CHEMISTRY LAB: ELECTRON DOT DIAGRAMS FOR IONIC COMPOUNDS

WHAT TO TURN IN: Data Table Questions #1-5

Objectives

- To review element and ion names and symbols
- To practice writing electron dot diagrams for ionic compounds
- To relate electron dot diagrams to ion formation

Materials

- Colored pencils or markers
- White paper
- Ruler

Procedure

1) Obtain a data table with ten rows and eight columns.
    - Use one color for the cation and a different color for the anion.
    - Columns 1 & 3 are identical.
    - Use colors for columns 3, 6, and 8.

1	2	3	4	5	6	7	8
Cation Symbol (with charge)	**Cation Name**	**Cation Dot Diagram**	**Anion Symbol (with charge)**	**Anion Name**	**Anion Dot Diagram**	**Compound formula AND name**	**Compound Dot Diagram**
1							
2							
etc…							

2) The steps to writing the electron dot diagram of a binary ionic compound:

- Write the symbols of the elements (such as Na and Cl).
- (Columns 1 & 4) Look up their oxidation numbers (charges) from their placement in the periodic table. Write the proper ion symbols and charges.
- (Columns 2 and 5) Write the names of the ions. Remember that all monatomic anions end in –IDE.
- (Column 7) Write the chemical formula using the crisscross method, ensuring that the sum of the charges on all the ions in the compound equals zero.
- (Column 7) Write the name of the binary ionic compound.
- (Column 3) Draw the electron dot diagram for the cation. The cation will lose its electrons to the anion. If you use blue for sodium, its blue valence electron will be taken to form the chloride ion. The sodium ion has no valence electron showing. The complete octet in the cation is the exposed, previously filled shell from underneath the original valance. It is not shown in dot diagrams, to reflect the loss of electrons from the original valence "shell."
- (Column 6) Draw the electron dot diagram for the anion. Use a different color than you used for the cation. The anion will gain electron(s) by taking it/them from the cation(s). The electrons that come from the cations should be shown in the color you used for the cation. All anions should show a complete octet.

sodium atom

sodium ion

chlorine atom

chloride ion

- (Column 8) Draw the electron dot diagrams for the ions. You may alternate positive and negative ions.

ENTRIES FOR DATA TABLE	
BONDING PARTNERS	CHEMICAL FORMULA
1) lithium and oxygen	**Li_2O**
2) magnesium and iodine	**MgI_2**
3) aluminum and fluorine	**AlF_3**
4) calcium and nitrogen	**Ca_3N_2**
5) zinc and selenium (Note: zinc is a typical transition metal.)	**ZnSe**
6) aluminum and sulfur	**Al_2S_3**
7) potassium and chlorine	**KCl**
8) cesium and bromine	**CsBr**
9) sodium and phosphorus	**Na_3P**
10) lead(IV) and nitrogen (Note: lead forms more than one charge, so the Roman numeral indicates that Pb^{4+} is the proper ion for this compound. If you write "lead" instead of "lead(IV)," the name is incomplete and will be marked wrong.)	**Pb_3N_4**

Questions

1) Why do dot diagrams of cations show no electrons?
2) How many electrons should the anions show in their dot diagrams?
3) Why are all 10 of these compounds "binary ionic" compounds?
4) Why is it suggested to *alternate the positive and negative ions* in the compound dot diagrams, if possible?
5) How can you use dot diagrams of cations and anions to show which type is more electronegative than the other?

CHEMISTRY LAB: ELECTRON DOT DIAGRAMS FOR IONIC COMPOUNDS

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sodium atom

sodium ion

chlorine atom

chloride ion

- (Column 8) Draw the electron dot diagrams for the ions. You may alternate positive and negative ions.

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5) How can you use dot diagrams of cations and anions to show which type is more electronegative than the other?

CHEMISTRY LAB: ELECTRON DOT DIAGRAMS FOR IONIC COMPOUNDS

WHAT TO TURN IN: Data Table Questions #1-5

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sodium atom

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CHEMISTRY LAB: ELECTRON DOT DIAGRAMS FOR IONIC COMPOUNDS

WHAT TO TURN IN: Data Table Questions #1-5

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- To review element and ion names and symbols
- To practice writing electron dot diagrams for ionic compounds
- To relate electron dot diagrams to ion formation

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2) The steps to writing the electron dot diagram of a binary ionic compound:

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sodium atom

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CHEMISTRY LAB: ELECTRON DOT DIAGRAMS FOR IONIC COMPOUNDS

WHAT TO TURN IN: Data Table Questions #1-5

Objectives

- To review element and ion names and symbols
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2) The steps to writing the electron dot diagram of a binary ionic compound:

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WHAT TO TURN IN: Data Table Questions #1-5

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WHAT TO TURN IN: Data Table Questions #1-5

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WHAT TO TURN IN: Data Table Questions #1-5

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- (Column 3) Draw the electron dot diagram for the cation. The cation will lose its electrons to the anion. If you use blue for sodium, its blue valence electron will be taken to form the chloride ion. The sodium ion has no valence electron showing. The complete octet in the cation is the exposed, previously filled shell from underneath the original valance. It is not shown in dot diagrams, to reflect the loss of electrons from the original valence "shell."
- (Column 6) Draw the electron dot diagram for the anion. Use a different color than you used for the cation. The anion will gain electron(s) by taking it/them from the cation(s). The electrons that come from the cations should be shown in the color you used for the cation. All anions should show a complete octet.

sodium atom

sodium ion

chlorine atom

chloride ion

- (Column 8) Draw the electron dot diagrams for the ions. You may alternate positive and negative ions.

ENTRIES FOR DATA TABLE	
BONDING PARTNERS	CHEMICAL FORMULA
1) lithium and oxygen	**Li_2O**
2) magnesium and iodine	**MgI_2**
3) aluminum and fluorine	**AlF_3**
4) calcium and nitrogen	**Ca_3N_2**
5) zinc and selenium (Note: zinc is a typical transition metal.)	**ZnSe**
6) aluminum and sulfur	**Al_2S_3**
7) potassium and chlorine	**KCl**
8) cesium and bromine	**CsBr**
9) sodium and phosphorus	**Na_3P**
10) lead(IV) and nitrogen (Note: lead forms more than one charge, so the Roman numeral indicates that Pb^{4+} is the proper ion for this compound. If you write "lead" instead of "lead(IV)," the name is incomplete and will be marked wrong.)	**Pb_3N_4**

Questions

1) Why do dot diagrams of cations show no electrons?
2) How many electrons should the anions show in their dot diagrams?
3) Why are all 10 of these compounds "binary ionic" compounds?
4) Why is it suggested to *alternate the positive and negative ions* in the compound dot diagrams, if possible?
5) How can you use dot diagrams of cations and anions to show which type is more electronegative than the other?

CHEMISTRY LAB: ELECTRON DOT DIAGRAMS FOR IONIC COMPOUNDS

WHAT TO TURN IN: Data Table Questions #1-5

Objectives

- To review element and ion names and symbols
- To practice writing electron dot diagrams for ionic compounds
- To relate electron dot diagrams to ion formation

Materials

- Colored pencils or markers
- White paper
- Ruler

Procedure

1) Obtain a data table with ten rows and eight columns.
    - Use one color for the cation and a different color for the anion.
    - Columns 1 & 3 are identical.
    - Use colors for columns 3, 6, and 8.

1	2	3	4	5	6	7	8
Cation Symbol (with charge)	**Cation Name**	**Cation Dot Diagram**	**Anion Symbol (with charge)**	**Anion Name**	**Anion Dot Diagram**	**Compound formula AND name**	**Compound Dot Diagram**
1							
2							
etc…							

2) The steps to writing the electron dot diagram of a binary ionic compound:

- Write the symbols of the elements (such as Na and Cl).
- (Columns 1 & 4) Look up their oxidation numbers (charges) from their placement in the periodic table. Write the proper ion symbols and charges.
- (Columns 2 and 5) Write the names of the ions. Remember that all monatomic anions end in –IDE.
- (Column 7) Write the chemical formula using the crisscross method, ensuring that the sum of the charges on all the ions in the compound equals zero.
- (Column 7) Write the name of the binary ionic compound.
- (Column 3) Draw the electron dot diagram for the cation. The cation will lose its electrons to the anion. If you use blue for sodium, its blue valence electron will be taken to form the chloride ion. The sodium ion has no valence electron showing. The complete octet in the cation is the exposed, previously filled shell from underneath the original valance. It is not shown in dot diagrams, to reflect the loss of electrons from the original valence "shell."
- (Column 6) Draw the electron dot diagram for the anion. Use a different color than you used for the cation. The anion will gain electron(s) by taking it/them from the cation(s). The electrons that come from the cations should be shown in the color you used for the cation. All anions should show a complete octet.

sodium atom

sodium ion

chlorine atom

chloride ion

- (Column 8) Draw the electron dot diagrams for the ions. You may alternate positive and negative ions.

ENTRIES FOR DATA TABLE	
BONDING PARTNERS	CHEMICAL FORMULA
1) lithium and oxygen	**Li_2O**
2) magnesium and iodine	**MgI_2**
3) aluminum and fluorine	**AlF_3**
4) calcium and nitrogen	**Ca_3N_2**
5) zinc and selenium (Note: zinc is a typical transition metal.)	**ZnSe**
6) aluminum and sulfur	**Al_2S_3**
7) potassium and chlorine	**KCl**
8) cesium and bromine	**CsBr**
9) sodium and phosphorus	**Na_3P**
10) lead(IV) and nitrogen (Note: lead forms more than one charge, so the Roman numeral indicates that Pb^{4+} is the proper ion for this compound. If you write "lead" instead of "lead(IV)," the name is incomplete and will be marked wrong.)	**Pb_3N_4**

Questions

1) Why do dot diagrams of cations show no electrons?
2) How many electrons should the anions show in their dot diagrams?
3) Why are all 10 of these compounds "binary ionic" compounds?
4) Why is it suggested to *alternate the positive and negative ions* in the compound dot diagrams, if possible?
5) How can you use dot diagrams of cations and anions to show which type is more electronegative than the other?

CHEMISTRY LAB: ELECTRON DOT DIAGRAMS FOR IONIC COMPOUNDS

WHAT TO TURN IN: Data Table Questions #1-5

Objectives

- To review element and ion names and symbols
- To practice writing electron dot diagrams for ionic compounds
- To relate electron dot diagrams to ion formation

Materials

- Colored pencils or markers
- White paper
- Ruler

Procedure

1) Obtain a data table with ten rows and eight columns.
    - Use one color for the cation and a different color for the anion.
    - Columns 1 & 3 are identical.
    - Use colors for columns 3, 6, and 8.

1	2	3	4	5	6	7	8
Cation Symbol (with charge)	**Cation Name**	**Cation Dot Diagram**	**Anion Symbol (with charge)**	**Anion Name**	**Anion Dot Diagram**	**Compound formula AND name**	**Compound Dot Diagram**
1							
2							
etc…							

2) The steps to writing the electron dot diagram of a binary ionic compound:

- Write the symbols of the elements (such as Na and Cl).
- (Columns 1 & 4) Look up their oxidation numbers (charges) from their placement in the periodic table. Write the proper ion symbols and charges.
- (Columns 2 and 5) Write the names of the ions. Remember that all monatomic anions end in –IDE.
- (Column 7) Write the chemical formula using the crisscross method, ensuring that the sum of the charges on all the ions in the compound equals zero.
- (Column 7) Write the name of the binary ionic compound.
- (Column 3) Draw the electron dot diagram for the cation. The cation will lose its electrons to the anion. If you use blue for sodium, its blue valence electron will be taken to form the chloride ion. The sodium ion has no valence electron showing. The complete octet in the cation is the exposed, previously filled shell from underneath the original valance. It is not shown in dot diagrams, to reflect the loss of electrons from the original valence "shell."
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sodium atom

sodium ion

chlorine atom

chloride ion

- (Column 8) Draw the electron dot diagrams for the ions. You may alternate positive and negative ions.

ENTRIES FOR DATA TABLE	
BONDING PARTNERS	CHEMICAL FORMULA
1) lithium and oxygen	**Li_2O**
2) magnesium and iodine	**MgI_2**
3) aluminum and fluorine	**AlF_3**
4) calcium and nitrogen	**Ca_3N_2**
5) zinc and selenium (Note: zinc is a typical transition metal.)	**ZnSe**
6) aluminum and sulfur	**Al_2S_3**
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8) cesium and bromine	**CsBr**
9) sodium and phosphorus	**Na_3P**
10) lead(IV) and nitrogen (Note: lead forms more than one charge, so the Roman numeral indicates that Pb^{4+} is the proper ion for this compound. If you write "lead" instead of "lead(IV)," the name is incomplete and will be marked wrong.)	**Pb_3N_4**

Questions

1) Why do dot diagrams of cations show no electrons?
2) How many electrons should the anions show in their dot diagrams?
3) Why are all 10 of these compounds "binary ionic" compounds?
4) Why is it suggested to *alternate the positive and negative ions* in the compound dot diagrams, if possible?
5) How can you use dot diagrams of cations and anions to show which type is more electronegative than the other?

CHEMISTRY LAB: ELECTRON DOT DIAGRAMS FOR IONIC COMPOUNDS

WHAT TO TURN IN: Data Table Questions #1-5

Objectives

- To review element and ion names and symbols
- To practice writing electron dot diagrams for ionic compounds
- To relate electron dot diagrams to ion formation

Materials

- Colored pencils or markers
- White paper
- Ruler

Procedure

1) Obtain a data table with ten rows and eight columns.
    - Use one color for the cation and a different color for the anion.
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1	2	3	4	5	6	7	8
Cation Symbol (with charge)	**Cation Name**	**Cation Dot Diagram**	**Anion Symbol (with charge)**	**Anion Name**	**Anion Dot Diagram**	**Compound formula AND name**	**Compound Dot Diagram**
1							
2							
etc…							

2) The steps to writing the electron dot diagram of a binary ionic compound:

- Write the symbols of the elements (such as Na and Cl).
- (Columns 1 & 4) Look up their oxidation numbers (charges) from their placement in the periodic table. Write the proper ion symbols and charges.
- (Columns 2 and 5) Write the names of the ions. Remember that all monatomic anions end in –IDE.
- (Column 7) Write the chemical formula using the crisscross method, ensuring that the sum of the charges on all the ions in the compound equals zero.
- (Column 7) Write the name of the binary ionic compound.
- (Column 3) Draw the electron dot diagram for the cation. The cation will lose its electrons to the anion. If you use blue for sodium, its blue valence electron will be taken to form the chloride ion. The sodium ion has no valence electron showing. The complete octet in the cation is the exposed, previously filled shell from underneath the original valance. It is not shown in dot diagrams, to reflect the loss of electrons from the original valence "shell."
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sodium atom

sodium ion

chlorine atom

chloride ion

- (Column 8) Draw the electron dot diagrams for the ions. You may alternate positive and negative ions.

ENTRIES FOR DATA TABLE	
BONDING PARTNERS	CHEMICAL FORMULA
1) lithium and oxygen	**Li_2O**
2) magnesium and iodine	**MgI_2**
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Questions

1) Why do dot diagrams of cations show no electrons?
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CHEMISTRY LAB: ELECTRON DOT DIAGRAMS FOR IONIC COMPOUNDS

WHAT TO TURN IN: Data Table Questions #1-5

Objectives

- To review element and ion names and symbols
- To practice writing electron dot diagrams for ionic compounds
- To relate electron dot diagrams to ion formation

Materials

- Colored pencils or markers
- White paper
- Ruler

Procedure

1) Obtain a data table with ten rows and eight columns.
    - Use one color for the cation and a different color for the anion.
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Cation Symbol (with charge)	**Cation Name**	**Cation Dot Diagram**	**Anion Symbol (with charge)**	**Anion Name**	**Anion Dot Diagram**	**Compound formula AND name**	**Compound Dot Diagram**
1							
2							
etc…							

2) The steps to writing the electron dot diagram of a binary ionic compound:

- Write the symbols of the elements (such as Na and Cl).
- (Columns 1 & 4) Look up their oxidation numbers (charges) from their placement in the periodic table. Write the proper ion symbols and charges.
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sodium atom

sodium ion

chlorine atom

chloride ion

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ENTRIES FOR DATA TABLE	
BONDING PARTNERS	CHEMICAL FORMULA
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Questions

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CHEMISTRY LAB: ELECTRON DOT DIAGRAMS FOR IONIC COMPOUNDS

WHAT TO TURN IN: Data Table Questions #1-5

Objectives

- To review element and ion names and symbols
- To practice writing electron dot diagrams for ionic compounds
- To relate electron dot diagrams to ion formation

Materials

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- White paper
- Ruler

Procedure

1) Obtain a data table with ten rows and eight columns.
    - Use one color for the cation and a different color for the anion.
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1							
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2) The steps to writing the electron dot diagram of a binary ionic compound:

- Write the symbols of the elements (such as Na and Cl).
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sodium atom

sodium ion

chlorine atom

chloride ion

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ENTRIES FOR DATA TABLE	
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Questions

1) Why do dot diagrams of cations show no electrons?
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CHEMISTRY LAB: ELECTRON DOT DIAGRAMS FOR IONIC COMPOUNDS

WHAT TO TURN IN: Data Table Questions #1-5

Objectives

- To review element and ion names and symbols
- To practice writing electron dot diagrams for ionic compounds
- To relate electron dot diagrams to ion formation

Materials

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Procedure

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2) The steps to writing the electron dot diagram of a binary ionic compound:

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sodium atom

sodium ion

chlorine atom

chloride ion

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BONDING PARTNERS	CHEMICAL FORMULA
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6) aluminum and sulfur	**Al_2S_3**
7) potassium and chlorine	**KCl**
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