

Name: \_\_\_\_\_

## Physical Science Unit 4 Study Guide

### Chapter 2:

1. What are the two categories of pure substances?
2. What type of substance cannot be broken down into simpler substances?
3. What is the difference between an element and a compound?
4. Is stainless steel a homogeneous or heterogeneous mixture?
5. List colloid, suspension, and solution in order of smallest to largest particles.
6. Which mixture (solution, suspension, or colloid) settles over time?
7. Which elements tend to be malleable and good conductors?
8. Filtration separates mixtures based on \_\_\_\_\_, and distillation separates mixtures based on \_\_\_\_\_.
9. What are the 3 signs that a chemical change has occurred?
10. Is digesting food a physical or chemical change?

### Chapter 3:

11. Fill in the following chart.

State of Matter	Shape	Volume
Liquid		
		indefinite
	definite	

12. List the states of matter in order from closest particles to most spread out particles.
13. Which of the states of matter would generally have the LEAST kinetic energy?  
a. solid                      b. liquid                      c. gas                      d. plasma
14. What 3 factors affect gas pressure?
15. What is Boyle's law?
16. What is Charles' law?
17. Sample A of CO<sub>2</sub> has a density of 1562 kg/m<sup>3</sup>. Sample B of CO<sub>2</sub> has a density of 770 kg/m<sup>3</sup>. How can the two samples of the same substance have different densities?  
a. Sample A must be a gas, and Sample B must be a solid.  
b. Sample A must be a solid, and Sample B must be a liquid.  
c. Sample A must be a newer sample of CO<sub>2</sub> than Sample B.  
d. Sample A must be a greater amount of CO<sub>2</sub> than Sample B.
18. Which of the following is MOST affected by a change in pressure?  
a. volume of a gas  
b. volume of a liquid  
c. mass of a solid  
d. temperature of a liquid
19. What would happen if a scuba tank (a rigid, sealed gas cylinder) heats up?  
a. The pressure exerted by the gas in the tank would increase.  
b. The size of the gas particles in the tank would increase.  
c. The number of particles in the tank would increase.  
d. The density of the gas in the tank would increase.

20. Fill in the blanks.

- a. If temperature decreases, then volume \_\_\_\_\_.
- b. If volume is halved, then pressure \_\_\_\_\_.
- c. If the number of particles increases, then pressure \_\_\_\_\_.

21. Name the following phase changes **AND** label them as endothermic or exothermic.

- a. solid  $\rightarrow$  gas
- b. gas  $\rightarrow$  liquid
- c. gas  $\rightarrow$  solid
- d. liquid  $\rightarrow$  gas
- e. solid  $\rightarrow$  liquid
- f. liquid  $\rightarrow$  solid

#### Chapter 4:

22. What term did Democritus use for matter that cannot be divided?

23. What particle did J.J. Thomson discover?

24. Draw J.J. Thomson's plum pudding model of the atom.

25. What part of the atom did Rutherford discover with his gold foil experiment?

26. Draw Rutherford's model of the atom.

27. Which conclusion was the direct result of the gold foil experiment?
- An atom is composed of at least three types of subatomic particles.
  - An electron has a positive charge and is located inside the nucleus.
  - An electron has properties of both waves and particles.
  - An atom is mostly empty space with a dense, positively charged nucleus.
28. Which particles are in the nucleus?
29. The mass of an electron is
- a small fraction of the mass of a proton.
  - the majority of the mass of a nucleus.
  - the majority of the mass of an atom.
  - the same as the mass of a proton.
30. If an atom picks up an extra electron, what happens to it?
- It becomes more positive.
  - It becomes more negative.
  - Its charge becomes neutral.
  - Its charge does not change.
31. What is unique for each element?
32. What is the difference in the atomic number and the mass number?
33. In what two ways do isotopes differ from one another?
34. Draw the Bohr model of a phosphorus (P) atom.
35. A neutral atom contains eight protons, nine neutrons, and eight electrons. The atom must be
- an oxygen isotope.
  - a nitrogen isotope.
  - a fluorine isotope.
  - a neon isotope.

36. How can an electron move to another energy level?

37. What is the difference between ground state and excited state for an electron?

38. How are oxygen-17 and oxygen-18 similar? How are they different?

39. Which row correctly classifies atoms and ions?

Row	Atoms	Ions
1	H <sup>+</sup> and Na <sup>+</sup>	OH <sup>-</sup> and Cl <sup>-</sup>
2	Fe and K	CH <sub>3</sub> COO <sup>-</sup> and H <sub>2</sub> O
3	Fe and H <sub>2</sub> O	Ca <sup>2+</sup> and N <sup>3-</sup>
4	Na and C	I <sup>-</sup> and NO <sub>3</sub> <sup>-</sup>

a. 1

b. 2

c. 3

d. 4

40. Fill in the following chart. (All rows are **neutral** atoms.)

symbol	atomic #	mass #	protons	neutrons	electrons
			6	7	
		96			42
Al		27			
	55	133			