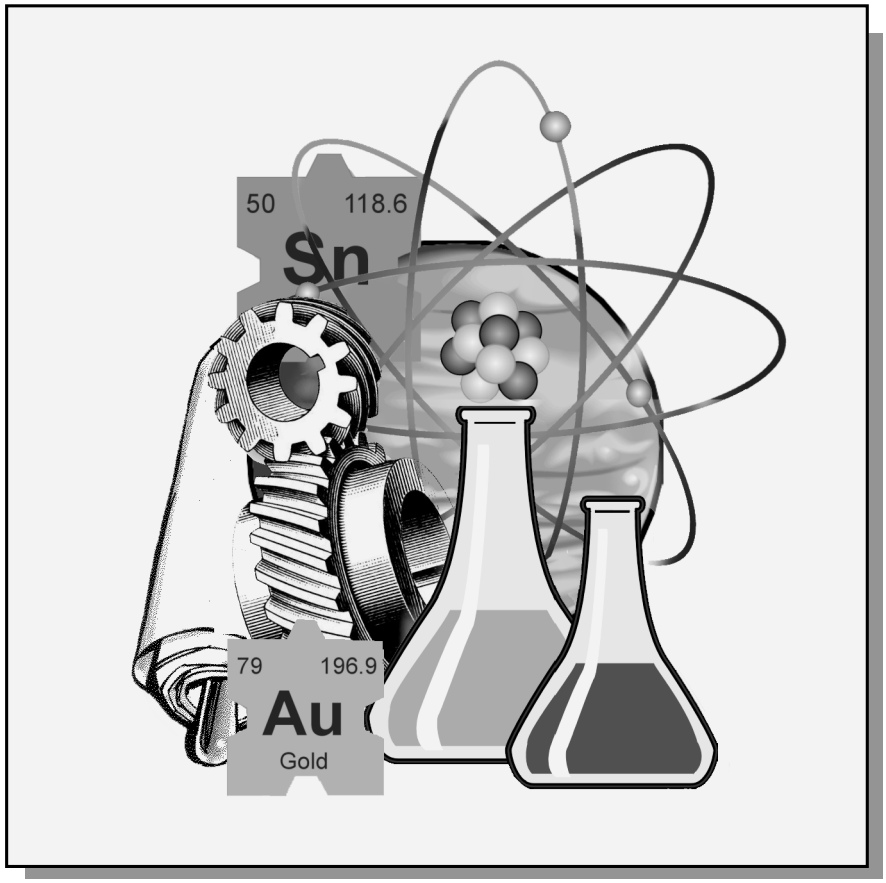
Integrated Physics & Chemistry

ACTIVITIES



Chapter 11

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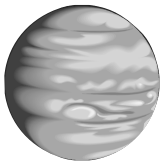
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ACTIVITIES
Lesson 1:
Planets

The Earth

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. Earth's sphere of air is the _____.

*2. The three most abundant elements in the atmosphere are _____, _____ and _____.

3. If you go above _____ you will probably need extra oxygen.
(a) 2,000 feet (b) 1,000 feet (c) 7 miles (d) 20 feet

*4. A scientist who studies weather and the atmosphere is a: _____.
(a) motorist (b) biologist (c) geologist (d) meteorologist

*5. Clouds and most weather conditions form in the _____.

*6. The Earth's sphere of water is the _____.

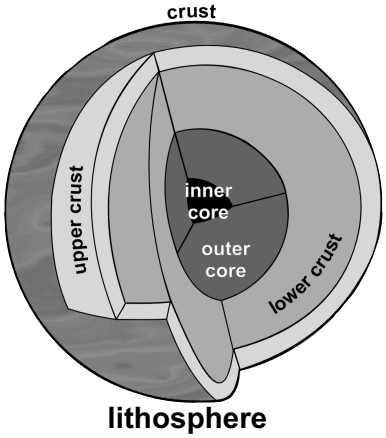
*7. A scientist who studies the ***hydrosphere*** and the oceans is a: _____.
(a) biologist (b) waterman (c) geologist (d) oceanographer

8. The scientist who invented the self-contained underwater breathing apparatus was: _____.
(a) Blaise Pascal (c) Elmo van Fandel
(b) Jacques Yves Cousteau (d) William Thomson

9. The name _____ comes from the letters of Self-Contained Underwater Breathing Apparatus.

*10. The four most abundant elements in the ocean are _____, _____, _____ and _____.

*11. According to the chart on the right, the topmost layer of the lithosphere is the _____.



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*12. A scientist who studies Earth's lithosphere is a(n): _____.
(a) biologist (b) geologist (c) oceanographer (d) rock hound

*13. The solid sphere of Earth is the _____.

*14. Compared to the total radius of Earth, the crust is very _____.

*15. The three most abundant elements in the crust are _____, _____ and _____.

16. Geologists have been able to make a model of the interior of the Earth because they were able to measure the speed and direction of _____ waves.

17. The ***crust*** and mantle do not blend into one another.
(a) True or (b) False

18. Below the crust and mantle is the _____ that extends to the center of the Earth.
(a) molten lava (b) core (c) humus (d) troposphere

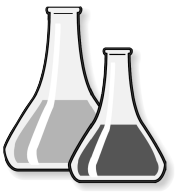
19. Geologists estimate that at the center of the Earth, the temperature of the ***molten*** lava may be as high as _____, which is about the same temperature as the surface of the _____.

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

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ACTIVITIES
Lesson 2:
Compounds

Minerals

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 _____ is a name given to the severe drought of the 1930s.

*2. Before settlers moved to the Midwest states, the fine-grained soil was held in place by: _____.

(a) a coating of sandstone
(b) interlocking roots of native grasses
(c) crops such as corn
(d) heavy clay

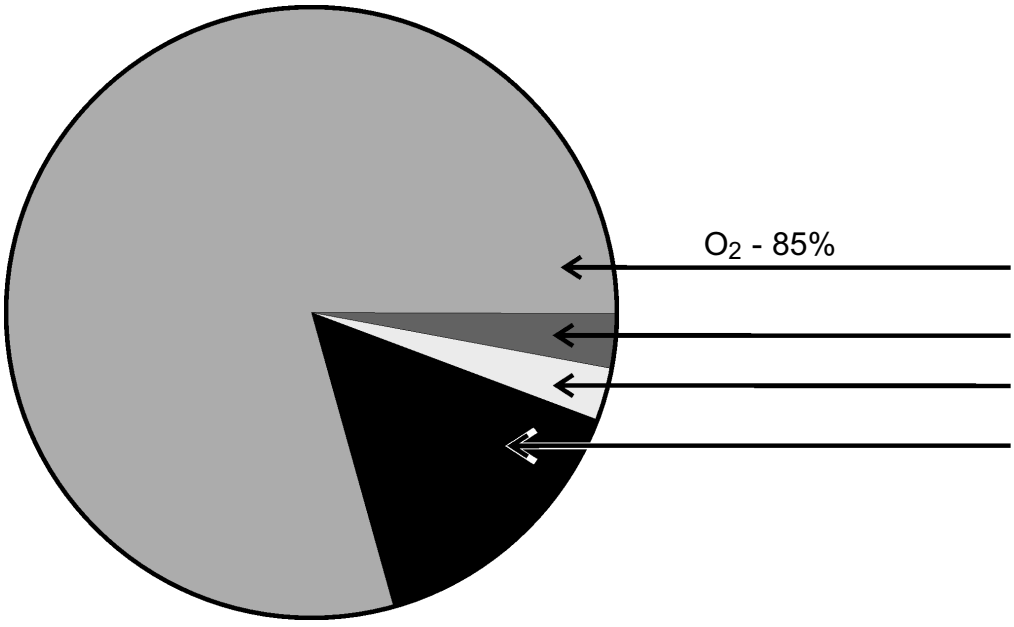
3. It took almost _____ years for the land to recover from the Dust Bowl.

*4. ***Soil*** is produced by fine particles of _____ mixed with organic materials.

5. A sample of air taken at one location in the _____ will be very similar to one taken elsewhere in the _____ on Earth.

6. A sample of _____ taken in one ocean will be very similar to one taken from another _____ elsewhere on Earth.

7. The pie graph below represents the composition of Earth's ocean's. Label the sections with each element's symbol and its percentage. (You may refer to the periodic table at the end of your text.) One is done for you.

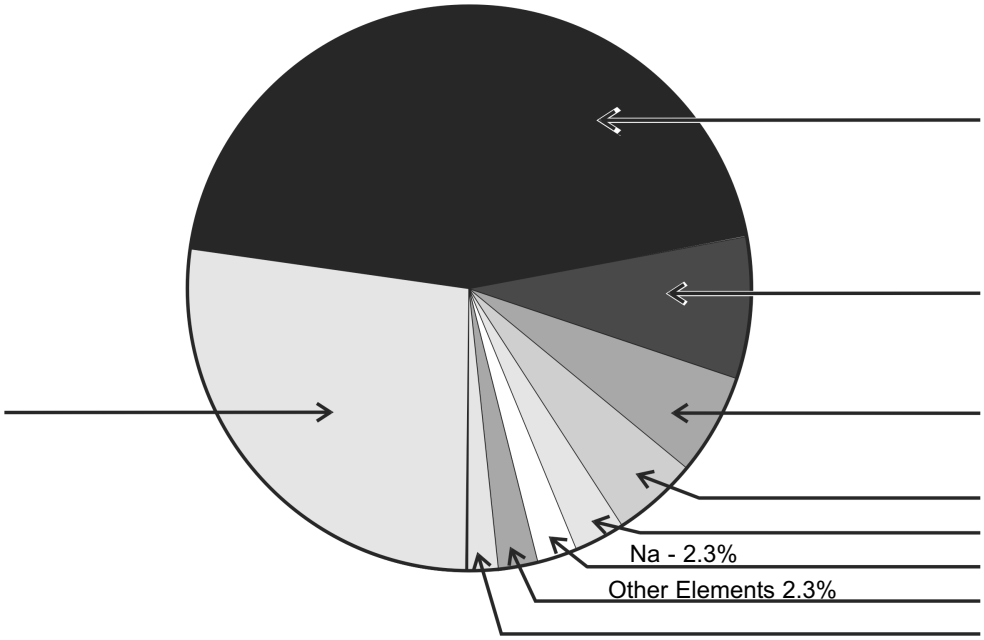


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*8. To figure out which elements are most abundant, _____ compute an average from samples around the world at various depths of Earth's crust.

9. The three most abundant elements in the Earth's crust are _____, _____ and _____.

10. The pie graph below represents the composition of Earth's crust. Label the sections with each element's symbol and its percentage. (You may refer to the periodic table at the end of your text.) Two are done for you.



*11. The second most abundant element in the atmosphere and the most abundant element in the hydrosphere and lithosphere is: _____.
(a) nitrogen (b) carbon (c) hydrogen (d) oxygen

12. A mineral: _____.
(a) has a definite chemical composition
(b) is always hard
(c) is always soft
(d) is a mixture of elements whose composition is different from one place to another

13. _____ is the most abundant group of elements in the Earth's crust.

*14. Quartz is silicon dioxide with a chemical formula of: _____.
(a) $CaCO_3$ (b) $KAlSi_3O_8$ (c) Si_2O (d) SiO_2

*15. Another name for silicon dioxide is: _____.
(a) calcite (b) silica (c) mica (d) diosil

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16. Mica can be described as being _____ in the Earth's crust.
(a) everywhere (b) abundant (c) scarce (d) rare

17. Kaolinite is the chief ingredient in _____, a fine white _____ used in ceramic, porcelain and china products.

18. The formula for calcite is _____.

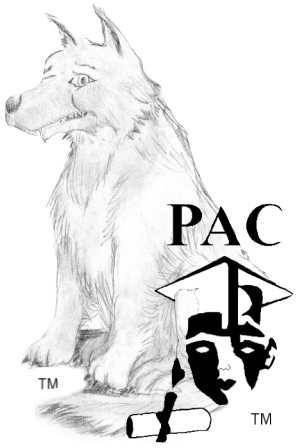
*19. Calcite is the chief mineral in: _____.
(a) limestone and marble (b) metamorphosis (c) clay (d) mica

*20. Some crystals can _____ light.

21. An American inventor, Edward Land, invented _____ glasses that reduce glare.

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

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ACTIVITIES
Lesson 3:
Geology

Sedimentary, Igneous and Metamorphic Rock

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 bluff at Torrey Pines Nature Preserve reveals two of the ways that _____ _____ rocks are formed.

*2. Wind and water can lay down _____ layers.

3. The process of breaking down larger rocks into smaller fragments is: _____.
(a) mountain building (b) settling (c) weathering (d) difficult

*4. Sedimentary rocks form from the sediment usually carried in water. The single most common feature of sedimentary rocks is that they form in _____.

5. The layers of sedimentary rocks are called beds or _____.

Write the letter of the matching sedimentary rock in the blank provided.

6. _____ most common type sedimentary rock
7. _____ breaks into smooth flakes with very sharp edges
8. _____ often contains oil
9. _____ made of a jumble of pebbles and gravel
10. _____ calcium carbonate ($CaCO_3$) produced by chemical action
11. _____ found in the Great Salt Plain in Oklahoma, used to manufacture plaster of Paris

(a) conglomerate
(b) flint
(c) gypsum
(d) limestone
(e) sandstone
(f) shale

*12. (Review question) In which type of rock would weathering by wind erosion happen the fastest?
(a) sandstone (b) flint (c) shale (d) conglomerate

*13. The rock that forms when molten rock becomes solid is: _____.
(a) glacial ice (b) igneous (c) sedimentary (d) magma

14. Molten material produced from rock by heat deep in the Earth is _____.

15. The primary difference in types of igneous rocks is: _____.
(a) their strength (c) how the particles settled out
(b) the size of the crystals (d) their color

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Write the letter the matching igneous rock in the blank provided.

16. _____ glass-like with a shiny surface
17. _____ when this type of igneous rock cools slowly, it can form columns like the Devil's Tower in Wyoming
18. _____ filled with pores caused by gas bubbles
19. _____ has large crystals and cools slowly, deep below the Earth's surface

(a) ***basalt***
(b) granite
(c) obsidian
(d) pumice

*20. Metamorphic rocks are sedimentary or igneous rocks that have been changed by: _____.
(a) weathering (c) lightning
(b) heat or pressure (d) nuclear reactions

21. Quartzite is metamorphic rock that comes from the sedimentary rock: _____.
(a) limestone (b) pumice (c) magma (d) sandstone

22. Slate is metamorphic rock that comes from the sedimentary rock: _____.
(a) limestone (b) shale (c) pumice (d) sandstone

23. Marble is metamorphic rock that comes from the sedimentary rock: _____.
(a) limestone (b) magma (c) shale (d) pumice

*24. The three types of rock are _____, _____ and _____.

25. Only sedimentary rocks contain _____.

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

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Date: _____ Grade: _____



ACTIVITIES
Lesson 4:
Geology

Volcanoes, Weathering and Erosion

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 Paricutín volcano erupted from a ***fissure***: _____.
   (a) in a cornfield (c) on the side of a mountain
   (b) in downtown Mexico City (d) under the sea

*2. The primary way that new crust is produced is by _____ and _____.

3. Volcanoes cannot erupt underwater.
   (a) True or (b) False

*4. Volcanoes are most common: _____.
   (a) away from the tectonic plates (c) on the ocean floor
   (b) at the center of a tectonic plate (d) where two tectonic plates meet

*5. Breaking rock into smaller fragments is: _____.
   (a) catastrophism (b) erosion (c) volcanism (d) weathering

*6. Carrying away smaller fragments of rock is: _____.
   (a) erosion (b) transportation (c) volcanism (d) weathering

*7. Water is active in both _____ and _____.

8. Once barrier islands form they are permanent features.
   (a) True or (b) False

9. A talus slope is caused by temperature changes and _____.

*10. A landslide is more likely to occur if the top layer is: _____.
   (a) on flat land (c) porous and weakened by water
   (b) hard and resists the action of water (d) in the city

11. An example of a layer prone to landslide is one with a top layer of: _____.
   (a) clay or slate (b) coarse (c) water (d) sandstone

12. Arches National Park in Utah contains rock formations that have been smoothed by: _____.
   (a) constant temperature (b) gravity (c) water (d) wind blown grit

13. Changes in _____ can cause weathering.

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14. Living things do not cause weathering.
(a) True or (b) False

*15. The action of lichens is an example of weathering by: _____.
(a) changes in temperature (c) living things
(b) gravity (d) wind-blown grit

*16. The purpose of _____ _____ is to catch and release slowly the water that drains from buildings and parking lots following a rainstorm.

17. ***Disintegration*** is _____ weathering.

*18. The grinding of rock by glaciers is an example of _____ weathering.
(a) fall off (b) chemical (c) physical (d) synthetic

*19. The ***decomposition*** of rocks by lichens and acid rain are examples of _____ weathering.
(a) chemical (b) nuclear (c) physical (d) synthetic

*20. Today in wet climates, the most effective weathering is by: _____.
(a) ***glaciers*** (c) water
(b) growing plants (d) wind and temperature changes

*21. Today in dry climates, the most effective weathering is by: _____.
(a) glaciers (c) water
(b) growing plants (d) wind and temperature changes

22. Glaciers have never been a major factor in weathering.
(a) True or (b) False

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

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Date: _____ Grade: _____



ACTIVITIES
Lesson 5:
Geology

Rock Cycle

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 last time Kilauea in Hawaii erupted was in 1532.
   (a) True or (b) False

2. Mount Vesuvius is: _____.
   (a) on the big island of Hawaii
   (b) in Italy in Europe
   (c) in a field in Mexico
   (d) near a lake in Montana

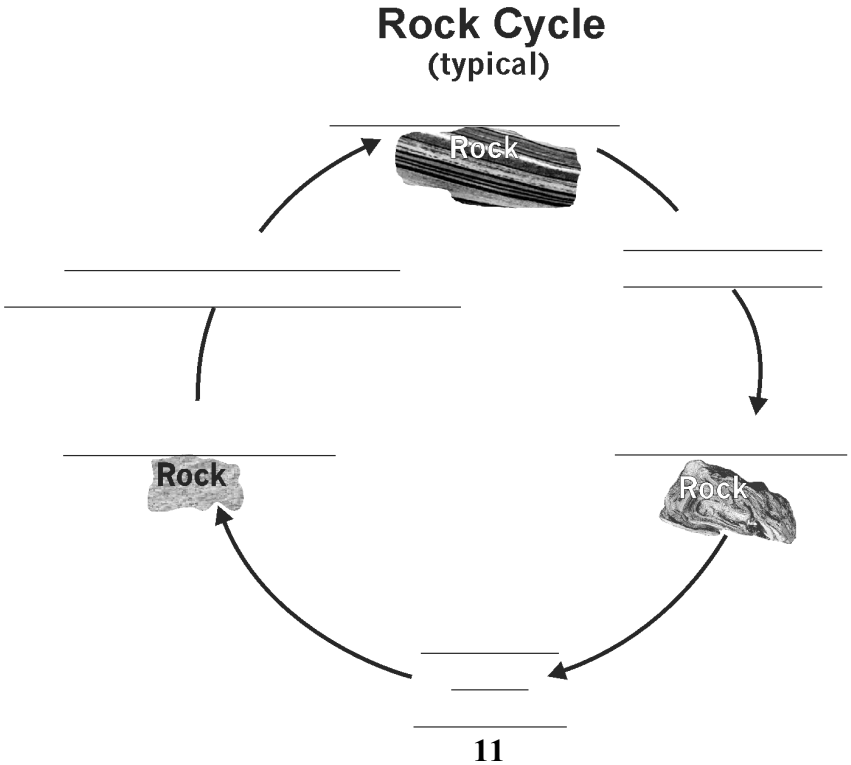
3. The only force acting on the Earth's crust is gravity.
   (a) True or (b) False

*4. Some mountains are formed by_____ in the Earth's surface.

5. Forces that change rock are part of the _____ _____.

6. Sedimentary rock can be produced from metamorphic rock, igneous rock or from other _____ rock.

7. **Label the diagram of the rock cycle:**



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8. Sedimentary rock is weathered: _____.
   (a) 200 miles below the ocean floor (c) on or near the surface of the Earth
   (b) at any depth (d) only in riverbeds and lakes

9. Geologists believe sedimentary rock forms at a depth of about 0.5 to: _____
   (a) 2 miles (b) 5 miles (c) 20 miles (d) 200 miles

Refer to the diagram below (as well as your text) for questions 10 and 11.



*10. This rock would have been formed in: _____.
   (a) shallow ocean water (c) a freshwater stream
   (b) deep ocean water (d) a freshwater lake

*11. The rock would be a _____ type of _____ rock.

12. Pressure and temperature are high enough to form _____ rock at a depth between 6 and 18 miles.

*13. Magma is a(n): _____.
   (a) gas (b) liquid (c) solid (d) acrostic

*14. ***Molten*** rock is known as: _____.
   (a) igneous rock (c) metamorphic rock
   (b) magma (d) sedimentary rock

15. When magma cools, it produces: _____.
   (a) humus soil (c) metamorphic rock
   (b) igneous rock (d) sedimentary rock

*16. Decayed plants and animals produce: _____.
   (a) humus (b) oniferious odors (c) shale (d) pH

17. Water is retained in _____ soils.
   (a) clay (b) sandy (c) all (d) sedimentary deposit

18. An acid contains an _____ of hydrogen ions.
   (a) few (b) excess (c) deficit (d) equal amount

*19. Pure water is neutral and therefore gives a ***pH*** reading of: _____.
   (a) 2.3 (b) 7.0 (c) 8.4 (d) 10

*20. Hydrochloric acid is a _____ acid.
   (a) base (b) strong (c) weak (d) neutral

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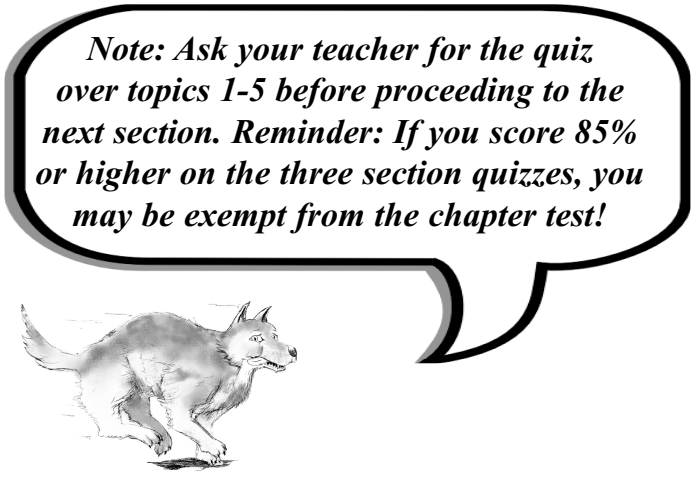
21. A base contains an excess of: _____.
    (a) chalk (b) clay (c) hydrogen ions (d) hydroxide ions

22. Sodium hydroxide is a strong: _____.
    (a) acid (b) medication (c) base (d) concrete ingredient

23. Deserts tend to have soils that are: _____.
    (a) basic (b) acidic (c) rock (d) humus

24. Lime is spread on a field to neutralize _____ soil.

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



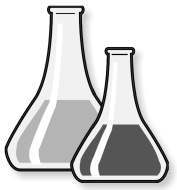
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ACTIVITIES
Lesson 6:
Compounds

Silicon

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. Which element is the most abundant in the Earth's crust? _____.

*2. Which element is the second most abundant in the Earth's crust?_____.

3. The formula for silicon dioxide is _____.

4. The valence of ***silicon*** is _____.

*5. Another name for silicon dioxide is: _____.
(a) beryl (b) opal (c) silica (d) silicate

6. ***Quartz*** is the most common _____ mineral.
(a) silica (b) silicate (c) silver (d) ore

7. The formula for silicon carbide is _____.

8. Silicon carbide is one of the hardest minerals known.
(a) True or (b) False

9. Tanning beds use quartz lamps because quartz: _____
_____.
(a) is transparent to infrared light (c) is transparent to radio waves
(b) produces light without heat (d) is transparent to ultraviolet light

*10. Sand is made of small crystals of: _____.
(a) Carborundum (b) diamond (c) gypsum (d) quartz

11. A silicate contains silicon, oxygen and one or more _____.

12. Glass used in windows and jars is an example of: _____.
(a) fusion (b) fused quartz (c) silicates (d) silicon semiconductors

*13. The three ingredients that go into producing ordinary window glass are _____, limestone and soda ash.

*14. Glass is a crystalline solid with a definite internal structure.
(a) True or (b) False

*15. Glass can be given a blue color by introducing the metal _____ into the mix.

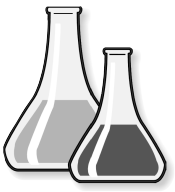
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*16. The modern way to make flat, plate glass is to: _____.
(a) flatten the glass with hot metal rollers (c) float the glass on molten metal
(b) use a hydraulic glass press (d) fold out a large globe of glass

17. Most camera lenses are made of a single glass lens to prevent defects in the image.
(a) True or (b) False

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

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ACTIVITIES
Lesson 7:
Compounds

Silicon Compounds

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. Which of these has a greater number of different compounds? _____
   (a) carbon (b) silicon (c) spun glass (d) oxygen

2. Many ***gemstones*** are silicate compounds of _____,
   _____, and one or more _____.

3. The ***optical properties*** of a stone have to do with: _____.
   (a) its hardness (c) its rarity
   (b) its beauty (d) where it is found

4. One of the properties of a gemstone is that it must be hard.
   (a) True or (b) False

5. A gemstone keeps its value regardless of how rare or abundant it is.
   (a) True or (b) False

*6. Rarity, hardness and beauty alone determine the value of a gem.
   (a) True or (b) False

7. Which of these is hardest? _____
   (a) talc (b) sandstone (c) pumice (d) silicon carbide

8. The formula for ferric oxide is: _____.
   (a) Al_2O_3 (b) CH_3 (c) Fe_2O_3 (d) SiC

*9. Optical rouge is used _____ a gemstone.
   (a) as makeup to improve the appearance of (c) to cut and grind
   (b) to search out the best quality in (d) to polish

10. One problem with fiber optics is that light escapes through the sides of the fibers.
   (a) True or (b) False

11. Fiber optics are very useful in _____ surgery.

*12. The bandwidth capacity increases with _____.

13. The one with the greater frequency is _____ waves.
   (a) sound (b) water (c) light (d) radio

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14. ***Silicones*** are synthetic and not found in nature.
(a) True or (b) False

*15. Chemists build long silicon chains by alternating silicon atoms with _____ atoms.
(a) argon (b) carbon (c) hydrogen (d) oxygen

16. Silicone compounds of short chains produce synthetic: _____.
(a) oil (b) fibers (c) rubber (d) nitrogen

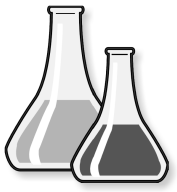
17. Silicone oils become thick as molasses in bitterly cold temperatures.
(a) True or (b) False

*18. Silicone rubber is used in aircraft because it endures _____ temperatures.

*19. Artificial heart valves are made of: _____.
(a) silica (b) silicates (c) aluminum (d) silicones

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

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ACTIVITIES
Lesson 8:
Compounds

Gems

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. Water under pressure can dissolve _____ silica than water at normal pressure.
   (a) more (b) less (c) equal amounts of (d) excess

2. Which of these is more likely to dissolve silica? _____
   (a) cold water (b) hot water (c) tepid water (d) frozen water

3. Geysers are found only in Yellowstone National Park.
   (a) True or (b) False

4. Many precious and ***semiprecious stones*** are formed from _____ silicates.

*5. Opal, agate, onyx and jasper are examples of _____ gems
   (a) precious (b) aluminum oxide (c) beryl (d) silicate

6. _____ is the most valuable silicate gem.

*7. Aluminum ranks _____ in abundance in the Earth's crust.
   (a) first (b) second (c) third (d) last

8. Emery, sapphire and ruby are compounds that contain _____.

9. The most valuable form of aluminum oxide is: _____.
   (a) emerald (b) emery (c) ruby (d) sapphire

10. Emerald and aquamarine are gems based on _____.

11. The most valuable form of beryl is _____.

12. A gem is LEAST likely to be identified by: _____.
   (a) measuring its density (c) testing its ability to polarize light
   (b) measuring its index of refraction (d) using the hardness test

13. All gems have a _____ index of refraction.

14. _____ light contains waves that vibrate in only one plane.

*15. Which gem most nearly matches the chemical, optical and physical characteristics of a real gem? _____
   (a) a synthetic (b) an imitation (c) oxide silicate (d) a ruby

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16. Synthetic diamonds _____ (can/cannot) be made.

*17. A gem without flaws is mostly likely a _____ one.

*18. Mechanical watches and delicate scientific instruments have _____ as their bearings.

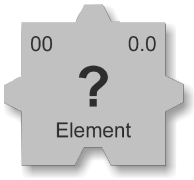
19. Synthetic _____ were used in the first visible light lasers.

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

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Name: _____

Date: _____ Grade: _____



Boron and its Family of Elements

ACTIVITIES
Lesson 9:
Elements

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. Cause: Napoleon believed scientific achievement was important.
   Effect: _____.

2. Joseph Gay-Lussac freed boron from boric acid by _____.

*3. On most Periodic Tables of the Elements, metals are _____ of the zigzag line.
   (a) to the right (b) to the left (c) on both sides (d) close to the side

*4. The chemical symbol of ***boron*** is _____.

*5. The chemical symbol of aluminum is _____.

6. Metals usually have a(n) _____ surface.
   (a) rusty (b) dull (c) shiny (d) amber

7. Metals are usually: _____.
   (a) brittle (b) strong (c) ductile (d) malleable

*8. Metals _____ electrons during chemical reactions.
   (a) accept (b) give up (c) burn (d) neutralize

*9. Metals form: _____.
   (a) bases with hydroxide (c) solutions with oxygen
   (b) acids with hydrogen (d) coagulants

10. Metals _____ heat and electricity.
   (a) radiate (b) readily conduct (c) are insulators of (d) reject

11. Which of these is a metal? _____
   (a) sodium (b) neon (c) chlorine (d) boron

12. Family characteristics are not _____ for elements in the middle of the periodic chart.

13. Boron is a: _____.
   (a) metal (b) nonmetal (c) conglomerate (d) sodium molecule

14. Aluminum is a: _____.
   (a) metal (b) nonmetal (c) synthetic (d) acid

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15. Boron has chemical properties that are more like those of: _____.
(a) oxygen (b) aluminum (c) silicon (d) sodium

*16. Borax can produce both mild _____ and mild _____.

*17. Boric acid can be prepared so it can safely be used as disinfectant eye drops.
(a) True or (b) False

*18. Pyrex is a: _____.
(a) mild acid (c) type of semiconductor
(b) mild base (d) type of borosilicate glass

*19. The symbol for gallium is _____.

20. Gallium was named after: _____.
(a) a word meaning rooster (c) the Roman name for France
(b) Lecoq de Boisbaudran who discovered it (d) all of these

21. The existence of gallium was predicted by _____.

22. Gallium is a _____ from 86ºF to 4,250ºF.

*23. The chemical symbol for ***indium*** is _____.

*24. An indium alloy is used in: _____.
(a) fire sprinkler systems (c) fire hydrants
(b) electronic doors (d) dyes

*25. The chemical symbol for thallium is _____.

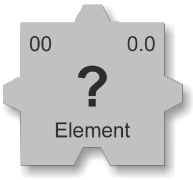
*26. One of the compounds of thallium is used as a: _____.
(a) mild base (b) rat poison (c) fire sprinkler (d) ventilating hood

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

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Name: _____

Date: _____ Grade: _____



Aluminum

ACTIVITIES
Lesson 10:
Elements

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. Aluminum was known more than two thousand years ago.
   (a) True or (b) False

2. Aluminum, like silver, is considered safe when ***ingested***.
   (a) True or (b) False

3. The most abundant metal in the Earth's crust is: _____.
   (a) aluminum (b) gold (c) iron (d) oxygen

4. Separating aluminum from oxygen is relatively easy.
   (a) True or (b) False

5. The chemical formula for aluminum oxide is _____.

*6. A substance with atoms all of the same kind is a(n): _____.
   (a) alloy (b) compound (c) element (d) mixture

7. Humphry Davy and most other chemists believed alumina to be a(n): _____.
   (a) element (b) compound (c) metallic crust (d) mag wheel

*8. Iron is separated from its ore by: _____.
   (a) aluminum (b) carbon (c) oxygen (d) silicon

9. The first person to prepare aluminum, although it was poor grade, was: _____.
   (a) Friedrich Wohler (c) Jons Jacobs Berzelius
   (b) Hans Christian Oersted (d) Napoleon III

10. One of the reasons Friedrich Wohler was given credit for discovering aluminum is because: _____.
   (a) he really did deserve it
   (b) he discovered many of the important properties of aluminum
   (c) he spent his time publicizing his discovery
   (d) he was the friend of powerful politicians

11. The top of the Washington Monument has a cap of: _____.
   (a) aluminum (b) gold (c) iron (d) silver

12. Charles Martin Hall's father encouraged his son's plan to make _____ aluminum.

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13. Charles Martin Hall discovered that aluminum oxide would dissolve in molten _____.

14. Hall and Héroult engaged in a long and costly court battle that left both of them penniless.
(a) True or (b) False

*15. ***Bauxite*** is an _____ ore.

16. _____ is one of the few metals that is malleable.

17. Which of these metals has the greatest density? _____
(a) aluminum (b) pumice (c) iron (d) clay bauxite

18. The color of aluminum oxide is: _____.
(a) aluminum (b) blue (c) green (d) red

*19. When copper and aluminum wires are the same thickness, the one that can better conduct electricity is _____.

*20. The metal that is used in high-voltage, cross-country transmission lines is: _____.
(a) silver (b) aluminum (c) copper (d) iron

*21. The reason aluminum is used to back insulation is because aluminum: _____.
(a) absorbs infrared heat rays (c) reflects infrared heat rays
(b) is cheap (d) repels voltage

*22. About _____ percent of aluminum production comes from recycled aluminum.

*23. Aluminum hydroxide is used as a ***coagulant*** to: _____.
(a) weaken strong acids (c) purify water
(b) enhance the source of ultraviolet light (d) treat burns

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

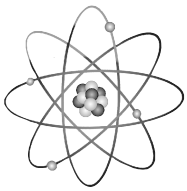
Note: Ask your teacher for the quiz over topics 6-10 before proceeding to the next section. Reminder: If you score 85% or higher on the three section quizzes, you may be exempt from the chapter test!



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Name: _____

Date: _____ Grade: _____



ACTIVITIES
Lesson 11:
Energy

Energy and Chemical Reactions

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. Cold packs chill down to 32ºF because of: _____.
   (a) a chemical reaction (c) a physical change of state
   (b) the photoelectric effect (d) stored thermonic emissions

2. The reaction that frees a metal from its ore is _____.

3. The ***thermite*** reaction uses iron oxide and powdered _____.

4. _____ produces so much heat it can be used to weld steel.

5. Thermite can burn under _____.

6. An ***exothermic*** reaction _____ heat.
   (a) absorbs (b) releases (c) diminishes (d) extinguishes

7. Glow sticks require a match to light them. (a) True or (b) False

8. Glow sticks produce light when ***luminol*** combines with _____ from hydrogen peroxide.

*9. Burning is an example of a(n) _____ reaction.
   (a) acidic (b) endothermic (c) exothermic (d) spontaneous

*10. A test tube containing an exothermic reaction would feel: _____.
   (a) cool (b) wet (c) warm (d) neutral

11. Heat packs generate heat by the rapid: _____.
   (a) oxidation of iron
   (b) reaction of aluminum with iron oxide
   (c) sublimation of carbon dioxide
   (d) burning of wood soaked in alcohol

*12. An _____ reaction is one that absorbs heat.

*13. A test tube containing an endothermic reaction would feel: _____.
   (a) cool (b) warm (c) wet (d) neutral

14. Photosynthesis is an example of an _____ reaction.

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*15. Salt dissolving in water _____ the temperature of the water.
(a) lowers (b) raises (c) stabilizes (d) erases

16. The fuel and oxidizer for the engine of the ascent stage of the Lunar Lander were ignited: _____.
(a) after being heated to 451ºF
(b) by a spark
(c) by intense heat and pressure
(d) when they came in contact with one another

17. The oxidizer for the engine of the Lunar Lander ascent stage was: _____.
(a) aluminum oxide (Al_2O_3)
(b) hydrogen peroxide (H_2O_2)
(c) iron oxide (Fe_2O_3)
(d) nitrogen tetraoxide (NO_4)

18. The energy needed to start a chemical reaction is the _____ energy.

*19. A _____ reaction requires no activation energy.

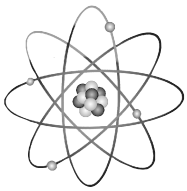
20. Hydrogen mixed with oxygen is an example of a spontaneous reaction.
(a) True or (b) False

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

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Name: _____

Date: _____ Grade: _____



ACTIVITIES
Lesson 12:
Energy

Oxidizers

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. Burning is a type of chemical reaction known as: _____.
(a) oxidation (b) reduction (c) induction (d) refraction

*2. Concentrating the reactants _____ the speed of a reaction.
(a) releases (b) decreases (c) increases (d) stabilizes

3. Fire proceeds at a slower rate because of the presence of _____ in the atmosphere.
(a) nitrogen (b) hydrogen (c) oxygen (d) pressure

4. During the test of the Apollo I Command Module, the astronauts breathed: _____.
(a) carbon dioxide (c) nitrogen and oxygen
(b) helium and oxygen (d) pure oxygen

*5. Concentration of reactants is _____ related to the rate of the reaction.
(a) directly (b) inversely (c) not (d) indirectly

*6. During a chemical reaction, electrons may be: _____.
(a) gained (b) shared (c) lost (d) all of these

*7. Fluorine is very active chemically because of its tendency to _____ an electron.
(a) accept (b) release (c) retard (d) trade

*8. Sodium is very active chemically because of its tendency to _____ an electron.
(a) trade (b) accept (c) release (d) retard

*9. Increasing the surface area _____ the speed of a reaction.
(a) decreases (b) releases (c) increases (d) stabilizes

*10. Increasing the speed at which molecules collide _____ the speed of a reaction.
(a) decreases (b) increases (c) does not effect (d) stabilizes

*11. The hotter the temperature the _____ molecules move.
(a) faster (b) slower (c) higher (d) lower

*12. Pressure has _____ effect on chemical reactions among solids and liquids.

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13. Increasing the pressure has no effect on the speed of a reaction if the volume of the products equals the volume of the reactants.
(a) True or (b) False

14. Pressure affects the rate of a reaction for those reactants where the volume of the reactants is different from the volume of the products.
(a) True or (b) False

15. If the volume decreases in going from reactants to products, then increasing the pressure _____ the reaction.
(a) slows (b) speeds (c) stabilizes (d) neutralizes

*16. The one that speeds a chemical reaction is a(n): _____.
(a) catalyst (b) ***inhibitor*** (c) stabilizer (d) intensifier

17. Organic ***catalysts*** are: _____.
(a) carbohydrates (b) enzymes (c) fats (d) proteins

*18. The five factors that can affect the rate of a reaction are the concentration, _____ _____, temperature, pressure and the presence of a catalyst or inhibitor.

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

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ACTIVITIES
Lesson 13:
Motion

Physical Equilibrium

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. A body is in physical equilibrium if all the forces and torques exceed the mass of the body.
   (a) True or (b) False

*2. For objects with a regular shape and uniform density, the ***center of gravity*** is located: _____.
   (a) at zero point in the ***torques***
   (b) anywhere except within the object
   (c) at the ***geometric center*** of the object
   (d) closer to Earth than to the Sun

3. To keep an object from tipping over, extra weight is added to the: _____.
   (a) bottom (b) top (c) middle (d) center of gravity

*4. The center of _____ of an object can lie outside the object.

5. Although Dick Fosbury introduced his unusual method of high jumping, he never succeeded in winning an Olympic metal.
   (a) True or (b) False

6. Dick Fosbury was able to send his body over the high jump bar but his _____ ____ _____ passed under the bar.

7. To change the position of an object in stable ***equilibrium***, the center of gravity must be: _____.
   (a) moved to the right (c) lowered
   (b) kept at the same height (d) raised

*8. If an object with stable equilibrium is disturbed, it will: _____.
   (a) be easily toppled (c) oscillate about the center point
   (b) remain in its new position (d) return to its original location

9. A ship that recovers after being tipped by a wave has _____ equilibrium.
   (a) neutral (b) no (c) stable (d) unstable

*10. If an object with neutral equilibrium is disturbed, it will: _____.
   (a) be easily toppled (c) oscillate about the center point
   (b) remain in its new position (d) return to its original position

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*11. An example of an object with neutral equilibrium is a(n): _____.
(a) ball rolling across the floor (c) brick on its end
(b) bicycle that comes to a stop (d) tip proof coffee cup

*12. An object with _____ equilibrium is easily toppled.

13. An example of an object with unstable equilibrium is a: _____.
(a) ball rolling across the floor (c) coin on its edge
(b) tip-proof coffee cup (d) coin on its side

14. If forces acting on an object constantly change, but the object remains in equilibrium, then the object has _____ equilibrium.
(a) dynamic (b) neutral (c) stable (d) unstable

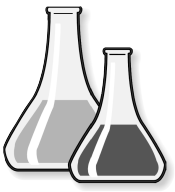
*15. Proving that ***global warming*** is taking place is a _____ task.

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

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Name: _____

Date: _____ Grade: _____



ACTIVITIES
Lesson 14:
Compounds

Chemical Equilibrium

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. Once gravity and air resistance are in equilibrium, a skydiver stops _____.

2. At 32ºF, the amount of water in a mixture of water and ice will: _____.
   (a) decrease (b) increase (c) stay the same (d) evaporate

3. In the conversion of mercury oxide to mercury and oxygen, the mercury oxide is the: _____.
   (a) primate (b) product (c) reactant (d) equilibrium

4. In the expression mercury oxide ← mercury + oxygen the arrow shows that this is a _____ reaction.
   (a) forward (b) unusual (c) reverse (d) stabilizing

5. The chemicals in a rechargeable battery undergo a _____ reaction when the battery is being charged.

*6. At _____, both the forward and reverse chemical reactions proceed at the same rate.

7. The combination of hydrogen and oxygen to form water is an example of a reaction that can go in only one direction.
   (a) True or (b) False

8. Chemical reactions move in the direction to relieve the _____ that acts on them.

*9. ***Reversible reactions*** are exothermic in one direction and _____ in the other direction.
   (a) endothermic (b) neutral (c) oxidative (d) reductive

10. To favor an exothermic reaction the chemist _____ the reactants.
    (a) cools (b) heats (c) stirs (d) stabilizes

*11. To favor the forward reaction, a chemist can increase the concentration of the: _____.
    (a) products (b) reactants (c) oxidizers (d) catalysts

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*12. The three ways to control the direction of a reaction is by varying the _____, _____ and _____.

13. The combination of nitrogen and hydrogen to give ammonia takes place naturally.
(a) True or (b) False

14. In the ***Haber process*** to make ammonia, the endothermic reaction is favored by using a _____ temperature.

15. In the Haber process to make ammonia, the pressure is: _____.
(a) normal at sea level (c) nearly a vacuum
(b) exceptionally high (d) equal

16. In the Haber process to make ammonia, the _____ is removed from the reaction.

17. The iron particles in the Haber process act as a(n): _____.
(a) ballast (b) catalyst (c) equilibrium constant (d) inhibitor

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

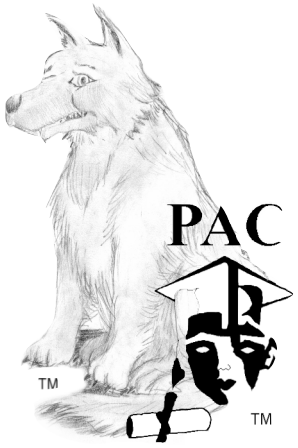
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Just For Fun: First write the name of each element to the far left of its chemical symbol (you may refer to the Periodic Table of the Elements); next, find the humorous description each element matches. Write the humorous element names in the parentheses and the matching letters in the blanks to the right. (One is done for you.)

Names of Elements	Humorous Element Names	Matching Chemical Symbols	Matching Letters
19. _____	(_____)	H	_____
20. _____	(_____)	He	_____
21. _____	(_____)	Ba	_____
22. _____	(_____)	B	_____
23. _____	(_____)	C	_____
24. _____	(_____)	F	_____
25. *silicon*	(silly con)	S	(a)
26. _____	(_____)	Ar	_____
27. _____	(_____)	Ag	_____
28. _____	(_____)	Cu	_____
29. _____	(_____)	Ni	_____

(a) a convict who acts funny
(b) a glue that works on cars
(c) a long-winded speaker who drones on and on (rhymes with "moron")
(d) cotton gin powered by water
(e) five cents
(f) linoleum and carpet, for instance
(g) slang name for policeman
(h) the Lone Ranger's horse
(i) they were here but they left, so they . . .
(j) what a doctor does for sick patients
(k) what an undertaker does with dead bodies

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ACTIVITIES
Lesson 15:
Motion

Is a Career in Chemistry for You?

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. _____ science deals with evidence that may be presented in a court of law.

2. The one who works in a crime lab is a(n): _____.
   (a) environmental chemist (c) geologist
   (b) forensic chemist (d) organic chemist

*3. Organic chemistry is the study of _____ compounds.

4. Each farmer in the United States provides food for: _____.
   (a) 40 people (c) more than a hundred people
   (b) four people (d) only himself

5. United States farmers produce _____ food than the worldwide average.
   (a) better (b) more (c) less (d) the same

*6. A chemist who works to understand diet and digestion is most likely a: _____.
   (a) biochemist (b) geologist (c) metallurgist (d) nuclear chemist

7. ***Metabolism*** is a method of removing metals from their ores.
   (a) True or (b) False

8. Organic compounds include hydrocarbons such as coal and _____.

*9. An example of ***inorganic chemistry*** is finding uses for: _____.
   (a) coal (b) enzymes (c) proteins (d) rocks and minerals

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(Review Activity) Using the chart below, label each item of numbers 10-20 below according to the type of Chemistry involved, Organic or Inorganic.

Contains carbon	Does not contain carbon
all living things	Rocks
Things made from living things	Minerals
Petroleum	Gems
Synthetic fibers	Volcanoes
Pesticides	Earthquakes
Drugs	Landslides
Cosmetics	Iron
Plastics	Silver
Tennis shoes	Gold

10. gasoline _____
11. hamburger _____
12. diamonds _____
13. milk _____
14. lava _____
15. wedding ring _____
16. iron ore _____
17. human cells _____
18. bowl of cereal _____
19. antracite coal _____
20. seismic waves _____

*21. Carbon-14 dating would probably be used by: _____.
(a) chemists studying rocks
(b) chemists studying volcanoes
(c) chemist studying artifact
(d) chemist studying metallic ores

*22. Most chemists believe students who want to be chemists should: _____.
(a) focus on chemistry alone
(b) eat brain food
(c) pursue a broad education
(d) major in mathematics

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*23. All signs point toward a steady _____ in the need for chemists over the next ten years.

24. It is important for a chemist to _____ chemistry.

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

Note: Ask your teacher for the quiz over topics 11-15 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!



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