Clayton Valley Charter High School

Chemistry

Semester 1 Final

STUDY GUIDE

# 2017-2018

Name: _____ Period: _____

1. Suppose that you have two cubes of exactly the same volume. You weigh them on a scale and find a mass of 8.91 g for one cube and 8.94 g for the other cube even though they are made out of the same material. How is this possible?

2. If two objects have the same mass what <u>must</u> be true about them? Justify your answer.
    a. They have the same volume.
    b. They are made of the same material.
   c. They contain the same amount of matter.
    d. They have the same density.

Explanation

3. What is the difference between an intensive and an extensive property? Give an example of each.

4. Gold is much more dense than aluminum. I have drawn a model representing gold atoms in a cube of pure gold. If I had a cube of aluminum that was exactly the same size, fill in what the atoms in the cube may look like. Explain your drawing.
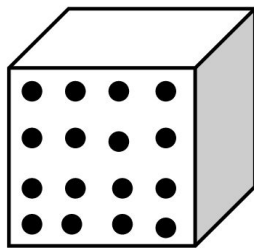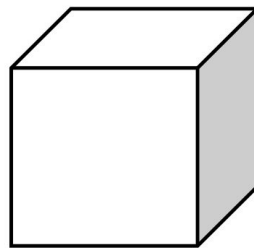

Gold   Aluminum

Explanation

5. In 1999, the United States Mint produced a coin called the Golden Dollar. It features an image of Sacagawea, the famous Native American guide for Lewis and Clark. It has a mass of 0.0098 kg and a volume of 1.1 mL. Is this coin solid gold? Calculate the density of the coin to help you explain your answer. (The density of gold is 19.3 g/mL). *Note:* You must justify your answer as to whether it is solid gold or not.

6. The density of iron is 7.88 g/mL. What is the mass of a piece of iron that has a volume of 0.023 L?

7. A rectangular block has a length of 13.2 cm, a width of 10.3 cm, and a height of 4.6 cm. If the block has a mass of 4920 g, what is its density?

8. The densities for the substances in the graph above are listed in the table below. In the cup, label each layer with the correct substance. Below, draw the particle models of the substances based on density; water has been done for you. In the box below, explain your reasoning for your choices.

| Substance	Density (g/mL)
Water	1.00
Oil	0.91
Honey	1.36
Isopropyl Alcohol	0.79
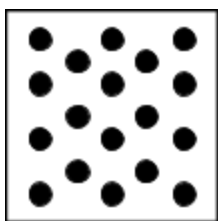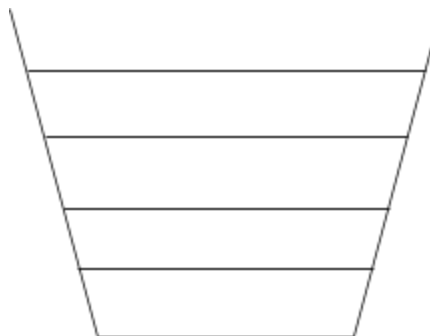
Water

Oil

Honey

Isopropyl Alcohol

Explanation

9. From your experiment with the slinky, which waves do you think would cause more damage: S-waves or P-waves? Explain using sentences and drawings from your experiment.

10. Below is a map of the Bay Area. Draw the potential wave effect if an earthquake strikes on the Hayward Fault (in Berkeley). Explain your reasoning below.
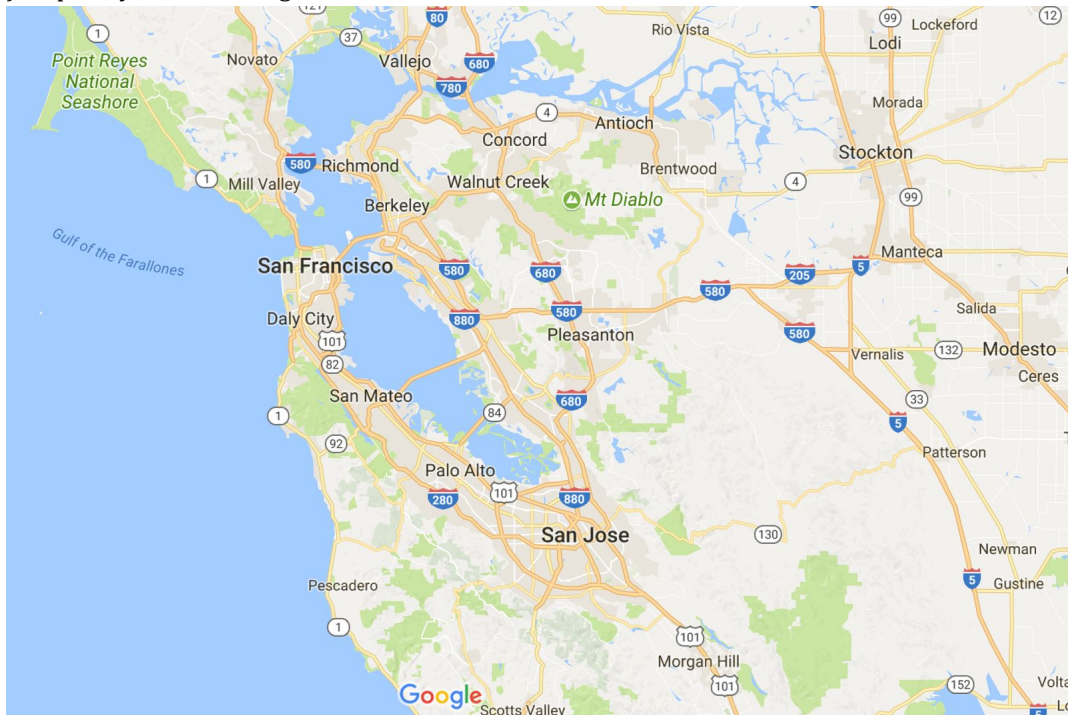
11. What evidence caused Thompson to change Dalton's solid sphere model into the plum pudding model?

12. Name all the elements found in the chemical formula for sodium nitrate, $NaNO_3$. (Write the name and the abbreviation). Determine the molar mass.

13. Use the periodic table to fill in the following table:

Element	Chemical Symbol	Atomic Number	Number of Protons	Number of Electrons	Number of Neutrons	Average Atomic Mass
Nickel						
	Ne					
						24.31
		15				
				30		

14.   a. Below, draw the simple atomic models (solar system model) of nitrogen. Label the protons, neutrons and electrons and give a key. Indicate where the nucleus is.

KEY	
Protons	
Neutrons	
Electrons	

   b. Draw a simple atomic model of an atom of Oxygen, O, that contains 9 neutrons. Color code the protons, neutrons, electrons and nucleus in your model, and include a key.

15. Provide the following information for element number 17.
   a. The element's name and symbol.

   b. The number of protons in the nucleus.

   c. The number of electrons in a neutral atom.

16. Use the periodic table to fill in the following table:

Element	Chemical Symbol	Atomic Number	Number of Protons	Number of Electrons	Number of Neutrons	Average Atomic Mass
Strontium						
	K					
						58.93
		53				
				2		

17. Which of the following compounds would produce similar flame colors when heated? **Explain**.

NaCl   CaCl$_2$ SrCl$_2$ Sr(NO$_3$)$_2$ Cu(NO$_3$)$_2$
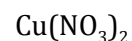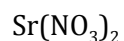
18. Would it matter whether you did a flame test with sodium chloride, NaCl, in solid form or sodium chloride as an aqueous solution? **Explain**.

19. Nickel sulfate, NiSO$_4$(aq), is a green solution. Nickel chloride, NiCl$_2$(aq), is a yellow solution. Hydrochloric acid, HCl(aq), is a colorless solution. If you add nickel, Ni(s), to hydrochloric acid, HCl(aq), what color do you think the resulting solution will be, green or yellow? Explain your answer.

20. Draw a shell model for boron, B. Label protons, electrons, neutrons, and nucleus. How many core and valence electrons does B have?

1. Explain how to determine the molar mass of sodium chloride, NaCl.
2. Which contains more molecules, 1.0 g of methanol, CH_4O, or 1.0 g of ethanol, C_2H_6O? Explain your choice.
3. How many grams of each molecule are in 2 mol of each substance?
    a. Methane, CH_4
    b. Methanol, CH_4O
    c. Ethanol, C_2H_6O

1. List these compounds in order of increasing moles of molecules: 2.0 g of CH_4O, 2.0 g of H_2O, 2.0 g of C_8H_{18}. Show your work or explain your answer.
2. List these compounds in order of increasing mass in grams: 2.0 mol of $SiCl_4$, 2.0 mol of PbO, 2.0 mol of Fe_2O_3. Show your work or explain your answer.
3. Suppose you run a company that buys copper compounds and then recycles the copper for resale. Your company wants to get the most pure copper for the lowest cost. Three different suppliers want to sell you 1 mol CuO(s), 1 mol $CuCO_3$ (s), and 1 mol Cu_2S (s) for the same price.
    a. Which compound has the greatest total mass? Show your work.
    b. Which compound has the greatest mass of Cu? Show your work.
    c. Assuming it costs the same to extract the copper from each compound, which represents the best deal for your company? Explain.