LIFEPAC®

SCIENCE

Placement Test

700 – 1200

AOP

Science 700 – 1200

Placement Tests

CONTENTS

AOP

804 N. 2nd Ave. E., Rock Rapids, IA 51246-1759

PLACEMENT TEST for the LIFEPAC CURRICULUM

Science 700 – 1200

Instructions

This test is designed to aid the teacher or parent in proper placement of the student into the LIFEPAC curriculum. It has two sections: the Student Test and the Answer Key.

This is not a timed test and the student should be given an opportunity to answer each question adequately. If the student becomes bogged down and the test seems too difficult, skip to the next section. If the test is still too difficult, this child's academic skill level has been reached and testing may stop. Each test level should take no longer than one hour.

Testing should begin approximately two grade levels below the student's current or just completed grade level. For example, a student entering tenth grade [1000] should begin testing at the eighth grade [800] level. This allows for proper grade level placement as well as identification of any learning gaps that the student may have.

Once the test has been administered, it is ready to be scored. The teacher or parent does all of the scoring. **Each section has 10 numbered questions. Each numbered question equals one point.** Use the Answer Key to mark all incorrect answers on the Student Test. Next, record the total number of **correct** answers in the box beneath the LIFEPAC number in the right hand column. **When all tests have been graded, transfer the number correct by LIFEPAC to the Student Placement Worksheet on the back page of the Answer Keys.** Then add the total number of points per grade level.

Test	Level	Test	Level
701 - 710	7	1001 - 1010	10
801 - 810	8	1101 - 1110	11
901 - 910	9	1201 - 1210	12

701

1. The standard metric unit of volume is the _____.
   a. liter
   b. cubic centimeter
   c. cubic meter
   d. milliliter

1a. ☐
b. ☐
c. ☐
d. ☐

2. The standard metric unit of mass is the _____.
   a. pound
   b. gram
   c. ton
   d. kilogram

2a. ☐
b. ☐
c. ☐
d. ☐

3. Objects are usually grouped together because they are _____.
   a. small
   b. large
   c. similar
   d. different

3a. ☐
b. ☐
c. ☐
d. ☐

4. In terms of internal structure, a cat is most like _____.
   a. a worm
   b. a jellyfish
   c. an insect
   d. a bird

4a. ☐
b. ☐
c. ☐
d. ☐

5. A scientific law is _____.
   a. a deductive statement
   b. an observation
   c. a hypothesis
   d. unbiblical

5a. ☐
b. ☐
c. ☐
d. ☐

6. Deductive reasoning begins with _____.
   a. an observation
   b. an experiment
   c. a generalization
   d. research

6a. ☐
b. ☐
c. ☐
d. ☐

7. The first step in applying the scientific method to solving a problem is _____.
   a. identifying the problem
   b. forming a hypothesis
   c. conducting an experiment
   d. drawing a conclusion

7a. ☐
b. ☐
c. ☐
d. ☐

8. A guess that must either be proved or be disproved is _____.
   a. a law
   b. an observation
   c. a conclusion
   d. a hypothesis

8a. ☐
b. ☐
c. ☐
d. ☐

9. Biological science deals with _____.
   a. rocks and minerals
   b. mathematics
   c. plants and animals
   d. money and laws

9a. ☐
b. ☐
c. ☐
d. ☐

10. The sciences that deal with customs, laws, religion, and behavior are _____.
    a. mathematics and logic
    b. the social sciences
    c. the physical sciences
    d. the biological sciences

10a. ☐
b. ☐
c. ☐
d. ☐

☐

702

1. The metric system began in _____.
   a. Germany
   b. the United States
   c. France
   d. Great Britain

1a. ☐
b. ☐
c. ☐
d. ☐

2. The United States began a formal shift toward use of the metric system under President _____.
   a. Jackson
   b. Lincoln
   c. Wilson
   d. Ford

2a. ☐
b. ☐
c. ☐
d. ☐

3. Divisions of the metric system are based on the number _____.
   a. twelve
   b. two
   c. ten
   d. three

3a. ☐
b. ☐
c. ☐
d. ☐

4. The dimension of length has _____ basic metric units.
   a. one
   b. three
   c. two
   d. four

4a. ☐
b. ☐
c. ☐
d. ☐

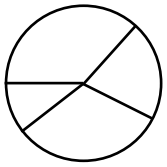
5. Mass is a measure of _____.
   a. density
   b. volume
   c. matter
   d. weight

5a. ☐
b. ☐
c. ☐
d. ☐

6. The response of an object to a gravitational force field is its _____.
   a. mass
   b. weight
   c. density
   d. volume

6a. ☐
b. ☐
c. ☐
d. ☐

7. This type of graph is a _____ graph.
   a. line
   b. circle
   c. bar
   d. picto-



7a. ☐
b. ☐
c. ☐
d. ☐

8. This type of graph is a _____ graph.
   a. line
   b. circle
   c. bar
   d. picto-

8a. ☐
b. ☐
c. ☐
d. ☐

9. A pictograph is most similar to a _____ graph.
   a. variable
   b. circle
   c. pie
   d. bar

9a. ☐
b. ☐
c. ☐
d. ☐

10. To relate parts of a quantity to the whole quantity, a _____ graph is best.
   a. line
   b. circle
   c. bar
   d. picto-

10a. ☐
b. ☐
c. ☐
d. ☐

703

1. The motions of the Sun, Moon, and stars give the appearance that the center of the universe is the _____.
   a. Earth
   b. Sun
   c. North Star
   d. Moon

1a. ☐
b. ☐
c. ☐
d. ☐

2. Copernicus, Kepler, and Galileo promoted an explanation of planetary motion called the _____ theory.
   a. geocentric
   b. heliocentric
   c. concentric
   d. eccentric

2a. ☐
b. ☐
c. ☐
d. ☐

3. Five lights in the night sky that sometimes do not follow the normal paths of stars are _____.
   a. meteors
   b. planets
   c. comets
   d. satellites

3a. ☐
b. ☐
c. ☐
d. ☐

4. Something that could not happen if the Sun and Moon were on the same celestial sphere is _____.
   a. comets
   b. eclipses
   c. sunsets
   d. tides

4a. ☐
b. ☐
c. ☐
d. ☐

5. The astronomer who modified Aristotle's geocentric theory with epicycles was _____.
   a. Aristarchus
   b. Ptolemy
   c. Copernicus
   d. Galileo

5a. ☐
b. ☐
c. ☐
d. ☐

6. The astronomer whose observations with the unaided eye were used by other astronomers to predict the shape of orbits was _____.
   a. Kepler
   b. Brahe
   c. Newton
   d. Copernicus

6a. ☐
b. ☐
c. ☐
d. ☐

7. The time taken for a planet to revolve around the Sun is known as the _____.
   a. month
   b. period of revolution
   c. orbital equation
   d. speed of the planet

7a. ☐
b. ☐
c. ☐
d. ☐

8. The Sun occupies a point within the planetary orbits called the _____.
   a. center
   b. focal point
   c. equinox
   d. directrix

8a. ☐
b. ☐
c. ☐
d. ☐

9. Gravitational attraction exists _____.
   a. only between objects in our solar system
   b. only between the Earth and the Moon
   c. only between objects on the Earth
   d. between all objects everywhere

9a. ☐
b. ☐
c. ☐
d. ☐

10. As the distance between objects increases, gravitational attraction _____.
    a. increases
    b. decreases
    c. remains constant
    d. is unaffected

10a. ☐
b. ☐
c. ☐
d. ☐

704

1. Most of the energy used on the Earth comes directly or indirectly from the _____.
   a. center of the Earth
   b. decay of radioactive elements in the mantle
   c. fusion reactions on the Sun
   d. combustion of coal

1a. ☐
b. ☐
c. ☐
d. ☐

2. Solar energy is stored as chemical energy in the form of _____.
   a. uranium
   b. salt
   c. petroleum
   d. hydrogen

2a. ☐
b. ☐
c. ☐
d. ☐

3. The element that serves as fuel for solar energy is _____.
   a. uranium
   b. hydrogen
   c. petroleum
   d. helium

3a. ☐
b. ☐
c. ☐
d. ☐

4. The scientist who explained mathematically the conversion of mass to energy was _____.
   a. Newton
   b. Bohr
   c. Einstein
   d. Planck

4a. ☐
b. ☐
c. ☐
d. ☐

5. The word that best describes an eclipse is _____.
   a. surface
   b. shadow
   c. ring
   d. light

5a. ☐
b. ☐
c. ☐
d. ☐

6. *Umbra* refers to _____.
   a. the darkest part of the eclipse
   b. partial eclipse
   c. the brilliant ring around the Sun
   d. the new moon

6a. ☐
b. ☐
c. ☐
d. ☐

7. The largest planet is _____.
   a. Mercury
   b. Jupiter
   c. Earth
   d. Mars

7a. ☐
b. ☐
c. ☐
d. ☐

8. Jupiter most closely resembles _____.
   a. the Sun
   b. the Moon
   c. the Earth
   d. Mars

8a. ☐
b. ☐
c. ☐
d. ☐

9. The high high tides and low low tides are called _____ tides.
   a. flood
   b. ebb
   c. spring
   d. neap

9a. ☐
b. ☐
c. ☐
d. ☐

10. A seacoast town experiences _____ high tide(s) every twenty-four hours.
   a. one
   b. two
   c. four
   d. eight

10a. ☐
b. ☐
c. ☐
d. ☐

☐

705

1. The two most abundant atmospheric gases make up _____ of the atmosphere.
   a. one-half
   b. three-quarters
   c. nine-tenths
   d. well over nine-tenths

1a. ☐ b. ☐ c. ☐ d. ☐

2. The most abundant gas is _____.
   a. oxygen
   b. carbon dioxide
   c. nitrogen
   d. hydrogen

2a. ☐ b. ☐ c. ☐ d. ☐

3. The lowest layer of the atmosphere is the _____.
   a. troposphere
   b. ozonosphere
   c. stratosphere
   d. ionosphere

3a. ☐ b. ☐ c. ☐ d. ☐

4. The part of the atmosphere in which radiation from space produces charged particles is the _____.
   a. troposphere
   b. ozonosphere
   c. stratosphere
   d. ionosphere

4a. ☐ b. ☐ c. ☐ d. ☐

5. Seawater and certain sedimentary rocks are two reservoirs in the _____ cycle.
   a. carbon
   b. nitrogen
   c. hydrogen
   d. water

5a. ☐ b. ☐ c. ☐ d. ☐

6. The cycle whose energy is provided by the Sun during evaporation is the _____ cycle.
   a. carbon
   b. nitrogen
   c. oxygen
   d. water

6a. ☐ b. ☐ c. ☐ d. ☐

7. Sulfur oxide pollutants are formed by using _____ as a fuel.
   a. coal
   b. natural gas
   c. uranium
   d. geothermal steam

7a. ☐ b. ☐ c. ☐ d. ☐

8. Lead in the atmosphere interferes with the body's ability to produce _____.
   a. carbon dioxide
   b. blood
   c. oxygen
   d. calcium

8a. ☐ b. ☐ c. ☐ d. ☐

9. Our role as steward implies that we _____ our natural resources.
   a. consume
   b. sell abroad
   c. use wisely
   d. recycle

9a. ☐ b. ☐ c. ☐ d. ☐

10. A reasonable goal for an industrialized nation is _____.
    a. to reduce pollution to zero
    b. to reduce pollution by 50 percent
    c. to accept the minimum pollution necessary to maintain a desirable life style
    d. to accept the present level of pollution

10a. ☐ b. ☐ c. ☐ d. ☐

☐

706

1. The greatest effect on weather is exerted by _____.
   a. wind
   b. temperature
   c. air pressure
   d. moisture

1a. ☐
b. ☐
c. ☐
d. ☐

2. The temperature of an air mass directly affects the _____ the air mass.
   a. winds around
   b. air pressure beneath
   c. moisture within
   d. precipitation from

2a. ☐
b. ☐
c. ☐
d. ☐

3. Air pressure increases when _____.
   a. the temperature of the air mass decreases
   b. the temperature rises and the humidity remains constant
   c. the temperature rises and the humidity increases
   d. the temperature rises and the humidity decreases

3a. ☐
b. ☐
c. ☐
d. ☐

4. The wind pattern around a low-pressure region is called _____.
   a. a cyclone
   b. an anticyclone
   c. an aneroid
   d. a downdraft

4a. ☐
b. ☐
c. ☐
d. ☐

5. The air mass that typically forms over northern Canada is _____.
   a. maritime polar
   b. maritime tropical
   c. continental polar
   d. continental tropical

5a. ☐
b. ☐
c. ☐
d. ☐

6. Tall, fluffy clouds are called _____.
   a. cirrus
   b. stratus
   c. nimbo-stratus
   d. cumulus

6a. ☐
b. ☐
c. ☐
d. ☐

7. The boundary between two air masses is _____.
   a. a storm
   b. an isobar
   c. a weather front
   d. a downdraft

7a. ☐
b. ☐
c. ☐
d. ☐

8. A drop in temperature is usually forecasted by the arrival of _____ front.
   a. a warm
   b. a cold
   c. an occluded
   d. a stationary

8a. ☐
b. ☐
c. ☐
d. ☐

9. A small, local storm that forms from rapidly rising warm air is _____.
   a. a thunderstorm
   b. a tornado
   c. a hurricane
   d. a typhoon

9a. ☐
b. ☐
c. ☐
d. ☐

10. The eye of a hurricane is characterized by _____.
    a. heavy rain and winds greater than 80 kph
    b. little rain and high winds
    c. heavy rain and light winds
    d. little rain and winds under 5 kph

10a. ☐
b. ☐
c. ☐
d. ☐

707

1. The weather that characterizes an area is the _____ of that area.
   a. geography
   b. barometric pressure
   c. climate
   d. latitude

1a. ☐
b. ☐
c. ☐
d. ☐

2. A statement that might be part of a region's weather report is _____.
   a. a yearly rainfall of 50 cm
   b. a daily high of 35° C
   c. an average seasonal temperature of 25° C
   d. the Sunshine State

2a. ☐
b. ☐
c. ☐
d. ☐

3. Primary control of a region's temperature results from _____.
   a. radioactive decay
   b. solar radiation
   c. volcanic activity
   d. geothermal heat

3a. ☐
b. ☐
c. ☐
d. ☐

4. The coolest climates occur at _____.
   a. high altitude and high latitude
   b. low altitude and low latitude
   c. high altitude and low latitude
   d. low altitude and high latitude

4a. ☐
b. ☐
c. ☐
d. ☐

5. Climate that has characteristics derived from being near water is called _____.
   a. mesothermal
   b. tropical
   c. maritime
   d. polar

5a. ☐
b. ☐
c. ☐
d. ☐

6. The term *desert* is commonly a synonym for _____.
   a. polar
   b. tropical
   c. maritime
   d. arid

6a. ☐
b. ☐
c. ☐
d. ☐

7. Communities within the Arctic Circle do not regulate their lives by _____.
   a. the Sun
   b. laws
   c. tradition
   d. a clock

7a. ☐
b. ☐
c. ☐
d. ☐

8. Rainforests provide adequate hunting and gathering for _____.
   a. African foragers
   b. Bedouins
   c. Eskimos
   d. the Inuit

8a. ☐
b. ☐
c. ☐
d. ☐

9. The continent whose entire interior is a desert is _____.
   a. North America
   b. Australia
   c. Europe
   d. South America

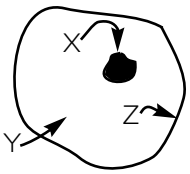
9a. ☐
b. ☐
c. ☐
d. ☐

10. Tropical rainforests make up the interior of _____.
    a. Australia
    b. North America
    c. Antarctica
    d. South America

10a. ☐
b. ☐
c. ☐
d. ☐

☐

1-3 Answer these three questions by referring to the illustration. **708**



1. *X* labels the part of the cell which is the _____. 1a. ☐
   a. membrane b. ☐
   b. nucleus c. ☐
   c. Golgi d. ☐
   d. cytoplasm
2. *Y* labels the part of the cell which is the _____. 2a. ☐
   a. membrane b. ☐
   b. granules c. ☐
   c. cytoplasm d. ☐
   d. corpuscle
3. *Z* labels the part of the cell which is the _____. 3a. ☐
   a. membrane b. ☐
   b. nucleus c. ☐
   c. cytoplasm d. ☐
   d. corpuscle
4. Parts of the body, such as the nose, trachea, and lungs, that work together are collectively called _____. 4a. ☐
   a. tissues b. ☐
   b. organs c. ☐
   c. systems d. ☐
   d. organisms
5. The heart, kidney, liver, and other bodily parts that each carry out one or more jobs are individually called _____. 5a. ☐
   a. a tissue b. ☐
   b. an organ c. ☐
   c. a system d. ☐
   d. an organism
6. The flexible support tissue that gives shape to, among other things, the tip of the nose and the ears is _____. 6a. ☐
   a. cartilage b. ☐
   b. ossicle c. ☐
   c. cilia d. ☐
   d. osteum
7. Stomach and intestinal movement are controlled by _____. 7a. ☐
   a. voluntary muscles b. ☐
   b. cardiac muscles c. ☐
   c. involuntary muscles d. ☐
   d. striped muscles
8. The gap between nerve cells is called _____. 8a. ☐
   a. a synapse b. ☐
   b. an axon c. ☐
   c. a neutron d. ☐
   d. a dendrite
9. The part of the brain that controls coordination and voluntary movements is the _____. 9a. ☐
   a. medulla b. ☐
   b. cerebellum c. ☐
   c. cerebrum d. ☐
   d. spinal cord
10. The central nervous system is made up of the _____. 10a. ☐
    a. cerebellum, eyes, and ears b. ☐
    b. cerebellum, speech center, and eyes c. ☐
    c. cerebrum, eyes, and ears d. ☐
    d. cerebrum, cerebellum, and spinal cord

709

1. The circulatory system is made up of the _____.
   a. heart, lungs, kidneys, and liver
   b. heart, veins, capillaries, and arteries
   c. lungs, kidneys, liver, and thyroid
   d. mouth, stomach, small intestine, and large intestine

1a. ☐ b. ☐ c. ☐ d. ☐

2. Blood that arrives at the heart goes first to the _____.
   a. lungs
   b. brain
   c. abdomen
   d. kidneys

2a. ☐ b. ☐ c. ☐ d. ☐

3. White blood cells are designed to _____.
   a. transport oxygen
   b. carry nutrients
   c. fight infection
   d. prevent hemorrhages

3a. ☐ b. ☐ c. ☐ d. ☐

4. The purpose of blood platelets is to _____.
   a. stop bleeding
   b. carry oxygen
   c. prevent infection
   d. produce antibodies

4a. ☐ b. ☐ c. ☐ d. ☐

5. Digestion of protein begins in the _____.
   a. mouth
   b. stomach
   c. small intestine
   d. large intestine

5a. ☐ b. ☐ c. ☐ d. ☐

6. In the mouth digestion of _____ begins.
   a. protein
   b. starch
   c. fat
   d. sugar

6a. ☐ b. ☐ c. ☐ d. ☐

7. The function of the kidneys is similar to the function of _____.
   a. a carburetor
   b. a brake cylinder
   c. an oil filter
   d. a windshield wiper

7a. ☐ b. ☐ c. ☐ d. ☐

8. The bladder is connected directly to the _____.
   a. heart
   b. stomach
   c. large intestine
   d. kidneys

8a. ☐ b. ☐ c. ☐ d. ☐

9. The master control gland for the body is the _____ gland.
   a. pituitary
   b. pancreas
   c. thymus
   d. adrenal

9a. ☐ b. ☐ c. ☐ d. ☐

10. Physical or emotional stress produces a response in the _____ gland.
    a. pituitary
    b. pancreas
    c. adrenal
    d. thymus

10a. ☐ b. ☐ c. ☐ d. ☐

☐

710

1. Information gained during an experiment is called _____.
   a. data
   b. conclusions
   c. hypothesis
   d. laws

1a. ☐
b. ☐
c. ☐
d. ☐

2. The prefix *kilo-* means _____.
   a. one-thousandth
   b. one-hundredth
   c. one thousand
   d. one million

2a. ☐
b. ☐
c. ☐
d. ☐

3. The word *geocentric* means _____.
   a. astronomical
   b. Sun-centered
   c. solar
   d. Earth-centered

3a. ☐
b. ☐
c. ☐
d. ☐

4. The scientist whose name is given to the law of gravitation is _____.
   a. Kepler
   b. Aristotle
   c. Newton
   d. Copernicus

4a. ☐
b. ☐
c. ☐
d. ☐

5. The type of reaction that generates the Sun's energy is _____.
   a. fusion
   b. fission
   c. chemical
   d. oxidation

5a. ☐
b. ☐
c. ☐
d. ☐

6. The gas comprising about 21 percent of our atmosphere is _____.
   a. oxygen
   b. carbon dioxide
   c. nitrogen
   d. hydrogen

6a. ☐
b. ☐
c. ☐
d. ☐

7. A narrow, funnel-shaped cloud of rapidly rotating winds around a low-pressure center is _____.
   a. a thunderstorm
   b. a tornado
   c. a hurricane
   d. a typhoon

7a. ☐
b. ☐
c. ☐
d. ☐

8. Air pressure at high elevations is less than at sea level because _____.
   a. warm air is lighter than cold air
   b. winds blow up mountain slopes
   c. less air overlies high elevations
   d. temperatures are cooler at high elevations

8a. ☐
b. ☐
c. ☐
d. ☐

9. The outer skin layer is the _____.
   a. hairline
   b. dermis
   c. epidermis
   d. fatty layer

9a. ☐
b. ☐
c. ☐
d. ☐

10. Metabolism and growth rate are controlled by the _____ gland.
    a. pancreas
    b. thyroid
    c. thymus
    d. adrenal

10a. ☐
b. ☐
c. ☐
d. ☐

☐

801

1. *Science* is best defined as _____.
   a. an orderly arrangement of knowledge
   b. an accumulation of information
   c. the study of physics, chemistry, and geology
   d. incorrect and unscriptural assumptions

1a. ☐ b. ☐ c. ☐ d. ☐

2. A complete and correct statement is that technology _____.
   a. is the cause of the world's pollution problems
   b. draws people away from the good things in life
   c. is amoral; that is, neither good nor bad
   d. will solve the world's basic problems

2a. ☐ b. ☐ c. ☐ d. ☐

3. Most Greek philosophers were not true scientists because they _____.
   a. could not read
   b. did not experiment
   c. were concerned more with art and literature than with things of nature
   d. were not government funded

3a. ☐ b. ☐ c. ☐ d. ☐

4. The birth of technology occurred with the _____.
   a. Industrial Revolution
   b. Renaissance
   c. invention of the wheel
   d. atomic age

4a. ☐ b. ☐ c. ☐ d. ☐

5. The number 93 million, in scientific notation, is _____.
   a. 93,000,000
   b. 93 million
   c. 93×10^{6}
   d. 9.3×10^{7}

5a. ☐ b. ☐ c. ☐ d. ☐

6. A correct scientific notation is _____.
   a. 431×10^{-3}
   b. 7×10^{8}
   c. 16×10^{5}
   d. 0.05×10^{-8}

6a. ☐ b. ☐ c. ☐ d. ☐

7. The metric unit of mass is the _____.
   a. kilogram
   b. meter
   c. pound
   d. liter

7a. ☐ b. ☐ c. ☐ d. ☐

8. A measure of volume is _____.
   a. meter
   b. liter
   c. second
   d. gram

8a. ☐ b. ☐ c. ☐ d. ☐

9. A scientist is most likely to find out if his guess is correct by _____.
   a. performing experiments
   b. asking a graduate student
   c. thinking about the question
   d. using a computer

9a. ☐ b. ☐ c. ☐ d. ☐

10. The announced or published result of interpreting the data collected in an investigation is _____.
    a. a law
    b. a theory
    c. a problem
    d. an experiment

10a. ☐ b. ☐ c. ☐ d. ☐

☐

802

1. All matter in the universe has _____.
   a. magnetism
   b. momentum
   c. mass
   d. motion

1a. ☐
b. ☐
c. ☐
d. ☐

2. Matter on Earth exists in at least one of _____ states.
   a. two
   b. three
   c. twelve
   d. twenty

2a. ☐
b. ☐
c. ☐
d. ☐

3. Generally, molecules of a solid are more _____ than are molecules of other states.
   a. spread out
   b. close together
   c. highly active
   d. free to move

3a. ☐
b. ☐
c. ☐
d. ☐

4. The gaseous state of a substance (for example, water) differs from the solid state in that the gaseous state has _____.
   a. a definite volume
   b. high speed molecules
   c. less energy
   d. a definite shape

4a. ☐
b. ☐
c. ☐
d. ☐

5. The nuclei of most atoms are made of _____.
   a. protons and electrons
   b. electrons and nucleons
   c. neutrons and protons
   d. neutrons and electrons

5a. ☐
b. ☐
c. ☐
d. ☐

6. Of the following choices the compound is _____.
   a. H_2O
   b. H_2
   c. saltwater
   d. Ne

6a. ☐
b. ☐
c. ☐
d. ☐

7. An example of a mixture is _____.
   a. hot water
   b. salt water
   c. sodium hydroxide
   d. hydrogen

7a. ☐
b. ☐
c. ☐
d. ☐

Answer Items 8 through 10 by referring to the entry for potassium.

2 8 8 1	19 K 39

8. The number of protons in an atom of potassium is _____.
   a. 2
   b. 19
   c. 20
   d. 39

8a. ☐
b. ☐
c. ☐
d. ☐

9. The number of protons in an atom is called the _____.
   a. mass number
   b. atomic mass
   c. valence
   d. atomic number

9a. ☐
b. ☐
c. ☐
d. ☐

10. The number of particles in the nucleus of a potassium atom is _____.
   a. 2
   b. 19
   c. 20
   d. 39

10a. ☐
b. ☐
c. ☐
d. ☐

803

1. Common table salt (NaCl) is composed of sodium, a highly reactive metal, and chlorine, a poisonous gas. The harmless product is a result of a _____ reaction.
   a. nuclear
   b. chemical
   c. physical
   d. phase

1a. ☐
b. ☐
c. ☐
d. ☐

2. An extremely small amount of matter is converted to energy in a _____ reaction.
   a. nuclear
   b. chemical
   c. physical
   d. phase

2a. ☐
b. ☐
c. ☐
d. ☐

3. The fuel for a fusion reaction is _____.
   a. hydrogen
   b. helium
   c. radium
   d. uranium

3a. ☐
b. ☐
c. ☐
d. ☐

4. A common fuel for fission reactions is _____.
   a. hydrogen
   b. helium
   c. lead
   d. uranium

4a. ☐
b. ☐
c. ☐
d. ☐

5. Beta radiation consists of _____ emitted from an atomic nucleus.
   a. protons
   b. neutrons
   c. electrons
   d. mesons

5a. ☐
b. ☐
c. ☐
d. ☐

6. Gamma radiation is most similar to _____.
   a. alpha radiation
   b. sound
   c. light
   d. electrons

6a. ☐
b. ☐
c. ☐
d. ☐

7. Of the following choices the acid is _____.
   a. NaOH
   b. KCl
   c. HNO_3
   d. $NaHCO_3$

7a. ☐
b. ☐
c. ☐
d. ☐

8. An identifying characteristic of an acid in solution is _____.
   a. H^+
   b. OH^-
   c. K^+
   d. $O^=$

8a. ☐
b. ☐
c. ☐
d. ☐

9. All bases contain _____.
   a. oxygen and sodium
   b. helium and potassium
   c. oxygen and hydrogen
   d. hydrogen and potassium

9a. ☐
b. ☐
c. ☐
d. ☐

10. Of the following choices the base is _____.
   a. $NaHCO_3$
   b. HNO_3
   c. NaOH
   d. KCl

10a. ☐
b. ☐
c. ☐
d. ☐

☐

804

1. Starches and sugars are both classified as _____.
   a. proteins
   b. fats
   c. carbohydrates
   d. vitamins

1a. ☐
b. ☐
c. ☐
d. ☐

2. The nutrient class that is neither animal nor vegetable is _____.
   a. proteins
   b. fats
   c. minerals
   d. carbohydrates

2a. ☐
b. ☐
c. ☐
d. ☐

3. The nutrient that transports vitamins A, D, and E and that is a slow-energy source is _____.
   a. proteins
   b. minerals
   c. fats
   d. carbohydrates

3a. ☐
b. ☐
c. ☐
d. ☐

4. Complex organic substances necessary in small amounts for normal growth and health are _____.
   a. minerals
   b. vitamins
   c. carbohydrates
   d. fats

4a. ☐
b. ☐
c. ☐
d. ☐

5. Cheese and butter belong to the _____ food group.
   a. vegetable and fruit
   b. bread and cereal
   c. milk
   d. meat

5a. ☐
b. ☐
c. ☐
d. ☐

6. The bread and cereal food group includes _____.
   a. macaroni, rice, and spaghetti
   b. spaghetti, peas, and peanut butter
   c. cheese, rice, and bread
   d. beans, fish, and rice

6a. ☐
b. ☐
c. ☐
d. ☐

7. Fats begin digestion in the _____.
   a. mouth
   b. stomach
   c. small intestine
   d. large intestine

7a. ☐
b. ☐
c. ☐
d. ☐

8. Proteins begin digestion in the _____.
   a. mouth
   b. stomach
   c. small intestine
   d. large intestine

8a. ☐
b. ☐
c. ☐
d. ☐

9. Exposure to sunshine is necessary for the body to produce _____.
   a. Vitamin A
   b. Vitamin B
   c. Vitamin C
   d. Vitamin D

9a. ☐
b. ☐
c. ☐
d. ☐

10. Vitamin C-deficiency symptoms, such as excessive bleeding and bruising, may be relieved by adding _____ to the diet.
    a. whole-grain cereals
    b. lean meats
    c. oranges and tomatoes
    d. milk and cheese

10a. ☐
b. ☐
c. ☐
d. ☐

☐

805

1. *Any push or pull* is the definition of _____.
   a. force
   b. mass
   c. energy
   d. work

1a. ☐
b. ☐
c. ☐
d. ☐

2. Every object in the universe is always _____.
   a. at rest
   b. doing work
   c. exerting force
   d. curving

2a. ☐
b. ☐
c. ☐
d. ☐

3. An example of an object with potential energy is _____.
   a. an airplane at 35,000 feet
   b. a car traveling 80 km/hr
   c. an engine on a siding
   d. a pendulum at the bottom of its swing

3a. ☐
b. ☐
c. ☐
d. ☐

4. The total energy an object possesses equals _____.
   a. kinetic energy minus potential energy
   b. potential energy minus kinetic energy
   c. one-half kinetic energy plus potential energy
   d. kinetic energy plus potential energy

4a. ☐
b. ☐
c. ☐
d. ☐

5. The handle of a spoon in a soup bowl feels hot because of _____.
   a. conduction
   b. convection
   c. radiation
   d. both a and c

5a. ☐
b. ☐
c. ☐
d. ☐

6. Heat is distributed throughout the water in a teakettle because of _____.
   a. conduction
   b. convection
   c. radiation
   d. none of these

6a. ☐
b. ☐
c. ☐
d. ☐

7. Ten percent of the energy needed for the United States is supplied by the energy of falling water converted to _____ energy.
   a. electrical
   b. chemical
   c. atomic
   d. geothermal

7a. ☐
b. ☐
c. ☐
d. ☐

8. The most frequent energy conversion is that of mechanical energy to _____.
   a. chemical energy
   b. radiant energy
   c. heat energy
   d. electrical energy

8a. ☐
b. ☐
c. ☐
d. ☐

9. The disorder of creation in general is _____.
   a. increasing
   b. decreasing
   c. remaining constant
   d. increasing and decreasing

9a. ☐
b. ☐
c. ☐
d. ☐

10. The Second Law of Thermodynamics states that the amount of available energy in the universe is _____.
    a. decreasing
    b. increasing
    c. constant
    d. radiant

10a. ☐
b. ☐
c. ☐
d. ☐

☐

806

1. A magnet has _____ pole(s).
   a. one
   b. two
   c. three
   d. four

1a. ☐
b. ☐
c. ☐
d. ☐

2. A substance commonly used to show a magnet's lines of force is _____.
   a. sawdust
   b. iron filings
   c. water
   d. salt

2a. ☐
b. ☐
c. ☐
d. ☐

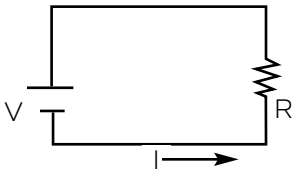
3. Electrical charges are different from magnetic poles in that _____.
   a. unlikes attract
   b. likes repel
   c. charged objects attract all uncharged objects
   d. magnetic poles attract all nonmagnetic objects

3a. ☐
b. ☐
c. ☐
d. ☐

4. The statement that is *not* a law of electrostatics is _____.
   a. objects with unlike charges attract each other
   b. objects with like charges repel each other
   c. charged objects repel neutral objects
   d. charged objects attract neutral objects

4a. ☐
b. ☐
c. ☐
d. ☐

5. An electric circuit that has only one path is a _____ circuit.
   a. complex
   b. series
   c. perpendicular
   d. parallel



5a. ☐
b. ☐
c. ☐
d. ☐

6. If in Item 5 *V* equals 6 volts and *R* equals 2 ohms, the current, *I*, is _____ amperes.
   a. 4
   b. 12
   c. 3
   d. 8

6a. ☐
b. ☐
c. ☐
d. ☐

7. The first battery of silver and zinc was constructed by _____.
   a. Fred E. Eveready
   b. Al Volta
   c. Ray O'Vac
   d. Thomas Edison

7a. ☐
b. ☐
c. ☐
d. ☐

8. The first working light bulb was developed in the laboratory of _____.
   a. Franklin
   b. Coulomb
   c. Edison
   d. Morse

8a. ☐
b. ☐
c. ☐
d. ☐

9. The most abundant fuel in the United States is _____.
   a. petroleum
   b. coal
   c. natural gas
   d. uranium

9a. ☐
b. ☐
c. ☐
d. ☐

10. Solar power does not produce a high percentage of our electricity needs because _____.
    a. the Sun's energy that reaches the Earth is insufficient
    b. no means exist to conduct sunlight to cities
    c. the technology is expensive
    d. the Federal government has imposed a moratorium

10a. ☐
b. ☐
c. ☐
d. ☐

☐

807

1. Surveyors and mapmakers use _____ to represent distances that cannot be drawn directly.
   a. arithmetic
   b. geometry
   c. calculus
   d. statistics

1a. ☐ b. ☐ c. ☐ d. ☐

2. Indirect measurement is used _____.
   a. along highways between cities
   b. in building houses
   c. in measuring distances to planets
   d. in designing automobiles

2a. ☐ b. ☐ c. ☐ d. ☐

3. A symbol commonly used to represent a force is _____.
   a. x
   b. •
   c. →
   d. 0

3a. ☐ b. ☐ c. ☐ d. ☐

4. The result of a force to the north and a force to the east is a force to the _____.
   a. northeast
   b. southeast
   c. southwest
   d. northwest

4a. ☐ b. ☐ c. ☐ d. ☐

5. An object that has no force acting on it is likely to _____.
   a. move in a straight line
   b. come to a stop
   c. move in a circle
   d. fall to the ground

5a. ☐ b. ☐ c. ☐ d. ☐

6. The result of a single force acting on an object is _____.
   a. cancelled by the object's weight
   b. acceleration
   c. no movement
   d. rotation

6a. ☐ b. ☐ c. ☐ d. ☐

7. The rate of doing work is _____.
   a. power
   b. energy
   c. force
   d. mass

7a. ☐ b. ☐ c. ☐ d. ☐

8. If work is "bought," _____ must be "spent."
   a. power
   b. joules
   c. energy
   d. mass

8a. ☐ b. ☐ c. ☐ d. ☐

9. The work done in lifting a forty-pound crate three feet is _____ foot-pounds.
   a. forty-three
   b. thirteen
   c. one hundred twenty
   d. thirty-seven

9a. ☐ b. ☐ c. ☐ d. ☐

10. If twenty-four joules of energy are spent in four seconds, the rate of output is _____ watts.
    a. six
    b. ninety-six
    c. twenty
    d. twenty-eight

10a. ☐ b. ☐ c. ☐ d. ☐

☐

808

1. The friction that brings a boat to a stop after the motor has been cut is _____ friction.
   a. rolling
   b. sliding
   c. atomic
   d. fluid

1a. ☐
b. ☐
c. ☐
d. ☐

2. Dragging a flatbed across the ground produces _____ friction.
   a. sliding
   b. rolling
   c. atomic
   d. fluid

2a. ☐
b. ☐
c. ☐
d. ☐

3. To lessen resistance of a boat moving through water, engineers often adjust the _____.
   a. grease on the bearings
   b. number of sails
   c. size of the engine
   d. shape of the hull

3a. ☐
b. ☐
c. ☐
d. ☐

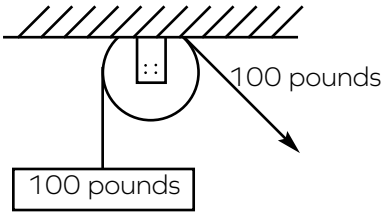
4. An application of the inclined plane is the _____.
   a. wedge
   b. wheel and axle
   c. lever
   d. gear

4a. ☐
b. ☐
c. ☐
d. ☐

Answer Items 5 through 7 from the illustration.

5. The ideal mechanical advantage of the single fixed pulley is _____.
   a. 0
   b. 1
   c. 100
   d. 200

5a. ☐
b. ☐
c. ☐
d. ☐



6. The actual mechanical advantage of the pulley is _____.
   a. 0
   b. 1
   c. 100
   d. 200

6a. ☐
b. ☐
c. ☐
d. ☐

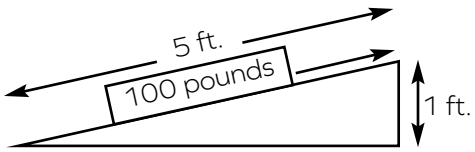
7. The efficiency of the pulley is _____ percent.
   a. 0
   b. 1
   c. 100
   d. 200

7a. ☐
b. ☐
c. ☐
d. ☐

Answer Items 8 through 10 from the illustration.

8. The work input on the inclined plane is _____ foot-pounds.
   a. 100
   b. 25
   c. 125
   d. 2,500

8a. ☐
b. ☐
c. ☐
d. ☐



9. The work output is _____ foot-pounds.
   a. 100
   b. 25
   c. 125
   d. 2,500

9a. ☐
b. ☐
c. ☐
d. ☐

10. The efficiency of the inclined plane is _____ percent.
   a. 80
   b. 100
   c. 50
   d. 25

10a. ☐
b. ☐
c. ☐
d. ☐

809

1. About five people could be fed by one United States farmer in 1910, and by 1970 more than _____ people could be fed.
   a. 40
   b. 80
   c. 120
   d. 160

1a. ☐
b. ☐
c. ☐
d. ☐

2. The forerunner of the wheat grown today for bread and cereal was most like _____.
   a. wild grass
   b. bulrushes
   c. corn cobs
   d. green beans

2a. ☐
b. ☐
c. ☐
d. ☐

3. The result of crossing two different strains of plants or animals is called a _____.
   a. thoroughbred
   b. hybrid
   c. halfbreed
   d. crossbreed

3a. ☐
b. ☐
c. ☐
d. ☐

4. A desired trait that has resulted from selective breeding of corn is _____.
   a. taller plants
   b. more green leaves
   c. larger ears
   d. more silk

4a. ☐
b. ☐
c. ☐
d. ☐

5. Decomposers in the soil _____.
   a. produce compounds poisonous to plants
   b. return dead material to simpler forms
   c. have little significant value
   d. live in leaf nodules

5a. ☐
b. ☐
c. ☐
d. ☐

6. A common practice that reintroduces nutrients into the soil is _____.
   a. one-crop agriculture
   b. terrace farming
   c. contour plowing
   d. crop rotation

6a. ☐
b. ☐
c. ☐
d. ☐

7. The energy-input part of the water cycle is _____.
   a. evaporation
   b. precipitation
   c. run-off
   d. percolation

7a. ☐
b. ☐
c. ☐
d. ☐

8. The rate of evaporation depends on the temperature of the air and water, the wind, and _____.
   a. the amount of moisture already in the air
   b. the angle of the Sun
   c. the amount of water in the ocean
   d. the presence of trees and shrubs

8a. ☐
b. ☐
c. ☐
d. ☐

9. The term *ecology* comes from a Greek word that means _____.
   a. pollution
   b. home
   c. recycling
   d. gum wrapper

9a. ☐
b. ☐
c. ☐
d. ☐

10. The total amount of living material in an area is called _____.
    a. biomass
    b. protoplasm
    c. food pyramid
    d. omnivore

10a. ☐
b. ☐
c. ☐
d. ☐

☐

810

1. A complete and correct definition of *technology* is the _____.
   a. application of science
   b. source of pollution
   c. opposite of simplicity
   d. basis of war

1a. ☐
b. ☐
c. ☐
d. ☐

2. Science as an orderly system of thought began with the philosopher _____.
   a. Copernicus
   b. Newton
   c. Aristotle
   d. Democritus

2a. ☐
b. ☐
c. ☐
d. ☐

3. Substances that have only one kind of atom are called _____.
   a. matter
   b. elements
   c. molecules
   d. atoms

3a. ☐
b. ☐
c. ☐
d. ☐

4. An example of a physical change (only) is _____.
   a. metal rusting
   b. an acid dissolving limestone
   c. water evaporating
   d. wood burning

4a. ☐
b. ☐
c. ☐
d. ☐

5. Kinetic energy depends upon _____.
   a. matter and motion
   b. matter and force
   c. height and force
   d. matter and height

5a. ☐
b. ☐
c. ☐
d. ☐

6. A measure of disorder is called _____.
   a. energy
   b. entropy
   c. power
   d. wattage

6a. ☐
b. ☐
c. ☐
d. ☐

7. The formula for work is _____.
   a. $F = ma$
   b. $F = G \frac{mm}{d^2}$
   c. $I = Prt$
   d. $W = Fd$

7a. ☐
b. ☐
c. ☐
d. ☐

8. To reduce friction the powdered lubricant _____ is used.
   a. silicone
   b. grease
   c. graphite
   d. grabtite

8a. ☐
b. ☐
c. ☐
d. ☐

9. The simple machine that has a fulcrum is the _____.
   a. wedge
   b. wheel and axle
   c. lever
   d. gear

9a. ☐
b. ☐
c. ☐
d. ☐

10. Bacteria in leguminous plants produce _____ compounds.
   a. oxygen
   b. carbon
   c. hydrogen
   d. nitrogen

10a. ☐
b. ☐
c. ☐
d. ☐

☐

901

1. For a substance that can exist in the three phases, the phase in which the atoms are not free to move around very much is _____.
   a. solid
   b. liquid
   c. gas

1a. ☐
b. ☐
c. ☐

2. A phase of matter that has neither definite shape nor definite volume is _____.
   a. solid
   b. liquid
   c. gas

2a. ☐
b. ☐
c. ☐

3. The mass of an atom is _____.
   a. distributed uniformly throughout the atomic sphere
   b. concentrated in the electrons
   c. divided equally between the nucleus and the electrons
   d. concentrated in the nucleus

3a. ☐
b. ☐
c. ☐
d. ☐

4. An atom's positive charge is balanced by negative charges on its _____.
   a. nucleus
   b. neutrons
   c. electrons
   d. protons

4a. ☐
b. ☐
c. ☐
d. ☐

5. Fuel for a fusion reaction is _____.
   a. oxygen
   b. uranium
   c. helium
   d. hydrogen

5a. ☐
b. ☐
c. ☐
d. ☐

6. Radiation was first detected by a _____.
   a. photographic plate
   b. Geiger counter
   c. microscope
   d. X-ray machine

6a. ☐
b. ☐
c. ☐
d. ☐

7. The rate at which reaction occurs in a nuclear reactor is regulated by _____.
   a. control rods
   b. the moderator
   c. the core
   d. water

7a. ☐
b. ☐
c. ☐
d. ☐

8. In an atomic reactor, atomic energy is converted directly to _____ energy.
   a. electrical
   b. heat
   c. light
   d. nuclear

8a. ☐
b. ☐
c. ☐
d. ☐

9. A disadvantage of atomic energy is the _____.
   a. unavailability of fuel
   b. limited number of good plant sites
   c. heating of water
   d. problem of waste disposal

9a. ☐
b. ☐
c. ☐
d. ☐

10. Compared to the energy produced, the amount of atomic fuel is _____ the amount of coal.
    a. greater than
    b. about the same as
    c. slightly less than
    d. much less than

10a. ☐
b. ☐
c. ☐
d. ☐

902

1. The measure of the amount of matter an object is made of is _____.
   a. mass
   b. weight
   c. density
   d. volume

1a. ☐
b. ☐
c. ☐
d. ☐

2. A gram is the amount of matter contained in one cubic centimeter of _____.
   a. air
   b. gold
   c. water
   d. helium

2a. ☐
b. ☐
c. ☐
d. ☐

3. A helium-filled balloon breaks. The volume of the helium _____.
   a. remains the same as the balloon's volume
   b. decreases to zero
   c. depends on temperature
   d. expands without limit

3a. ☐
b. ☐
c. ☐
d. ☐

4. The easiest method of measuring the volume of a rock is to _____.
   a. multiply length by width by height
   b. substitute for it an even piece of wood and to measure the wood
   c. measure the volume of water displaced when the rock is lowered into a full container
   d. measure the shadow of the rock

4a. ☐
b. ☐
c. ☐
d. ☐

5. The quotient of mass and volume is _____.
   a. weight
   b. density
   c. length
   d. area

5a. ☐
b. ☐
c. ☐
d. ☐

6. Density multiplied by volume equals _____.
   a. area
   b. weight
   c. density
   d. mass

6a. ☐
b. ☐
c. ☐
d. ☐

7. The specific gravity of water is _____.
   a. 0
   b. 1
   c. 2
   d. 8

7a. ☐
b. ☐
c. ☐
d. ☐

8. Specific gravity is a ratio of the density of a substance to the density of _____.
   a. air
   b. water
   c. ice
   d. silver

8a. ☐
b. ☐
c. ☐
d. ☐

9. A one-half kilogram piece of cork, lowered into a brimful container of water, will displace _____ of water.
   a. one-half kilogram
   b. slightly less than one-half kilogram
   c. slightly more than one-half kilogram
   d. much more than one-half kilogram

9a. ☐
b. ☐
c. ☐
d. ☐

10. An object that weighs three pounds when submerged will weigh _____ out of water.
    a. one pound
    b. two pounds
    c. three pounds
    d. four pounds

10a. ☐
b. ☐
c. ☐
d. ☐

☐

903

1. The rock of which the entire Earth was originally composed was _____.
   a. sedimentary
   b. metamorphic
   c. igneous
   d. schistose

1a. ☐
b. ☐
c. ☐
d. ☐

2. Examples of sedimentary rocks are _____.
   a. sandstone, mudstone, and conglomerate
   b. granite, sandstone, and gneiss
   c. granite, basalt, and rhyolite
   d. gneiss, phyllite, and pegmatite

2a. ☐
b. ☐
c. ☐
d. ☐

3. The layer of the Earth believed to be the source of the Earth's magnetic field is the _____.
   a. core
   b. mantle
   c. asthenosphere
   d. crust

3a. ☐
b. ☐
c. ☐
d. ☐

4. The Earth's layer presumed to be liquid is the _____.
   a. outer core
   b. crust
   c. inner core
   d. mantle

4a. ☐
b. ☐
c. ☐
d. ☐

5. Perhaps the most effective agent of erosion is _____.
   a. running water
   b. glaciers
   c. wind
   d. ocean currents

5a. ☐
b. ☐
c. ☐
d. ☐

6. Most sediment is finally deposited _____.
   a. on mountain slopes
   b. on continental slopes
   c. in river beds
   d. as deltas

6a. ☐
b. ☐
c. ☐
d. ☐

7. Evidence that rock is able to flow under pressure is a _____.
   a. fault
   b. plateau
   c. fold
   d. canyon

7a. ☐
b. ☐
c. ☐
d. ☐

8. A thick vertical sequence of alternating marine and continental rocks probably indicates _____.
   a. a series of seasonal floods
   b. several mountain-building episodes
   c. variations in sea level
   d. a reversal of magnetic polarity

8a. ☐
b. ☐
c. ☐
d. ☐

9. The "ring of fire" surrounding the Pacific Ocean marks the coincidence of volcanic activity and _____.
   a. earthquakes
   b. deep-sea trenches
   c. deserts
   d. mid-ocean ridges

9a. ☐
b. ☐
c. ☐
d. ☐

10. If the present movement at the mid-Atlantic ridge continues, North America and Europe will eventually _____.
    a. coincide
    b. collide
    c. be in a north-south line
    d. be farther apart

10a. ☐
b. ☐
c. ☐
d. ☐

904

1. An experimental science deals with ideas that _____.
   a. are passed down in folk stories
   b. are contained in early literature
   c. can be duplicated
   d. cannot be duplicated

1a. ☐ b. ☐ c. ☐ d. ☐

2. Examples of highly experimental sciences are _____.
   a. physics and chemistry
   b. chemistry and astronomy
   c. astronomy and geology
   d. geology and biology

2a. ☐ b. ☐ c. ☐ d. ☐

3. The all-inclusive term applied to rock lithified from sediment between gravel and mud is _____.
   a. shale
   b. sandstone
   c. conglomerate
   d. claystone

3a. ☐ b. ☐ c. ☐ d. ☐

4. Sandstone is a sedimentary rock made of _____.
   a. particles of quartz
   b. pebbles and cobbles
   c. particles smaller than 0.5 inches
   d. particles of any substance within the sand-size classification

4a. ☐ b. ☐ c. ☐ d. ☐

5. When organic remains have been removed from a rock, the small opening is called a _____.
   a. cast
   b. shell
   c. mold
   d. fragment

5a. ☐ b. ☐ c. ☐ d. ☐

6. The least common fossils are those that have been _____.
   a. petrified
   b. frozen
   c. buried
   d. distilled

6a. ☐ b. ☐ c. ☐ d. ☐

7. An example based on relative time is _____.
   a. plutonism
   b. radiometric dating
   c. the law of superposition
   d. neptunism

7a. ☐ b. ☐ c. ☐ d. ☐

8. Varves are associated with _____.
   a. deserts
   b. rivers
   c. glaciers
   d. deltas

8a. ☐ b. ☐ c. ☐ d. ☐

9. Two unreliable techniques for measuring absolute time are _____.
   a. ocean saltiness and sediment thickness
   b. radioactivity and tree rings
   c. varves and annuli
   d. varves and tree rings

9a. ☐ b. ☐ c. ☐ d. ☐

10. The rate at which the Earth is losing heat is an unreliable age indicator because _____.
    a. the Earth is not losing heat
    b. the Earth was originally cold
    c. heat from radioactivity confuses the problem
    d. the atmosphere traps heat

10a. ☐ b. ☐ c. ☐ d. ☐

☐

905

1. The smallest disease-causing organism is a _____.
   a. virus
   b. fungus
   c. protozoan
   d. rickettsia

1a. ☐
b. ☐
c. ☐
d. ☐

2. The only disease-causing organisms that can be classified as animals are _____.
   a. viruses
   b. fungi
   c. protozoans
   d. rickettsiae

2a. ☐
b. ☐
c. ☐
d. ☐

3. The time between infection with disease and first symptoms is called _____.
   a. secondary infection
   b. incubation
   c. symptom lag
   d. pathogen

3a. ☐
b. ☐
c. ☐
d. ☐

4. Most common childhood diseases are characterized by _____.
   a. a rash
   b. sweating
   c. boils
   d. hunger

4a. ☐
b. ☐
c. ☐
d. ☐

5. Improperly canned food is a potential source of _____.
   a. influenza
   b. botulism
   c. rabies
   d. tetanus

5a. ☐
b. ☐
c. ☐
d. ☐

6. Polluted drinking water is the source of _____.
   a. pneumonia
   b. salmonella
   c. cholera
   d. scarlet fever

6a. ☐
b. ☐
c. ☐
d. ☐

7. The pathogen of pneumonia, meningitis, and typhoid is a _____.
   a. virus
   b. bacterium
   c. fungus
   d. protozoan

7a. ☐
b. ☐
c. ☐
d. ☐

8. The pathogen of food poisoning, scarlet fever, and cholera is a _____.
   a. virus
   b. bacterium
   c. fungus
   d. protozoan

8a. ☐
b. ☐
c. ☐
d. ☐

9. The pathogen of typhus and Rocky Mountain spotted fever is a _____.
   a. virus
   b. rickettsia
   c. fungus
   d. protozoan

9a. ☐
b. ☐
c. ☐
d. ☐

10. The pathogen of ringworm and athletes foot is a _____.
    a. virus
    b. rickettsia
    c. fungus
    d. protozoan

10a. ☐
b. ☐
c. ☐
d. ☐

906

1. Antibodies are found in _____.
   a. blood serum
   b. tissue
   c. urine
   d. phagocytes

1a. ☐
b. ☐
c. ☐
d. ☐

2. Blood cells that feed on foreign particles are _____.
   a. fibroblasts
   b. antibiotics
   c. leukocytes
   d. red blood cells

2a. ☐
b. ☐
c. ☐
d. ☐

3. The primary technique of disease prevention is _____.
   a. inoculation
   b. personal hygiene
   c. antibiotics
   d. vitamins

3a. ☐
b. ☐
c. ☐
d. ☐

4. Draining swamps and spraying for mosquitoes is effective in the prevention of _____.
   a. measles
   b. malaria
   c. chicken pox
   d. pneumonia

4a. ☐
b. ☐
c. ☐
d. ☐

5. Cowpox vaccine is used to prevent _____.
   a. scarlet fever
   b. measles
   c. smallpox
   d. typhoid

5a. ☐
b. ☐
c. ☐
d. ☐

6. A broad-spectrum antibiotic that is effective against most bacteria, rickettsias, and certain viruses is _____.
   a. chlortetracycline
   b. amphotertericin B
   c. merthiolate
   d. isoniazid

6a. ☐
b. ☐
c. ☐
d. ☐

7. The Food and Drug Administration and Public Health Service are community health agencies on the _____ level.
   a. international
   b. national
   c. state
   d. local

7a. ☐
b. ☐
c. ☐
d. ☐

8. New drugs, additives, and foods are tested by the _____.
   a. Food and Drug Administration
   b. American Medical Association
   c. World Health Organization
   d. Hygienic Laboratory

8a. ☐
b. ☐
c. ☐
d. ☐

9. Wilhelm Roentgen discovered the valuable diagnostic tool, _____.
   a. the microscope
   b. X rays
   c. the stethoscope
   d. the thermometer

9a. ☐
b. ☐
c. ☐
d. ☐

10. The contribution to medicine of Louis Pasteur was the _____.
    a. invention of the microscope
    b. discovery of penicillin
    c. discovery of blood types
    d. association of disease with microbes

10a. ☐
b. ☐
c. ☐
d. ☐

☐

907

1. The item that is not a celestial body in the universe is a _____.
   a. planetoid
   b. satellite
   c. nebula
   d. parsec

1a. ☐
b. ☐
c. ☐
d. ☐

2. The largest planet in our solar system, Jupiter, has a diameter about _____ times greater than the diameter of the Earth.
   a. three
   b. eleven
   c. fifty
   d. one thousand

2a. ☐
b. ☐
c. ☐
d. ☐

3. An astronomical unit is the average radius of the _____.
   a. Sun
   b. Earth
   c. Earth's orbit
   d. solar system

3a. ☐
b. ☐
c. ☐
d. ☐

4. A light-year is a unit of _____.
   a. time
   b. mass
   c. distance
   d. frequency

4a. ☐
b. ☐
c. ☐
d. ☐

5. The earliest type of telescope was the _____ telescope.
   a. reflecting
   b. refracting
   c. radio
   d. condensing

5a. ☐
b. ☐
c. ☐
d. ☐

6. A telescope that can "see" through the clouds is a _____.
   a. reflecting
   b. refracting
   c. radio
   d. condensing

6a. ☐
b. ☐
c. ☐
d. ☐

7. One force that keeps a satellite in orbit is _____.
   a. gravitational
   b. nuclear
   c. solar
   d. magnetic

7a. ☐
b. ☐
c. ☐
d. ☐

8. Another force that keeps a satellite in orbit is _____.
   a. center-fleeing
   b. axial
   c. centripetal
   d. centrifugal

8a. ☐
b. ☐
c. ☐
d. ☐

9. In 1976 two unmanned Viking spacecraft were sent by the United States to determine _____.
   a. if life existed on Mars
   b. the make-up of Jupiter
   c. if Venus has a magnetic field
   d. if the Moon has an atmosphere

9a. ☐
b. ☐
c. ☐
d. ☐

10. The first artificial satellite to orbit the Earth did so in _____.
    a. 1945
    b. 1952
    c. 1957
    d. 1969

10a. ☐
b. ☐
c. ☐
d. ☐

☐

908

1. The ocean basins are basically _____.
   a. totally flat plains
   b. grooved and ridged
   c. mountainous
   d. flat plain with grooves

1a. ☐
b. ☐
c. ☐
d. ☐

2. The Hawaiian Islands are a line of _____.
   a. mid-ocean ridges
   b. plateaus
   c. volcanoes
   d. fault blocks

2a. ☐
b. ☐
c. ☐
d. ☐

3. In general, very fine biological sediments are considered _____.
   a. oozes
   b. mud
   c. sand
   d. silt

3a. ☐
b. ☐
c. ☐
d. ☐

4. Sediment deposits close to land masses often reach depths of _____ meters.
   a. 4
   b. 40
   c. 4,000
   d. 40,000

4a. ☐
b. ☐
c. ☐
d. ☐

5. England and northwest Europe have mild climates for their latitude because of the _____ current.
   a. Canary
   b. West Wind Drift
   c. North Atlantic
   d. Gulf Stream

5a. ☐
b. ☐
c. ☐
d. ☐

6. The northeast flowing current near Japan is the _____ current.
   a. North Equatorial
   b. Kuroshio
   c. Benguela
   d. Agulhas

6a. ☐
b. ☐
c. ☐
d. ☐

7. The world's largest consumer of fish products is _____.
   a. Russia
   b. the United States
   c. Peru
   d. Norway

7a. ☐
b. ☐
c. ☐
d. ☐

8. The largest fish-catch country in the world is _____.
   a. Peru
   b. Afghanistan
   c. Bermuda
   d. Switzerland

8a. ☐
b. ☐
c. ☐
d. ☐

9. As of 1964 the United States had recovered from the ocean about _____ worth of sulfur.
   a. $500,000
   b. $15,000,000
   c. $25,000
   d. $5,000

9a. ☐
b. ☐
c. ☐
d. ☐

10. France produces yearly 500 million kilowatt-hours of electricity from _____.
    a. fusion plants
    b. turbidity-current stations
    c. tidal-power stations
    d. offshore coal deposits

10a. ☐
b. ☐
c. ☐
d. ☐

☐

909

1. The primary use man has made of the biosphere is for _____.
   a. transportation
   b. communication
   c. food supply
   d. disease prevention

1a. ☐
b. ☐
c. ☐
d. ☐

2. The term that best defines *ecology* is _____.
   a. food
   b. plant
   c. home
   d. animal

2a. ☐
b. ☐
c. ☐
d. ☐

3. Cellulose from corn stalks and wood chips has been treated to make a _____.
   a. pancake batter
   b. durable tennis shoe
   c. roofing material
   d. high protein food

3a. ☐
b. ☐
c. ☐
d. ☐

4. Scrap glass is used in some communities for _____.
   a. roads
   b. beaches
   c. tires
   d. tabletops

4a. ☐
b. ☐
c. ☐
d. ☐

5. Energy sources that do not leave harmful by-products are _____.
   a. hydrogen, coal, and petroleum
   b. geothermal heat, hydrogen, and solar heat
   c. petroleum, uranium, and natural gas
   d. uranium, tidal energy, and geothermal heat

5a. ☐
b. ☐
c. ☐
d. ☐

6. Fuels for atomic energy are _____.
   a. hydrogen and uranium
   b. helium and uranium
   c. petroleum and helium
   d. natural gas and hydrogen

6a. ☐
b. ☐
c. ☐
d. ☐

7. The greatest benefit of space exploration to the greatest number of people is _____.
   a. knowledge of rocket fuels
   b. technology
   c. knowledge of Moon's origin
   d. acquisition of Moon rocks

7a. ☐
b. ☐
c. ☐
d. ☐

8. Electronics has been advanced by the space program's need for _____.
   a. vacuum radio tubes
   b. metals for antennas
   c. ultra small components
   d. long extension cords

8a. ☐
b. ☐
c. ☐
d. ☐

9. Pharmacology refers to _____.
   a. agriculture
   b. medicines
   c. communication
   d. animal breeding

9a. ☐
b. ☐
c. ☐
d. ☐

10. Continental shelves are a promising source of _____.
   a. coal
   b. uranium
   c. petroleum
   d. aluminum

10a. ☐
b. ☐
c. ☐
d. ☐

☐

910

1. Fusion is not yet a source of electric power because _____.
   a. fuel is not readily available
   b. waste disposal is a problem
   c. technology is not sufficiently advanced
   d. governmental regulations are too strict

1a. ☐
b. ☐
c. ☐
d. ☐

2. The standard metric unit of mass is the _____.
   a. pound
   b. liter
   c. kilogram
   d. meter

2a. ☐
b. ☐
c. ☐
d. ☐

3. A measure of the Earth's pull on an object is the object's _____.
   a. mass
   b. weight
   c. density
   d. area

3a. ☐
b. ☐
c. ☐
d. ☐

4. Evidence that rock under stress will break is _____.
   a. a fault
   b. a plain
   c. an anticline
   d. a valley

4a. ☐
b. ☐
c. ☐
d. ☐

5. Examples of observational sciences are _____.
   a. physics and chemistry
   b. chemistry and astronomy
   c. astronomy and geology
   d. geology and biology

5a. ☐
b. ☐
c. ☐
d. ☐

6. The pathogen of amoebic dysentery and malaria is a _____.
   a. virus
   b. rickettsia
   c. fungus
   d. protozoan

6a. ☐
b. ☐
c. ☐
d. ☐

7. The first line of defense against disease is the _____.
   a. kidneys
   b. skin
   c. liver
   d. blood

7a. ☐
b. ☐
c. ☐
d. ☐

8. Rat control is effective in preventing _____.
   a. typhus
   b. the common cold
   c. malaria
   d. meningitis

8a. ☐
b. ☐
c. ☐
d. ☐

9. The Milky Way is a _____.
   a. universe
   b. galaxy
   c. star cluster
   d. solar system

9a. ☐
b. ☐
c. ☐
d. ☐

10. The middle of the Atlantic Ocean is characterized by _____.
    a. a series of deep trenches
    b. a long mountain range
    c. deep depressions
    d. a featureless plain

10a. ☐
b. ☐
c. ☐
d. ☐

☐

1001

1. The correct form for binomial nomenclature is _____.
   a. *Passer domesticus*
   b. *Passer Domesticus*
   c. Passer domesticus
   d. *Passer* domesticus

1a. ☐
b. ☐
c. ☐
d. ☐

2. The language of taxonomy is usually _____.
   a. Greek
   b. Latin
   c. Italian
   d. French

2a. ☐
b. ☐
c. ☐
d. ☐

3. The grouping of animals into phyla is based on _____.
   a. size
   b. appearance in the fossil record
   c. being extinct versus being extant
   d. complexity

3a. ☐
b. ☐
c. ☐
d. ☐

4. Which characteristics would not be used in making animal classifications? _____
   a. segmented or nonsegmented
   b. presence or absence of conductive tissue
   c. presence or absence of appendages
   d. patterns of coloration

4a. ☐
b. ☐
c. ☐
d. ☐

5. The distinction between unicellular or multicellular applies to _____.
   a. plants only
   b. animals only
   c. both plants and animals
   d. neither plants nor animals

5a. ☐
b. ☐
c. ☐
d. ☐

6. A characteristic that distinguishes most plants from animals is _____.
   a. means of locomotion
   b. chloroplasts
   c. symmetry
   d. color

6a. ☐
b. ☐
c. ☐
d. ☐

7. A taxon of plants, but not of animals, is the _____.
   a. Kingdom
   b. Class
   c. Division
   d. Family

7a. ☐
b. ☐
c. ☐
d. ☐

8. Man belongs to Phylum _____.
   a. *Arthropoda*
   b. *Bryozoa*
   c. *Protozoa*
   d. *Chordata*

8a. ☐
b. ☐
c. ☐
d. ☐

9. The creationist view of life requires _____.
   a. immense time
   b. probability
   c. directive force
   d. trial and error

9a. ☐
b. ☐
c. ☐
d. ☐

10. Evolution portrays the diversity of life forms resulting from _____.
   a. the origin of species
   b. the survival of the weakest
   c. the will of a Creator
   d. natural selection

10a. ☐
b. ☐
c. ☐
d. ☐

☐

1002

1. The parts of atoms that interact to form compounds are the _____.
   a. inner electrons
   b. outer electrons
   c. neutrons
   d. protons

1a. ☐
b. ☐
c. ☐
d. ☐

2. For elements to form molecules, the _____ of the elements must be high.
   a. concentration
   b. dispersion
   c. weight
   d. sugar level

2a. ☐
b. ☐
c. ☐
d. ☐

3. Organic compounds produced in the body require _____ during formation.
   a. proteins
   b. fats
   c. carbohydrates
   d. energy

3a. ☐
b. ☐
c. ☐
d. ☐

4. Activation energy is _____.
   a. produced by a chemical reaction
   b. required for a chemical reaction
   c. required for nuclear stability
   d. produced by a nuclear reaction

4a. ☐
b. ☐
c. ☐
d. ☐

5. A form of polymerization is _____.
   a. dehydration synthesis
   b. hydrolysis
   c. exchange
   d. decomposition

5a. ☐
b. ☐
c. ☐
d. ☐

6. Energy is stored in chemical bonds by the process of _____.
   a. dehydration synthesis
   b. hydrolysis
   c. exchange
   d. decomposition

6a. ☐
b. ☐
c. ☐
d. ☐

7. The function of DNA is to _____.
   a. contain genetic information
   b. regulate metabolism
   c. regulate growth
   d. control hormones

7a. ☐
b. ☐
c. ☐
d. ☐

8. The function of RNA is to _____.
   a. control hormonal output
   b. carry out instructions of DNA
   c. liberate energy
   d. produce vitamins

8a. ☐
b. ☐
c. ☐
d. ☐

9. A good descriptive term for an enzyme's function is _____.
   a. salt
   b. catalyst
   c. preserver
   d. destroyer

9a. ☐
b. ☐
c. ☐
d. ☐

10. Enzymes promote reactions by _____.
    a. producing heat
    b. providing activation energy
    c. lowering the level of activation energy required
    d. producing uracil

10a. ☐
b. ☐
c. ☐
d. ☐

☐

1003

1. The limitation of a light (optical) microscope is _____.
   a. magnification
   b. contrast
   c. resolution
   d. illumination

1a. ☐
b. ☐
c. ☐
d. ☐

2. A compound microscope has a ten-power eyepiece and a ninety-power objective lens. The microscope is capable of magnification of _____.
   a. 10X
   b. 9X
   c. 90X
   d. 900X

2a. ☐
b. ☐
c. ☐
d. ☐

3. The "slipper animal," paramecium, moves around by means of _____.
   a. a flagellum (whip)
   b. cilia (hairs)
   c. water jets
   d. ameboid movement

3a. ☐
b. ☐
c. ☐
d. ☐

4. A statement true of an amoeba is it _____.
   a. eats and moves with the same motion
   b. manufactures its own food
   c. has a restricted habitat
   d. has a flagellum

4a. ☐
b. ☐
c. ☐
d. ☐

5. Disease-producing protozoa are _____.
   a. parasites
   b. free-living
   c. restricted to Texas
   d. transmitted by grasshoppers

5a. ☐
b. ☐
c. ☐
d. ☐

6. A protozoan-caused disease is _____.
   a. the common cold
   b. pneumonia
   c. malaria
   d. chicken pox

6a. ☐
b. ☐
c. ☐
d. ☐

7. The groups of algae are named on the basis of their _____.
   a. size
   b. color
   c. habitat
   d. structure

7a. ☐
b. ☐
c. ☐
d. ☐

8. A protozoan that produces its own food is the _____.
   a. amoeba
   b. paramecium
   c. fungus
   d. algae

8a. ☐
b. ☐
c. ☐
d. ☐

9. Rickettsias are most like _____.
   a. bacteria
   b. paramecia
   c. fungi
   d. amoebas

9a. ☐
b. ☐
c. ☐
d. ☐

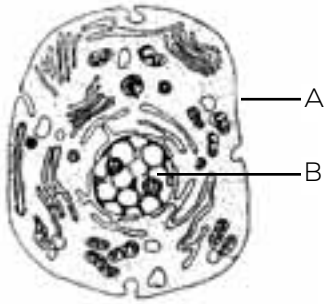
10. A pathogen that can function only in a living cell is the _____.
    a. protozoan
    b. virus
    c. fungus
    d. bacterium

10a. ☐
b. ☐
c. ☐
d. ☐

☐

Refer to the illustration of a cell for items 1 and 2.

1004



1. Letter A designates the _____. 1a. ☐
   a. cell membrane b. ☐
   b. cytoplasm c. ☐
   c. corpuscle d. ☐
   d. nucleus
2. Letter B designates the _____. 2a. ☐
   a. cell membrane b. ☐
   b. cytoplasm c. ☐
   c. corpuscle d. ☐
   d. nucleus
3. The cell membrane is involved in all the following functions *except* _____. 3a. ☐
   a. containment b. ☐
   b. passive diffusion c. ☐
   c. reproduction d. ☐
   d. active transport
4. Parts of a cell in which energy is produced are called _____. 4a. ☐
   a. glucose b. ☐
   b. plastids c. ☐
   c. mitochondria d. ☐
   d. chloroplasts
5. Mitochondria use energy produced by oxidation to change ADP to _____. 5a. ☐
   a. ATP b. ☐
   b. PHD c. ☐
   c. LHD d. ☐
   d. MED
6. The breakdown of glucose into two molecules of pyruvic acid is called _____. 6a. ☐
   a. fermentation b. ☐
   b. lactation c. ☐
   c. pyruvation d. ☐
   d. glycolysis
7. A group of organs that perform a specific bodily process is _____. 7a. ☐
   a. a tissue b. ☐
   b. a cell c. ☐
   c. an organelle d. ☐
   d. a system
8. A structure in which body systems work together to sustain independent life is _____. 8a. ☐
   a. an organelle b. ☐
   b. an organism c. ☐
   c. a system d. ☐
   d. a tissue
9. A cell that transmits messages is a _____. 9a. ☐
   a. tissue b. ☐
   b. neuron c. ☐
   c. synapse d. ☐
   d. phagocyte
10. A cell that combats disease is _____. 10a. ☐
    a. a neuron b. ☐
    b. a hemoglobin c. ☐
    c. a leukocyte d. ☐
    d. an antibody

☐

1005

1. The part of a plant that serves to anchor the plant body is the _____.
   a. root
   b. stem
   c. leaf
   d. fruit

1a. ☐
b. ☐
c. ☐
d. ☐

2. Food factories for plants are their _____.
   a. roots
   b. stems
   c. leaves
   d. fruits

2a. ☐
b. ☐
c. ☐
d. ☐

3. *Tap* and *fibrous* are descriptive of a plant's _____.
   a. roots
   b. stems
   c. leaves
   d. fruit

3a. ☐
b. ☐
c. ☐
d. ☐

4. *Dehiscent* and *indehiscent* are descriptive of a plant's _____.
   a. roots
   b. stems
   c. leaves
   d. fruit

4a. ☐
b. ☐
c. ☐
d. ☐

5. Angiosperms (flowering plants) are _____.
   a. neither monocots nor dicots
   b. monocots
   c. dicots
   d. both monocots and dicots

5a. ☐
b. ☐
c. ☐
d. ☐

6. Monocots are distinguished from dicots primarily by their _____.
   a. root structure
   b. seed leaf number
   c. leaf shape
   d. size

6a. ☐
b. ☐
c. ☐
d. ☐

7. Food production in plants is called _____.
   a. respiration
   b. photosynthesis
   c. protein synthesis
   d. transpiration

7a. ☐
b. ☐
c. ☐
d. ☐

8. The manufacture of plant building blocks is _____.
   a. respiration
   b. photosynthesis
   c. protein synthesis
   d. transpiration

8a. ☐
b. ☐
c. ☐
d. ☐

9. The fundamental food supply is _____.
   a. beef
   b. fish
   c. herbivores
   d. plants

9a. ☐
b. ☐
c. ☐
d. ☐

10. An example of selective breeding for better yield or other improved characteristics is the cross between _____.
    a. wheat and rye
    b. mule and horse
    c. crocodile and abalone
    d. sumac and grape

10a. ☐
b. ☐
c. ☐
d. ☐

☐

1006

1. The common bile duct connects the liver, gall bladder, pancreas, and _____.
   a. stomach
   b. small intestine
   c. large intestine
   d. spleen

1a. ☐
b. ☐
c. ☐
d. ☐

2. Extensions of neurons that transmit the nerve impulse from other neurons toward the cell body are _____.
   a. dendrites
   b. leukocytes
   c. cranial nerves
   d. axons

2a. ☐
b. ☐
c. ☐
d. ☐

3. The softer material in a tooth is _____.
   a. gum
   b. enamel
   c. root
   d. dentin

3a. ☐
b. ☐
c. ☐
d. ☐

4. Cartilage is found in all the following places *except* the _____.
   a. nose
   b. trachea
   c. fingernails
   d. ears

4a. ☐
b. ☐
c. ☐
d. ☐

5. The digestive system includes all of these organs *except* _____.
   a. mouth
   b. stomach
   c. kidneys
   d. large intestines

5a. ☐
b. ☐
c. ☐
d. ☐

6. The respiratory system includes the _____.
   a. mouth, trachea, and periosteum
   b. nose, bronchia, and lungs
   c. esophagus, nose, and lipia
   d. heart, lungs, and trachea

6a. ☐
b. ☐
c. ☐
d. ☐

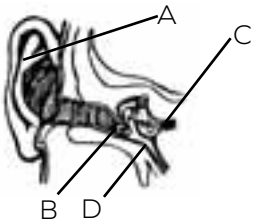
7. Myopia is an eye condition in which _____.
   a. the person is nearsighted
   b. the person is farsighted
   c. vision is both clear and clouded
   d. blindness results from pressure within the eye

7a. ☐
b. ☐
c. ☐
d. ☐

8. An example of a hereditary disease is _____.
   a. poliomyelitis
   b. sickle cell anemia
   c. leukemia
   d. typhoid

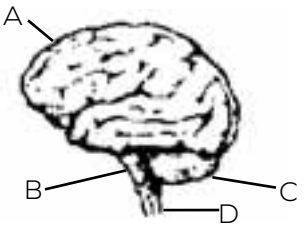
8a. ☐
b. ☐
c. ☐
d. ☐

9. In this illustration of the ear, the eustachian tube is represented by Letter _____.
   a. A
   b. B
   c. C
   d. D



9a. ☐
b. ☐
c. ☐
d. ☐

10. In this illustration of the brain, the cerebellum is represented by Letter _____.
   a. A
   b. B
   c. C
   d. D



10a. ☐
b. ☐
c. ☐
d. ☐

☐

1007

1. A family has seven sons. The chance that their eighth child will be a daughter is _____.
   a. one chance in seven
   b. one chance in eight
   c. one chance in two
   d. practically none

1a. ☐
b. ☐
c. ☐
d. ☐

2. The probability that both of two tossed coins will come down heads is _____.
   a. one in one
   b. one in two
   c. one in four
   d. one in eight

2a. ☐
b. ☐
c. ☐
d. ☐

3. A couple with blood types A and B may have children with the blood types _____.
   a. A only
   b. A and B only
   c. A, B, and AB
   d. AB only

3a. ☐
b. ☐
c. ☐
d. ☐

4. If the parent genotypes are Aa and Aa, the offspring are expected to be _____.
   a. one-half AA and one-half aa
   b. all Aa
   c. one-quarter AA, and one-half Aa, and one-quarter aa
   d. three-quarters AA and one-quarter aa

4a. ☐
b. ☐
c. ☐
d. ☐

5. The total of all genes carried by an organism is the _____.
   a. genotype
   b. phenotype
   c. prototype
   d. linotype

5a. ☐
b. ☐
c. ☐
d. ☐

6. Genes that carry contrasting inheritance factors are _____.
   a. heterozygotes
   b. homozygotes
   c. alleles
   d. none of these

6a. ☐
b. ☐
c. ☐
d. ☐

7. Meiosis occurs during _____.
   a. spermatogenesis only
   b. oogenesis only
   c. both spermatogenesis and oogenesis
   d. neither spermatogenesis nor oogenesis

7a. ☐
b. ☐
c. ☐
d. ☐

8. Preceding the first division in meiosis, the DNA in the nucleus _____.
   a. is halved
   b. remains unaffected
   c. doubles
   d. atrophies

8a. ☐
b. ☐
c. ☐
d. ☐

9. The internal environmental factor that may influence gene function is _____.
   a. blood type
   b. temperature
   c. digestion
   d. hormones

9a. ☐
b. ☐
c. ☐
d. ☐

10. An external environmental factor that may temporarily influence gene function is _____.
    a. temperature
    b. radiation
    c. DDT
    d. food additives

10a. ☐
b. ☐
c. ☐
d. ☐

☐

1008

1. A function of meiosis is _____.
   a. a production of gametes
   b. growth
   c. replacement of cells
   d. repair of injured tissue

1a. ☐
b. ☐
c. ☐
d. ☐

2. A product of meiosis is _____.
   a. a white blood cell
   b. a plant stem cell
   c. a sperm cell
   d. an epithelial cell

2a. ☐
b. ☐
c. ☐
d. ☐

3. Compared to the parent, the daughter organisms produced by asexual reproduction _____.
   a. are genetically identical
   b. have the same chromosomes
   c. are sterile
   d. are inferior

3a. ☐
b. ☐
c. ☐
d. ☐

4. Of the following forms of asexual reproduction, one that *cannot* occur in unicellular organisms is _____.
   a. budding
   b. binary fission
   c. multiple fission
   d. fragmentation

4a. ☐
b. ☐
c. ☐
d. ☐

5. An advantage of sexual reproduction is _____.
   a. genetic variability
   b. predictable phenotypes
   c. rapid reproduction
   d. territorial domination

5a. ☐
b. ☐
c. ☐
d. ☐

6. In sexual reproduction the genetic possibilities in offspring are _____.
   a. very small
   b. zero
   c. doubled
   d. very great

6a. ☐
b. ☐
c. ☐
d. ☐

7. Technique of placing a desired plant stem into another, more adequate root system is _____.
   a. cutting
   b. layering
   c. grafting
   d. budding

7a. ☐
b. ☐
c. ☐
d. ☐

8. A commercial crop available only through grafting is _____.
   a. navel oranges
   b. purple plums
   c. Winesap apples
   d. tangelos

8a. ☐
b. ☐
c. ☐
d. ☐

9. A life cycle spent primarily as gametes is the _____ cycle.
   a. diplontic
   b. haplontic
   c. larval
   d. embryonic

9a. ☐
b. ☐
c. ☐
d. ☐

10. A life cycle spent primarily as diploids is the _____ cycle.
    a. diplontic
    b. haplontic
    c. larval
    d. embryonic

10a. ☐
b. ☐
c. ☐
d. ☐

☐

1009

1. The term *ecology* comes from a Greek word that means _____.
   a. litter
   b. pollution
   c. house
   d. concern

1a. ☐
b. ☐
c. ☐
d. ☐

2. The term that relates an organism to every aspect of its environment is _____.
   a. biomass
   b. biosphere
   c. ecosystem
   d. environmental factor

2a. ☐
b. ☐
c. ☐
d. ☐

3. The region occupied by a community is _____.
   a. a biosphere
   b. a habitat
   c. an ecosystem
   d. a biome

3a. ☐
b. ☐
c. ☐
d. ☐

4. A nonliving condition in a habitat is _____.
   a. an environment
   b. a biosphere
   c. an environmental factor
   d. a fauna

4a. ☐
b. ☐
c. ☐
d. ☐

5. The habitats most vulnerable to destruction by man are _____.
   a. rainforest and steppes
   b. antarctic and rainforest
   c. desert and tundra
   d. antarctic and desert

5a. ☐
b. ☐
c. ☐
d. ☐

6. A population restricted to a single habitat is the _____.
   a. rat
   b. koala
   c. opossum
   d. pigweed

6a. ☐
b. ☐
c. ☐
d. ☐

7. The foremost *preventive* method for pollution is _____.
   a. recycling
   b. landfills
   c. combustion
   d. decreased consumption

7a. ☐
b. ☐
c. ☐
d. ☐

8. A reasonable view of pollution is it _____.
   a. must be eliminated
   b. should be tolerated
   c. must be reduced to 50 percent of its present level
   d. must be reduced to the level that continues to provide our needs

8a. ☐
b. ☐
c. ☐
d. ☐

9. The primary advantage of nuclear energy is that it _____.
   a. uses little water
   b. does not pollute the air
   c. produces no waste
   d. produces no heat

9a. ☐
b. ☐
c. ☐
d. ☐

10. Tidal power is a good energy solution in coastal areas that _____.
    a. border on the Pacific Ocean
    b. have a neap tide
    c. have high tides and a return river
    d. have high tides and a bay that can be closed

10a. ☐
b. ☐
c. ☐
d. ☐

☐

1010

1. Taxonomy is the study of _____.
   a. taxes
   b. classification
   c. government
   d. fossils

1a. ☐
b. ☐
c. ☐
d. ☐

2. DNA and RNA are molecules involved in _____.
   a. transmitting nerve signals
   b. transmitting genetic code
   c. transferring energy
   d. transporting nutrients

2a. ☐
b. ☐
c. ☐
d. ☐

3. Bacteria are named primarily on the basis of their _____.
   a. size
   b. color
   c. shape
   d. effects

3a. ☐
b. ☐
c. ☐
d. ☐

4. The collective name given to parts of a cell that perform separate functions is _____.
   a. membrane
   b. organelle
   c. nucleus
   d. corpuscle

4a. ☐
b. ☐
c. ☐
d. ☐

5. A group of similar cells that perform a similar activity is _____.
   a. a tissue
   b. an organ
   c. an organelle
   d. a system

5a. ☐
b. ☐
c. ☐
d. ☐

6. A change in genetic code is _____.
   a. meiosis
   b. a mutation
   c. mitosis
   d. gametogenesis

6a. ☐
b. ☐
c. ☐
d. ☐

7. Sexual reproduction requires _____.
   a. one parent
   b. two parents
   c. four parents
   d. eight parents

7a. ☐
b. ☐
c. ☐
d. ☐

8. The layer at the Earth's surface occupied by living things is _____.
   a. biomass
   b. biosphere
   c. ecosystem
   d. environmental

8a. ☐
b. ☐
c. ☐
d. ☐

9. A group of living things that occupies the same location is _____.
   a. a biomass
   b. a habitat
   c. an ecosystem
   d. a community

9a. ☐
b. ☐
c. ☐
d. ☐

10. The item least likely to be considered a community is _____.
    a. a drop of drinking water
    b. a drop of pond water
    c. an apple tree
    d. a fallen log

10a. ☐
b. ☐
c. ☐
d. ☐

☐

1101

1. If you entered a career in chemistry and were assigned to discover new products and processes, you would be in the area of _____.
   a. corporate management
   b. chemical technician
   c. research and development
   d. marketing and distribution

1a. ☐ b. ☐ c. ☐ d. ☐

2. A career in chemistry that would enable you to set goals and determine the direction the company will take is in the area of _____.
   a. corporate management
   b. chemical technician
   c. research and development
   d. marketing and distribution

2a. ☐ b. ☐ c. ☐ d. ☐

3. The fundamental metric unit of length is the _____.
   a. furlong
   b. kilometer
   c. meter
   d. foot

3a. ☐ b. ☐ c. ☐ d. ☐

4. The metric unit of time is the _____.
   a. hour
   b. minute
   c. second
   d. nanosecond

4a. ☐ b. ☐ c. ☐ d. ☐

5. The term that best describes *precision* is _____.
   a. a finer line
   b. standard
   c. correctness
   d. error

5a. ☐ b. ☐ c. ☐ d. ☐

6. Assuming that none of these choices is in error, the one with the highest precision is _____.
   a. 200
   b. 186.4
   c. $2 \cdot 10^2$
   d. $1.8642 \cdot 10^2$

6a. ☐ b. ☐ c. ☐ d. ☐

7. In a plot of the direct relationship $y = kx$, k is the _____.
   a. y intercept
   b. y coordinate
   c. x coordinate
   d. constant

7a. ☐ b. ☐ c. ☐ d. ☐

8. The best display of a bit of data is _____.
   a. •
   b. 0
   c. ⦿
   d. ⦿

8a. ☐ b. ☐ c. ☐ d. ☐

9. The metric unit equivalent of a liter is _____.
   a. 1 cm^3
   b. 1000 cm^3
   c. 100 ml
   d. 100 ml^3

9a. ☐ b. ☐ c. ☐ d. ☐

10. In a scientific notation 186,000 becomes _____.
    a. 186 thousand
    b. $186 \cdot 10^3$
    c. $1.86 \cdot 10^4$
    d. $1.86 \cdot 10^5$

10a. ☐ b. ☐ c. ☐ d. ☐

☐

1102

1. The pseudoscience of alchemy became important around the year _____.
   a. 5,000 B.C.
   b. 1,300 B.C.
   c. 300 B.C.
   d. A.D. 1700

1a. ☐ b. ☐ c. ☐ d. ☐

2. Alchemy dealt primarily with _____.
   a. symbols
   b. metals
   c. organic compounds
   d. utensils

2a. ☐ b. ☐ c. ☐ d. ☐

3. An example of an element is _____.
   a. H_2O
   b. H_2
   c. H_2CO_3
   d. NH_3

3a. ☐ b. ☐ c. ☐ d. ☐

4. The fundamental unit of an element is _____.
   a. a group
   b. a proton
   c. a molecule
   d. an atom

4a. ☐ b. ☐ c. ☐ d. ☐

5. A chemical change always involves _____.
   a. a separation of molecules
   b. a breakdown of molecules
   c. a loss of energy
   d. a change in properties

5a. ☐ b. ☐ c. ☐ d. ☐

6. The basic unit of a compound is _____.
   a. an atom
   b. a nucleus
   c. a molecule
   d. a radical

6a. ☐ b. ☐ c. ☐ d. ☐

7. An example of a compound is _____.
   a. H_3O^+
   b. H_2
   c. H_3
   d. H_2O

7a. ☐ b. ☐ c. ☐ d. ☐

8. An example of a mixture is _____.
   a. salt water
   b. sodium bicarbonate
   c. hot water
   d. sodium chloride

8a. ☐ b. ☐ c. ☐ d. ☐

9. In these choices the *in*organic compound is _____.
   a. C_2H_6
   b. C_6H_5OH
   c. CO_2
   d. $C_6H_{12}O_6$

9a. ☐ b. ☐ c. ☐ d. ☐

10. Organic compounds are produced by the _____.
   a. lithosphere
   b. biosphere
   c. hydrosphere
   d. asthenosphere

10a. ☐ b. ☐ c. ☐ d. ☐

☐

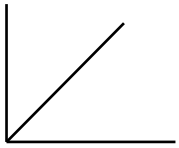
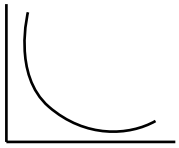
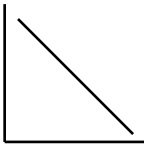
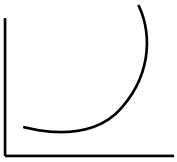
1103

1. As the temperature of a phase increases, so does the _____ of its molecules.
   a. kinetic energy
   b. potential energy
   c. mass
   d. density

1a. ☐
b. ☐
c. ☐
d. ☐

2. Evidence of the kinetic molecular nature of matter is _____.
   a. a chemical reaction
   b. a nuclear reaction
   c. a phase change
   d. diffusion

2a. ☐
b. ☐
c. ☐
d. ☐

3. A graph of Boyle's law relationship is _____.
   a. 
   b. 
   c. 
   d. 

3a. ☐
b. ☐
c. ☐
d. ☐

4. A mathematical statement of Boyle's law is _____.
   a. $P = kV$
   b. $V = kP$
   c. $P + V = k$
   d. $P \bullet V = k$

4a. ☐
b. ☐
c. ☐
d. ☐

5. Charles's law describes the relationship between _____ in a gas.
   a. pressure and volume
   b. pressure and temperature
   c. volume and temperature
   d. pressure, volume, and temperature

5a. ☐
b. ☐
c. ☐
d. ☐

6. A mathematical statement of Charles's law is _____.
   a. $VT = k$
   b. $V = kT$
   c. $V + T = k$
   d. $V + k = T$

6a. ☐
b. ☐
c. ☐
d. ☐

7. A correct statement of the combined gas law is _____.
   a. $P_1V_1T_1 = P_2V_2T_2$
   b. $\frac{P_1}{V_1T_1} = \frac{P_2}{V_2T_2}$
   c. $\frac{V_1}{P_1T_1} = \frac{V_2}{P_2T_2}$
   d. $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$

7a. ☐
b. ☐
c. ☐
d. ☐

8. In Boyle's law, Charles's law, and combined gas law, temperatures are given in degrees _____.
   a. Fahrenheit
   b. Celsius
   c. centigrade
   d. Kelvin

8a. ☐
b. ☐
c. ☐
d. ☐

9. Avogadro's hypothesis deals with the _____ in equal volumes of gas.
   a. energy
   b. number of particles
   c. masses
   d. molecular weights

9a. ☐
b. ☐
c. ☐
d. ☐

10. If the atomic mass of oxygen is 15.9994, one mole of O_2 is _____.
    a. 15.9994 amu
    b. 15.9994 grams
    c. 7.9997 grams
    d. 31.9988 grams

10a. ☐
b. ☐
c. ☐
d. ☐

1104

1. Until late in the nineteenth century, the atomic model resembled _____.
   a. a marble
   b. a raisin pudding
   c. a solar system
   d. a cloud

1a. ☐
b. ☐
c. ☐
d. ☐

2. Experiments by Geiger, Mardsen, and Rutherford yielded the _____ atomic model.
   a. plum pudding
   b. quantum
   c. planetary
   d. wave-particle

2a. ☐
b. ☐
c. ☐
d. ☐

3. Discovery of the atomic nucleus is credited (somewhat generously) to _____.
   a. Dalton
   b. Thomson
   c. Rutherford
   d. Bohr

3a. ☐
b. ☐
c. ☐
d. ☐

4. The planetary atom with quantized energy levels is attributed to _____.
   a. Dalton
   b. Thomson
   c. Rutherford
   d. Bohr

4a. ☐
b. ☐
c. ☐
d. ☐

5. Bohr explained the emission spectrum of the element _____.
   a. hydrogen
   b. helium
   c. uranium
   d. gold

5a. ☐
b. ☐
c. ☐
d. ☐

6. An atom emits energy when _____.
   a. electrons move in circular orbit
   b. electrons move to higher energy levels
   c. electrons move to lower energy levels
   d. electrons leave the atom

6a. ☐
b. ☐
c. ☐
d. ☐

7. Periodicity is best characterized by _____.
   a. the fact that elements increase in atomic mass in a regular way
   b. the cyclical nature of physical and chemical properties
   c. the regular growth of atomic size with atomic mass
   d. the repeating nature of nuclear structure

7a. ☐
b. ☐
c. ☐
d. ☐

8. The scientist credited with developing the Periodic Table was _____.
   a. Dalton
   b. Nobel
   c. Mendeleev
   d. de Broglie

8a. ☐
b. ☐
c. ☐
d. ☐

9. The final result of a nuclear fission reaction is _____.
   a. lead
   b. radioactive nuclides
   c. energy
   d. an inert gas

9a. ☐
b. ☐
c. ☐
d. ☐

10. In the reaction, $^{76}_{33}As \longrightarrow {}^{0}_{-1}e + X$, the atomic mass of X is _____.
   a. 76
   b. 77
   c. 33
   d. 34

10a. ☐
b. ☐
c. ☐
d. ☐

☐

1105

1. The Al^{+3} ion will combine with _____ Cl^{-} ion (s).
   a. one
   b. two
   c. three
   d. four
2. Three NO_3^{-} ions will combine with _____ Al^{+3} ion (s).
   a. one
   b. two
   c. three
   d. four
3. The term that best describes electronegativity is _____.
   a. atomic charge
   b. nuclear mass
   c. attracting ability
   d. electron cloud
4. A hybrid bond is a mixture of different types of _____.
   a. compounds
   b. isotopes
   c. elements
   d. orbitals
5. If atoms with similar electronegativities form a bond, the bond would most likely be _____.
   a. a polar bond
   b. a covalent bond
   c. an ionic bond
   d. a metallic bond
6. Electron transfer occurs with _____ bonds.
   a. ionic
   b. covalent
   c. metallic
   d. hydrogen
7. Compounds whose components have a high difference in electronegativity have a high percent _____ character.
   a. ionic
   b. covalent
   c. metallic
   d. hydrogen
8. Bonding electrons that are free to wander are characteristic of _____ bonds.
   a. ionic
   b. covalent
   c. metallic
   d. hydrogen
9. A molecule that is electrically lopsided is _____.
   a. polar
   b. elongated
   c. symmetrical
   d. nonpolar
10. The polar compound is _____.
   a. $AlCl_3$
   b. H_2
   c. CCl_4
   d. H_2O

1a. ☐ b. ☐ c. ☐ d. ☐

2a. ☐ b. ☐ c. ☐ d. ☐

3a. ☐ b. ☐ c. ☐ d. ☐

4a. ☐ b. ☐ c. ☐ d. ☐

5a. ☐ b. ☐ c. ☐ d. ☐

6a. ☐ b. ☐ c. ☐ d. ☐

7a. ☐ b. ☐ c. ☐ d. ☐

8a. ☐ b. ☐ c. ☐ d. ☐

9a. ☐ b. ☐ c. ☐ d. ☐

10a. ☐ b. ☐ c. ☐ d. ☐

1106

1. These occurrences are manifestations of chemical reactions *except* _____.
   a. the change in color of leaves in autumn
   b. the rusting of iron
   c. the freezing of water
   d. the burning of wood

1a. ☐ b. ☐ c. ☐ d. ☐

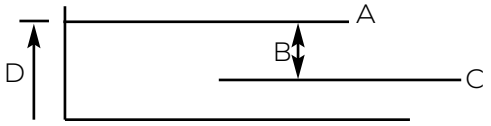
2. The phenomenon that accompanies *every* chemical reaction is _____.
   a. a change in temperature
   b. a change in color
   c. the evolution of gas
   d. the formation of a solid

2a. ☐ b. ☐ c. ☐ d. ☐

3. Energy tied up in chemical bonds are called _____.
   a. momentum
   b. entropy
   c. enthalpy
   d. kinesis

3a. ☐ b. ☐ c. ☐ d. ☐

4. In the enthalpy diagram the heat of reaction is designated by _____.
   a. A
   b. B
   c. C
   d. D



4a. ☐ b. ☐ c. ☐ d. ☐

5. If additional reactant is added to a reversible reaction, the result would be _____.
   a. the reaction goes to completion
   b. the amount of products equals the amount of reactants
   c. the reaction reaches equilibrium
   d. more reactants are produced

5a. ☐ b. ☐ c. ☐ d. ☐

6. The reaction $4\ NH_3 + 5\ O_2 \rightarrow 4\ NO + 6\ H_2O$ will go to completion if _____.
   a. H_2O is removed
   b. NH_3 is removed
   c. NO is added
   d. O_2 is removed

6a. ☐ b. ☐ c. ☐ d. ☐

7. Equilibrium in a reversible reaction requires that _____.
   a. the reaction equation must be balanced
   b. concentrations on both sides must be equal
   c. rate of the reverse reaction
   d. the moles of products must be equal the moles of reactants

7a. ☐ b. ☐ c. ☐ d. ☐

8. A factor that will decrease the rate of an exothermic reaction is _____.
   a. the addition of a catalyst
   b. an increase of reactants
   c. addition of heat
   d. a decrease of products

8a. ☐ b. ☐ c. ☐ d. ☐

9. Raising the temperature of a reaction increases the rate of reaction, but does *not* increase the _____.
   a. activation energy requirements
   b. number of collisions
   c. vibrational motions within the molecules
   d. average velocity of the reacting particles

9a. ☐ b. ☐ c. ☐ d. ☐

10. A correct statement about collision geometry, concentration, and catalyst is _____.
    a. increasing the concentration of reactants increases the collisions
    b. a catalyst raises the activation energy requirements
    c. the fastest reaction in a reaction mechanism determines the overall rate of reaction
    d. optimum collision geometry raises the activation energy requirement

10a. ☐ b. ☐ c. ☐ d. ☐

☐

1107

1. The gram-formula weight is the combined mass of _____ of a substance.
   a. one mole
   b. 22.4 moles
   c. one gram
   d. one molecule

1a. ☐ b. ☐ c. ☐ d. ☐

2. A one molar solution is made up of _____.
   a. one gram solute plus one liter solvent
   b. one mole solute plus one liter solvent
   c. one liter solute plus one liter solvent
   d. one mole solute in one liter solution

2a. ☐ b. ☐ c. ☐ d. ☐

3. The factor that causes a solution to be a good electrical conductor is _____.
   a. presence of ions
   b. presence of metal
   c. presence of electrons
   d. presence of protons

3a. ☐ b. ☐ c. ☐ d. ☐

4. A solution of 0.1 M NaCl conducts more electricity than a 0.1 NaI solution primarily because _____.
   a. NaCl has a higher number of potential ions
   b. NaI is less ionic in bond character
   c. the electronegativity of Na changes from NaCl to NaI
   d. one mole of NaI requires more water to dissolve

4a. ☐ b. ☐ c. ☐ d. ☐

5. As the concentration of a given solution increases, the conductivity of the solution _____.
   a. increases
   b. decreases
   c. remains constant
   d. may increase or may decrease

5a. ☐ b. ☐ c. ☐ d. ☐

6. When one mole of sodium chloride dissociates in water, the result is _____.
   a. one mole of ions
   b. two moles of ions
   c. one-half mole of chloride ions
   d. one-half mole of sodium ions

6a. ☐ b. ☐ c. ☐ d. ☐

7. An acid is _____.
   a. a proton acceptor
   b. a proton donor
   c. any compound containing hydrogen
   d. any compound that is a hydroxide

7a. ☐ b. ☐ c. ☐ d. ☐

8. A solution that is neutral has a pH of _____.
   a. 0
   b. 1
   c. 7
   d. 14

8a. ☐ b. ☐ c. ☐ d. ☐

9. A correct statement about cations is that they _____.
   a. are attracted to the anode
   b. undergo oxidation at the appropriate electrode
   c. undergo reduction at the appropriate electrode
   d. are negatively charged

9a. ☐ b. ☐ c. ☐ d. ☐

10. In the reaction $Cu + Cl_2 \longrightarrow CuCl_2$, _____.
    a. copper is oxidized
    b. chlorine is oxidized
    c. oxidation occurs without reduction
    d. neither oxidation nor reduction occurs

10a. ☐ b. ☐ c. ☐ d. ☐

☐

1108

1. The element that characterizes organic compounds is _____.
   a. hydrogen
   b. carbon
   c. oxygen
   d. nitrogen

1a. ☐
b. ☐
c. ☐
d. ☐

2. The combustion of methane (CH_4) yields _____.
   a. CH_4OH
   b. COOH
   c. H_2O_2 and CO
   d. H_2O and CO_2

2a. ☐
b. ☐
c. ☐
d. ☐

3. Carbon is _____.
   a. a metal
   b. a nonmetal
   c. an inert gas
   d. a rare earth metal

3a. ☐
b. ☐
c. ☐
d. ☐

4. Carbon has valences of _____.
   a. +1, -3
   b. -1, +3
   c. +4, -4
   d. +4, -2

4a. ☐
b. ☐
c. ☐
d. ☐

5. The geometry of the CH_4 molecule is _____.
   a. rectangular
   b. linear
   c. ring-shaped
   d. tetrahedral

5a. ☐
b. ☐
c. ☐
d. ☐

6. Covalent bonds result from _____ electrons.
   a. shared
   b. donated
   c. accepted
   d. free

6a. ☐
b. ☐
c. ☐
d. ☐

7. Pentane contains _____ carbon atoms.
   a. five
   b. four
   c. three
   d. two

7a. ☐
b. ☐
c. ☐
d. ☐

8. An important characteristic of alkanes is their ability to _____.
   a. combust
   b. combine
   c. react
   d. reduce

8a. ☐
b. ☐
c. ☐
d. ☐

9. The alkene series has at least one _____ band.
   a. single
   b. double
   c. three-fold
   d. four-fold

9a. ☐
b. ☐
c. ☐
d. ☐

10. Members of the alkyne series have the general composition _____.
   a. C_nH_{2n}
   b. C_nH_n
   c. C_nH_{2n-2}
   d. C_nH_{2n+2}

10a. ☐
b. ☐
c. ☐
d. ☐

☐

1109

1. In the reaction, $CH_4 + Cl_2 \longrightarrow CH_3Cl + X$, X is _____.
   a. CH_3Cl
   b. CCl_4
   c. CCl_2
   d. HCl

1a. ☐ b. ☐ c. ☐ d. ☐

2. The type of reaction shown in Item 1 is _____.
   a. a substitution
   b. an addition
   c. a transformation
   d. a hydrogenation

2a. ☐ b. ☐ c. ☐ d. ☐

3. In the reaction, $C_6H_6 + 2Cl_2 \longrightarrow 2HCl + X$, X is _____.
   a. H_2Cl_2
   b. C_6Cl_4
   c. $C_6H_4Cl_2$
   d. CH_2

3a. ☐ b. ☐ c. ☐ d. ☐

4. The ring structure of unsaturated hydrocarbons is called the _____ ring.
   a. ethane
   b. pentane
   c. phosgene
   d. benzene

4a. ☐ b. ☐ c. ☐ d. ☐

5. Organic compounds with the OH^- group are _____.
   a. ketones
   b. alcohols
   c. alkanes
   d. esters

5a. ☐ b. ☐ c. ☐ d. ☐

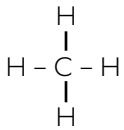
6. In the reaction, $mCO + nH_2 \longrightarrow pCH_3OH$ (where *m*, *n*, and *p* are integers), the value of *n* is _____.
   a. 1
   b. 2
   c. 3
   d. 4

6a. ☐ b. ☐ c. ☐ d. ☐

7. Amides are the basic structural element in the long-chain molecules that make up _____.
   a. proteins
   b. fats
   c. alcohols
   d. water

7a. ☐ b. ☐ c. ☐ d. ☐

8. The general structural formula for an amine is _____.

a.


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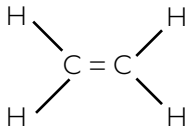

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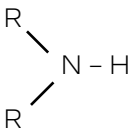

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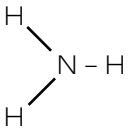


8a. ☐ b. ☐ c. ☐ d. ☐

9. Proteins are composed of _____.
   a. aldehyde acids
   b. amides
   c. benzenes
   d. amino acids

9a. ☐ b. ☐ c. ☐ d. ☐

10. Amino acids are to proteins as _____.
   a. raisins are to puddings
   b. links are to chains
   c. gas is to balloons
   d. bricks are to walls

10a. ☐ b. ☐ c. ☐ d. ☐

☐

1110

1. In expanded form, $13 \cdot 10^{-3}$ becomes _____.
   a. 133
   b. 13,000
   c. $\frac{3}{13}$
   d. .013

1a. ☐
b. ☐
c. ☐
d. ☐

2. An example of a phase change is _____.
   a. water boiling
   b. a bomb exploding
   c. iron rusting
   d. leaves turning

2a. ☐
b. ☐
c. ☐
d. ☐

3. The rotting of meat is _____.
   a. a phase change
   b. a chemical change only
   c. a physical change
   d. both a physical and a chemical change

3a. ☐
b. ☐
c. ☐
d. ☐

4. Boyle's law describes the relationship between _____ in a gas.
   a. pressure and volume
   b. pressure and temperature
   c. volume and temperature
   d. pressure, volume, and temperature

4a. ☐
b. ☐
c. ☐
d. ☐

5. As a result of J. J. Thomson's work, the atomic model came to resemble _____.
   a. a marble
   b. a raisin pudding
   c. a solar system
   d. a cloud

5a. ☐
b. ☐
c. ☐
d. ☐

6. When two atoms react that have similar electronegativities, _____ bond is formed.
   a. an ionic
   b. a covalent
   c. metallic
   d. hydrogen

6a. ☐
b. ☐
c. ☐
d. ☐

7. Sharing of electrons is a characteristic of _____ bonds.
   a. ionic
   b. covalent
   c. metallic
   d. hydrogen

7a. ☐
b. ☐
c. ☐
d. ☐

8. Substances produced in a chemical reaction are called _____.
   a. reagents
   b. reactants
   c. aliquots
   d. products

8a. ☐
b. ☐
c. ☐
d. ☐

9. A reaction that releases energy is _____.
   a. entropic
   b. exalthic
   c. exothermic
   d. endothermic

9a. ☐
b. ☐
c. ☐
d. ☐

10. Amino acids are connected by _____.
    a. peptide bonds
    b. carbon atoms
    c. water molecules
    d. alcohols

10a. ☐
b. ☐
c. ☐
d. ☐

☐

1201

1. A quantity that has magnitude only is _____.
   a. vector
   b. scalar
   c. tensor
   d. visor

1a. ☐
b. ☐
c. ☐
d. ☐

2. Of the following quantities the only scalar is _____.
   a. momentum
   b. velocity
   c. acceleration
   d. distance

2a. ☐
b. ☐
c. ☐
d. ☐

3. The vector sum of 3 newtons and 4 newtons _____.
   a. is 1 newton
   b. is 7 newtons
   c. is 5 newtons
   d. cannot be determined from the given information

3a. ☐
b. ☐
c. ☐
d. ☐

4. The scalar sum of 3 newtons and 4 newtons _____.
   a. is 1 newton
   b. is 7 newtons
   c. is 5 newtons
   d. cannot be determined from the given information

4a. ☐
b. ☐
c. ☐
d. ☐

5. Traveling 30 kilometers per hour, a train travels 10 kilometers in _____.
   a. 3 hours
   b. 10 hours
   c. 20 minutes
   d. 30 minutes

5a. ☐
b. ☐
c. ☐
d. ☐

6. A point on the Earth's equator (25,000 miles in circumference) travels approximately _____ in three hours.
   a. 0 miles
   b. 3,000 miles
   c. 25,000 miles
   d. 186,000 miles

6a. ☐
b. ☐
c. ☐
d. ☐

7. Units of acceleration are _____.
   a. $\frac{\text{km}}{\text{sec.}}$
   b. $\frac{\text{miles}}{\text{hour}}$
   c. $\frac{\text{kg} \bullet \text{m}}{\text{sec.}^2}$
   d. $\frac{\text{feet/hour}}{\text{sec.}}$

7a. ☐
b. ☐
c. ☐
d. ☐

8. Acceleration is defined as a time rate of change of _____.
   a. displacement
   b. distance
   c. velocity
   d. speed

8a. ☐
b. ☐
c. ☐
d. ☐

9. An early atomic model was _____.
   a. the solar system
   b. a water wave
   c. a magnet
   d. a tree

9a. ☐
b. ☐
c. ☐
d. ☐

10. A word that best describes *field* is _____.
   a. value
   b. class
   c. line
   d. pole

10a. ☐
b. ☐
c. ☐
d. ☐

☐

1202

1. Acceleration is produced by _____.
   a. velocity
   b. momentum
   c. impulse
   d. inertia

1a. ☐
b. ☐
c. ☐
d. ☐

2. Momentum is expressed as _____.
   a. m • v
   b. m • a
   c. f • t
   d. mgh

2a. ☐
b. ☐
c. ☐
d. ☐

3. Inertia is a good term to summarize _____.
   a. Newton's first law of motion
   b. Newton's second law of motion
   c. Newton's third law of motion
   d. Newton's law of gravitation

3a. ☐
b. ☐
c. ☐
d. ☐

4. A planet stays in orbit primarily because of _____.
   a. centrifugal force
   b. magnetic and electrostatic forces
   c. centripetal force and Newton's first law
   d. Newton's third law

4a. ☐
b. ☐
c. ☐
d. ☐

5. An unalterable property of an object is its _____.
   a. momentum
   b. mass
   c. weight
   d. velocity

5a. ☐
b. ☐
c. ☐
d. ☐

6. A measure of a planet's gravitational field on a nearby object is its _____.
   a. mass
   b. distance from the planet
   c. weight
   d. density

6a. ☐
b. ☐
c. ☐
d. ☐

7. If a pitched baseball has a momentum of 10 units, its momentum when hit back to the pitcher might be _____ units.
   a. 10
   b. 20
   c. -10
   d. 0

7a. ☐
b. ☐
c. ☐
d. ☐

8. Two boxcars have a momenta of A units and B units, respectively. After coupling the momentum of the two boxcars will be _____.
   a. A + B
   b. 0
   c. A – B
   d. $\frac{A+B}{2}$

8a. ☐
b. ☐
c. ☐
d. ☐

9. Kepler's concept of the universe was most like that of _____.
   a. Galileo
   b. Aristotle
   c. Brahe
   d. Ptolemy

9a. ☐
b. ☐
c. ☐
d. ☐

10. An advantage Galileo had over Copernicus and Brahe was _____.
    a. superior intelligence
    b. the telescope
    c. painstaking technique
    d. financial support

10a. ☐
b. ☐
c. ☐
d. ☐

☐

1203

1. The ability to do work is _____.
   a. momentum
   b. inertia
   c. force
   d. energy

1a. ☐
b. ☐
c. ☐
d. ☐

2. The form of energy in falling water is _____.
   a. electrical
   b. mechanical
   c. chemical
   d. solar

2a. ☐
b. ☐
c. ☐
d. ☐

3. At the bottom of its swing, a pendulum has 10 units of kinetic energy. At each of the high points of its swing, the pendulum will have _____ units of energy.
   a. 5
   b. 0
   c. 10
   d. 20

3a. ☐
b. ☐
c. ☐
d. ☐

4. A spring that stores 80 joules of potential energy will propel a ten-kilogram mass at _____ meters per second.
   a. 80
   b. 10
   c. 16
   d. 4

4a. ☐
b. ☐
c. ☐
d. ☐

5. The potential energy of a ten-kilogram mass 5 meters above the ground is approximately _____ joules.
   a. 10
   b. 50
   c. 100
   d. 500

5a. ☐
b. ☐
c. ☐
d. ☐

6. A 75-watt bulb consumes the equivalent of 150 joules of energy in _____ seconds.
   a. one
   b. two
   c. 75
   d. 100

6a. ☐
b. ☐
c. ☐
d. ☐

7. A heat engine is a practical application of the principles of _____.
   a. Newtonian physics
   b. thermodynamics
   c. atomic physics
   d. wave motion

7a. ☐
b. ☐
c. ☐
d. ☐

8. A heat engine operates at 400° K and exhausts waste gas at 200° K. The efficiency of the engine is _____ percent.
   a. 400
   b. 200
   c. 100
   d. 50

8a. ☐
b. ☐
c. ☐
d. ☐

9. Fifty calories of heat are added to a gram of ice at 0° C. The water will experience a change in temperature of _____ degrees.
   a. 0
   b. 1
   c. 2
   d. 50

9a. ☐
b. ☐
c. ☐
d. ☐

10. Fifty calories of heat are added to a gram of liquid water at 0° C. The water will experience a change in temperature of _____ degrees.
    a. 0
    b. 1
    c. 2
    d. 50

10a. ☐
b. ☐
c. ☐
d. ☐

☐

1204

1. A nonrepetitive disturbance in a medium is _____.
   a. a period
   b. a pulse
   c. an epoch
   d. a splash

1a. ☐
b. ☐
c. ☐
d. ☐

2. Longitudinal waves cannot be _____.
   a. reflected
   b. refracted
   c. diffracted
   d. polarized

2a. ☐
b. ☐
c. ☐
d. ☐

3. The period of a wave is the reciprocal of its _____.
   a. velocity
   b. amplitude
   c. frequency
   d. wave length

3a. ☐
b. ☐
c. ☐
d. ☐

4. An equation relating velocity, frequency, and wave length is _____.
   a. $v = \frac{f}{w}$
   b. $V = fw$
   c. $v = \frac{w}{f}$
   d. $f = vw$

4a. ☐
b. ☐
c. ☐
d. ☐

5. When a wave meets a barrier, the angle of incidence equals the angle of _____.
   a. reflection
   b. refraction
   c. diffraction
   d. polarization

5a. ☐
b. ☐
c. ☐
d. ☐

6. The bending of waves as they pass through a hole in a barrier is _____.
   a. reflection
   b. refraction
   c. diffraction
   d. polarization

6a. ☐
b. ☐
c. ☐
d. ☐

7. Standing waves result from _____.
   a. interference of identical waves
   b. interference of unequal wave lengths
   c. refraction of a wave front
   d. polarization of dissimilar waves

7a. ☐
b. ☐
c. ☐
d. ☐

8. During resonance, a vibrating object sets up in a second object vibrations that _____.
   a. destroy the second object
   b. are of higher frequency than those in the first object
   c. are of lower frequency
   d. are equal in frequency

8a. ☐
b. ☐
c. ☐
d. ☐

9. The Doppler effect occurs _____.
   a. when the wave generator is moving
   b. for sound waves only
   c. for transverse waves only
   d. for very high frequencies only

9a. ☐
b. ☐
c. ☐
d. ☐

10. When electrons travel faster than light, _____.
    a. a red light occurs
    b. a blue light occurs
    c. no light occurs
    d. they evaporate

10a. ☐
b. ☐
c. ☐
d. ☐

☐

1205

1. The indices of refraction for material substances is _____ the index of refraction for a vacuum.
   a. less than
   b. equal to
   c. greater than
   d. proportional to

1a. ☐
b. ☐
c. ☐
d. ☐

2. The incident angle that produces total internal reflection is called the _____ angle.
   a. reflection
   b. index
   c. polarization
   d. critical

2a. ☐
b. ☐
c. ☐
d. ☐

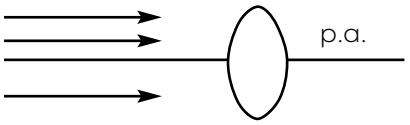
3. Polarization commonly occurs when light is _____.
   a. diffracted
   b. reflected
   c. refracted
   d. dispersed

3a. ☐
b. ☐
c. ☐
d. ☐

4. The spreading of light into colors of the spectrum is termed _____.
   a. dispersion
   b. diffusion
   c. scattering
   d. refracting

4a. ☐
b. ☐
c. ☐
d. ☐

5. Rays parallel to the principal axis (p. a.) will _____.
   a. never converge
   b. converge on the left side of the lens
   c. converge on the right side of the lens
   d. only seem to converge



5a. ☐
b. ☐
c. ☐
d. ☐

6. A virtual image is *always* _____.
   a. erect
   b. inverted
   c. reduced
   d. blurred

6a. ☐
b. ☐
c. ☐
d. ☐

7. Common interference patterns of light are due to _____.
   a. refraction
   b. dispersion
   c. diffraction
   d. reflection

7a. ☐
b. ☐
c. ☐
d. ☐

8. Diffraction occurs when _____.
   a. the wave length is significantly smaller than the opening
   b. the wave length approximates the size of the opening
   c. the index of refraction approximates the wave length
   d. the medium is dispersive

8a. ☐
b. ☐
c. ☐
d. ☐

9. Both water waves and marbles can demonstrate _____.
   a. refraction
   b. interference
   c. polarization
   d. diffraction

9a. ☐
b. ☐
c. ☐
d. ☐

10. The strongest evidence for the photon model of light is _____.
    a. interference
    b. the photoelectric effect
    c. the Doppler effect
    d. refraction

10a. ☐
b. ☐
c. ☐
d. ☐

1206

1. The contribution of William Gilbert was the _____.
   a. measurement of the electron charge
   b. discovery of the atomic nucleus
   c. invention of the cathode ray tube
   d. discovery of electrical charges

1a. ☐ b. ☐ c. ☐ d. ☐

2. A positive charge on an object is caused by _____.
   a. an excess of protons
   b. an excess of electrons
   c. a deficiency of protons
   d. a deficiency of electrons

2a. ☐ b. ☐ c. ☐ d. ☐

3. The law of attraction can be stated as _____.
   a. $Q = cv$
   b. $E = \frac{F}{q}$
   c. $E = mc^2$
   d. $F = K \frac{Q_1Q_2}{r^2}$

3a. ☐ b. ☐ c. ☐ d. ☐

4. If the force between two point charges is four units at three units of separation, the force at six units of separation is _____ units.
   a. six
   b. four
   c. three
   d. two

4a. ☐ b. ☐ c. ☐ d. ☐

5. The space around a charge or a pole in which a force is experienced is called a _____.
   a. force line
   b. domain
   c. test charge
   d. field

5a. ☐ b. ☐ c. ☐ d. ☐

6. Electric fields normally present in the air are generally _____.
   a. dangerous
   b. oblique in direction
   c. horizontal in direction
   d. vertical in direction

6a. ☐ b. ☐ c. ☐ d. ☐

7. The formula that relates voltage, distance, and electric field is _____.
   a. $V = \frac{E}{d}$
   b. $d = \frac{E}{V}$
   c. $E = \frac{V}{d}$
   d. $V = \frac{d}{E}$

7a. ☐ b. ☐ c. ☐ d. ☐

8. A charge accelerating in an electric field is losing _____.
   a. momentum
   b. velocity
   c. potential energy
   d. kinetic energy

8a. ☐ b. ☐ c. ☐ d. ☐

9. The electric field strength *E* is measured as _____.
   a. force per unit mass
   b. force times mass
   c. charge per unit force
   d. force per unit charge

9a. ☐ b. ☐ c. ☐ d. ☐

10. The *ideal* way to measure the strength and direction of an electric field is to place in the field a _____.
    a. neutral object with an unknown mass
    b. charged object with an unknown mass
    c. neutral object of no mass
    d. charged object of no mass

10a. ☐ b. ☐ c. ☐ d. ☐

☐

1207

1. The driving influence for an electric current is called _____.
   a. ammeter
   b. electromotive force
   c. resistance
   d. chargenpuscher

1a. ☐
b. ☐
c. ☐
d. ☐

2. The unit of electromotive force is the _____.
   a. newton
   b. coulomb
   c. volt
   d. newton per coulomb

2a. ☐
b. ☐
c. ☐
d. ☐

3. A device in electricity that is analogous to a water pump is _____.
   a. a resistance
   b. a conductor
   c. a generator
   d. an ammeter

3a. ☐
b. ☐
c. ☐
d. ☐

4. In a series circuit current is _____.
   a. diffused
   b. unknown
   c. constant
   d. variable

4a. ☐
b. ☐
c. ☐
d. ☐

5. If the length of a conductor increases, its resistance _____.
   a. increases
   b. decreases
   c. remains unchanged

5a. ☐
b. ☐
c. ☐

6. If the diameter of a conductor increases, its resistance _____.
   a. increases
   b. decreases
   c. remains unchanged

6a. ☐
b. ☐
c. ☐

7. If a resistance is added in series to a circuit, the circuit resistance is then _____.
   a. greater
   b. less
   c. the same
   d. redirected

7a. ☐
b. ☐
c. ☐
d. ☐

8. The fact that the total current delivered by a source to a parallel circuit must equal the sum of the currents delivered to the branches is an application of the principle of _____.
   a. Newton's second law
   b. conservation of energy
   c. conservation of charge
   d. Coulomb's law

8a. ☐
b. ☐
c. ☐
d. ☐

9. A series circuit has an emf of 120 volts and 0.5 amps. The resistance in the circuit is _____ ohms.
   a. 0.004
   b. 0.15
   c. 60
   d. 240

9a. ☐
b. ☐
c. ☐
d. ☐

10. A circuit has an emf of 120 volts and a circuit of 0.5 amperes through one resistance. The power developed in that resistance is _____ watts.
    a. 0.004
    b. 0.15
    c. 60
    d. 240

10a. ☐
b. ☐
c. ☐
d. ☐

☐

1208

1. The phrase that best describes the space around a magnetic pole is _____.
   a. a line of force
   b. an area of impulse
   c. a sphere of influence
   d. a point of focus

1a. ☐ b. ☐ c. ☐ d. ☐

2. The magnetic field of a solenoid (coil) is similar to the field of _____.
   a. a horseshoe magnet
   b. a bar magnet
   c. a moving charge
   d. a long, straight wire

2a. ☐ b. ☐ c. ☐ d. ☐

3. If the force is eight units between two poles separated by two units of distance, the force will be two units when the poles are separated by _____ units of distance.
   a. two
   b. four
   c. six
   d. eight

3a. ☐ b. ☐ c. ☐ d. ☐

4. The formula for the force of attraction or repulsion between two magnetic poles is _____.
   a. $F_m = K \frac{r^2}{M_1M_2}$
   b. $F_m = r^2 \frac{K}{M_1M_2}$
   c. $F_m = K \frac{M_1 + M_2}{r}$
   d. $F_m = K \frac{M_1M_2}{r^2}$

4a. ☐ b. ☐ c. ☐ d. ☐

5. The Biot-Savart force law is shown as _____.
   a. $F = qB \sin \theta$
   b. $F_m = Bq$
   c. $F_{max} = qvB$
   d. $F_{max} = \sin \theta \, v$

5a. ☐ b. ☐ c. ☐ d. ☐

6. If a magnetic field is to exert a force on a current-carrying wire, the field must have some vector component _____ the current.
   a. parallel with
   b. concentric with
   c. tangential to
   d. perpendicular to

6a. ☐ b. ☐ c. ☐ d. ☐

7. Induction occurs when _____.
   a. a conductor is in an electric field
   b. a conductor moves through an electric field
   c. a conductor is in a magnetic field
   d. a conductor moves through a magnetic field

7a. ☐ b. ☐ c. ☐ d. ☐

8. In practice a transformer is composed of _____.
   a. a coil
   b. a rotor
   c. two coils
   d. a rotor and a coil

8a. ☐ b. ☐ c. ☐ d. ☐

9. A beam of charged particles can be deflected by _____.
   a. an electric field
   b. a magnetic field
   c. both an electric field and a magnetic field
   d. neither magnetic nor electric field

9a. ☐ b. ☐ c. ☐ d. ☐

10. A cathode ray is _____.
    a. a beam of electrons
    b. a beam of alpha particles
    c. electromagnetic radiation
    d. an evacuated glass tube

10a. ☐ b. ☐ c. ☐ d. ☐

☐

1209

1. The Bohr atomic model is an expansion of the planetary model of _____.
   a. Dalton
   b. Thomson
   c. Rutherford
   d. Millikan

1a. ☐
b. ☐
c. ☐
d. ☐

2. One of Bohr's postulates is _____.
   a. the hydrogen nucleus is negatively charged
   b. electrons orbit the hydrogen nucleus in a cloud
   c. electrons orbit the hydrogen nucleus in definite, discrete levels
   d. the centripetal force on the electron must be greater than the electrostatic attraction

2a. ☐
b. ☐
c. ☐
d. ☐

3. Line emission spectra always come from _____.
   a. a low temperature solid
   b. an incandescent bulb
   c. a high temperature solid
   d. an incandescent gas

3a. ☐
b. ☐
c. ☐
d. ☐

4. An absorption spectrum has _____ in the positions of the missing wave lengths.
   a. bright lines
   b. dark lines
   c. holes
   d. radiant energy

4a. ☐
b. ☐
c. ☐
d. ☐

5. The phenomenon of light energy being absorbed by electrons allowing them to escape from a metal surface is known as _____.
   a. the photoelectric effect
   b. the quantum effect
   c. escape theory
   d. electron transference

5a. ☐
b. ☐
c. ☐
d. ☐

6. Evidence for the particle nature of radiation is _____.
   a. the photoelectric effect
   b. reflection
   c. absorption
   d. interference

6a. ☐
b. ☐
c. ☐
d. ☐

7. The de Broglie wave associated with an automobile on the highway has a wavelength _____.
   a. considerably smaller than can be detected
   b. considerably larger than can be detected
   c. within the range of X rays
   d. the mass of a "Newtonian" object

7a. ☐
b. ☐
c. ☐
d. ☐

8. The uncertainty principle applies to determining _____.
   a. the charge on an electron
   b. the charge on an atomic nucleus
   c. the position of an electron
   d. the mass of an electron

8a. ☐
b. ☐
c. ☐
d. ☐

9 . The mass of a deuterium nucleus is _____ the sum of its components masses.
   a. greater than
   b. less than
   c. equal to
   d. independent of

9a. ☐
b. ☐
c. ☐
d. ☐

10. Alpha radiation is made up of _____.
   a. hydrogen nuclei
   b. helium nuclei
   c. electrons
   d. neutrons

10a. ☐
b. ☐
c. ☐
d. ☐

☐

1210

1. Kepler believed planetary orbits to be _____.
   a. epicycles
   b. circles
   c. ellipses
   d. parabolas

1a. ☐
b. ☐
c. ☐
d. ☐

2. *Power* is defined as *the time rate of change of* _____.
   a. work
   b. force
   c. momentum
   d. impulse

2a. ☐
b. ☐
c. ☐
d. ☐

3. The unit of power is the _____.
   a. joule
   b. newton
   c. foot-pound
   d. watt

3a. ☐
b. ☐
c. ☐
d. ☐

4. The unit of frequency is the _____.
   a. hertz
   b. joule
   c. newton
   d. faraday

4a. ☐
b. ☐
c. ☐
d. ☐

5. The strongest evidence for the wave model of light is _____.
   a. interference
   b. the photoelectric effect
   c. the Doppler effect
   d. refraction

5a. ☐
b. ☐
c. ☐
d. ☐

6. The inverse square law that describes electrostatic force was named for _____.
   a. Hans Oersted
   b. William Gilbert
   c. Charles Coulomb
   d. Isaac Newton

6a. ☐
b. ☐
c. ☐
d. ☐

7. The unit of electric field strength is the _____.
   a. newton
   b. coulomb
   c. volt
   d. newton per coulomb

7a. ☐
b. ☐
c. ☐
d. ☐

8. A device in electricity that is analogous to a water mill is _____.
   a. a resistance
   b. a conductor
   c. a generator
   d. an ammeter

8a. ☐
b. ☐
c. ☐
d. ☐

9. If resistance is added in parallel to a circuit, the circuit resistance is then _____.
   a. greater
   b. less
   c. the same
   d. redirected

9a. ☐
b. ☐
c. ☐
d. ☐

10. Induction is the principle applied in _____.
    a. generators and transformers
    b. generators and motors
    c. resistors and motors
    d. motors and transformers

10a. ☐
b. ☐
c. ☐
d. ☐

☐

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SCIENCE

Placement Test Answer Keys

700-1200

701	702	703	704	705
1a. ■	1a. □	1a. ■	1a. □	1a. □
b. □	b. □	b. □	b. □	b. □
c. □	c. ■	c. □	c. ■	c. □
d. □	d. □	d. □	d. □	d. ■
2a. □	2a. □	2a. □	2a. □	2a. □
b. □	b. □	b. ■	b. □	b. □
c. □	c. □	c. □	c. ■	c. ■
d. ■	d. ■	d. □	d. □	d. □
3a. □	3a. □	3a. □	3a. □	3a. ■
b. □	b. □	b. ■	b. ■	b. □
c. ■	c. ■	c. □	c. □	c. □
d. □	d. □	d. □	d. □	d. □
4a. □	4a. ■	4a. □	4a. □	4a. □
b. □	b. □	b. ■	b. □	b. □
c. □	c. □	c. □	c. ■	c. □
d. ■	d. □	d. □	d. □	d. ■
5a. ■	5a. □	5a. □	5a. □	5a. ■
b. □	b. □	b. ■	b. ■	b. □
c. □	c. ■	c. □	c. □	c. □
d. □	d. □	d. □	d. □	d. □
6a. □	6a. □	6a. □	6a. ■	6a. □
b. □	b. ■	b. ■	b. □	b. □
c. ■	c. □	c. □	c. □	c. □
d. □	d. □	d. □	d. □	d. ■
7a. ■	7a. □	7a. □	7a. □	7a. ■
b. □	b. ■	b. ■	b. ■	b. □
c. □	c. □	c. □	c. □	c. □
d. □	d. □	d. □	d. □	d. □
8a. □	8a. ■	8a. □	8a. ■	8a. □
b. □	b. □	b. ■	b. □	b. ■
c. □	c. □	c. □	c. □	c. □
d. ■	d. □	d. □	d. □	d. □
9a. □	9a. □	9a. □	9a. □	9a. □
b. □	b. □	b. □	b. □	b. □
c. ■	c. □	c. □	c. ■	c. ■
d. □	d. ■	d. ■	d. □	d. □
10a. □	10a. □	10a. □	10a. □	10a. □
b. ■	b. ■	b. □	b. ■	b. □
c. □	c. □	c. □	c. □	c. ■
d. □	d. □	d. ■	d. □	d. □

706	707	708	709	710
1a. ☐	1a. ☐	1a. ☐	1a. ☐	1a. ■
b. ■	b. ☐	b. ■	b. ■	b. ☐
c. ☐	c. ■	c. ☐	c. ☐	c. ☐
d. ☐	d. ☐	d. ☐	d. ☐	d. ☐
2a. ■	2a. ☐	2a. ☐	2a. ■	2a. ☐
b. ☐	b. ■	b. ☐	b. ☐	b. ☐
c. ☐	c. ☐	c. ■	c. ☐	c. ■
d. ☐	d. ☐	d. ☐	d. ☐	d. ☐
3a. ■	3a. ☐	3a. ■	3a. ☐	3a. ☐
b. ☐	b. ■	b. ☐	b. ☐	b. ☐
c. ☐	c. ☐	c. ☐	c. ■	c. ☐
d. ☐	d. ☐	d. ☐	d. ☐	d. ■
4a. ■	4a. ■	4a. ☐	4a. ■	4a. ☐
b. ☐	b. ☐	b. ☐	b. ☐	b. ☐
c. ☐	c. ☐	c. ■	c. ☐	c. ■
d. ☐	d. ☐	d. ☐	d. ☐	d. ☐
5a. ☐	5a. ☐	5a. ☐	5a. ☐	5a. ■
b. ☐	b. ☐	b. ■	b. ■	b. ☐
c. ■	c. ■	c. ☐	c. ☐	c. ☐
d. ☐	d. ☐	d. ☐	d. ☐	d. ☐
6a. ☐	6a. ☐	6a. ■	6a. ☐	6a. ■
b. ☐	b. ☐	b. ☐	b. ■	b. ☐
c. ☐	c. ☐	c. ☐	c. ☐	c. ☐
d. ■	d. ■	d. ☐	d. ☐	d. ☐
7a. ☐	7a. ■	7a. ☐	7a. ☐	7a. ☐
b. ☐	b. ☐	b. ☐	b. ☐	b. ■
c. ■	c. ☐	c. ■	c. ■	c. ☐
d. ☐	d. ☐	d. ☐	d. ☐	d. ☐
8a. ☐	8a. ■	8a. ■	8a. ☐	8a. ☐
b. ■	b. ☐	b. ☐	b. ☐	b. ☐
c. ☐	c. ☐	c. ☐	c. ☐	c. ■
d. ☐	d. ☐	d. ☐	d. ■	d. ☐
9a. ■	9a. ☐	9a. ☐	9a. ■	9a. ☐
b. ☐	b. ■	b. ■	b. ☐	b. ☐
c. ☐	c. ☐	c. ☐	c. ☐	c. ■
d. ☐	d. ☐	d. ☐	d. ☐	d. ☐
10a. ☐	10a. ☐	10a. ☐	10a. ☐	10a. ☐
b. ☐	b. ☐	b. ☐	b. ☐	b. ■
c. ☐	c. ☐	c. ☐	c. ■	c. ☐
d. ■	d. ■	d. ■	d. ☐	d. ☐

801	802	803	804	805
1a. ■	1a. □	1a. □	1a. □	1a. ■
b. □	b. □	b. ■	b. □	b. □
c. □	c. ■	c. □	c. ■	c. □
d. □	d. □	d. □	d. □	d. □
2a. □	2a. □	2a. ■	2a. □	2a. □
b. □	b. ■	b. □	b. □	b. □
c. ■	c. □	c. □	c. ■	c. ■
d. □	d. □	d. □	d. □	d. □
3a. □	3a. □	3a. ■	3a. □	3a. ■
b. ■	b. ■	b. □	b. □	b. □
c. □	c. □	c. □	c. ■	c. □
d. □	d. □	d. □	d. □	d. □
4a. □	4a. □	4a. □	4a. □	4a. □
b. □	b. ■	b. □	b. ■	b. □
c. ■	c. □	c. □	c. □	c. □
d. □	d. □	d. ■	d. □	d. ■
5a. □	5a. □	5a. □	5a. □	5a. ■
b. □	b. □	b. □	b. □	b. □
c. □	c. ■	c. ■	c. ■	c. □
d. ■	d. □	d. □	d. □	d. □
6a. □	6a. ■	6a. □	6a. ■	6a. □
b. ■	b. □	b. □	b. □	b. ■
c. □	c. □	c. ■	c. □	c. □
d. □	d. □	d. □	d. □	d. □
7a. ■	7a. □	7a. □	7a. □	7a. ■
b. □	b. ■	b. □	b. □	b. □
c. □	c. □	c. ■	c. ■	c. □
d. □	d. □	d. □	d. □	d. □
8a. □	8a. □	8a. ■	8a. □	8a. □
b. ■	b. ■	b. □	b. ■	b. □
c. □	c. □	c. □	c. □	c. ■
d. □	d. □	d. □	d. □	d. □
9a. ■	9a. □	9a. □	9a. □	9a. ■
b. □	b. □	b. □	b. □	b. □
c. □	c. □	c. ■	c. □	c. □
d. □	d. ■	d. □	d. ■	d. □
10a. □	10a. □	10a. □	10a. □	10a. ■
b. ■	b. □	b. □	b. □	b. □
c. □	c. □	c. ■	c. ■	c. □
d. □	d. ■	d. □	d. □	d. □

806	807	808	809	810
1a. ☐	1a. ☐	1a. ☐	1a. ☐	1a. ■
b. ■	b. ■	b. ☐	b. ☐	b. ☐
c. ☐	c. ☐	c. ☐	c. ☐	c. ☐
d. ☐	d. ☐	d. ■	d. ■	d. ☐
2a. ☐	2a. ☐	2a. ■	2a. ■	2a. ☐
b. ■	b. ☐	b. ☐	b. ☐	b. ☐
c. ☐	c. ■	c. ☐	c. ☐	c. ■
d. ☐	d. ☐	d. ☐	d. ☐	d. ☐
3a. ☐	3a. ☐	3a. ☐	3a. ☐	3a. ☐
b. ☐	b. ☐	b. ☐	b. ■	b. ■
c. ■	c. ■	c. ☐	c. ☐	c. ☐
d. ☐	d. ☐	d. ■	d. ☐	d. ☐
4a. ☐	4a. ■	4a. ■	4a. ☐	4a. ☐
b. ☐	b. ☐	b. ☐	b. ☐	b. ☐
c. ■	c. ☐	c. ☐	c. ■	c. ■
d. ☐	d. ☐	d. ☐	d. ☐	d. ☐
5a. ☐	5a. ■	5a. ☐	5a. ☐	5a. ■
b. ■	b. ☐	b. ■	b. ■	b. ☐
c. ☐	c. ☐	c. ☐	c. ☐	c. ☐
d. ☐	d. ☐	d. ☐	d. ☐	d. ☐
6a. ☐	6a. ☐	6a. ☐	6a. ☐	6a. ☐
b. ☐	b. ■	b. ■	b. ☐	b. ■
c. ■	c. ☐	c. ☐	c. ☐	c. ☐
d. ☐	d. ☐	d. ☐	d. ■	d. ☐
7a. ☐	7a. ■	7a. ☐	7a. ■	7a. ☐
b. ■	b. ☐	b. ☐	b. ☐	b. ☐
c. ☐	c. ☐	c. ■	c. ☐	c. ☐
d. ☐	d. ☐	d. ☐	d. ☐	d. ■
8a. ☐	8a. ☐	8a. ☐	8a. ■	8a. ☐
b. ☐	b. ☐	b. ☐	b. ☐	b. ☐
c. ■	c. ■	c. ■	c. ☐	c. ■
d. ☐	d. ☐	d. ☐	d. ☐	d. ☐
9a. ☐	9a. ☐	9a. ■	9a. ☐	9a. ☐
b. ■	b. ☐	b. ☐	b. ■	b. ☐
c. ☐	c. ■	c. ☐	c. ☐	c. ■
d. ☐	d. ☐	d. ☐	d. ☐	d. ☐
10a. ☐	10a. ■	10a. ■	10a. ■	10a. ☐
b. ☐	b. ☐	b. ☐	b. ☐	b. ☐
c. ■	c. ☐	c. ☐	c. ☐	c. ☐
d. ☐	d. ☐	d. ☐	d. ☐	d. ■

901	902	903	904	905
1a. ■	1a. ■	1a. □	1a. □	1a. ■
b. □	b. □	b. □	b. □	b. □
c. □	c. □	c. ■	c. ■	c. □
	d. □	d. □	d. □	d. □
2a. □	2a. □	2a. ■	2a. ■	2a. □
b. □	b. □	b. □	b. □	b. □
c. ■	c. ■	c. □	c. □	c. ■
	d. □	d. □	d. □	d. □
3a. □	3a. □	3a. ■	3a. □	3a. □
b. □	b. □	b. □	b. ■	b. ■
c. □	c. □	c. □	c. □	c. □
d. ■	d. ■	d. □	d. □	d. □
4a. □	4a. □	4a. ■	4a. □	4a. ■
b. □	b. □	b. □	b. □	b. □
c. ■	c. ■	c. □	c. □	c. □
d. □	d. □	d. □	d. ■	d. □
5a. □	5a. □	5a. ■	5a. □	5a. □
b. □	b. ■	b. □	b. □	b. ■
c. □	c. □	c. □	c. ■	c. □
d. ■	d. □	d. □	d. □	d. □
6a. ■	6a. □	6a. □	6a. □	6a. □
b. □	b. □	b. ■	b. ■	b. □
c. □	c. □	c. □	c. □	c. ■
d. □	d. ■	d. □	d. □	d. □
7a. ■	7a. □	7a. □	7a. □	7a. □
b. □	b. ■	b. □	b. □	b. ■
c. □	c. □	c. ■	c. ■	c. □
d. □	d. □	d. □	d. □	d. □
8a. □	8a. □	8a. □	8a. □	8a. □
b. ■	b. ■	b. □	b. □	b. ■
c. □	c. □	c. ■	c. ■	c. □
d. □	d. □	d. □	d. □	d. □
9a. □	9a. ■	9a. ■	9a. ■	9a. □
b. □	b. □	b. □	b. □	b. ■
c. □	c. □	c. □	c. □	c. □
d. ■	d. □	d. □	d. □	d. □
10a. □	10a. □	10a. □	10a. □	10a. □
b. □	b. □	b. □	b. □	b. □
c. □	c. □	c. □	c. ■	c. ■
d. ■	d. ■	d. ■	d. □	d. □

906	907	908	909	910
1a. ■	1a. □	1a. □	1a. □	1a. □
b. □	b. □	b. ■	b. □	b. □
c. □	c. □	c. □	c. ■	c. ■
d. □	d. ■	d. □	d. □	d. □
2a. □	2a. □	2a. □	2a. □	2a. □
b. □	b. ■	b. □	b. □	b. □
c. ■	c. □	c. ■	c. ■	c. ■
d. □	d. □	d. □	d. □	d. □
3a. □	3a. □	3a. ■	3a. □	3a. □
b. ■	b. □	b. □	b. □	b. ■
c. □	c. ■	c. □	c. □	c. □
d. □	d. □	d. □	d. ■	d. □
4a. □	4a. □	4a. □	4a. ■	4a. ■
b. ■	b. □	b. □	b. □	b. □
c. □	c. ■	c. ■	c. □	c. □
d. □	d. □	d. □	d. □	d. □
5a. □	5a. □	5a. □	5a. □	5a. □
b. □	b. ■	b. □	b. ■	b. □
c. ■	c. □	c. ■	c. □	c. ■
d. □	d. □	d. □	d. □	d. □
6a. ■	6a. □	6a. □	6a. ■	6a. □
b. □	b. □	b. ■	b. □	b. □
c. □	c. ■	c. □	c. □	c. □
d. □	d. □	d. □	d. □	d. ■
7a. □	7a. ■	7a. □	7a. □	7a. □
b. ■	b. □	b. ■	b. ■	b. ■
c. □	c. □	c. □	c. □	c. □
d. □	d. □	d. □	d. □	d. □
8a. ■	8a. □	8a. ■	8a. □	8a. ■
b. □	b. □	b. □	b. □	b. □
c. □	c. □	c. □	c. ■	c. □
d. □	d. ■	d. □	d. □	d. □
9a. □	9a. ■	9a. □	9a. □	9a. □
b. ■	b. □	b. ■	b. ■	b. ■
c. □	c. □	c. □	c. □	c. □
d. □	d. □	d. □	d. □	d. □
10a. □	10a. □	10a. □	10a. □	10a. □
b. □	b. □	b. □	b. □	b. ■
c. □	c. ■	c. ■	c. ■	c. □
d. ■	d. □	d. □	d. □	d. □

1001	1002	1003	1004	1005
1a. ■	1a. □	1a. □	1a. ■	1a. ■
b. □	b. ■	b. □	b. □	b. □
c. □	c. □	c. ■	c. □	c. □
d. □	d. □	d. □	d. □	d. □
2a. □	2a. ■	2a. □	2a. □	2a. □
b. ■	b. □	b. □	b. □	b. □
c. □	c. □	c. □	c. □	c. ■
d. □	d. □	d. ■	d. ■	d. □
3a. □	3a. □	3a. □	3a. □	3a. ■
b. □	b. □	b. ■	b. □	b. □
c. □	c. □	c. □	c. ■	c. □
d. ■	d. ■	d. □	d. □	d. □
4a. □	4a. □	4a. ■	4a. □	4a. □
b. ■	b. ■	b. □	b. □	b. □
c. □	c. □	c. □	c. ■	c. □
d. □	d. □	d. □	d. □	d. ■
5a. □	5a. ■	5a. ■	5a. ■	5a. □
b. □	b. □	b. □	b. □	b. □
c. ■	c. □	c. □	c. □	c. □
d. □	d. □	d. □	d. □	d. ■
6a. □	6a. ■	6a. □	6a. □	6a. □
b. ■	b. □	b. □	b. □	b. ■
c. □	c. □	c. ■	c. □	c. □
d. □	d. □	d. □	d. ■	d. □
7a. □	7a. ■	7a. □	7a. □	7a. □
b. □	b. □	b. ■	b. □	b. ■
c. ■	c. □	c. □	c. □	c. □
d. □	d. □	d. □	d. ■	d. □
8a. □	8a. □	8a. □	8a. □	8a. □
b. □	b. ■	b. □	b. ■	b. □
c. □	c. □	c. □	c. □	c. ■
d. ■	d. □	d. ■	d. □	d. □
9a. □	9a. □	9a. ■	9a. □	9a. □
b. □	b. ■	b. □	b. ■	b. □
c. ■	c. □	c. □	c. □	c. □
d. □	d. □	d. □	d. □	d. ■
10a. □	10a. □	10a. □	10a. □	10a. ■
b. □	b. □	b. ■	b. □	b. □
c. □	c. ■	c. □	c. ■	c. □
d. ■	d. □	d. □	d. □	d. □

1006	1007	1008	1009	1010
1a. ☐	1a. ☐	1a. ■	1a. ☐	1a. ☐
b. ■	b. ☐	b. ☐	b. ☐	b. ■
c. ☐	c. ■	c. ☐	c. ■	c. ☐
d. ☐	d. ☐	d. ☐	d. ☐	d. ☐
2a. ■	2a. ☐	2a. ☐	2a. ☐	2a. ☐
b. ☐	b. ☐	b. ☐	b. ☐	b. ■
c. ☐	c. ■	c. ■	c. ■	c. ☐
d. ☐	d. ☐	d. ☐	d. ☐	d. ☐
3a. ☐	3a. ☐	3a. ■	3a. ☐	3a. ☐
b. ☐	b. ☐	b. ☐	b. ■	b. ☐
c. ☐	c. ■	c. ☐	c. ☐	c. ■
d. ■	d. ☐	d. ☐	d. ☐	d. ☐
4a. ☐	4a. ☐	4a. ☐	4a. ☐	4a. ☐
b. ☐	b. ☐	b. ☐	b. ☐	b. ■
c. ■	c. ■	c. ☐	c. ■	c. ☐
d. ☐	d. ☐	d. ■	d. ☐	d. ☐
5a. ☐	5a. ■	5a. ■	5a. ☐	5a. ■
b. ☐	b. ☐	b. ☐	b. ☐	b. ☐
c. ■	c. ☐	c. ☐	c. ■	c. ☐
d. ☐	d. ☐	d. ☐	d. ☐	d. ☐
6a. ☐	6a. ■	6a. ☐	6a. ☐	6a. ☐
b. ■	b. ☐	b. ☐	b. ■	b. ■
c. ☐	c. ☐	c. ☐	c. ☐	c. ☐
d. ☐	d. ☐	d. ■	d. ☐	d. ☐
7a. ■	7a. ☐	7a. ☐	7a. ☐	7a. ☐
b. ☐	b. ☐	b. ☐	b. ☐	b. ■
c. ☐	c. ■	c. ■	c. ☐	c. ☐
d. ☐	d. ☐	d. ☐	d. ■	d. ☐
8a. ☐	8a. ☐	8a. ■	8a. ☐	8a. ☐
b. ■	b. ☐	b. ☐	b. ☐	b. ■
c. ☐	c. ■	c. ☐	c. ☐	c. ☐
d. ☐	d. ☐	d. ☐	d. ■	d. ☐
9a. ☐	9a. ☐	9a. ☐	9a. ☐	9a. ☐
b. ☐	b. ☐	b. ■	b. ■	b. ☐
c. ☐	c. ☐	c. ☐	c. ☐	c. ☐
d. ■	d. ■	d. ☐	d. ☐	d. ■
10a. ☐	10a. ■	10a. ■	10a. ☐	10a. ■
b. ☐	b. ☐	b. ☐	b. ☐	b. ☐
c. ■	c. ☐	c. ☐	c. ☐	c. ☐
d. ☐	d. ☐	d. ☐	d. ■	d. ☐

1101	1102	1103	1104	1105
1a. ☐	1a. ☐	1a. ■	1a. ■	1a. ☐
b. ☐	b. ☐	b. ☐	b. ☐	b. ☐
c. ■	c. ■	c. ☐	c. ☐	c. ■
d. ☐	d. ☐	d. ☐	d. ☐	d. ☐
2a. ■	2a. ☐	2a. ☐	2a. ☐	2a. ■
b. ☐	b. ■	b. ☐	b. ☐	b. ☐
c. ☐	c. ☐	c. ☐	c. ■	c. ☐
d. ☐	d. ☐	d. ■	d. ☐	d. ☐
3a. ☐	3a. ☐	3a. ☐	3a. ☐	3a. ☐
b. ☐	b. ■	b. ■	b. ☐	b. ☐
c. ■	c. ☐	c. ☐	c. ■	c. ■
d. ☐	d. ☐	d. ☐	d. ☐	d. ☐
4a. ☐	4a. ☐	4a. ☐	4a. ☐	4a. ☐
b. ☐	b. ☐	b. ☐	b. ☐	b. ☐
c. ■	c. ☐	c. ☐	c. ☐	c. ☐
d. ☐	d. ■	d. ■	d. ■	d. ■
5a. ■	5a. ☐	5a. ☐	5a. ■	5a. ☐
b. ☐	b. ☐	b. ☐	b. ☐	b. ■
c. ☐	c. ☐	c. ■	c. ☐	c. ☐
d. ☐	d. ■	d. ☐	d. ☐	d. ☐
6a. ☐	6a. ☐	6a. ☐	6a. ☐	6a. ■
b. ☐	b. ☐	b. ■	b. ☐	b. ☐
c. ☐	c. ■	c. ☐	c. ■	c. ☐
d. ■	d. ☐	d. ☐	d. ☐	d. ☐
7a. ☐	7a. ☐	7a. ☐	7a. ☐	7a. ■
b. ☐	b. ☐	b. ☐	b. ■	b. ☐
c. ☐	c. ☐	c. ☐	c. ☐	c. ☐
d. ■	d. ■	d. ■	d. ☐	d. ☐
8a. ☐	8a. ■	8a. ☐	8a. ☐	8a. ☐
b. ■	b. ☐	b. ☐	b. ☐	b. ☐
c. ☐	c. ☐	c. ☐	c. ■	c. ■
d. ☐	d. ☐	d. ■	d. ☐	d. ☐
9a. ☐	9a. ☐	9a. ☐	9a. ☐	9a. ■
b. ■	b. ☐	b. ■	b. ■	b. ☐
c. ☐	c. ■	c. ☐	c. ☐	c. ☐
d. ☐	d. ☐	d. ☐	d. ☐	d. ☐
10a. ☐	10a. ☐	10a. ☐	10a. ■	10a. ☐
b. ☐	b. ■	b. ☐	b. ☐	b. ☐
c. ☐	c. ☐	c. ☐	c. ☐	c. ☐
d. ■	d. ☐	d. ■	d. ☐	d. ■

1106	1107	1108	1109	1110
1a. ☐	1a. ■	1a. ☐	1a. ☐	1a. ☐
b. ☐	b. ☐	b. ■	b. ☐	b. ☐
c. ■	c. ☐	c. ☐	c. ☐	c. ☐
d. ☐	d. ☐	d. ☐	d. ■	d. ■
2a. ■	2a. ☐	2a. ☐	2a. ■	2a. ■
b. ☐	b. ☐	b. ☐	b. ☐	b. ☐
c. ☐	c. ☐	c. ☐	c. ☐	c. ☐
d. ☐	d. ■	d. ■	d. ☐	d. ☐
3a. ☐	3a. ■	3a. ☐	3a. ☐	3a. ☐
b. ☐	b. ☐	b. ■	b. ☐	b. ☐
c. ■	c. ☐	c. ☐	c. ■	c. ☐
d. ☐	d. ☐	d. ☐	d. ☐	d. ■
4a. ☐	4a. ☐	4a. ☐	4a. ☐	4a. ■
b. ■	b. ■	b. ☐	b. ☐	b. ☐
c. ☐	c. ☐	c. ■	c. ☐	c. ☐
d. ☐	d. ☐	d. ☐	d. ■	d. ☐
5a. ☐	5a. ■	5a. ☐	5a. ☐	5a. ☐
b. ☐	b. ☐	b. ☐	b. ■	b. ■
c. ■	c. ☐	c. ☐	c. ☐	c. ☐
d. ☐	d. ☐	d. ■	d. ☐	d. ☐
6a. ■	6a. ☐	6a. ■	6a. ☐	6a. ☐
b. ☐	b. ■	b. ☐	b. ■	b. ■
c. ☐	c. ☐	c. ☐	c. ☐	c. ☐
d. ☐	d. ☐	d. ☐	d. ☐	d. ☐
7a. ☐	7a. ☐	7a. ■	7a. ■	7a. ☐
b. ☐	b. ■	b. ☐	b. ☐	b. ■
c. ■	c. ☐	c. ☐	c. ☐	c. ☐
d. ☐	d. ☐	d. ☐	d. ☐	d. ☐
8a. ☐	8a. ☐	8a. ■	8a. ☐	8a. ☐
b. ☐	b. ☐	b. ☐	b. ☐	b. ☐
c. ■	c. ■	c. ☐	c. ■	c. ☐
d. ☐	d. ☐	d. ☐	d. ☐	d. ■
9a. ■	9a. ☐	9a. ☐	9a. ☐	9a. ☐
b. ☐	b. ☐	b. ■	b. ☐	b. ☐
c. ☐	c. ■	c. ☐	c. ☐	c. ■
d. ☐	d. ☐	d. ☐	d. ■	d. ☐
10a. ■	10a. ■	10a. ☐	10a. ☐	10a. ■
b. ☐	b. ☐	b. ☐	b. ■	b. ☐
c. ☐	c. ☐	c. ■	c. ☐	c. ☐
d. ☐	d. ☐	d. ☐	d. ☐	d. ☐

1201	1202	1203	1204	1205
1a. ☐	1a. ☐	1a. ☐	1a. ☐	1a. ☐
b. ■	b. ☐	b. ☐	b. ■	b. ☐
c. ☐	c. ■	c. ☐	c. ☐	c. ■
d. ☐	d. ☐	d. ■	d. ☐	d. ☐
2a. ☐	2a. ■	2a. ☐	2a. ☐	2a. ☐
b. ☐	b. ☐	b. ■	b. ☐	b. ☐
c. ☐	c. ☐	c. ☐	c. ☐	c. ☐
d. ■	d. ☐	d. ☐	d. ■	d. ■
3a. ☐	3a. ■	3a. ☐	3a. ☐	3a. ☐
b. ☐	b. ☐	b. ☐	b. ☐	b. ■
c. ☐	c. ☐	c. ■	c. ■	c. ☐
d. ■	d. ☐	d. ☐	d. ☐	d. ☐
4a. ☐	4a. ☐	4a. ☐	4a. ☐	4a. ■
b. ■	b. ☐	b. ☐	b. ■	b. ☐
c. ☐	c. ■	c. ☐	c. ☐	c. ☐
d. ☐	d. ☐	d. ■	d. ☐	d. ☐
5a. ☐	5a. ☐	5a. ☐	5a. ■	5a. ☐
b. ☐	b. ■	b. ☐	b. ☐	b. ☐
c. ■	c. ☐	c. ☐	c. ☐	c. ■
d. ☐	d. ☐	d. ■	d. ☐	d. ☐
6a. ☐	6a. ☐	6a. ☐	6a. ☐	6a. ■
b. ■	b. ☐	b. ■	b. ☐	b. ☐
c. ☐	c. ■	c. ☐	c. ■	c. ☐
d. ☐	d. ☐	d. ☐	d. ☐	d. ☐
7a. ☐	7a. ☐	7a. ☐	7a. ■	7a. ☐
b. ☐	b. ☐	b. ■	b. ☐	b. ☐
c. ☐	c. ■	c. ☐	c. ☐	c. ■
d. ■	d. ☐	d. ☐	d. ☐	d. ☐
8a. ☐	8a. ■	8a. ☐	8a. ☐	8a. ☐
b. ☐	b. ☐	b. ☐	b. ☐	b. ■
c. ■	c. ☐	c. ☐	c. ☐	c. ☐
d. ☐	d. ☐	d. ■	d. ■	d. ☐
9a. ■	9a. ■	9a. ■	9a. ■	9a. ■
b. ☐	b. ☐	b. ☐	b. ☐	b. ☐
c. ☐	c. ☐	c. ☐	c. ☐	c. ☐
d. ☐	d. ☐	d. ☐	d. ☐	d. ☐
10a. ■	10a. ☐	10a. ☐	10a. ☐	10a. ☐
b. ☐	b. ■	b. ☐	b. ■	b. ■
c. ☐	c. ☐	c. ☐	c. ☐	c. ☐
d. ☐	d. ☐	d. ■	d. ☐	d. ☐

1206	1207	1208	1209	1210
1a. ☐	1a. ☐	1a. ☐	1a. ☐	1a. ☐
b. ☐	b. ■	b. ☐	b. ☐	b. ☐
c. ☐	c. ☐	c. ■	c. ■	c. ■
d. ■	d. ☐	d. ☐	d. ☐	d. ☐
2a. ☐	2a. ☐	2a. ☐	2a. ☐	2a. ■
b. ☐	b. ☐	b. ■	b. ☐	b. ☐
c. ☐	c. ■	c. ☐	c. ■	c. ☐
d. ■	d. ☐	d. ☐	d. ☐	d. ☐
3a. ☐	3a. ☐	3a. ☐	3a. ☐	3a. ☐
b. ☐	b. ☐	b. ■	b. ☐	b. ☐
c. ☐	c. ■	c. ☐	c. ☐	c. ☐
d. ■	d. ☐	d. ☐	d. ■	d. ■
4a. ☐	4a. ☐	4a. ☐	4a. ☐	4a. ■
b. ☐	b. ☐	b. ☐	b. ■	b. ☐
c. ☐	c. ■	c. ☐	c. ☐	c. ☐
d. ■	d. ☐	d. ■	d. ☐	d. ☐
5a. ☐	5a. ■	5a. ☐	5a. ■	5a. ■
b. ☐	b. ☐	b. ☐	b. ☐	b. ☐
c. ☐	c. ☐	c. ■	c. ☐	c. ☐
d. ■		d. ☐	d. ☐	d. ☐
6a. ☐	6a. ☐	6a. ☐	6a. ■	6a. ☐
b. ☐	b. ■	b. ☐	b. ☐	b. ☐
c. ☐	c. ☐	c. ☐	c. ☐	c. ■
d. ■		d. ■	d. ☐	d. ☐
7a. ☐	7a. ■	7a. ☐	7a. ■	7a. ☐
b. ☐	b. ☐	b. ☐	b. ☐	b. ☐
c. ■	c. ☐	c. ☐	c. ☐	c. ☐
d. ☐	d. ☐	d. ■	d. ☐	d. ■
8a. ☐	8a. ☐	8a. ☐	8a. ☐	8a. ■
b. ☐	b. ☐	b. ☐	b. ☐	b. ☐
c. ■	c. ■	c. ■	c. ■	c. ☐
d. ☐	d. ☐	d. ☐	d. ☐	d. ☐
9a. ☐	9a. ☐	9a. ☐	9a. ☐	9a. ☐
b. ☐	b. ☐	b. ☐	b. ■	b. ■
c. ☐	c. ☐	c. ■	c. ☐	c. ☐
d. ■	d. ■	d. ☐	d. ☐	d. ☐
10a. ☐	10a. ☐	10a. ■	10a. ☐	10a. ■
b. ☐	b. ☐	b. ☐	b. ■	b. ☐
c. ☐	c. ■	c. ☐	c. ☐	c. ☐
d. ■	d. ☐	d. ☐	d. ☐	d. ☐

Science 700 – 1200 Placement Worksheet

_____ _____
Student Name Age

_____ _____
Date Grade Last Completed

	700	800	900	1000	1100	1200
	____	____	____	____	____	____
	____	____	____	____	____	____
	____	____	____	____	____	____
	____	____	____	____	____	____
	____	____	____	____	____	____
	____	____	____	____	____	____
	____	____	____	____	____	____
	____	____	____	____	____	____
	____	____	____	____	____	____
	____	____	____	____	____	____
TOTAL SCORE	____	____	____	____	____	____

GRADE LEVEL PLACEMENT: A student can be placed academically using the rule that they have successfully passed the test for any given level if they achieve a **Total Score of 70 points or more**.

This student places at grade level _____.

LEARNING GAPS: Learning gaps can be easily identified with the placement test. If a student receives **points of 6 or less** on any individual test, they have not shown mastery of the skills in that particular LIFEPAC. If desired, these LIFEPACs may be ordered and completed before the student begins their assigned grade level curriculum.

Learning gap LIFEPACs for this student are _____ _____ _____ _____
_____ _____ _____ _____

It is not unusual for a student to place at more than one level in various subjects when beginning the LIFEPAC curriculum. For example, a student may be placed at 5th level in Bible, math, science, and history & geography but 4th level in language arts. The majority of school time should be concentrated on the areas of lower achievement with the ultimate goal of equal skill mastery in all subjects at the same grade level.

AOP

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