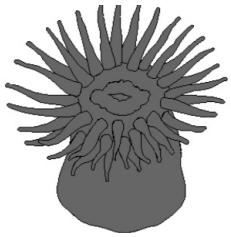
You are making progress! ***Answer the following questions. Circle the correct answers or fill in the blanks with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

Matching:

1. _____ ***hydrostatic*** skeleton — (a) external skeletal system
2. _____ ***exoskeleton*** — (b) a skeleton located within the body
3. _____ ***chitin*** — (c) skeletal system in which the muscles are supported by a water-filled body cavity
4. _____ ***endoskeleton*** — (d) structural carbohydrate that is the main component of arthropod exoskeletons

Label each as having a hydrostatic skeleton, exoskeleton, or endoskeleton.

5. _____



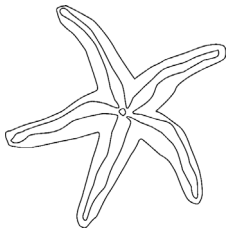
6. _____



7. _____



8. _____



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

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

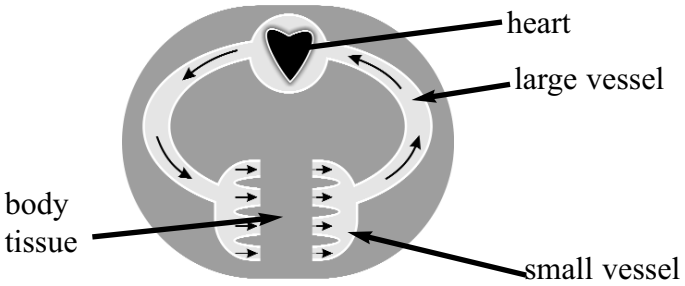
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11. A collection of one or more pumps and tubes that move important substances around within the body is called a(n): _____.
    (a) digestive system (c) nervous system
    (b) circulatory system (d) excretory system

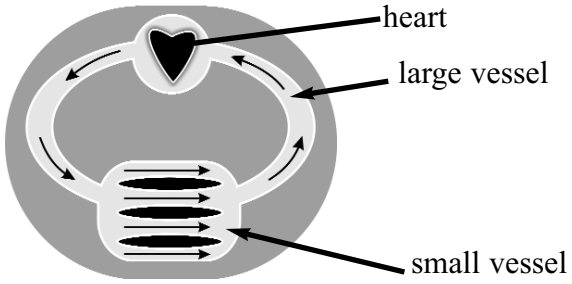
12. Place an "X" in front of all statements that are true concerning ***open circulatory systems***.
    _____ (a) Blood is pumped from the heart.
    _____ (b) Blood is contained entirely in blood vessels.
    _____ (c) Blood is released directly onto body tissues.
    _____ (d) Blood flows through tissues and collects in sinuses.

13. Place an "X" in front of all statements that are true concerning ***closed circulatory systems***.
    _____ (a) Blood is contained in a system of closed vessels.
    _____ (b) Blood directly contacts tissues.
    _____ (c) Oxygen and carbon dioxide diffuse in and out of blood through walls of tiny blood vessels.

Label as "open" or "closed" circulatory systems.



14. _____



15. _____

16. Small, soft-bodied animals are able to exchange oxygen and carbon dioxide with their environment by diffusion through their body surfaces. _____
    (a) True or (b) False

17. The feathery respiratory organ of many aquatic species that is used to obtain oxygen from the water is called a(n): _____.
    (a) fin (b) swim bladder (c) gill (d) scale

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18. A series of air-filled tubes that bring air into each body cell of an insect are called: _____.
(a) gills (b) trachea (c) book lungs (d) bronchioles

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

Matching:

20. _____ ***flame cells*** (a) removes nitrogenous wastes from the blood of many invertebrates

21. _____ ***nephridia*** (b) excretes nitrogenous wastes in arthropods

22. _____ ***Malpighian tubules*** (c) conduct water and wastes through the branching tubes and serve as an excretory system in flat worms

23. The concentration of nerve cells that form nerve cords or nerve rings around the mouth of some invertebrates is called _____.

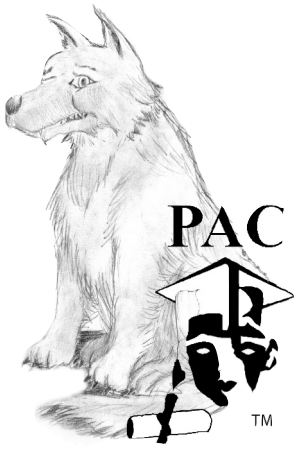
24. ***Cephalization*** is the concentration of nerve cells and sensory cells in the_____ of an organism.
(a) spine (b) appendages (c) tail (d) head

25. Clumps of nerve cells in the head region of primitive organisms such as the flatworm are called: _____.
(a) brains (b) axons (c) ganglia (d) tumors

26. All invertebrates are capable of sexual reproduction. _____
(a) True or (b) False

27. Write the **Life Principle**:
"_____ _____ _____."

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ACTIVITIES
Lesson 13:

KINGDOM ANIMALIA: THE VERTEBRATES, OVERVIEW I

You are making progress! ***Answer the following questions. Circle the correct answers or fill in the blanks with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. All vertebrates of the animal kingdom are members of the phylum:_____.
   (a) Arthropoda (b) Molluska (c) Chordata (d) Platyhelminthes

2. A flexible, rod-like structure that provides body support to chordates at some point in their development is a(n): _____.
   (a) vertebral column (c) nephridia
   (b) notochord (d) exoskeleton

3. Most chordates have which of the following? _____
   (a) two sets of appendages (c) gills or lungs
   (b) closed circulatory systems (d) all of these

4. Place an "X" in front of all characteristics concerning fish.
   _____ (a) aquatic
   _____ (b) streamlined shape
   _____ (c) gills for gas exchange
   _____ (d) functional tail
   _____ (e) no lungs in any fish species

Matching:

5. _____ Agnatha (a) jawless fish

6. _____ Chondrichthyes (b) bony fish

7. _____ Osteichthyes (c) fish with cartilagenous endoskeletons

8. Amphibians live in/on: _____-.
   (a) water and land (c) land only
   (b) water only (d) trees

9. Which of the following is **not** characteristic of amphibians?_____
   _____
   (a) They lay eggs in water. (c) They have moist skin.
   (b) They live on land as adults. (d) They tolerate dryness well.

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10. Place an "X" in front of all statements that pertain to reptiles.
_____ (a) They reproduce by external fertilization.
_____ (b) They produce leathery-shelled eggs.
_____ (c) They have dry, scaly skin.
_____ (d) They have gills for gas exchange.
_____ (e) Lizards and snakes are most abundant.

11. A characteristic that is unique to birds is (the) _____.
(a) claws (b) mammary glands (c) feathers (d) beak/bill

12. Bird bones are: _____.
(a) dense (b) hollow (c) heavy (d) soft

13. Humans belong to the class: _____.
(a) Mammalia (b) Aves (c) Agnatha (d) Reptilia

14. The gland that enables a female to nourish her young with milk is the_____ _____ gland.
(a) adrenal (b) salivary (c) mammary (d) sweat

Matching:

15. _____ monotremes — (a) mammals whose embryos are connected to the mother through the placenta

16. _____ marsupials — (b) egg-laying mammals that produce milk

17. _____ placental mammals — (c) mammals whose embryos develop within the mother's uterus for a short time and complete development in the mother's abdominal pouch after birth

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

19. 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_____ _____.

20. Write the **Life Principle**:
"_____
_____
_____."

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ACTIVITIES
Lesson 14:

KINGDOM ANIMALIA: THE VERTEBRATES, OVERVIEW II

You are making progress! ***Answer the following questions. Circle the correct answers or fill in the blanks with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. The central element of the vertebrate endoskeleton is the: _____.
   (a) ribcage (b) sternum (c) vertebral column (d) pelvis

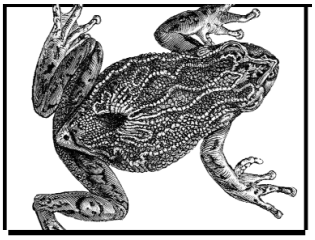
2. Meat eating organisms are called: _____.
   (a) herbivores (b) carnivores (c) insectivores (d) none of these

3. Plant eating organisms are called: _____.
   (a) herbivores (b) carnivores (c) insectivores (d) autotrophs

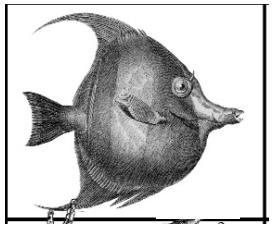
4. ***Carnivores*** have longer digestive tracts than ***herbivores***. _____
   (a) True or (b) False

Identify the primary source of gas exchange in each of the following organisms as gills, lungs, or skin.

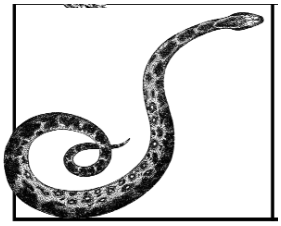
5. _____



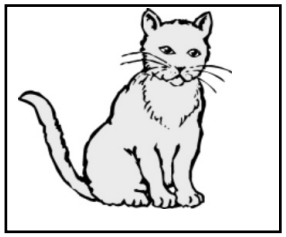
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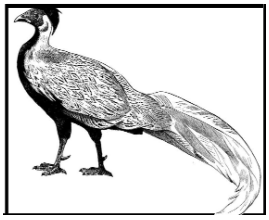
7. _____



8. _____



9. _____



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10. The rate at which an organism uses food and oxygen is called the:_____ _____.
(a) heart rate (b) filtration rate (c) metabollic rate (d) expiration rate

11. Air tubes that enter the lungs and branch off for air exchange are called:_____ _____.
(a) trachea (b) pleura (c) alveoli (d) bronchi

12. Tiny air sacs in the lungs appearing in a grape-like cluster surrounding a network of capillaries where gas exchange takes place are called:_____.
(a) bronchi (b) alveoli (c) pleural sacs (d) nephrons

13. The primary difference between mammalian and ***avian*** lungs is:_____ _____ _____.
(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
(b) bird lungs contain stale air that remains after each breath due to a two-way flow current
(c) the mammalian lungs do not have bronchioles and alveoli as do bird lungs, causing their gas exchange to be less than efficient
(d) none of the above

14. In a double-loop circulatory system as in mammals, the first loop carries blood between the heart and _____, and the second loop carries blood between the heart and _____.
(a) body; brain (b) lungs; body (c) brain; body (d) lungs; brain

15. Complex vertebrates primarily utilize which organ to excrete nitrogen and nonsolid wastes? _____
(a) heart (b) liver (c) lungs (d) kidneys

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

17. Birds and reptiles convert nitrogenous wastes into a semi-solid paste called_____ _____.

18. At each joint between the vertebrae of the spinal column, pairs of nerves run into and out of the spinal column to connect muscles, organs, and sensory receptors in the skin and throughout the body. _____ (a) True or (b) False

19. Organisms that rely on interactions with the environment to control body temperature are called:_____.
(a) ectotherms (b) echinoderms (c) endotherms (d) mesotherms

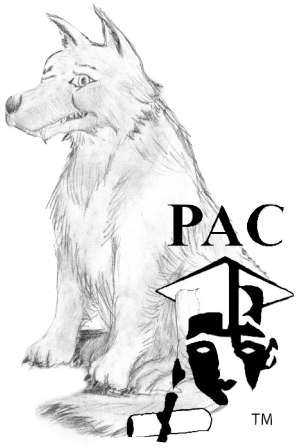
20. Organisms that generate and maintain body heat through chemical reactions in the body are called: _____.
(a) ectotherms (b) echinoderms (c) endotherms (d) mesotherms

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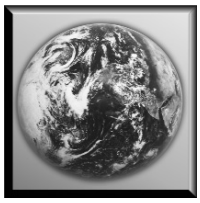
21. Fertilization in vertebrates can be external or internal. _____
(a) True or (b) False

22. Write the **Life Principle**:
"_____
_____
_____."

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ACTIVITIES
Lesson 15:

A REVIEW: OUTER SPACE TO BACTERIA

You are making progress! ***Answer the following questions. Circle the correct answers or fill in the blanks with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. Place the following events in chronological order according to the Big Bang Theory.
   _____ (a) stars and planets came into being
   _____ (b) prokaryotes evolved
   _____ (c) Earth's crust formed
   _____ (d) eukaryotes evolved

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

3. The bacteria engulfed by larger cells eventually became the_____ of those cells, according to the ***endosymbiotic hypothesis***.

4. According to the endosymbiotic hypothesis, cyanobacteria evolved into the higher plants.
   _____ (a) True or (b) False

5. The phenomenon in the Cambrian sedimentary deposits in which each of the major invertebrate forms of life appear abruptly in the fossil record, with no intermediate forms leading up to them is called the _____.

6. Many fossils of evolutionary ancestors of the Cambrian period have been found worldwide. _____ (a) True or (b) False

7. Evolutionists use similar features among species to indicate common ancestry. _____
   (a) True or (b) False

8. Paleontology provides abundant evidence for the existance of intermediate creatures, giving evidence of evolution of species. _____
   (a) True or (b) False

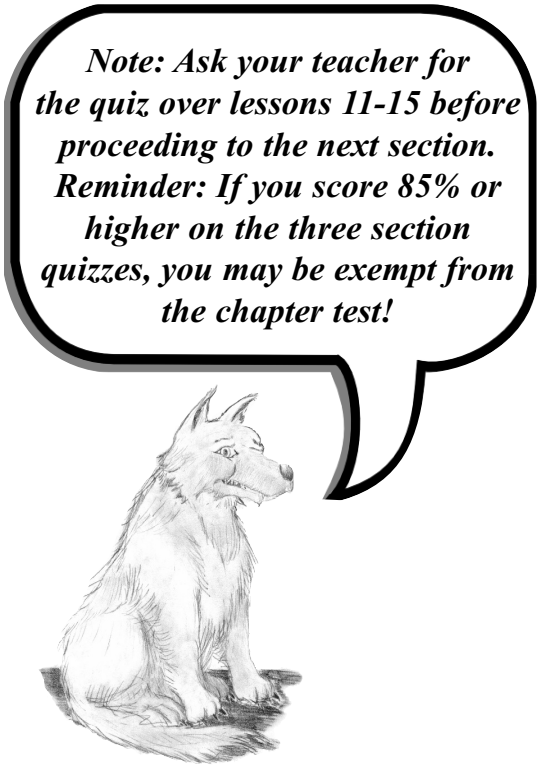
9. Mutations are rare and almost always universally _____.

10. What do all the millions of organism species have in common? _____
    _____

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11. Everything of natural origin in the universe reflects a powerful sense of: _____
(a) change (b) order (c) chaos (d) status quo

12. Write the **Life Principle**:
"_____
_____
_____."



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