

How to Study for and Take a Test By Durell C. Dobbins, Ph.D.

Studying for a test is an art form in itself. Students can be science wise and still be unable to do well in a formal school setting because of a lack of understanding of how to prepare for a test or an inability to take one well. Assuming there are no learning disability issues, we hope to simply help students understand how teachers prepare tests, and thereby better understand how to prepare for one.

On the subject of preparing for a test, memorization cannot be overlooked as an important element of test-taking. Some students enjoy memorization while others despise it. The truth is, you can't be a really good student (where grading is concerned) without developing some skill at it. Different students memorize information using different techniques. I personally memorize by writing things longhand over and over until I can do it without looking at a cue card. Others memorize by recitation (this is the worst one for me). Still others memorize using mnemonic devices such as acrostics and associations. This is probably the best way to keep things in long-term memory but can require quite a bit of time and creativity to devise.

Our courses are designed to teach principles through book learning followed by kinesthetic practice. We believe that this is the best way to learn and understand a discipline, even though, in the classical sense, it isn't the best way to score high on a test. These quizzes are prepared in recognition that students want to (and their parents want them to) perform well when they get to college and to remember as much of their foundational material as possible to make the college experience easier. Not everyone will take these quizzes. Of those who do only a fraction will excel at it. Use them in keeping with your own educational goals, philosophies and desires.

The following are some steps for the student to take in preparation for any test—especially mine:

1. Write a list of vocabulary words and be sure you can define them. Watch especially for any term in bold letters. The glossary in the back of the book will help, but these terms must be understood before a formal definition is really helpful. Never ignore a boldface term. (Example: Define the word **fulcrum**.) Also remember any names you read.
2. Look for anything that the test might ask you to list. (Example: State Newton's three laws of motion.) Write out that list by hand and memorize it.
3. Ask your teacher if he/she will give you some clues on what information to memorize for the test. For example, if there is a long table of birds, you don't want to have to memorize everything on the table. Perhaps there is a bird or two or even a classification scheme that you should know. In biology, classification is very important, so memorizing the classifications that are the subject of a particular lesson is very important in getting a good grade.
4. Think of the different kinds of questions that are often asked on tests and make up your own test in your mind. Here are the types of questions most used:

- Matching (Example: Match the following words with their definitions.) Any chapter having a lot of related terms (as for example, differentiating all the various organs that make up the digestive system) can easily be tested using this method. Since all the potential answers are provided in this format, it is often used as much as a reminder as it is to see if they can remember something themselves. If tests were made up of only matching problems, test scores would be high on average.
- Fill-in-the-blank (Example: Name the founder of classical physics.) I tend to use this type of question if there is a term or list of terms I want the student to be able to recall without prompting. (I tend to reserve this most difficult testing method for terms I think are important in a student's ongoing education.)
- True/False (Example: Acceleration under gravity is constant for all objects.) Since you are assured 50% on a T/F test, even if you know nothing at all about the subject, a good student can score 75% on one without preparing. Just be sure and read the question carefully. Any question that cannot be formatted in a better way may find its way to this section. It's a good method for testing retention of brief tasks.
- Multiple choice (Example: Substances that flow are called: a. fluids, b. flowers, c. solids, d. liquids). There are clearly two reasonable answers here, but one of them is the best. These questions will often separate the good student for the average student.
- Math-based problems (Example: After three second fall, what will be an object's velocity?) Only students who have prepared well and have a good grasp of math concepts will score well on these questions.
- Essay questions (Example: Please explain how hemoglobin might be thought of as a part of either the circulatory system or the respiratory system.) These questions are asked infrequently because they are time consuming for students to write a response and time consuming to grade. The grading of such questions is usually somewhat subjective. This is the best testing method, however, when the students must demonstrate an understanding of a complex point.

When you are preparing for a test, try to picture how the information you are reading might come back to you in the form of a test question. Prepare yourself to answer all the questions you can imagine.

5. You should never be surprised to see that a question in your daily exercises comes back again in a slightly different form as a quiz question. Always re-study the correct answers to the exercises and correct any mistakes or omissions you make.

Following these guidelines in preparing for a test will seem excessive to some, but those who follow them completely will undoubtedly have consistently good test scores (barring reading/learning difficulties).

Red Quiz 1

Lessons 1, 2, 3, 4, Labs 1, 2

Please supply the requested information.

1. Name the English gentleman who was responsible for the three laws of motion that serve as the foundation of classical physics. *Sir Isaac Newton*
2. If you were able to let go of a ball in outer space, far away from the influence of gravity, without pushing it in any particular direction, would the ball remain in that exact spot or would it move in one direction or another? *It would stay exactly where it is put.*
3. If a book were placed in your hand and you could measure the force applied to your hand by the book, could you determine how much force your hand was applying to the book? *Yes. The force would be exactly equal to that applied to your hand.*
4. How many decimeters are in one meter? *10*
5. How many centimeters are in one meter? *100*

Match the three laws of motion with the word or phrase that best describes it:

- | | |
|------------------------|-----------------------|
| 6. <u>c</u> First Law | a. equal and opposite |
| 7. <u>b</u> Second Law | b. $F = ma$ |
| 8. <u>a</u> Third Law | c. inertia |

Match each word or phrase with the definition or description that best fits it:

- | | |
|------------------------------------|---|
| 9. <u>e</u> gravity | a. the entire range of gravitational influence |
| 10. <u>g</u> force | b. a rate of increase or decrease in the rate of travel |
| 11. <u>d</u> velocity | c. a ball, thrown upward, continues upward after it is released |
| 12. <u>b</u> acceleration | d. a rate of travel |
| 13. <u>a</u> gravitational field | e. the natural force of attraction between any two masses |
| 14. <u>c</u> inertia | f. gravitational acceleration constant |
| 15. <u>f</u> 9.8 m/sec^2 | g. a natural push or pull |

Circle the best response(s).

16. The farther an object falls under gravity the *greater* will be its velocity by the end of its travel.
17. Objects falling under the influence of gravity will fall with a constant *acceleration*.
18. Galileo, the Italian student of nature, lived in which century? *1600's*
19. In its third second of fall, an object falling under gravity will fall at a velocity of *29.4 m/sec*.
20. A ball thrown upward approaches its *lowest* velocity when it reaches its highest point from the ground.
21. Two cannon balls of different masses, when dropped from the Leaning Tower of *Pizza* will hit the ground *at the same time*.
22. If an object having a mass of 1 gram were pushed so that it accelerated at a rate of 1 meter per second for each second of the push, what was the force of the push?
 - a. $F = 1 \text{ gram} \times 1 \text{ meter per second for every second of the fall}$
 - b. $F = 1 \text{ gram} + 1 \text{ meter per second for every second of the fall}$
 - c. $F = 0.5 \text{ gram} \times 1 \text{ meter per second}$
 - d. $F = 1 \text{ gram}$

Note to the teacher: later in physics students will learn a technical distinction between speed and velocity—speed is simply a quantity that tells “how fast?” whereas velocity implies a direction and a speed, or “how fast in which direction?” We say that speed is a “scalar” quantity (one dimensional) while velocity is a vector (two dimensional) quantity. We needn't complicate the discussion with this distinction at this point in their understanding.

Red Quiz 2

Lessons 5, 6, 7, 8, Labs 3, 4

Circle the letter corresponding to the correct response(s).

1. Two lines running side by side and that are the same distance from one another at all adjacent points are:
 - a. orbital
 - b. purple
 - c. perpendicular
 - d. *parallel*

2. Substances that flow are called:
 - a. solids
 - b. flowers
 - c. *fluids*
 - d. oozers

3. Fluids have a tendency to travel in complex motions that result from being compressed (squished together) in one place while spreading out in another. This pattern of compression and decompression is described as:
 - a. *wave motion*
 - b. orbital motion
 - c. linear motion
 - d. slinky motion

4. A branch of mathematics that deals with waves and curves is called:
 - a. fluidometry
 - b. ergonometry
 - c. *trigonometry*
 - d. waveometry

5. Work is often defined as the application of:
 - a. force over mass
 - b. *force over a distance*
 - c. energy over a force
 - d. distance over time

6. Simple machines have the ability to:
 - a. increase the output of work
 - b. increase the output of energy
 - c. *increase the output of force*
 - d. increase the output of people

7. The price you pay for this increase is paid by an increase in:
- distance*
 - energy
 - work
 - people

Choose the best answers from among the words at the end. You may use a word more than once.

8. A satellite travels around the earth in a circular pattern. This is because of two influences in different directions. First, its own *inertia* makes it tend to continue in a straight line, but *gravity* continually pulls it toward the center of the earth. The resulting motion is called a(n) *orbit*. All the planets circle the sun in this type of motion as does the moon around the earth.
9. In science, a word that is used to describe a particular part of the universe we wish to consider is the word *system*.
10. Of the two kinds of energy, stored energy is called *potential* energy.
11. Of the two kinds of energy, energy of motion is called *kinetic* energy.
12. The amount of potential energy in a system has the tendency to *decrease*. This represents a(n) *decrease* in the level of organization of the system.
13. A slinky is a good example of a solid material which displays *wave* motion, which is typical of fluids.
14. A slinky or a jump rope, when twirled from the ends has a tendency to form a number of waves at evenly-spaced distances. Those waves are called *standing* waves, and they are separated by evenly spaced points between waves that are called *nodes*.
15. A force pulling an object toward the center of its orbit is called a *centripetal* force.
16. The price paid for doing work is called *energy*. The amount you pay is directly related to the amount of work that is done, although you may lose some to heat if your system is inefficient.

jumping, centripetal, wiggly, central, system, bumps, kinetic, stored, frenetic, linear, wave, orbital, inertia, sitting, standing, potential, nodes, knots, decrease, increase, not-movey thingies, centripetal, toward-the-middle force, gravity, orbit, energy, dollars, friction, dereliction

Red Quiz 3

Lessons 9, 10, 11, 12, Labs 5, 6

True or false?

1. The law of conservation of energy states that energy cannot change forms. *false*
2. Anytime we do work against a force (such as gravity), we pay for that work with energy. *true*
3. Falling water can be used to turn generators. This takes the potential energy from the generator and passes it on to the falling water. *false*
4. A resistance converts heat energy into electricity. *false*
5. A light bulb uses a filament made from tungsten to convert electrical energy to light. *true*
6. The explosion of an atomic bomb is an example of a conversion of mass-energy to heat, light and kinetic energy. *true*
7. The hot dogs we eat provide us with energy in the form of chemical bonds. *true*
8. In the real world, it is possible to transfer energy perfectly from one marble to another such that no energy is lost to the surroundings in the form of sound or heat. *false*

Match the following energy changes with the devices that cause them:

- | | |
|--|----------------------|
| 9. <i>f</i> electrical energy to light energy | a. rocket engine |
| 10. <i>d</i> chemical energy to light energy | b. hydroelectric dam |
| 11. <i>a</i> chemical energy to gravitational energy | c. glowing embers |
| 12. <i>c</i> thermal energy to light energy | d. kerosene lamp |
| 13. <i>b</i> gravitational energy to electric energy | e. steam generator |
| 14. <i>e</i> thermal energy to electric energy | f. light bulb |

Red Quiz 4

Lessons 13, 14, 15, 16, Labs 7, 8

Select the best response(s) from the list below.

1. Name the four natural forces.

gravitation

electromagnetism

the strong nuclear force

the weak nuclear force

2. Particles having like charges *repel* one another.
3. Particles having unlike charges *attract* one another.
4. The force that is seen in the presence of all large masses is *gravitation*.
5. Electricity that flows through a conductive medium is called electric *current*, while electrical charges that are simply accumulated in one location are called *static* (“staying”) charges.
6. Name the three types of particles that make up atoms.

protons

neutrons

electrons

static, gravitation, strong nuclear, weak nuclear, medium nuclear, energy, work, distance, repel, repulse, attract, adore, proton, boson, lepton, electron, neutron, acceleron, intron, exon, current, electromagnetism

True or false?

7. Gravity is a natural pull with no push. *true*
8. The electromagnetic force pushes but does not pull. *false*
9. Electric current flows from a location of high potential energy to an area of low potential energy. *true*
10. Work is done when nearby, opposite-charged particles are separated. *true*
11. Protons carry a negative charge. *false*

Red Quiz 5

Lessons 17, 18, 19, 20, Labs 9, 10

Select the best response(s) from the list below.

1. A electromagnetic device that is used to lock and unlock car doors automatically is called a *solenoid*.
2. The range of influence of a magnet is called its magnetic *field*.
3. Atoms of a particular element are identified by their number of *protons*.
4. The *nuclear* force is responsible for holding several positive-charged protons in a single nucleus.
5. The number of protons in an atom is also called its *atomic number*.

atoms, protons, hologram, solenoid, neutrons, selenium, molecules, pole, electrons, yard, pasture, field, elements, nuclear, electromagnetic, gravitational, atomic number, atomic mass, mass number

Match the following common elements with their descriptions:

- | | |
|-----------------------|---|
| 6. <u>b</u> iodine | a. main ingredient in a penny |
| 7. <u>h</u> oxygen | b. tincture for cuts |
| 8. <u>i</u> aluminum | c. shiny bumpers |
| 9. <u>e</u> neon | d. gas for party balloons |
| 10. <u>a</u> copper | e. colorful lighted signs |
| 11. <u>d</u> helium | f. radioactive gas found in basements |
| 12. <u>g</u> hydrogen | g. light, explosive gas |
| 13. <u>f</u> radon | h. a gas in the atmosphere we must breathe in to live |
| 14. <u>c</u> chromium | i. common kitchen foil |

True or false?

15. Every electric current is accompanied by a magnetic field. *true*
16. Atoms are an unstable form of matter. *false*
17. Protons are about 2,000 times the size of electrons. *true*
18. A compass points toward the geographic north and south poles. *false*
19. The north pole of one magnet attracts the north pole of another. *false*

20. Skin is made up of atoms. *true*
21. The electromagnetic force is primarily responsible for the activity of an atomic bomb. *false*
22. An electromagnet is a magnetic device made by passing electrical current through a conductor. *true*

Red Quiz 6

Lessons 21, 22, 23, 24, Labs 11, 12

Circle the best response(s) to complete the sentence(s).

1. Anytime work is done against a force, (*potential*, kinetic) energy is stored up.
2. (*Deeper*, Shallower) liquid is associated with greater pressure.
3. Molecules of a hot substance move (*faster*, slower) than molecules of the substance when it is cold.

True or false?

4. Matter is a highly stable form of energy, but can sometimes disassemble to release huge amounts of energy. *true*
5. Heat is a form of matter. *false*
6. In general when matter is heated, it expands. *true*
7. *Locomotion* is movement from place to place. *true*
8. Heat has no effect on the way matter interacts. *false*

Circle the letter(s) corresponding to the correct response(s).

9. Which of the following require an input of work?
 - a. *separating opposite-charged particles*
 - b. *pushing together opposite-charged particles*
 - c. *separating like-charged particles*
 - d. *pushing together like-charged particles*
 - e. *separating magnetic poles having opposite charges*
 - f. *pushing together magnetic poles having opposite charges*
 - g. *separating magnetic poles having like charges*
 - h. *pushing together magnetic poles having like charges*
 - i. *separating two earth-sized masses*
 - j. *pushing together two earth-sized masses*
10. Which of the following are best described as fluids? (Circle all the correct responses.)
 - a. *solids*
 - b. *liquids*
 - c. *gases*
11. Which of the following are properties of fluids? (Circle all the correct responses.)
 - a. *increasing pressure with increasing depth*
 - b. *can be suctioned and siphoned*
 - c. *flowing*
 - d. *surface tension*

12. Which is the correct name of the device pictured in the textbook for detecting and measuring radioactivity?
- Google counter
 - Geister counter
 - Geiger counter*
 - Gamma counter
13. A generator is a device that is used to take mechanical energy and convert it to what kind of energy?
- light energy
 - heat energy
 - chemical bond energy
 - electric energy*
14. The temperature of your freezer is more likely to be set at:
- 40°C
 - 20°C
 - 0°C
 - 10°C
15. The temperature of your house is comfortable at:
- 0°C
 - 20°C
 - 40°C
 - 72°C
16. Mark each of the following forces as either “n” for natural or “a” for artificial:
- n the force of earth pulling on the moon
 - a the force of a spring pushing a pogo stick upward
 - n the force of gravity pulling the pogo stick downward
 - a the force of your feet kicking a trampoline
 - n the force of one electron repelling another
 - n the force holding two protons together in the nucleus of an atom

Please provide the requested information.

17. Elements with large, unstable nuclei that give off energy are described as being *radioactive*.
18. In a steam engine, steam is used to turn a *turbine*, which turns a shaft, which operates a generator.
19. A substance which reduces surface tension is called a *surfactant*.

Red Quiz 7

Lessons 25, 26, 27, 28, Labs 13, 14

Circle the best response(s) to complete the sentence(s).

1. A (*photometer*, refractometer) is a device that is used to measure how much light passes through a sample. It can be used to measure how much of a chemical is present in that sample.
2. A (photometer, *refractometer*) is a device that is used to measure the amount of bending of light that occurs as it passes through a sample. It can be used to identify an unknown substance by how much it bends light.
3. The more energetic electromagnetic radiation is, the (*greater*, lesser) is its degree of refraction (bending) when it passes from one substance into another.
4. Our eyes perceive the wavelengths of light that are (absorbed into, *reflected from*) an object we are observing.
5. A mirror is a device that (absorbs, *reflects*) light with near perfection.
6. A lens having a (*shorter*, longer) focal length will magnify any object to a greater extent than a lens having a (shorter, *longer*) one.

True or false?

7. Light may be accurately described as self-perpetuating waves of electromagnetism. *true*
8. The wavelength of an electromagnetic ray is a proper expression of its energy. *true*
9. A long tubular light bulb is an incandescent bulb. *false*
10. The sun gives off both visible and invisible electromagnetic rays. *true*
11. Light travels at a rate of almost 200,000 miles per second. *true*
12. Electrons can absorb light causing them to increase in kinetic energy. *true*
13. The angle at which light leaves a mirror is unrelated to the angle at which it hits the mirror. *false*

Number the following forms of electromagnetic radiation in their correct order from highest to lowest energy (smallest to greatest wavelength):

14. 3 ultraviolet rays
15. 7 radio waves
16. 4 visible light
17. 1 gamma rays
18. 6 microwaves
19. 2 X rays
20. 5 infrared

Circle the letter corresponding to the best answer.

21. Bending of light—a change in its direction that often occurs when it moves from one substance into another—is called:
 - a. absorption
 - b. *refraction*
 - c. fraction
 - d. transmission

22. If an object absorbs all of the wavelengths of light except yellow and red ones, our eyes will perceive that object as being:
 - a. a mixture of colors that does not include yellow and red, probably brown
 - b. sometimes yellow and sometimes red
 - c. red, because it is dominant
 - d. *orange*

23. The magnification of an object can be calculated as follows:
 - a. *height of the image/height of the object*
 - b. height of the object/height of the image
 - c. focal length/height of the object
 - d. focal length/height of the image

Please provide the requested information.

24. Our eyes detect only “*visible*” light.

25. Name three things that can happen to light when it strikes an object (use the proper scientific terms):

absorption

reflection

transmission

26. What color do we perceive when our eyes detect no light? *black*

27. When we detect a wide variety of wavelengths at the same time? *white*

Red Section Review

See Lab Workbook

*Note: The Section Reviews as closed book tests unless you allow the student to look the test over before the start of the semester or provide some kind of study guide.

Yellow Quiz 1

Lessons 1, 2, 3, 4, Labs 1, 2

True or false?

1. Evaporation is the process that converts water vapor to liquid water. *false*
2. The opposite of evaporation is constipation. *false*
3. Mass is a measure of an amount of matter. *true*
4. Atomic masses are measured in AMB (atomic mass bundles). *false*
5. Grams are a measure of liquid volume. *false*
6. All liquids freeze at the same temperature. *false*
7. One milliliter (ml) is the same as one cubic centimeter (cm³). *true*
8. Aluminum is more dense than iron. *false*

Match the following words with their descriptions:

- | | |
|-----------------------|--|
| 9. <u>e</u> atom | a. pure substance combining two or more atoms of different kinds |
| 10. <u>d</u> proton | b. pure substance combining two or more bound atoms |
| 11. <u>f</u> electron | c. pure substance consisting of only one kind of atom |
| 12. <u>c</u> element | d. particle in an atom carrying a positive electric charge |
| 13. <u>b</u> molecule | e. smallest stable form of matter, all matter is made up of them |
| 14. <u>a</u> compound | f. particle in an atom carrying a negative electric charge |

Match the following words with their descriptions:

- | | |
|-------------------------|---|
| 15. <u>c</u> solid | a. neither as stiff as a solid nor as fluid as a liquid |
| 16. <u>d</u> liquid | b. distant molecules, free motion, little attraction among molecules |
| 17. <u>b</u> gas | c. tight molecules, little motion, strong attractions among molecules |
| 18. <u>a</u> semi-solid | d. close molecules, fluid motion, neither strong nor weak attractions |

Circle the letter corresponding to the best answer.

19. The value, 6.02×10^{23} , is:

- a. Avogadro's number
- b. the number of atoms of any element in one gram-atomic-mass of that element
- c. *both of the above*
- d. neither of the above

20. The density of any substance is correctly calculated as follows:

- a. mass/distance
- b. number of atoms/volume
- c. *mass/volume*
- d. volume/mass

21. The usual units of density are:

- a. g/m
- b. #/ml or #/cm³
- c. *g/ml or g/cm³*
- d. ml/g

22. Archimedes principle states that:

- a. a floating object displaces its mass in liquid
- b. a floating object displaces its volume in liquid
- c. a sinking object displaces its mass in liquid
- d. a sinking object displaces its volume in liquid
- e. a and c
- f. *a and d*
- g. b and c
- h. b and d
- i. all of a through d

Provide the requested information.

23. What is the normal boiling point of water in °C? *100*

24. In °F? *212*

25. What is the freezing point of water in °C? *0*

26. What is the freezing point of water in °F? *32*

27. Hot gas that results from boiling water is called *steam*.

28. Changes of a substance from solid to liquid, liquid to gas or any of the changes in reverse are called changes of *phase*.

Yellow Quiz 2

Lessons 5, 6, 7, 8, Labs 3, 4

True or false?

1. When chemicals interact with one another they can be said to have *reacted*. *true*
2. When shared electrons are shared equally so that they spend about the same amount of time with each atom, the resulting atom is likely to be polar. *false*
3. A double bond is stronger than a triple bond. *false*
4. A diatomic molecule is one having two of the same kind of atom bound together. *true*
5. Halogens often form diatomic molecules. *true*
6. The lanthanoids (or lanthanides) are also called the rare earth metals. *true*
7. None of the actinoid (or actinide) series elements are radioactive. *false*
8. Polar molecules tend to dissolve readily in water. *true*
9. Atoms consist of a few particles moving about in mostly empty space. *true*

Match the following groups of atoms with their group names:

- | | |
|-----------------------|-----------------------------|
| 10. <u>e</u> 1A | a. transition metals |
| 11. <u>f</u> 2A | b. post-transition elements |
| 12. <u>a</u> B groups | c. noble gases |
| 13. <u>b</u> 3A to 6A | d. halogens |
| 14. <u>d</u> 7A | e. alkali metals |
| 15. <u>c</u> 8A | f. alkaline earth metals |

Match the following symbols with their elements:

- | | |
|-----------------|--------------|
| 16. <u>g</u> Mg | a. iron |
| 17. <u>i</u> Mn | b. sodium |
| 18. <u>c</u> O | c. oxygen |
| 19. <u>j</u> Cu | d. gold |
| 20. <u>a</u> Fe | e. potassium |
| 21. <u>d</u> Au | f. lead |
| 22. <u>h</u> Ag | g. magnesium |
| 23. <u>f</u> Pb | h. silver |
| 24. <u>e</u> K | i. manganese |
| 25. <u>b</u> Na | j. copper |

Match the following names of molecules with their molecular formulas:

26. b CH₄ a. carbon dioxide
27. e H₂O b. methane
28. a CO₂ c. oxygen
29. c O₂ d. ethylene
30. d C₂H₂ e. water

Circle the letter corresponding to the best answer.

31. A substance that can be readily shaped is said to be:

- a. duck-like
- b. *malleable*
- c. malevolent
- d. malletable

32. Semiconductors are found among the:

- a. metals
- b. *metalloids*
- c. Altoids
- d. non-metals

Provide the requested information.

33. Atoms on the far right-hand side of the periodic table that are completely satisfied with their number and arrangement of electrons. They are called the *noble gases*.

34. An ion is an atom that bears a charge. A ion carrying a positive charge is called a(n) *cation*, while an ion carrying a negative charge is called a(n) *anion*.

35. Name two types of chemical bonding: *ionic, covalent*

36. Which of these two types is the stronger? *covalent*

37. In writing a chemical equation, the *reactants* are shown on the left-hand side of the arrow and the *products* are shown on the right-hand side.

38. List four properties of metals:

- shine when polished*
- malleable & ductile*
- conduct heat*
- conduct electricity*

Yellow Quiz 3

Lessons 9, 10, 11, 12, Labs 5, 6

True or false?

1. The combined mass of the products is always exactly the same as the combined mass of the reactants. *true*
2. The amount of energy contained in the reactant molecules is the same as the amount of energy contained in the products of a chemical reaction. *false*
3. A reaction equation can have different numbers of atoms on the left and right sides of the equation and still be correct. *false*

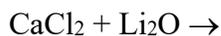
Match the atoms on the left with corresponding atoms on the right with which they will combine to form a compound:

- | | |
|--|-----------------------------------|
| 4. <u>d</u> one atom of a group 1A element | a. one atom of a group 4A element |
| 5. <u>c</u> two atoms of a group 1A element | b. one atom of a group 5A element |
| 6. <u>b</u> three atom of a group 1A element | c. one atom of a group 6A element |
| 7. <u>e</u> one atom of a group 2A element | d. one atom of a group 7A element |
| 8. <u>a</u> two atoms of a group 2A element | |
| 9. <u>b</u> one atom of a group 3A element | |
| 10. <u>a</u> one atom of a group 4A element | |

Circle the letter corresponding to the best answer.

11. One water molecule (H_2O) consists of:
 - a. one hydrogen atom and two oxygen atoms
 - b. *two hydrogen atoms and one oxygen atom*
 - c. not enough information to give an answer
12. If the atomic weight of hydrogen is 1 AMU and the atomic weight of carbon is 12 AMU, then the molecular weight of methane (CH_4) is:
 - a. 13 AMU
 - b. 14 AMU
 - c. *16 AMU*
 - d. 16 AMU plus a toothpick
13. Which of the following is a proper, balanced reaction equation:
 - a. $\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}^2\text{O}$
 - b. $2 \text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O}$
 - c. $\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2$
 - d. *$\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O}$*

14. Which is the proper way to complete the following reaction:



- a. $\text{CaCl}_2 + \text{Li}_2\text{O} \rightarrow \text{CaO} + 2 \text{LiCl}$
- b. $\text{CaCl}_2 + \text{Li}_2\text{O} \rightarrow 2 \text{CaO} + \text{LiCl}$
- c. $\text{CaCl}_2 + \text{Li}_2\text{O} \rightarrow \text{CaLi}_2 + \text{OCl}_2$

15. Sulfate (SO_4^{2-}) is a polyatomic ion with a 2 – charge. Ammonium (NH_4^+) is a polyatomic ion with a 1 + charge. Which is the proper way to complete the following reaction:



- a. $\text{MgSO}_4 + \text{NH}_4\text{Cl} \rightarrow \text{MgCl}_2 + \text{NH}_4\text{SO}_4$
- b. $\text{MgSO}_4 + \text{NH}_4\text{Cl} \rightarrow \text{Mg}_2\text{Cl}_2 + (\text{NH}_4)_2\text{SO}_4$
- c. $\text{MgSO}_4 + 2 \text{NH}_4\text{Cl} \rightarrow \text{MgCl}_2 + (\text{NH}_4)_2\text{SO}_4$

Provide the requested information.

16. Atoms that stay together in charged (ionic) groups that act as though they were a single element are called *polyatomic ions*.

Yellow Quiz 4

Lessons 13, 14, 15, 16, Labs 7, 8

True or false?

1. Children should lose weight by fasting. *false*
2. Fasting causes your body to accumulate fat during times when food is available. *true*
3. Bodies use food molecules for generating energy for activities and for keeping itself warm. *true*
4. A person should always eat anytime he/she feels hungry. *false*
5. There are bacteria that can use petroleum for fuel (food). *true*
6. The best way to lose weight is to eat less and exercise. *true*
7. To lose weight we will probably have to be hungry sometimes. *true*

Match the following carbon compounds with their descriptions:

- | | |
|---------------------------------|---|
| 8. <u>b</u> alkane | a. a straight carbon chain with at least one side chain |
| 9. <u>e</u> alkene | b. a carbon chain consisting of only single bonds |
| 10. <u>d</u> alkyne | c. a carbon chain in the form of a ring |
| 11. <u>a</u> branched aliphatic | d. a carbon chain having at least one triple bond |
| 12. <u>c</u> cycloaliphatic | e. a carbon chain having at least one double bond |

Place the following petroleum fractions in the correct order in which they boil off from crude oil (the last one doesn't boil off at all):

13. 4 motor oil
14. 2 kerosene
15. 1 gasoline
16. 3 diesel fuel
17. 5 asphalt

Circle the letter(s) corresponding to the best answer(s).

18. Natural gas is gas that comes out of wells at a petroleum field that is used in homes for fuel.

It is composed of mostly:

- a. gasoline
- b. butane
- c. nitrogen
- d. methane

19. Which of the following come from petroleum?

- a. petrolatum
- b. beeswax
- c. paraffin
- d. potato chips

20. Which of the following equations are balanced?

- a. $HCl + NaOH \rightarrow NaCl + H_2O$
- b. $2 NH_3 + O_2 \rightarrow 2 NO + 3 H_2O$
- c. $2 Mg + CO_2 \rightarrow 2 MgO + C$
- d. $CH_4 + H_2O \rightarrow CO + 3 H_2$

Provide the requested information.

21. Automobiles have a device called a *catalytic converter* that improves the efficiency of fuel burning.

22. The main dangerous gas that is removed by the device in the previous question is called *carbon monoxide*.

23. There are always two products from an efficient fueling reaction. What are they?
carbon dioxide
water

24. Name two kinds of molecules people use for fuel.
fats (or lipids)
sugars (or carbohydrates)

Yellow Quiz 5

Lessons 17, 18, 19, 20, 21, Labs 9, 10

Note: This test includes a fifth lesson (Lesson 21) since it makes more sense to keep all this biochemistry together.

True or false?

1. Two things that are needed by bodies are fuel molecules and carbon dioxide. *false*
2. Bodies produce carbon dioxide, energy, body mass and waste. *true*
3. The energy produced by our bodies is used for our activities and to generate heat. *true*
4. If we wish to lose weight we should be more physically active and eat more to fuel that extra activity. *false*
5. If we wish to gain weight we should try to stop producing waste. *false*
6. Two types of proteins are structural proteins and enzymes. *true*
7. DNA and RNA store information that is used in guiding cellular processes. *true*
8. Genetic engineering is a scientific discipline in which scientists manipulate polysaccharides. *false*
9. Vitamin C is an oxidizing agent. *false*
10. Rust is the result of chemical oxidation of iron. *true*
11. Meat tenderizer contains enzymes that break down meat proteins. *true*
12. Monosodium glutamate is a form of an amino acid used to flavor foods. *true*
13. Dextrose is an example of a fatty acid. *false*
14. Soap is made from nucleic acids. *false*

Match the following with one of the terms on the right:

- | | |
|---|--------------------|
| 15. <i>a</i> made up of “base pairs” | a. nucleic acids |
| 16. <i>c</i> starch, for example | |
| 17. <i>b</i> made up of amino acids | b. proteins |
| 18. <i>c</i> glycogen, for example | |
| 19. <i>a</i> make up the genetic code | |
| 20. <i>c</i> made up of sugars | c. polysaccharides |
| 21. <i>a</i> made of adenine, guanine, thymine, cytosine | |
| 22. <i>d</i> made up of fatty acids | d. lipids |
| 23. <i>c</i> cellulose, for example | |
| 24. <i>a</i> DNA and RNA | |
| 25. <i>b</i> enzymes, for example | |
| 26. <i>a</i> deoxyribose and ribose sugars linked by PO_4^{2-} | |
| 27. <i>b</i> collagen, for example | |
| 28. <i>c</i> polymers of glucose, for example | |

Circle the letter(s) corresponding to the best answer(s).

29. Which of the following types of molecules have energy storage as a major function?
- a. nucleic acids
 - b. proteins
 - c. *polysaccharides*
 - d. *lipids*

Yellow Quiz 6

Lessons 22, 23, 24, Labs 11, 12

True or false?

1. Chemical reactions take place readily in solutions because molecules of two different substances can come into close contact with one another in solution. *true*
2. Polar solutes dissolve readily in non-polar solvents. *false*
3. True solutions are cloudy in appearance. *false*
4. More viscous liquids create more stable suspensions. *true*
5. Lakes have a considerable amount of suspended matter in them. *true*
6. Vegetable oil becomes less viscous when warmed. *true*
7. Sodium chloride is soluble in vegetable oil. *false*

Provide the requested information from the word list at the end.

8. Fill in the blanks to complete this sentence regarding solutions:

A solution results when a solute is dissolved in a solvent.

9. “Likes dissolve likes.”
10. Oil mixed into vinegar is an example of a *suspension*.
11. The chemists word for a thicker fluid is “*viscous*.”

solution, solvent, solute, dissolved, likes, dislikes, unlikes, solution, suspension, gluey, viscous, tacky, gooey

Yellow Quiz 7

Lessons 25, 26, 27, 28, Labs 13, 14

Circle the best response(s) to complete the sentence(s).

1. When water ionizes, it creates H^+ ions which are (*acidic*, basic) and OH^- ions which are (*acidic*, *basic*).
2. Evaporation of a liquid has a (warming, *cooling*) effect on the surface from which it evaporates.
3. A solution having a pH of 6 is (*acidic*, basic, neutral).

True or false?

4. The unique nature of water keeps the temperature of the earth's surface livable. *true*
5. The unique nature of water keeps lakes from freezing solid in the winter months. *true*
6. Blood and lymph are made of mostly protein. *false*
7. Water serves as a medium in which food and nutrient substances dissolve to feed living cells. *true*
8. Acid/base reactions produce water and a salt. *true*
9. Soft drinks contain acid. *true*
10. Milk of magnesia works by neutralizing stomach acid. *true*

Circle the letter(s) corresponding to the best answer(s).

11. Which of the following are methods for separating suspensions:
 - a. *filtration*
 - b. *settling*
 - c. *centrifugation*
 - d. *mixing*
12. Which of the following reactions shows the correct, complete ionization of sodium hydroxide:
 - a. $NaOH \rightarrow Na^+ + O^{2-} + H^+$
 - b. $NaOH \rightarrow Na^+ + OH^-$
 - c. $NaOH \rightarrow NaO^- + H^+$
 - d. none of the above
13. Which of the following reactions shows the correct way that hydrochloric acid normally reacts with sodium hydroxide:
 - a. $HCl + NaOH \rightarrow NaCl + H_2O$
 - b. $HCl + NaOH \rightarrow Na^+ + Cl^- + H^+ + OH^-$
 - c. $HCl + NaOH \rightarrow NaOCl + H_2$
 - d. none of the above

Yellow Section Review

See Lab Workbook

Blue Quiz 1

Lessons 1, 2, 3, 4, Labs 1, 2

Circle the best response(s) to complete the sentence(s).

1. Reproduction that depends on the participation of male and female organisms of the same kind is called (asexual, *sexual*) reproduction.

True or false?

2. A theory is a mental model for understanding our observations. *true*
3. The general theory of evolution suggests that all life evolved from a single-celled ancestor. *true*
4. Most scientists classify humans as animals. *true*
5. Living things are different than non-living things because they do not obey the laws of physics. *false*
6. Our scientific system for naming plants and animals is a “binomial” system. *true*
7. The genome copies itself before a cell divides by a process called “duplicity.” *false*
8. Sodium hypochlorite is added to city water to prevent the growth of harmful microbes. *true*
9. The gelatin that is often used to grow bacteria is called agar. *true*
10. Agar is layered on the inside of a special dish called a Putrid dish. *false*
11. A common way diseases are transmitted is by shaking hands. *true*
12. Chemical buffers are added to media to control the temperature. *false*

Place the following levels of organization of living things in order beginning with the least organized and ending with the most highly organized:

13. 3 molecules
14. 1 subatomic particles (protons, neutrons, electrons)
15. 9 organ systems
16. 5 organelles
17. 2 atoms
18. 7 tissues
19. 8 organs
20. 4 large biomolecules
21. 10 organism
22. 6 cells

Place the following taxonomic classifications in order beginning with the broadest (kingdom) and ending with the narrowest:

- 23. 4 order
- 24. 6 genus
- 25. 3 class
- 26. 2 phylum
- 27. 1 kingdom
- 28. 7 species
- 29. 5 family

Circle the letter corresponding to the best answer.

30. The fluid inside a cell is called:

- a. cell juice
- b. cytol
- c. *cytoplasm*
- d. plasma

31. The tiny functioning parts of a cell are called:

- a. *organelles*
- b. organs
- c. protoplasm
- d. cytoplasm

32. The entire genetic makeup of the cell is called the:

- a. cytoplasm
- b. gene
- c. RNA
- d. *genome*

33. The tiny device for assembling proteins is called:

- a. enzyme
- b. protein factory
- c. *ribosome*
- d. proteinosome

Provide the requested information.

34. Name five characteristics of living things.

Made up of one or more cells

Cells contain DNA

Consume food and produce wastes

Reproduce

Self-maintenance

35. Name five kingdoms of living things.

Eubacteria (Eubacteriaceae)

Archaea

Plants (or Plantae)

Fungi

Animals (or Animalia)

Choose the correct answers from the word list below

36. The kind of plate used for culturing bacteria is called a *Petri* plate.

37. The eyepiece of a microscope is also called the *ocular*.

38. The *objective* of the microscope contains the lower lens of the microscope.

39. The higher magnification provided by a microscope allows you to *resolve*, or separate out, fine details.

40. Organisms that require oxygen to live are called *aerobic*.

occipital, ocular, oculary, occult, objection, object, objective, obtrusive, resolution, resin, reason, resolve, dissolve, aerobic, aesthetic, aerobic, anaerobic, pizza, pecuniary, Petra, Petri, petrified, flat, fluted

Blue Quiz 2

Lessons 5, 6, 7, 8, Labs 3, 4

True or false?

1. Fungi, plants, archaea and bacteria cells all have some kind of rigid cell wall. *true*
2. Animal cells are known for having chlorophyll. *false*
3. Bacteria cells have a nucleus with a nuclear membrane. *false*
4. Plants often have starch storage granules in their cells. *true*
5. Fungi always have cells that are clearly separated from one another. *false*
6. Another word for chemical evolution is abiogenesis. *false*
7. A materialistic viewpoint is one based only on what can be directly observed. *true*
8. Photosynthesis is the process by which animals make their own food. *false*
9. Bacteria are all round in shape. *false*

Match the following organelles with their descriptions:

- | | |
|------------------------------------|--|
| 10. <u>g</u> nucleus | a. folded, complex inner membrane |
| 11. <u>f</u> nuclear membrane | b. paired strands of DNA in higher organisms |
| 12. <u>d</u> nucleoplasm | c. rigid covering outside the cell membrane |
| 13. <u>b</u> chromosome | d. fluid inside the nucleus |
| 14. <u>c</u> cell wall | e. "powerhouse of the cell," site of energy generation |
| 15. <u>a</u> endoplasmic reticulum | f. thin membrane surrounding the nucleus |
| 16. <u>e</u> mitochondria | g. part of eukaryotic cells containing the genome |

Circle the letter corresponding to the best answer.

17. The big bang theory is an attempt to explain:
- a. *how matter was originally dispersed throughout the universe*
 - b. where matter came from
 - c. where people came from
 - d. Darwinism
18. The theory of chemical evolution is an attempt to explain:
- a. where chemicals came from
 - b. *how life arose from non-living matter*
 - c. where Darwin came from
 - d. where Elijah Wood came from

19. Darwinian evolution is an attempt to explain:
- where the first living thing came from
 - why apes are smarter than your siblings
 - how a single ancestor organism developed into all the diverse organisms present today*
 - how a fish turned into a person
20. In which century did Charles Darwin live?
- 1400's
 - 1600's
 - 1800's*
 - He's still alive
21. Which of the following support(s) the big bang theory:
- the universe is dark
 - the universe appears to be expanding*
 - the universe appears to be contracting
 - the universe exists
22. Which of the following is(are) taken to support chemical evolution:
- bacteria are extremely complex
 - the universe appears to be expanding
 - large chemicals tend to be broken down into small ones
 - biochemicals can be manufactured in the laboratory under conditions that might be thought to be like early earth conditions*
23. On agar plates, bacteria grow in clusters called:
- groups
 - hog piles
 - colonies*
 - states

Blue Quiz 3

Lessons 9, 10, 11, 12, Labs 5, 6

Circle the best response(s) to complete the sentence(s).

1. For a living thing to increase in complexity over time is to go (*against*, with) the direction in which natural processes tend to go.
2. Organisms that are less complex are considered “less evolved” and are referred to as “(*lower organisms*, higher organisms).”
3. (*Plants*, Animals) are at the bottom of the food chain.
4. Animals are (producers, *consumers*).
5. Oxygen is a (reactant in, *product of*) photosynthesis.
6. (Producers, *Consumers*) break plant material down into food chemicals which they use to make new cells and energy.

True or false?

7. The word *evolution* means “change.” *true*
8. Organisms do change over time. *true*
9. By selective breeding, people can bring about desired changes in organisms. *true*
10. Plants require carbon dioxide, water and sunlight in order to produce glucose. *true*
11. Carbon dioxide and water are products of consumers. *true*

Match the following microbes with their descriptions:

- | | |
|-------------------------|--|
| 12. <u>d</u> virus | a. microscopic animals |
| 13. <u>f</u> archaea | b. microscopic plants |
| 14. <u>e</u> bacteria | c. eukaryotic microbes including yeasts and molds |
| 15. <u>c</u> microfungi | d. a non-living particle that reproduces inside living cells |
| 16. <u>b</u> microphyta | e. prokaryotic organisms occupying virtually every environment |
| 17. <u>a</u> microzoa | f. prokaryotic “ancient ones” that occupy harsh environments |

Circle the letter(s) corresponding to the best answer(s).

18. Three characteristics that all fungi have in common are:
 - a. *eukaryotic*
 - b. *cell walls made of chitin*
 - c. *photosynthetic*
 - d. *feed on pre-formed organic matter*
 - e. *a squishy consistency*

19. Three common types of fungi are:

- a. yeasts
- b. algae
- c. molds
- d. slime molds
- e. bacteria

20. Three structures that typically appear in mold mycelia are:

- a. seeds
- b. hyphae
- c. spores
- d. hairs
- e. fruiting bodies

Provide the requested information.

21. Small changes that take place in organisms from one generation to another are called *adaptations*.

22. If an organism can be seen only with the help of a microscope we say that that organism is *microscopic*. The opposite of this term is *macroscopic*.

23. A bacterium that can no longer be defeated by antibiotics is referred to as antibiotic *resistant*.

24. An organism that loves high temperatures is called a *thermophile*.

25. Another name for blue-green algae is *cyanobacteria*.

26. The process by which plants produce glucose from sunlight and carbon dioxide is called *photosynthesis*.

27. Plants capture sunlight using chemical *pigments*.

28. *Chlorophyll a* is the best known and most common of these chemicals.

microlutions, adaptatons, macroevolution, really small, microscopic, a virus, a bacterium, redundant, reclusive, resistant, macroscopic, intermedioscopic, largoscopic, really large, a whopper, heatophile, tempophile, thermophile, cyanide, bacteria-cyanoverde, cyanobacteria, blue-green slime, gluconeogenesis, glycolysis, photophotosynthesis, phototrophism, stains, paints, greens, pigments, pygmies, Chlorophyte *a*, Chlorophyll *a*, Clorets *a*, Claustrophobi *a*, Clavulinic acid

Blue Quiz 4

Lessons 13, 14, 15, 16, Labs 7, 8

Circle the best response(s) to complete the sentence(s).

1. The part of the life cycle of the plant in which sexual reproduction takes place is called the (sporophyte, *gametophyte*) generation.
2. The seed is a product of (*sexual*, asexual) reproduction, while the spore is the product of (sexual, *asexual*) reproduction.
3. Plants that produce pollen and seeds in cones are called (*gymnosperms*, angiosperms) while those that produce pollen and seeds in flowers are called (gymnosperms, *angiosperms*).
4. Flowers having only male parts are called (*staminate*, pistillate), while those having only female parts are called (staminate, *pistillate*).

True or false?

5. The word *phytoplankton* means “suspended plants.” *true*
6. The word *microphyta* means “large plants.” *false*
7. If something is too large to be microscopic it is called *macrophagic*. *false*
8. Mosses and worts are likely to be found in the desert. *false*
9. Vascular plants are plants having vessels to carry water and food within the plant. *true*
10. The evolutionist might describe a vascular plant as a “higher plant” and an alga as a “lower plant.” *true*
11. A spore is a dormant, resistant form of plant life that germinates when the conditions are right. *true*
12. The fruit of a plant may be referred to as vegetable matter. *true*
13. Germination can refer to the emergence of a plant from either a seed or a spore. *true*

Match the following phyla of phytoplankton with their representative organisms:

- | | |
|---------------------------|-------------------------------|
| 14. <u>c</u> Pyrrophyta | a. <i>Volvox</i> , spirogyra |
| 15. <u>d</u> Chrysophyta | b. <i>Euglena</i> |
| 16. <u>b</u> Euglenophyta | c. dinoflagellates |
| 17. <u>a</u> Chlorophyta | d. coccolithophorids, diatoms |

Match the following phyla of plants with their meanings:

- | | | |
|--------------|--------------|--------------------------|
| 18. <u>f</u> | Pyrrophyta | a. “red plants” |
| 19. <u>b</u> | Chrysophyta | b. “gold plants” |
| 20. <u>e</u> | Euglenophyta | c. “dusky plants” |
| 21. <u>d</u> | Chlorophyta | d. “green plants” |
| 22. <u>a</u> | Rhodophyta | e. “good-eyeball plants” |
| 23. <u>c</u> | Phaeophyta | f. “fire plants” |

Match the following phyla of plants with the types of plants represented:

- | | | |
|--------------|--------------|----------------------------|
| 24. <u>e</u> | Chlorophyta | a. brown algae (kelp) |
| 25. <u>c</u> | Rhodophyta | b. mosses and worts |
| 26. <u>a</u> | Phaeophyta | c. red algae |
| 27. <u>b</u> | Bryophyta | d. vascular plants |
| 28. <u>d</u> | Tracheophyta | e. green filamentous algae |

Match the following flower parts to their descriptions:

- | | | |
|--------------|----------|---|
| 29. <u>i</u> | sepal | a. entire male organ of a flower including the anther and filament |
| 30. <u>g</u> | petal | b. top surface of the carpel that receives pollen for fertilization |
| 31. <u>k</u> | calyx | c. hollow organ that contains the ovules |
| 32. <u>i</u> | anther | d. stalk connecting the stigma to the ovary |
| 33. <u>e</u> | filament | e. long slender stalk to which an anther is attached |
| 34. <u>a</u> | stamen | f. entire female organ of a flower including the stigma and style |
| 35. <u>f</u> | carpal | g. brightly colored landing pad for insects |
| 36. <u>b</u> | stigma | h. contains a single egg which may be fertilized to form a seed |
| 37. <u>c</u> | ovary | i. male part on which pollen forms |
| 38. <u>d</u> | style | j. green, leaf-like structures making up the calyx |
| 39. <u>h</u> | ovule | k. entire cup-like base of a flower |

Circle the letter corresponding to the best answer.

40. Water and oxygen from photosynthesis are released from the leaves of vascular plants through special pores called
- stomata
 - tomato
 - stromboli
 - stigma

41. Which of the following plants is a tracheophyte (vascular plant)?
- liverwort
 - wart
 - oak tree*
 - green alga
42. Which of the following lines the pores in leaves to control the escape of water from the plant?
- centurion cells
 - soldier cells
 - guard cells*
 - dehydration protection thingies
43. Inside a seed you will find a(n):
- embryo*
 - fetus
 - bugaboo
 - egg
44. Division of plants into monocotyledons and dicotyledons is based on the number of :
- flowers
 - flower petals
 - centimeters in a meter
 - seed leaves*
45. A sugary fluid that insects remove from flowers is called:
- neck tar
 - nectar*
 - honey
 - beeswax
46. A seed-bearing or spore-bearing part of a plant or the mature ovary are called:
- fruiting bodies*
 - juicy fruit
 - bodies
 - vegetables

Blue Quiz 5

Lessons 17, 18, 19, 20

True or false?

1. The classification *Mesozoa* consists mainly of parasitic worms. *true*
2. Eucoelomates are animals that have legs. *false*
3. “Convergent evolution” is the process by which two very different organisms are supposed to have evolved very similar features. *true*
4. In an evolutionary sense, arthropods are a successful group of organisms. *true*
5. The word *diversity* refers to how many of a single exact kind of organism is alive at one time. *false*
6. A trilobite is an extinct arthropod. *true*
7. Spiders are in the class Merostomata. *false*
8. Spiders and horseshoe crabs are arthropods. *true*
9. Spiders and horseshoe crabs are Trilobites. *false*
10. Spiders, ticks, mites and scorpions are all arachnids. *true*

Match the following phyla of metazoans with their representative animals:

- | | |
|------------------------------|--|
| 11. <u>f</u> Porifera | a. flatworm |
| 12. <u>j</u> Coelenterata | b. proboscis, nemertine and ribbon worm |
| 13. <u>h</u> Ctenophora | c. roundworm |
| 14. <u>a</u> Platyhelminthes | d. arrow worm |
| 15. <u>b</u> Rhinchozoela | e. spiny-headed worm |
| 16. <u>c</u> Nematoda | f. sponge |
| 17. <u>e</u> Acanthocephala | g. acorn worm |
| 18. <u>d</u> Chaetognatha | h. comb jelly |
| 19. <u>i</u> Nematomorpha | i. horsehair worm |
| 20. <u>m</u> Brachiopoda | j. jellyfish, anemone, sea fan, coral |
| 21. <u>l</u> Tardigrada | k. chiton, snail, abalone, whelk, slug, periwinkle, cowrie |
| 22. <u>k</u> Mollusca | l. “water bear” |
| 23. <u>g</u> Hemichordata | m. lamp shells |

Match the following classes of mollusks with their representative animals:

- | | |
|--------------------------|------------------------------|
| 24. <u>e</u> Amphineura | a. snail, whelk, slug |
| 25. <u>d</u> Pelecypoda | b. tooth shell or tusk shell |
| 26. <u>b</u> Scaphopoda | c. octopus, squid, nautilus |
| 27. <u>a</u> Gastropoda | d. bivalve |
| 28. <u>c</u> Cephalopoda | e. chiton |

Match the following classes of annelid worms with their representative animals:

- | | |
|----------------------------|---------------------------------------|
| 29. <u>c</u> Archiannelida | a. leeches |
| 30. <u>d</u> Polychaeta | b. bristled worms with few appendages |
| 31. <u>b</u> Oligochaeta | c. a group of simple marine worms |
| 32. <u>a</u> Hirudinea | d. worms with many appendages |

Circle the letter corresponding to the best answer(s).

33. An arthropod has an exoskeleton made of:
- a. protein
 - b. mostly calcium
 - c. *chitin*
 - d. Jell-O

Provide the requested information from the list at the end.

34. The study of animals is called *zoology*.
35. Single-celled and colonial animals are classified as *protozoa*.
36. The *mesozoa* are multi-celled animals having only a few different cell types.
37. Multi-celled animals having a large variety of cell structures and functions are classified as *metazoa*.

botany, zoology, protozoology, animology, zoography, protoplasm, protein, probiotic, protozoa, mesozoa, mesoderm, mesobiotic, metabiotic, metazoa, metaplasm

Labs 9, 10

1. The *composite* family of plants includes marigolds, dandelions, chrysanthemums, asters and dahlias.
2. Circle one. This previous family is the most (*diverse*, similar) group of plants on earth.
3. This family of plants has special *ligulate* flowers that are “strap-like.”
4. These flowers are made up of a strap-like petal, a female part, like a pistil, called a(n) *gynoecium*; a male part, like a stamen, called a *androecium*. It also has a fuzzy, frilly *pappus*, and a(n) *ovary* which contains the seed when it is mature.

dandelion, composite, deposit, expository, repository, suppository, ligand, leg-like, leprous, ligulate, pedal, petal, gymnasium, gynoecium, gynecologist, androgen, androecium, philanthropist, papilla, pupa, pappus, puppy, oval, Orville Redenbacher, ovary, ornery, obituary

Blue Section Review I

Lessons 21, 22, 23, 24 (and cumulative from Lesson 1)

Labs 11, 12 (and cumulative from Lab 1)

See Lab Workbook

Blue Quiz 7

Lessons 25, 26, 27, 28 (Future labs will be quizzed only in the section reviews in the Lab Workbook)

Circle the best response(s) to complete the sentence(s).

1. The mammalian subclass *Prototheria* includes the (*monotremes*, marsupials).
2. An animal that is active mostly by day is (*diurnal*, nocturnal) while one that is active mostly by night is (diurnal, *nocturnal*).

True or false?

3. Birds are in the class *Aves*. *true*
4. Birds are vertebrates. *true*
5. Birds are chordates. *true*
6. The mammalian subclass *Eutheria* includes the kangaroo. *false*
7. Opossums are marsupials. *true*
8. Bats are in the class *Aves*. *false*
9. Bats are marsupials. *false*

Match the following orders of mammals with their representative animals:

- | | |
|-----------------------------|---|
| 10. <u>k</u> Insectivora | a. pangolin |
| 11. <u>b</u> Dermoptera | b. gliding lemur |
| 12. <u>c</u> Chiroptera | c. bat |
| 13. <u>l</u> Edentalia | d. squirrel, beaver, paca |
| 14. <u>a</u> Pholidota | e. swine, camel, llama, deer, giraffe, antelope |
| 15. <u>f</u> Lagomorpha | f. rabbit, hare |
| 16. <u>d</u> Rodentia | g. whale, dolphin, porpoise |
| 17. <u>h</u> Hyracoidea | h. hyrax |
| 18. <u>e</u> Artiodactyla | i. sea lion, seal, walrus |
| 19. <u>j</u> Perissodactyla | j. horse, tapir, rhinoceros |
| 20. <u>g</u> Cetacea | k. shrew, mole, hedgehog |
| 21. <u>i</u> Pinnipedia | l. anteater, sloth, armadillo |

Blue Quiz 8

Lessons 29, 30, 31, 32

True or false?

1. Giant panda are classified as carnivores, even though they eat no meat. *true*
2. An endangered animal is one that is in danger of becoming too popular with wildlife enthusiasts. *false*
3. The word *anatomy* is the breaking apart of “an atom.” *false*

Match the following orders of mammals with their representative animals:

- | | |
|-------------------------|------------------------------------|
| 4. <u>d</u> Carnivora | a. elephant |
| 5. <u>a</u> Proboscidea | b. monkey, ape, man, lemur, baboon |
| 6. <u>c</u> Sirenia | c. manatee, dugong, sea cow |
| 7. <u>b</u> Primates | d. cat, dog, bear, weasel |

Circle the letter(s) corresponding to the best answer(s).

8. The following are characteristics of primates:
 - a. *opposable thumbs*
 - b. *opposable big toes*
 - c. *ball and socket joints*
 - d. *large brain*
 - e. *flat nails*
 - f. *tails*
 - g. *all of the above*
9. The upper appendages include which of the following:
 - a. *upper extremities*
 - b. *pelvic girdle*
 - c. *collar bones (clavicles)*
 - d. *shoulder blades (scapulas)*

10. Which of the following are types of bone joints:

- a. *ball and socket*
- b. dovetail
- c. *hinge*
- d. *saddle*
- e. *pivot*
- f. *gliding*
- g. flying
- h. spreading
- i. ball and bat
- j. twist

11. The tips of our noses and outer ears are made of:

- a. rubber
- b. chiton
- c. cartilage
- d. Carthage
- e. agar

12. Name three types of connective tissue:

ligaments
tendons
cartilage

Blue Quiz 9

Lessons 33, 34, 35, 36

Circle the best response(s) to complete the sentence(s).

1. The word (*gamete, zygote*) describes either the egg cell or the sperm cell alone. The word (*gamete, zygote*) describes the new individual formed when the egg and the sperm come together.

True or false?

2. Bronchitis is a condition which describes an inflamed glottis. *false*
3. Ovulation is the production of a new egg for possible fertilization. *true*
4. Womb is another name for the ovary. *false*
5. Sperm cells are produced in the testicles and stored in the epididymus. *true*
6. The prostate is a female organ. *false*

Match the following organs with their descriptions or functions:

- | | |
|------------------------------|---|
| 7. <u>d</u> liver | a. site where food chemicals are absorbed into the blood |
| 8. <u>c</u> gall bladder | b. place where undigested waste is packaged and processed |
| 9. <u>f</u> salivary glands | c. produces an emulsifier to aid digestion |
| 10. <u>a</u> small intestine | d. the site of storage of some digested food chemicals |
| 11. <u>b</u> large intestine | e. temporary storage for solid waste |
| 12. <u>e</u> rectum | f. located about the mouth |

Match the following organs with their descriptions or functions:

- | | |
|------------------------------|--|
| 13. <u>b</u> kidney | a. temporary storage for liquid waste |
| 14. <u>c</u> ureter | b. organ that removes excess water and waste chemicals from blood |
| 15. <u>a</u> urinary bladder | c. tube that carries urine from the kidneys to the urinary bladder |
| 16. <u>d</u> urethra | d. tube that removes urine from the urinary bladder |

Place the following organs in the correct order in which food passes through them, beginning with the mouth as number 1:

17. 7 anus
18. 2 esophagus
19. 6 rectum
20. 4 small intestine
21. 5 large intestine
22. 1 mouth
23. 3 stomach

Place the following organs in the correct order in which air passes into them from the outside, beginning with the mouth:

24. 3 larynx
25. 1 mouth
26. 4 trachea
27. 6 bronchioles
28. 2 glottis
29. 5 bronchi
30. 7 alveoli

Circle the letter corresponding to the best answer.

Circle the letter corresponding to the best answer.

31. Which of the following are glands which secrete digestive juices into the stomach:

- a. small intestine
- b. *gall bladder*
- c. liver
- d. *pancreas*

32. The female menstrual cycle lasts:

- a. exactly 14 days
- b. exactly 28 days
- c. about 48 days
- d. *about 28 days, but it varies from one individual to another*

33. The common term for the menstrual cycle is the:

- a. comma
- b. *period*
- c. exclamation point
- d. fertilization

34. Fertilization usually takes place inside the:

- a. ovary
- b. oviduct
- c. uterus
- d. vagina

Provide the requested information.

35. Name four types of teeth in order from the front of the mouth to the back:

incisor

canine

premolar

molar

36. Explain why hemoglobin is usually thought of as part of the circulatory system, but could be considered part of the respiratory system as well.

Hemoglobin is part of the circulatory system because it is a chemical found in red blood cells that circulate throughout the body. However, it may be considered part of the respiratory system because it absorbs oxygen in the lungs.

Blue Quiz 10

Lessons 37, 38, 39, 40

Circle the best response(s) to complete the sentence(s).

1. Blood with the cells taken out of it is called (lymph, *plasma*, tissue fluid). The fluid, similar to plasma, that keeps the cells bathed in their required substances is called (lymph, plasma, *tissue fluid*). When this fluid collects in the lymphatic vessels, it is called (*lymph*, plasma, tissue fluid).
2. The largest single artery of the body is the (*aorta*, pulmonary artery). The large (aortas, *pulmonary arteries*) take blood to the lungs.
3. The large arteries that carry blood to the arms are the (femorals, *subclavians*) while those that carry blood to the legs are the (*femorals*, subclavians).
4. Athlete's foot and diaper rash are examples of two types of (bacterial, *fung*al, viral) infection. (*Bacteria*, Fungi, Viruses) are the only group of organisms that are treated with antibiotics. (Bacteria, Fungi, *Viruses*) on the other hand are non-living pathogens that cause a large variety of diseases including AIDS and the common cold.

True or false?

5. The blood flows to your head through two large arteries, one on each side of your neck called the carotid arteries. *true*
6. A nerve cell is called a neurotic. *false*
7. The sensation of the need to vomit is called malaise. *false*
8. Olfactory receptors are special nerve endings that sense pain. *false*
9. The brain sends signals to certain glands in the body causing them to release chemicals into the blood. *true*
10. The brain and spinal cord together are called the Grand Central Station (GCS). *false*
11. Genetics is the study of inheritance. *true*
12. The father of Genetics was Gregor Mendel. *true*
13. Offspring having specific characteristics can be directed by a process called selective eating. *false*
14. Genetic engineering is based on chemical methods for changing DNA. *true*
15. Bacterial cells and the cells of higher organisms reproduce in exactly the same way. *false*
16. Trichinosis is a disease caused by worms in poorly cooked pork. *true*

Place the following in the order in which they receive oxygenated blood:

17. 4 venules
18. 1 arteries
19. 5 veins
20. 2 arterioles
21. 3 capillaries

Circle the letter corresponding to the best answer(s).

22. Which are the six major portions of the brain?

- a. *frontal lobe*
- b. backal lobe
- c. auditory lobe
- d. temple lobe
- e. *temporal lobe*
- f. spatial lobe
- g. *brain stem*
- h. brain root
- i. *cerebellum*
- j. antebellum
- k. occidental lobe
- l. *occipital lobe*
- m. *parietal lobe*
- n. parental lobe

See Lab Workbook

Blue Section Review II

Rainbow Quiz 1

Lessons 1, 2, 3, 4, Labs 1, 2

Circle the best response(s) to complete the sentence(s).

1. An experimental (“control group,” “*treatment group*”) is changed in some important detail while the (“*control group*,” “*treatment group*”) is held constant.
2. Since feelings and beliefs are (objective, *subjective*), they do not serve as adequate bases for a scientific conclusion. The decision about an experiment’s outcome must be (*objective*, *subjective*).
3. (Plaster of Paris, *Cement*) is calcined calcium and aluminum silicates while (*plaster of Paris*, *cement*) is heat-treated gypsum.

True or false?

4. A theory might be described as a model for thinking. *true*
5. A rock (according to the science of geology) is a small piece of crystalline material that might be held in the palm of your hand. *false*
6. Settled materials are called sediments. *true*
7. The Ring of Fire is the ring of activity around a volcano. *false*
8. Ground water is water that lies on top of the ground. *false*
9. A spring that arises from pressure from beneath the ground surface is called an artesian spring. *true*
10. Water enters the atmosphere when it is warmed by the sun by a process we call exasperation. *false*
11. Water reenters the liquid phase by a process we call consternation. *false*
12. The study of fresh surface water is called limnology. *true*
13. The study of ocean water is oceanology. *false*
14. An “abiotic control” is a poisoned, negative-control sample. *true*
15. Corundum is also called “alumina,” and is made of aluminum trioxide. *true*

Circle the letter corresponding to the best answer.

16. Molten rock within the earth is called.

- a. magnetite
- b. lava
- c. *magma*
- d. mantle
- e. lavage

17. One method of detecting the growth of bacteria is monitoring for:

- a. morbidity
- b. *turbidity*
- c. light production
- d. condensation

18. What are the main components of concrete:

- a. sand, gravel, glue
- b. sand, lava rock, textile fibers
- c. duct tape, dinosaur bones, library paste, saliva
- d. *sand, gravel, cement*

19. The German scientist after whom the hardness scale is named is:

- a. Frederich Moz
- b. *Frederich Mohs*
- c. Moses
- d. Fred Moe

20. Which of the following may be products of a volcano.

- a. tectonic plates
- b. *gases*
- c. *lava*
- d. oceans
- e. *mudslides*
- f. *ash*

21. Which of the following are thought to be the result of tectonic activity:

- a. tidal waves
- b. *tsunamis*
- c. *earthquakes*
- d. Botswana

Provide the missing information.

22. The central part of the earth is called the *core*. Which is probably made of magnetic solid and magma. Surrounding this inner part is the thick, dense, crystalline rock we call the *mantle*.

The outermost layer is a relatively thin layer of soil, rock and water that we call the *crust*.

23. A large crack in the crust at the bottom of the ocean is called a *trench*.

24. Soil is presumed to have formed by the *erosion* of rock.

25. A *basin* is a place where water collects to form a lake or pond.

26. Artificial lakes for holding water, called *impoundments*, are formed by damming up a river.

27. An experiment is a test of a *hypothesis*.

28. What is the hardest natural substance? *diamond*.

mantle, hearth, heart, mantissa, cloak, core, crust, corps, corpus, corpse, filling, crust, crest, crud, fissure, fizzy, trench, wench, crevasse, explosion, erosion, evasion, invasion, incantation, bassoon, basin, sink, sinkhole, lavatory, compoundments, impoundments, hypothesis, theory, suspicion, student, corundum, emerite, diamond, science

Rainbow Quiz 2

Lessons 5, 6, 7, 8, Labs 3, 4

Circle the best response(s) to complete the sentence(s).

1. The dinosaurs are supposed to have first arisen during the (Jurassic, *Triassic*) period of the Mesozoic era.
2. Modern humans are supposed to have first arisen during the (*Recent*, Pleistocene) epoch of the Quaternary period of the Cenozoic era.
3. A representative of every vertebrate phylum appears in the (Precambrian era, *Cambrian period*).
4. Saltier water is (*more*, less) dense than less salty water.

True or false?

5. Carbon dioxide is a greenhouse gas. *true*
6. Geology is the study of the solar system. *false*
7. Beneath the earth's surface are layers of sediment called strata. *true*
8. Fossil fuels are believed to come from aging of dead plants and animals. *true*
9. Water that has more solid dissolved in it than it can continue to hold is referred to as "supercilious." *false*

Match the following terms with their descriptions:

- | | |
|--------------------------------|--|
| 10. <u>e</u> continental shelf | a. 500-meter-thick layer of dead organic matter, mineral matter and shells of dead animals |
| 11. <u>b</u> continental rise | b. dives 600 meters to the ocean floor |
| 12. <u>f</u> continental slope | c. depth of rapidly-changing water temperature |
| 13. <u>h</u> continental drift | d. an underwater mountain range that occurs approximately halfway between continents |
| 14. <u>d</u> mid-ocean ridge | e. shallow-sloping border around continents having shallow water above it |
| 15. <u>a</u> sediment | f. dives 3500 meters from the continental shelf |
| 16. <u>g</u> ocean floor | g. the bottom of the ocean |
| 17. <u>c</u> thermocline | h. separation of the continents over time |

Place the following terms eras of geochronology in their proper order **beginning with the most recent**:

- 18. 1 Cenozoic
- 19. 3 Paleozoic
- 20. 4 Precambrian
- 21. 2 Mesozoic

Circle the letter corresponding to the best answer.

22. To remove the salt from water is to:

- a. decant
- b. desaltize
- c. *desalinize*
- d. disabuse

23. Which is not an example of the greenhouse effect:

- a. the heating of air inside a greenhouse
- b. the heating of air inside your car on a sunny day
- c. the heating of the atmosphere due to accumulation of gases that hold in heat
- d. *the heating of air inside your house due to the use of an electric heater*

24. Which of the following words is used to describe the study of life history on earth:

- a. geology
- b. mineralogy
- c. *paleontology*
- d. geochronology
- e. agronomy

25. Which of the following words is used to describe the study of the age of the earth:

- a. geology
- b. mineralogy
- c. paleontology
- d. *geochronology*
- e. agronomy

26. Which of the following words is used to describe the study of soil for agriculture:

- a. geology
- b. mineralogy
- c. paleontology
- d. geochronology
- e. *agronomy*

27. The opposite of catastrophism is:

- a. evolutionism
- b. *uniformitarianism*
- c. Darwinism
- d. geochronology

28. Sea water is approximately what percent salt-saturated? This is equal to what percent salt by weight?

- a. 0.125% saturated; 0.00361% salt
- b. 1.25% saturated; 0.0361% salt
- c. *12.5% saturated; 0.361% salt*
- d. 125% saturated; 36.1% salt

29. Magnesium sulfate heptahydrate is the chemical name for:

- a. rock salt
- b. ice cream salt
- c. pickling salt
- d. *Epsom salts*

Rainbow Quiz 3

Lessons 9, 10, 11, 12, Labs 5, 6

True or false?

1. Ground water is water that fills the pore spaces of soil and rock beneath the ground surface. *true*
2. Soil is always made up of particles that are about the same size. *false*
3. Air that is holding its capacity of water is said to be *saturated*. *true*
4. Commercial jetliners typically travel at the boundary between the thermosphere and exosphere. *false*
5. The main factor affecting motion in the atmosphere is the heating of atmospheric gases by the sun. *true*
6. Natural acids decrease the pH of groundwater, causing it to dissolve minerals. *true*

Match the following weather phenomena with their descriptions:

- | | |
|-----------------------|---|
| 7. <u>c</u> lightning | a. frozen precipitation that damages crops, houses and cars |
| 8. <u>f</u> flood | b. a condensation phenomenon |
| 9. <u>b</u> fog | c. generated from static charges |
| 10. <u>a</u> hail | d. frozen precipitation with driving wind |
| 11. <u>e</u> wildfire | e. usually results from unusually dry conditions |
| 12. <u>d</u> blizzard | f. generated from moisture on saturated ground |

Circle the letter corresponding to the best answer.

13. Which word refers to liquid, especially water, that is suitable for drinking:

- a. *potable*
- b. drinkable
- c. palatable
- d. portable

14. Which of the following is not a major function of the atmosphere:

- a. keeps us warm by holding in solar heat
- b. *provides food for us*
- c. protects us from the sun's ultraviolet radiation
- d. provides us with oxygen in the correct concentration to support life
- e. brings about our climate and weather patterns

Provide the requested information.

15. Name the five major divisions of the atmosphere in order beginning at the earth's surface.

troposphere

stratosphere

mesosphere

thermosphere

exosphere

Rainbow Quiz 4

Lessons 13, 14, 15, 16, Labs 7, 8

Circle the best response(s) to complete the sentence(s).

1. While (*climate*, weather) has to do with long term conditions on earth, (*climate*, *weather*) has to do with day to day changes in those conditions.
2. A(n) (*anticyclone*, *cyclone*) is a(n) area of low atmospheric pressure, while a(n) (*anticyclone*, *cyclone*) is an area of high pressure.
3. In the northern hemisphere, an anticyclone rotates in a (*clockwise*, counterclockwise) direction while a cyclone rotates (*clockwise*, *counterclockwise*).
4. In North America, most of us live in a (*temperate*, tropical) climate.

True or false?

5. Prevailing winds are also called “trade winds.” *true*
6. Ocean currents are brought about in part by the effects of prevailing winds. *true*
7. Deforestation results in the loss of wildlife habitat. *true*
8. Cyclones and anticyclones are collectively called climate systems. *false*
9. Jet streams are tubes of rapidly moving air. *true*
10. There are six permanent jet streams (three in each hemisphere) *false*

Match the following climatic features with their descriptions:

- | | |
|-----------------------------------|---|
| 11. <u>c</u> Hadley cells | a. largely caused by Hadley cells |
| 12. <u>a</u> prevailing winds | b. experiences constant low pressure from rising warm air |
| 13. <u>f</u> Coriolis effect | c. large masses of air circulating in the atmosphere |
| 14. <u>b</u> equator | d. receive moisture that is picked up by air at the equator then dropped north and south of the equator |
| 15. <u>e</u> deserts | e. from constant dry air pressing on the surface of the earth |
| 16. <u>d</u> tropical rainforests | f. effect of inertia on objects moving across a spinning earth |

Circle the letter corresponding to the best answer.

17. Hadley cells are:

- a. large areas of low pressure that circulate above the earth
- b. large areas of high pressure that circulate above the earth
- c. *large areas of circulating air that result from warming at the equator and cooling as the air travels north and south toward the poles*
- d. large air masses that loom over the equator

18. Hadley cells do not extend from the equator to the poles because:

- a. *the earth rotates, breaking them up into several smaller cells*
- b. surface features of the earth break them up
- c. radio waves from outer space cause interference
- d. high pressure battles with low pressure

19. Air pressure is measured using a:

- a. hygrometer
- b. hydrometer
- c. *barometer*
- d. thermometer

Rainbow Section Review

See Lab Workbook