Science 9: Ionic & Covalent Chemical Bonding Virtual Lab

Pre-Virtual Lab Questions: Answer these before going to the website to begin the virtual lab.

1. Metals are located on the right/left (circle one) of the periodic table. Non-metals are located right/left (circle one) on the periodic table?
2. What subatomic particle(s) participate in chemical bonding? _____
3. In your own words, define valence electrons.

Virtual Lab Procedure: Go to the website **http://www.teachchemistry.org/bonding** (located also on my website). Once you get to the website, you should see a picture of the Periodic Table on your screen.

Part I: Ionic Bonding

1. Choose Sodium (Na).
    a. What type of element is it? _____
    b. How many valence electrons does it have? _____
2. Choose Fluorine (F).
    a. What type of element is it? _____
    b. How many valence electrons does it have?_____
3. Answer the question on the screen, "What type of bond is this combination likely to form?"
    a. Circle: Ionic or Covalent?
    b. Choose the appropriate number of atoms to make the bond. Record the number of each atom below: #Na atoms_____ #F atoms_____
4. Watch the final animation closely (it will play continuously).
    a. Describe the change in the number of valence electrons in the atoms as the bond is successfully formed:

    b. What does the positive (+) charge indicate (mention specific subatomic particles in your answer)?

    c. What does the negative (-) charge indicate (mention specific subatomic particles in your answer)?

    d. What is the final overall charge of the compound? _____
    e. What is the name AND formula for the compound formed? _____
5. Reset the selected data using the Reset symbol (arrow that looks like an "undo" button)
6. Choose Calcium (Ca).
    a. What type of element is it? _____
    b. How many valence electrons does it have? _____
7. Choose Chlorine (Cl).
    a. What type of element is it? _____
    b. How many valence electrons does it have? _____
8. Answer the question on the screen, "What type of bond is this combination likely to form?"
    a. Circle: Ionic or Covalent?
    b. Choose the appropriate number of atoms to make the bond. #Ca atoms_____ #Cl atoms_____
9. Watch the final animation closely (it will play continuously).
    a. Why were more than 2 total atoms needed to create this compound?
    b. Explain what happened to the valence electrons in each atom.
    c. What is the final overall charge? _____
    d. What is the name AND formula for the compound formed? _____
10. Reset the selected data using the Reset symbol (arrow that looks like an "undo" button)
11. Using a Periodic Table, complete the chart below. Then, use the simulation to check your answers by clicking on the appropriate elements to make each compound.

Atom #1	# Valence Electrons	Ion Charge	Atom #2	# Valence electrons	Ion Charge	Formula	Name
Na			O				
K			F				
Mg			Cl				
Ca			N				
Al			S				

Part II: Covalent Bonding

1. Now, you will investigate diatomic molecules, those that are made up of two of the same type of atom. Select 2 fluorine atoms.
    a. How many valence electrons are in each fluorine atom?_____
    b. Is a fluorine atom a metal or a non-metal?_____
    c. Did the combination of these atoms create a covalent or ionic bond? _____
    d. How are the valence electrons organized to form a bond between these atoms?

    e. How is this different from the ionic bonds formed in the previous part of the activity?

2. Select 2 oxygen atoms.
    a. How many valence electrons are in each oxygen atom?_____
    b. Is an oxygen atom a metal or a non-metal? _____
    c. Did the combination of these atoms create a covalent or ionic bond? _____
    d. How are the valence electrons organized to form a bond between the atoms?

    e. How is this bond different from the bond in the fluorine molecule in question 1?

Part III: Post Lab Questions

1. What are the differences between ionic and covalent bonds? Be sure to refer to valence electrons in your response.

2. How is the naming of ionic and covalent compounds different? Use specific examples in your answer.

3. Based on your knowledge of ionic and covalent compounds, complete the missing portions of the table below.

Name	Formula	Ionic or Covalent?
Beryllium bromide		
	PF_3	
Sulfur dioxide		
Strontium phosphide		
	Cs_3N	
	H_2O	