WLHS / Chem / Monson

WEBQUEST ACTIVITY: Computer Simulation of Chemical Bonding

Directions: Use the links as instructed. Answer the questions and/or draw the diagrams requested on this sheet of paper.

**NOTE: this activity is posted as a pdf on my webpage, so you can access it there and click directly on the links to the webpages!

1st WEBPAGE: Go to http://www.ausetute.com.au/ionicbond.html

Read through the information and answer the following questions.

1) Diagram the 3D ionic "lattice" (geometric arrangement of cations and anions) shown at the right side of the page.

2) What is an **ionic bond**?

3) List some **physical properties** of ionic compounds.

4) Provide an explanation as to WHY ionic compounds have high melting points.

5) What are the two major factors that lead to higher melting points in some ionic compounds (such as MgO) with a higher melting point than other ionic compounds (such as NaCl)? **Describe / explain each one.**

6) In **which state(s)** do ionic compounds **conduct electricity**? Why don't ionic compounds conduct electricity in the solid state?

7) Explain how the structure of ionic compounds makes them brittle.





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2nd WEBPAGE:

Go to https://opb.pbslearningmedia.org/resource/lsps07.sci.phys.matter.ionicbonding/ionic-bonding/

Launch and click through the Chem Think tutorial on ionic bonds and ionic compounds. Answer the following questions as you go.

1) Describe what happens when you try to drag or pull the two negative ions together.

2) Now describe what happens when you try to pull the positive and negative ions together.

3) Which elements tend to **LOSE electrons** and which elements tend to **GAIN electrons**?



4) Therefore, which two types of elements do we typically see forming an ionic bond together?

5) Describe exactly what happens when a **sodium atom encounters a chlorine atom**.

6) Using the above sodium and chlorine example, answer, what exactly IS an ionic bond?

7) Describe what happens when there are **many pairs of Na⁺ and Cl⁻ ions**...what kind of structure do they form?

8) In ionic compounds, the **formula** tells us the ______ of ions, not necessarily the total number.

9) (slide 24 of 27): Count up all or Ca^{2+} ions, and all of the F⁻ ions. How many of each are shown in the crystal?

Total number of Ca²⁺ ions:______Total number of F⁻ ions:_____

10) What is the correct formula of this ionic compound?_____

3rd WEBPAGE (Covalent vs. lonic Bonds):

Go to https://www.youtube.com/watch?v=OTgpN62ou24

Watch the animation on Covalent & Ionic Bonding. Either turn on the sound or turn on the captions ("CC") and read along. Answer the following questions.

1) Summarize the octet rule.

2) How does **forming a covalent bond** satisfy the valence electrons (i.e. the octet rule or full outer valence shell) of hydrogen and carbon in the formation of methane (CH₄)? Defend your answer with pictures.

3) How does **forming an ionic bond** satisfy the valence electrons (i.e. the octet rule) of sodium and chlorine in the formation of sodium chloride? Defend your answer with pictures.

4th WEBPAGE: Go to https://www.youtube.com/watch?v=LkAykOv1foc

Watch the animation on Covalent Bonding. Either turn on the sound or turn on the captions ("CC") and read along. Answer the following questions.

1) Which elements are stable on their own? WHY are they stable?

2) How do other elements (i.e. NOT the noble gases) achieve this kind of stability?

3) How does a COVALENT BOND form?

Example of a Covalent Bond



4) Diagram the following covalently bonded molecules. Below each molecule, explain why that bonding configuration works.

Diagram	Why it works / type of bond formed (i.e. single,
	double, triple, etc.)
Cl ₂	
O ₂	
N ₂	