Name_____

Topic 3: Bonding

Goals

- ❏ 3.1 - Ionic Bonding (*p. 39-50*)
- ❏ 3.2 - Covalent Bonding (*p. 51-58*)
- ❏ 3.3 - Molecular Geometry *(p. 59-61)*
- ❏ 3.4 - Synthesis

Date	*Homework*

Day 1
(Introduction)

Activity

1. Complete the table below.

Substance	Givers/Takers/Both	Ionic or Covalent	Conductivity
Deionized Water (Pure H_2O)			
Tap Water (H_2O + dissolved ions)			
Liquid Rubbing Alcohol (Pure C_3H_7O)			
Solid Copper (Pure Cu)			
Solid Table Salt (Pure NaCl)			
Aqueous Table Salt (NaCl + H_2O)			
Liquid Hexane (Pure C_6H_{14})			
Solid Epsom Salt ($MgSO_4$)			
Aqueous Epsom Salt ($MgSO_4$ + H_2O)			

Solid Aluminum (Pure Al)			

2. Provide a hypothesis that explains the conductivity differences above.

Day 2

(Ionic Bonding-3.1)

Notes

Practice Problems

Complete the tables below:

1. Show the formation of an ionic compound between Li and S.

PES Diagrams

Li	S

Lewis Dots and Valence e^- Transfer Diagram

Balanced Ionic Compound

2. Show the formation of an ionic compound between Al and P

PES Diagrams

Al	P

Lewis Dots and Valence e^- Transfer Diagram

Balanced Ionic Compound

3. Show the formation of an ionic compound between Na and N

PES Diagrams

Na	N

Lewis Dots and Valence e^- Transfer Diagram

Balanced Ionic Compound

4. Show the formation of an ionic compound between Mg and N.

PES Diagrams

Mg	N

Lewis Dots and Valence e^- Transfer Diagram

Balanced Ionic Compound

5. Show the formation of an ionic compound between Na and F.

PES Diagrams

Na	F

Lewis Dots and Valence e^- Transfer Diagram

Balanced Ionic Compound

Homework

1.

2.

3.

4.

Day 3

(Ionic Bonding-3.1)

Notes

Procedure

Data

Conclusion

Practice Problems

Complete the tables below:

Name	**Cation (+)** *Dots*	*Charge*	**Anion (-)** *Dots*	*Charge*	**Formula**
Sodium Chloride					
Lithium Oxide					
Potassium Phosphide					
Calcium Bromide					
Barium Sulfide					
Magnesium Nitride					
Aluminum Iodide					
Boron Selenide					
Gallium Arsenide					
Strontium Fluoride					
Francium Fluoride					

Homework

1.

2.

3.

4.

Day 4

(Ionic Bonding-3.1)

Notes

Practice Problems

Complete the tables below:

Name	**Cation (+)** *Dots*	*Charge*	**Anion (-)** *Dots*	*Charge*	**Formula**
Sodium Chloride					
Lithium Oxide					
Potassium Phosphide					
Calcium Bromide					
Barium Sulfide					
Magnesium Nitride					
Aluminum Iodide					
Boron Selenide					
Gallium Arsenide					
Strontium Fluoride					
Francium Fluoride					

Homework

1.

2.

3.

4.

Day 4

(Ionic Bonding-3.1)

Notes

Precipitation

Data

Conclusion

1.

2.

3.

4.

5.

6.

7.

8.

Practice Problems

Binary Ionic Compounds

Examples

Rules

"Ide" → _____

Polyatomic Ionic Compounds

Examples

Rules

"ite/ate" → _____

Common Polyatomic Ions	
Nitrite	NO_2^-
Nitrate	NO_3^-
Sulfite	SO_3^{2-}
Sulfate	SO_4^{2-}
Phosphite	PO_3^{3-}
Phosphate	PO_4^{3-}
Carbonate	CO_3^{2-}
Hydroxide	OH^-
Hypochlorite	ClO^-
Chlorite	ClO_2^-
Chlorate	ClO_3^-
Perchlorate	ClO_4^-
Permanganate	MnO_4^-
Acetate	$C_2H_3O_2^-$
Hydrogen carbonate	HCO_3^-
Ammonium	NH_4^+
Iodate	IO_3^-

Complete the table below:

Name	Cation (+)	Anion (-)	Formula
Sodium Chloride			
Lithium Chlorate			
Copper (II) Carbonate			
Calcium Phosphate			
Calcium Phosphide			
Calcium Phosphite			
Iron (III) Nitrite			
Iron (II) Sulfate			
Gallium Sulfite			
Strontium Iodate			
Nickel (I) Iodide			

Homework

1.

2.

3.

4.

Day 5

(Covalent Bonding-3.1)

Notes

Ionic vs. Covalent

Covalent Tattoos

Covalent Construction

Molecule _____

“Tattoo” Drawing

3-Dimensional Model Drawing

Day 6

(Covalent Bonding-3.2)

Notes

Name_____	Name_____
Name_____	Name_____
Name_____	Name_____

Practice Problems

# of Covalent Bonds =

Octet Exceptions

Formula	# Bonds	Lewis Structure
O_2		
H_2		
H_2O		
CO_2		

NH_3		
CH_4		
BCl_3		
SiH_2S		
CBr_4		
PH_3		

OI_2		
HCN		
N_2		
ClSiP		
*CH_4O		

Homework

1.

2.

3.

4.

Day 7

(Covalent Bonding-3.2)

Practice Problems

Formula	# Bonds	Lewis Structure
SO_4^{2-}		
H_3O^+		
NO_2^-		
PO_4^{3-}		
OH^-		

ClO_3^-		
IO_3^-		
PF_4^+		
HCP		
N_2		
SiS_3^{2-}		

Homework

1.

2.

3.

4.

Day 8

(Molecular Geometry-3.3)

Notes

Molecular Geometry Hypothesis

The shape of a covalent compound is caused by…

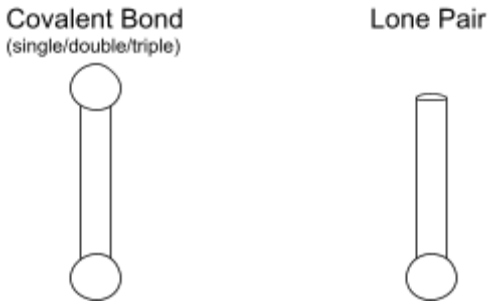
_____ _____ _____ _____ _____ _____ _____

_____ _____ _____ _____ _____

_____ _____ _____ _____ _____ _____ _____ _____

_____ _____ _____ _____

_____ _____ _____ _____ _____ _____ _____ _____ _____



Practice Problems

Molecular Geometry	Model	Examples
Linear		
Bent		
Trigonal Planar		
Trigonal Pyramidal		
Tetrahedral		

Formula	# Bonds	Lewis Structure	Magnet Model	Molecular Geometry
H_2				
CO_2				
HCN				
H_2O				
NO_2^-				
SO_2				

CH_2O				
BH_3				
CO_3^{2-}				
H_3O^+				
NH_3				
SO_3^{3-}				

CH_4				
PO_4^{3-}				
NH_4^+				

Homework

1.

2.

3.

4.

Topic 3: Bonding

Practice Test

1. Ionic Bonding (3.1) _____/ 10

(a) Diagram a Lewis Structure that shows formation of an Ionic Compound between Na and P.

(b) Diagram a Lewis Structure that shows formation of an Ionic Compound between Al and Se

(c) Diagram a Lewis Structure that shows formation of an Ionic Compound between Ba and At.

(d) Write a balanced formula for the ionic compound for Iron (II) Nitrate and Iron (III) Nitride

(e) Write the electron configuration for the copper atom and the Lithium Sulfide and Lithium Sulfate

2. Covalent Bonding (3.2)

_____/10

(a) Draw the Lewis Structure for S_3 (no ring)

(b) Draw the Lewis Structure for CS_3^{2-} (C in middle)

(c) Draw the Lewis Structure for BI_3 (O in middle)

(d) Draw the Lewis Structure for PO_2^- (O in middle)

(e) Draw the Lewis Structure for NI_4^+ (O in middle)

3. Molecular Geometry (3.3) _____/10

(a) Identify the shape of the covalent molecules listed below:

H_2O CCl_2O OS_4^{2-} PH_3 CO

(b). Draw the ammonia molecule, NH_3 according to the correct molecular geometry (using appropirate dashes and wedges).