

October 2017

Ann Arbor Public Schools
Physical Science 8
Mid Term-Study Guide

Students, remember to review all your labs, too!

HSCE C4.9-Identify elements with similar chemical and physical properties using the periodic table. (A copy of the periodic table will be provided.)

- 1) Groups of the periodic table correspond to elements with:
 - a. the same color
 - b. the same atomic number
 - c. similar chemical properties
 - d. similar numbers of neutrons

- 2) Name three elements that have similar chemical properties to oxygen.

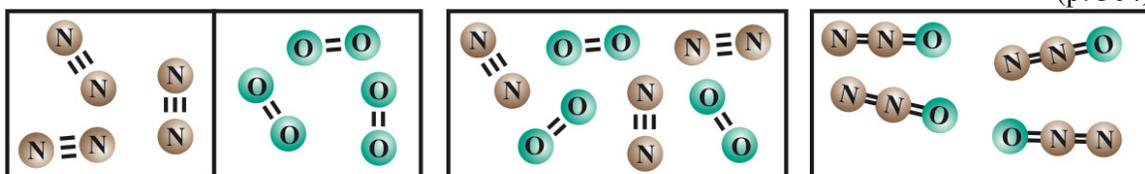
- 3) The elements fluorine, chlorine, and, bromine are in which group of the periodic table?
 - a. the alkali metals
 - b. the oxygen-like elements
 - c. the halogens
 - d. the noble gases

C4.8C Recognize that protons repel each other and that a strong force needs to be present to keep the nucleus intact.

- 4) Which of the following statements regarding electric charge is TRUE? (p. 324)
 - a. A positive charge repels a negative charge and attracts other positive charges.
 - b. A positive charge attracts a negative charge and repels other positive charges.

P4.p2A Distinguish between an element, compound, or mixture based on drawings or formulae.

- 5) Label each of the diagrams below as a mixture, compound, or separate elements.



A

B

C

- 6) Which of the following is a compound? (p. 364)
- C
 - N₂
 - O₃
 - H₂SO₄

- 7) What is the difference between a compound and a mixture? (p. 364)

C5.2B Distinguish between chemical and physical changes in terms of the properties of the reactants and products.

- 8) In the following list, decide whether each item is a physical or a chemical change: (p. 408)

- liquid water freezes into solid ice
- wood burns to ashes
- a window shatters when hit with a rock
- an old car sits in a junkyard and rusts
- a cup of hot chocolate gives off steam

- 9) Tearing a piece of paper is an example of what kind of change? (p. 408)

- 10) The reactants in the equation $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O} + \text{energy}$ are: (p. 409)

- hydrogen and energy.
- hydrogen and oxygen.
- water and energy.
- oxygen and water.

P4p2D Recognize that the properties of a compound differ from those of its individual elements.

- 11) Hydrogen (H) is a colorless, flammable gas at room temperature. Chlorine (Cl) is a toxic green gas at room temperature. Hydrochloric acid (HCl) is a strong acid that is liquid at room temperature. Why is HCl liquid, when H and Cl are both gases at room temperature?

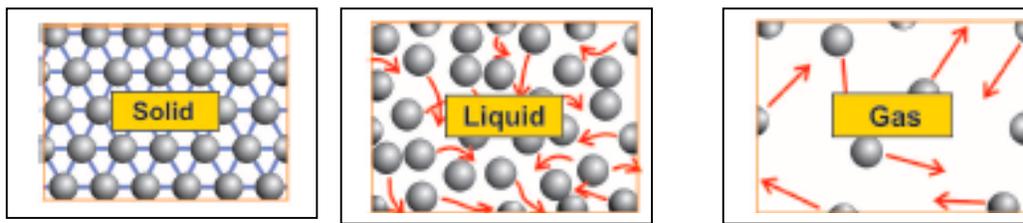
(p. 408)

- HCl is a mixture of hydrogen and chlorine, and mixtures have different physical properties than their original elements.
- HCl is colder than hydrogen or chlorine.
- You have to cool off hydrogen and chlorine to make HCl.
- HCl is a compound of hydrogen and chlorine, and compounds have different physical properties than their original elements.

- 12) Iron is a dark grey metal that can come in powder, in granules, in pellets, or in chunks, that is attracted to a magnet. Sulfur is a soft yellow powder, which can also come in chunks, that is not magnetic and has a strong smell (like rotten eggs). One compound of Iron sulfide (FeS_2) is a rock called pyrite, often called Fool's Gold which is a shiny solid that is *not* magnetic. Why is pyrite NOT magnetic? (p. 408)
- The iron atoms get rubbed the wrong way to make pyrite.
 - When you heat up the iron, the iron loses its' magnetism.
 - FeS_2 is a mixture of iron and sulfur, and mixtures have different physical properties than their original elements.
 - FeS_2 is a compound of iron and sulfur, and compounds have different physical properties than their original elements.

C2.2B-Describe the various states of matter in terms of the motion and arrangement of the molecules (atoms) making up the substance

- 13) Which of the following diagrams has the lowest energy?



- liquid
- solid
- gas

C4.3A-Recognize that substances that are solid at room temperature have stronger attractive forces than liquids at room temperature, which have stronger attractive forces than gases at room temperature.

C4.3B-Recognize that solids have a more ordered, regular arrangement of their particles than liquids and that liquids are more ordered than gases.

- 14) The phase of matter which has a definite volume, but not a definite shape:

- solid.
- liquid.
- gas.

- 15) As a liquid freezes to solid, the molecules _____

- speed up
- keep the same speed
- slow down

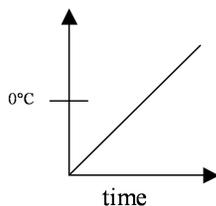
16) Solids and liquids conduct heat better than gases because _____

- a. they have more kinetic energy.
- b. the molecules are in contact with each other.
- c. they conduct electricity.
- d. the molecules are in random motion

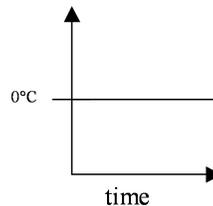
C3.3B- -Describe melting on a molecular level.

17) Which of the following most accurately represents what the graph would look like comparing temperature to time as an ice cube is heated from below 0°C to above 0°C ?

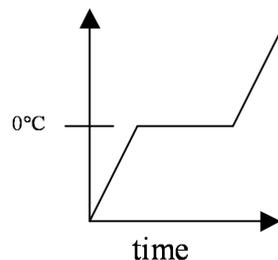
a.



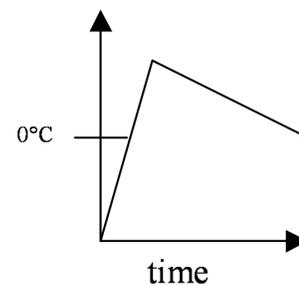
b.



c.



d.



e) Graph can't be predicted based on the information given.

P4.12A Describe peaceful technological applications of nuclear fission and radioactive decay.

18) Which of the following are peaceful uses of nuclear technology? (mini-unit)

- a. detecting and curing cancer
- b. making electricity
- c. luggage inspection at airports
- d. all of the above

19) Radioactive elements are found in:

(mini-unit)

- a. empty pop cans
- b. smoke detectors
- c. NaCl (table salt)
- d. distilled water

P4.12B Describe possible problems caused by exposure to prolonged radioactive decay.

- 20) Vertebrate animals that have prolonged exposure to radioactivity: (mini-unit)
- will show no side effects
 - will die within a year
 - will turn green
 - will have an increased risk of cancer

P1.1C Conduct scientific investigations using appropriate tools and techniques.

- 21) When describing scientific evidence, what is the meaning of the word “repeatable”? (p. 29)
- 22) Which of the following is an example of how scientists build knowledge? (p. 28)
- Miguel is told that hot objects, like a cup of coffee, cool off when left on the table in a cooler room.
 - Enrique wonders what happens to hot objects if you remove them from the stove. He puts a thermometer in a pot of boiling water and observes that the water cools off once it’s removed from the heat source.
- 23) Georgiana has the idea that salt water heats up faster than fresh water. Which of the following would be acceptable scientific proof of her hypothesis? (p. 29)
- Three of her friends believe it.
 - She read on an Internet website that it was so.
 - She did an experiment that showed it.
- 24) A careful description of how an experiment is conducted is called (lab)
- a data table.
 - a procedure.
 - an analysis.
 - a conclusion.
- 25) A student notices that some plants in her class have grown faster than others and wants to know why. Unscramble the steps of the scientific method she might use to investigate. Place them in a logical order from the first step to the last. (lab)
- She thinks it might be light (a hypothesis).
 - She wonders why (a question).
 - She concludes that it is not light (a conclusion).
 - She grows similar plants under different amounts of light (an experiment).
 - She compares the plants growth (analyzes data).

Evaluate the uncertainties or validity of scientific conclusions using an understanding of sources of measurement error, the challenges of controlling variables, accuracy of data analysis, logic of argument, logic of experimental design, and/or the dependence on underlying assumptions.

26) You and your lab partners are investigating how the speed of a cart rolling down a ramp is affected by the height of the ramp. You calculate the speed of the cart at the bottom of the ramp for 5 different ramp heights and find that the speed is different for each height. (p. 41)

- a. Name the experimental (independent) variable.
- b. Name a factor that would need to be maintained as constant in order to draw a reliable conclusion.
- c. When another lab group repeats your investigation, they get **different** speed values from your group. Your teacher says the values are not **significantly** different. What does she mean?

27) Pat, a fourth grader, decides to find out what foods guinea pigs like best. She sets a peanut and a raisin in front of her pet guinea pig. The guinea pig eats the peanut and doesn't eat the raisin. From this, Pat concludes that guinea pigs like peanuts better than raisins. (p. 44)

The *best* way for Pat to *strengthen* her claim would be:

- a. Try the same test on her guinea pig again.
- b. Try the same test in the dark.
- c. Try the same test on ten other guinea pigs.
- d. See whether her guinea pig likes peanuts better than lettuce.

28) Explain why a solid steel ball sinks in water but a steel ship floats in water.

29) If volume increases and density stays the same, mass

- A. must increase
- B. must decrease
- C. must stay the same
- D. is not related to density and volume

30) If mass increases, what has to happen to the volume in order to keep the density the same.

- A. The volume must decrease by the same amount that the mass increased.
- B. The volume must keep its original value.
- C. The volume must increase by the same amount that the mass increased.
- D. There is no relationship between mass and volume that will impact density.

31) Amy has a ball of Silly Putty that she drops in a sink full of water. The Silly Putty sinks to the bottom. She challenges her brother to see if he can make the same blob of Silly Putty float without adding or taking away any of the silly putty. What change will make it float? Provide a thorough explanation that includes the factors that will determine whether the silly putty will float. Describe which factors will remain constant, and which factors must change.

Given diagrams of many different possible connections of electric circuit elements, identify complete circuits, open circuits, and short circuits, and explain the reasons for the classification.

32) An electrical circuit is: (p. 196)

- a network of pipes that carry water
- a path for electric current to flow
- a source of voltage that can push current
- what flows and carries electrical power

33) Explain the difference between an open circuit and a closed circuit? (p. 197)

Discriminate between voltage, resistance, and current as they apply to an electric circuit.

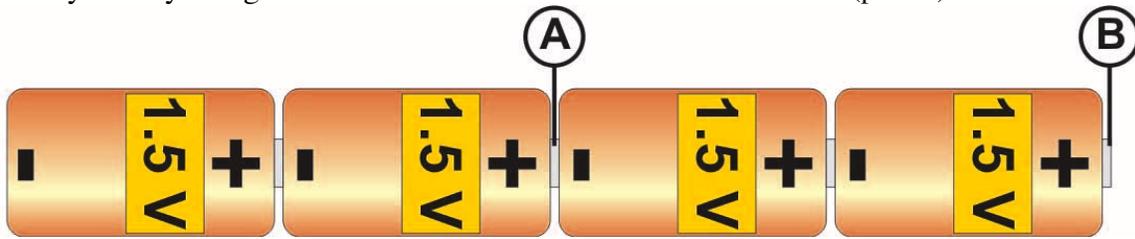
34) List the units for measuring current and voltage. (p. 195)

35) Describe the difference between current and voltage. Can there be current without voltage? Can there be voltage without current? (p. 200)

36) Electrical current flows (p. 197)

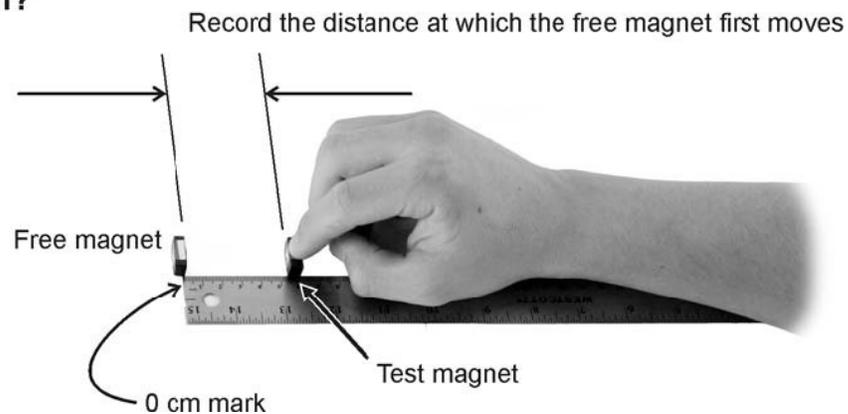
- through all wires all of the time
- from higher voltage to lower voltage
- whenever matter contains electric charge

- 37) What is the voltage difference between the points A and B in the diagram below? Assume each battery is fully charged. (p. 194)



P3.7A Predict how the electric force between charged objects varies when the distance between them and/or the magnitude of charges change.

How far does the magnetic force reach?



Review the data table of Lab 8B and data table 1.1

P3.7B Explain why acquiring a large excess static charge (e.g. pulling off a wool cap, touching a Van de Graaff generator, combing) affects your hair.

- 38) Why do you sometimes get a shock when you touch a metal doorknob? (p. 191)
- because there's a brief electric current between you and the doorknob
 - because negative charge moves from you to the metal
 - because electric charge builds up in your body
 - all of the above are true