

## Semester Exam Review

### Scientific Method (pages 18-29):

1. List the steps of the scientific method (in order) and write a brief description of each step.

Purpose: State the problem.

Research: Find out about the topic.

Hypothesis: Predict the answer to the problem.

Experiment: Plan a procedure to test the hypothesis.

Analysis: Record the results of the experiment.

Conclusion: State whether the results supported the hypothesis and explain why or why not.

2. What is the basic requirement that a scientific hypothesis must have?

It must be testable.

3. Why is it important that a scientific investigation be repeatable?

Repeating the procedure allows scientists to confirm the results. Similar results provide support for the conclusion.

4. How do you determine if your hypothesis is supported or not?

Design and conduct an experiment to test the hypothesis.

5. The process of obtaining information using your senses is called \_\_\_\_\_ (an observation, a scientific method, a conclusion, an inquiry)

### Measurement (pages 110-114):

6. What scientific tool do you use to measure the following:

a. Mass- triple beam balance

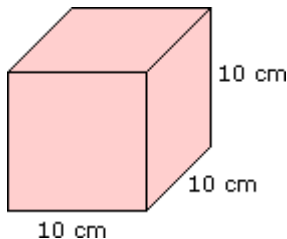
b. Weight- scale

c. Length- ruler or meter stick

d. Volume of a liquid- graduated cylinder

e. Volume of an irregularly shaped solid- graduated cylinder (displacement method)

7. Determine the volume of the object below: 1000 cm<sup>3</sup> (*Volume = length x width x height*)



### Density (pages 116-118):

8. What is the definition of matter? Anything that has mass and takes up space.

9. What is the formula for calculating density?  $Density = \frac{mass}{volume}$

10. If you were asked to find the density of your textbook what two tools would you need in order to determine the density? triple beam balance and ruler
11. If you were asked to find the density of a marble what two tools would you need in order to determine the density? triple beam balance and graduated cylinder
12. You are given a gold bar that has a density of 19.3 g/cm<sup>3</sup>. You cut the gold bar in half and now have two equal pieces of gold. What is the density of each piece of gold? 19.3 g/cm<sup>3</sup>
13. Calculate the density of an object that has a mass of 72 grams and volume of 9 cm<sup>3</sup>. Be sure that your answer has the correct units. 8 g/cm<sup>3</sup>
14. A piece of wood that measures 2.0 cm by 5.0 cm by 4.0 cm has a mass of 80.0 grams. What is the density of the wood? 2 g/cm<sup>3</sup> Would the piece of wood float in water? No, because the wood's density is more than 1 g/cm<sup>3</sup>

### Properties of Matter (pages 126-134):

15. Flammability is an example of a (physical/**chemical**) \_\_\_\_\_ property.
16. Electrical conductivity is an example of a (**physical**/chemical) \_\_\_\_\_ property.
17. What are three physical properties of aluminum foil?  
 a. **Malleable and ductile**  
 b. **Shiny luster**  
 c. **Solid metal**
18. Describe how a physical property, such as mass or texture can change without causing a chemical change in the substance. **If you change only the things you can observe or measure then the substance is undergoing a PHYSICAL change. If you change the atomic makeup of the substance it is undergoing a CHEMICAL change. Example: polishing a rock. You have changed the texture but the substance is still a rock.**

### Physical and Chemical Changes (pages 140-147):

19. How is a chemical change different from a physical change in matter?  
**Chemical changes cause the formation of a new substance with different properties. Chemical changes cannot be reversed. Physical changes do not form a new substance. Physical changes only change the appearance of the substance.**
20. Give an example of a chemical change and a physical change in matter.  
**Chemical change = baking a cake**  
**Physical change = melting chocolate (because it's still chocolate, it only changed from a solid to a liquid).**
21. What is the Law of Conservation of Mass? **Mass cannot be created or destroyed.**
22. Suppose a log's mass is 5 kg. After the log burns, the mass of the ash is 1 kg. Explain what may have happened to the other 4 kg. **The other 4 kg could have been given off as gas.**

### Atoms, Elements and Compounds (pages 154-157 and 168-175):

23. Write a definition for the following terms:  
 a. Atom- **the basic building block of matter. The smallest unit of an element.**  
 b. Element. **Pure substance that is made up of a single kind of atom**

c. **Compound**- A combination of two or more different elements. Compounds have different properties than the original elements they are made from.

24. Explain how atoms and elements are related? **An element is made up of only one type of atom. Although an element contains many atoms, all of them are the same.**

25. What are the three main classes of elements? Metals, Nonmetals, Metalloids.

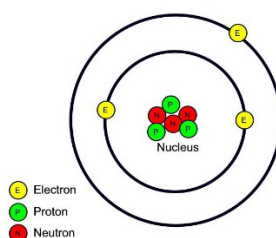
Provide two physical properties for each class of elements.

**Metals = shiny luster, conduct electricity and heat, malleable, sonorous**

**Nonmetals = dull luster, brittle, insulators**

**Metalloids = semiconductors, may be shiny or dull**

26. Draw and label an atom. Include electrons, neutrons and protons. Indicate what area is the nucleus of the atom.



27. What is the most abundant element for each part of the Earth?

- Lithosphere (solid outer surface of Earth) - **Oxygen**
- Hydrosphere (Oceans) - **Oxygen**
- Atmosphere (air surrounding Earth) - **Nitrogen**
- Biosphere (living matter) - **Oxygen**

28. There are countless different types of matter on Earth, yet this matter is made of the same handful of elements. How is this possible? **Nine elements account for almost all of the matter that makes up Earth. The elements combine to make different compounds. All matter is made up of just a few elements.**

29. A vertical column in the periodic table is called a Group.

30. A horizontal row in the periodic table is called a Period.

31. The chemical formula for vinegar is  $C_2H_4O_2$ . How many elements are in the formula? 3

### Energy (pages 190-197 and 210-216):

32. Explain the difference between Potential Energy and Kinetic Energy. Give an example of each.

**Potential = stored energy an object has due to its position or chemical composition.**

**Examples: food, stretched rubber band, a rollercoaster at the top of a hill**

**Kinetic = energy of an object due to motion. The object must be moving to have kinetic energy.**

**Examples = flying bird, soccer ball rolling**

33. What happens to the kinetic energy of a rock as it rolls down a hill? **The kinetic energy increases as the potential energy decreases. At the bottom of the hill the kinetic energy is the greatest because the rock is going the fastest.**

34. When a person uses an iron to remove wrinkles from a shirt, why does heat travel from the iron to the shirt?  
Thermal energy always moves from the hotter object to the colder object.

35. Define the following terms and draw a picture to illustrate each term:

- a. Conduction- the transfer of heat through direct touching.
- b. Convection- the transfer of heat by moving currents in liquids and gases.
- c. Radiation- the transfer of heat by electromagnetic waves through space. The matter does not touch.

36. Explain the law of conservation of energy? Energy cannot be created or destroyed, but can be changed from one form to another.

37. How are energy transformations related to the Law of conservation of energy? Energy transforms from one form to another. It is conserved which means it is not lost or gained.

### Energy Resources (pages 302-309 and 316-323)

38. Define the following terms:

- a. Renewable Resource- resources are replaced by natural processes at least as quickly as they are used.
- b. Nonrenewable Resource- resources are used up faster than they can be replaced.
- c. Solar Energy- energy received from the Sun. It is clean but solar panels are inefficient and expensive.
- d. Geothermal Energy- Energy produced by heat from the Earth's interior. It is clean but is only available in limited areas.
- e. Biomass- plants and animal waste that can be burned to release energy or the rotted or fermented remains of plants can be used to produce an alcohol (Ethanol). It is inexpensive, but inefficient.
- f. Wind Energy- energy harnessed from the force of moving air. It is clean, but expensive.
- g. Hydroelectric Energy- energy produced by moving water. It is clean, but expensive.
- h. Nuclear Energy- energy released from the nucleus of atoms. Uranium is used and it is nonrenewable. It is efficient but creates radioactive waste.

39. How are fossil fuels formed? Fossil fuels are Coal, Oil (petroleum), Natural Gas  
They form over millions of years from the buried remains of plants and animals.