

**P. Sci. Unit 7 Worksheet Matter** Do not write on this worksheet. Put answers on a separate sheet of paper.

### Chapter 2

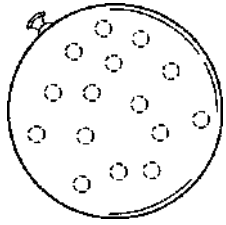
1. Matter is defined as anything that has mass and takes up space.
2. A substance that cannot be broken down into simpler substances is an element.
3. The chemical formula for water,  $H_2O$ , means that each water molecule contains 2 hydrogen atoms and 1 oxygen atoms.
4. You put 1 gram of salt into 1 liter of water and stir. The resulting liquid is an example of (homogenous / heterogenous) homogenous mixture.
5. The science of what matter is made of and how it changes is called chemistry.
6. A material that can be represented by a chemical formula is a pure substance or a compound.
7. Sound is *not* made of matter because it has no mass.
8. Aluminum, oxygen, and carbon are examples of elements.
9. The chemical symbol O stands for the element Oxygen.
10. A substance that is made of atoms of more than one type bound together is called a compound.
11. Every chemical compound is unique and different from the elements it contains.
12. The smallest particle of oxygen that behaves like oxygen is an oxygen atom ( $O_2$  molecule).
13. When two or more pure substances are blended together, the result is a mixture.
14. A mixture of flour and water is called a heterogeneous mixture because the substances do not dissolve.
15. Identify the following properties of matter as chemical (c) or physical (p)
  - a) color p
  - b) magnetic p
  - c) hardness p
  - d) rusting c
  - e) burning c
  - f) reacts w/ acid c
  - g) shape p
  - h) oxidizing c
  - i) weight p
  - j) boiling point p
  - k) density p
  - l) electroplating c
16. Define physical change. change in a substance's size, shape, or state of matter, but the substance does not change identity
17. How is a chemical change different from a physical change? In a physical change the substance does not change identity but in a chemical change the substance becomes something different from what it started as

18. Why are changes in phase physical changes? Because you are not changing the identity of the substance ex. Ice, water and steam are all forms of  $H_2O$
19. Why is rust forming on a nail not a physical change? Rust is a different substance from either iron or air (the two components in the chemical reaction) it has different properties so it is a chemical change
20. Why are most physical changes easy to recognize? Because most physical properties are experienced through the senses so their changes are easily detected through those same senses.
21. Identify the following changes as either chemical (c) or physical (p)
  - a) sharpening a pencil p
  - b) evaporation water p
  - c) burning a pencil c
  - d) mixing sand and water p
  - e) freezing water p
  - f) rusting steel wool c
  - g) spray painting a car p
  - h) milk souring c
22. Knowing the chemical properties of a substance will tell you how the substance reacts with other substances.
23. Give 5 examples of a chemical change. Answers will vary ex. burning wood into charcoal, paint fading, cooking an egg, rusting iron
24. Give 5 examples of a physical change. Answers will vary ex. ice melting, pounding gold into a coin, a puddle of water evaporating, dissolving salt in water
25. Digesting food is an example of a chemical change.
26. Grinding quartz crystals down to produce sand is an example of a physical change.
27. A chemical property describes how a substance acts when it reacts with other substances
28. Grinding wheat into flour is an example of a physical change
29. Lead has a density of  $11.3 \text{ g/cm}^3$ . What is the volume of a block of lead with a mass of 282.5 g?  $25 \text{ cm}^3$
30. A substance has a mass of 360 g and a volume of  $7.5 \text{ cm}^3$ . What is its density?  $48 \text{ g/cm}^3$
31. The density of a substance is defined as its mass divided by its volume

### Chapter 3

32. When boiling a liquid, you add heat until the liquid reaches a temperature at which it changes to bubbles of gas below its surface.
33. The melting point is the same temperature as the freezing point for a substance.

34. Which state of matter will hold its shape without a container? solid
35. The kinetic theory states that the higher the temperature, the faster the particles that make up a substance move \_
36. The change of a substance from a solid directly to a gas is called sublimation
37. All changes of the state of matter require energy
38. Evaporation refers to the change of state from a liquid to a gas.
39. The law of conservation of mass states that mass cannot be created nor destroyed. Only changed
40. A liquid changes rapidly into a gas at the liquid's boiling point.
41. Matter that has a definite volume and a definite shape is a solid .
42. Matter in which atoms are tightly held in place is a solid .
43. A gas-like mixture with no definite volume or shape that is made up of positively and negatively charged particles is a plasma .
44. Matter with no definite volume and no definite shape is a gas (plasma) .
45. Matter that has a definite volume but no definite shape is a Liquid .
46. Matter in which the particles are free to move in all directions until they have spread evenly throughout their container is a gas (plasma) .
47. The theoretical point at which all molecular motion stops is called absolute 0 , 0 K .
48. According to Boyles' Law , if you decrease the volume of a container of gas and hold the temperature constant, the pressure of the gas will increase.
49. According to Charles' Law , the volume of a gas increases with increasing temperature, as long as pressure does not change.
50. As a sample of matter is heated, its particles move more quickly \_.
51. The most common state of matter in the universe is plasma .
52. The idea that matter is made up of small particles that are in constant motion is Kinetic theory of matter .
53. The particles that make up a solid move more slowly than do the particles that make up a gas.
54. As the temperature of a gas increases, the volume of the gas will increase if the pressure remains the same.
55. As the volume of a gas decreases, the pressure of the gas will increase if the temperature remains the same.
56. The kinetic theory states that the particles in matter are always in motion
57. The kinetic theory states that, at the same temperature, heavier particles move more slowly than lighter particles.
58. As gas molecules bounce around and collide, they spread to fill all available space \_
59. As heat is added to a solid substance, the atoms vibrate faster \_ and move apart.
60. Ice cubes left in the freezer for several months will become smaller because of sublimation \_
61. Energy may be converted from one form to another, but it *cannot* be created or destroyed \_
62. In comparing plasma to a solid, a liquid, and a gas, plasma is most similar to a gas \_
63. Some high-altitude balloons are only partially filled when they are released from the ground. Using Boyle's law, explain why the balloons are only partially filled. Assume the air temperature remains constant. At higher altitude, there is less pressure. According to Boyle's law, the volume of the gas will increase and the balloon fills up completely
64. Adding thermal energy to a solid normally causes a temperature change in the solid. What happens to the thermal energy and the temperature as the solid melts? temperature remains the same; thermal energy goes to breaking solid particles apart
65. Thermal energy is added to water to turn it into steam. Explain this event according to the kinetic theory of matter. Water molecules are moving but are held together; as thermal energy is added, molecules move more quickly and are not held as tightly, and some fly off as steam
66. Which of the states of matter can you force into a smaller volume? Explain Gas and plasma; there is still room between the particles
67. What will happen to the size of a balloon when it is placed in a freezer? Explain It shrinks; as the temperature of air decreases, the volume of the air decreases
68. List the states of matter and explain their differences using the kinetic theory of matter. solid—particles held tightly, not free to move around; liquid—particles very close together but free to move; gas—particles are free to move in any direction, not held together; plasma—particles move with so much energy they break into smaller charged particles.



**Figure 16-2**

69. The dots on the balloon in Figure 16-2 represent particles of air. Use what you know about pressure, temperature, volume, and the kinetic theory of matter to write a hypothesis to explain what will happen to the volume of the balloon if pressure is kept constant and the temperature is lowered. The movement of the particles inside the balloon will slow down. Because the pressure is the same, the number of collisions of the particles and the balloon is the same. As a result, the volume of the balloon decreases