

Unit 4: Chemical Bonding and Nomenclature

Summary

This unit will introduce you to the common ways atoms bond with each other and how compounds are named.

Textbook References

- Silberberg, Martin. Principles of General Chemistry, 2nd ed. New York, NY: The McGraw-Hill Companies, Inc., 2010 – Chapters 2.7-2.8, 9-11
- Wilbraham, Antony C., Dennis D. Staley, Michael S. Matta. Addison-Wesley Chemistry, 5th ed. Menlo Park, CA: Addison-Wesley Publishing Company, 2002. – Chapters 6, 15-16

Vocabulary

valence electrons	electron pair/lone pair	trigonal bipyramidal
ion	single bond	see-saw shaped
anion	double bond	T-shaped
cation	triple bond	octahedral
ionic radius	exceptions to octet rule	square pyramidal
octet rule	resonance	square planar
duet rule	VSEPR theory	polarity
ionic bond	steric number	polar covalent bonds
electrostatic attraction/repulsion	electronic geometry	nonpolar covalent bonds
ionic compound	molecular geometry	polar molecules
salt	linear	nonpolar molecules
covalent bond	trigonal planar	metallic bonding
Lewis dot structure	bent	sea of electrons
bonding electrons/shared pair	tetrahedral	hybridization
non-bonding electrons/unshared	trigonal pyramidal	sigma/pi bonding

Words to the wise: If you can't draw a Lewis dot structure, then you will make many wrong predictions.

Calendar

Note: Silberberg and Self-Test are optional. We may skip hybridization & sigma/pi bonding depending on time*

M 11/2	T 11/3	W 11/4	Th 11/5	F 11/6
**Last year you skipped Conductivity Lab Part II so you were able to start the unit on Tuesday and it worked fine so that you were able to discuss the Molecule Table project before the 4-day weekend and then after the 4-day weekend they could work on the Molecule Table assignment because they had the work/handout				
Today: - New Calendar Conductivity Lab Part I Worksheet (fill out lab data table with type of bonds) - Lab Procedure ActivInspire - Conductivity Lab Part I OR Conductivity Lab Part I Video 3 types of bonds NOTES HW: -Outline Ch 2, 9-11	Due Today: -Once you finish the Conductivity Lab Part I Upload it Here Today: Metallic Bonding Animation (Annenberg Learner) Conductivity Lab Part II Worksheet (fill out lab data table with type of bonds) - Conductivity Lab Part II OR Conductivity Lab Part II Video HW: -Outline Ch 2, 9-11	Due Today: -Once you finish the Conductivity Lab Part II Upload it Here Today: - Go over lab and discuss electrolytes (salts, acids, bases) Salt & Solubility PhET Conductivity PhET - Ionic Formulas ActivInspire Ionic Formula WS (and KEY) - Practice Writing Ionic Formulas using Ion Sheet Cation/Anion NOTES <i>Demo: Ruler, Hammer, & Rubberband</i> HW: -Outline Ch 2, 9-11	Today: - Unit 3 Test Retake If not doing the retake: Bonding Video (covers electronegativity and FONCIBrISCH) - Work on Outline - For fun if you want.....Veritasium Bonding Video HW: -Outline Ch 2, 9-11	Today: Very Basic Intro to Lewis Structures NOTES Molecule Table (You need 4 of these charts) - Work on the FIRST Molecule List (All obey the Octet) - If Time: Start Watching Drawing Lewis Structures Video (NCl₃, CO₂, CO₃²⁻) -covers FIOL method, TOGGLE, BO, brackets, resonance (Kentucky Zorse), and Octet Rule Breakers Drawing Lewis Structures Rules Handout HW: -Outline Ch 2, 9-11

M 11/9	T 11/10	W 11/11	Th 11/12	F 11/13
<u>Molecule Table with Links</u> (Use this as your guide for filling out the Molecule Table for the week. You will also want to fill out a <u>VSEPR chart</u>)				
Today: -<u>Molecule Table with Links</u> (Use this as your guide for filling out the Molecule Table for the week. You will also want to fill out a <u>VSEPR chart</u>) HW: -Outline Ch 2, 9-11	Today: -<u>Molecule Table with Links</u> (Use this as your guide for filling out the Molecule Table for the week. You will also want to fill out a <u>VSEPR chart</u>) HW: -Outline Ch 2, 9-11	NO SCHOOL	Due Today: -Once you finish the <u>Outline Ch 2, 9-11</u> <u>Upload it Here</u> Today: -<u>Molecule Table with Links</u> (Use this as your guide for filling out the Molecule Table for the week. You will also want to fill out a <u>VSEPR chart</u>) HW: -Outline Ch 2, 9-11	Today: -<u>Molecule Table with Links</u> (Use this as your guide for filling out the Molecule Table for the week. You will also want to fill out a <u>VSEPR chart</u>) -Build VSEPR Shapes (Use Styrofoam Balls, Pipe Cleaners, & <u>Molecule Shapes PHET</u> to build 2-3 domains) HW: -Work on Molecule Table
M 11/16	T 11/17	W 11/18	Th 11/19	F 11/20
Today: -<u>Molecule Table with Links</u> (Use this as your guide for filling out the Molecule Table for the week. You will also want to fill out a <u>VSEPR chart</u>) -Build VSEPR Shapes (Use Styrofoam Balls, Pipe Cleaners, & <u>Molecule Shapes PHET</u> to build 4-6 domains) HW: -Work on Molecule Table	Due Today: -Once you finish the <u>Molecule Table Upload it Here</u> (Here is the <u>KEY</u>) Today: • <u>VSEPR Theory & Balloons Demo Video</u> • Finish Molecule Table • Work on the NEXT <u>Molecule List</u> drawings (This is the original honors chem version with several Octet Rule breakers) **If you need help with drawing structures A-X on this Molecule Table, then watch this video..... -<u>Video KEY</u> -Picture <u>KEY</u> HW: -Finish Molecule Table -Optional: <u>Self-Test</u> (skip #19-20) -The Key is Online in two Parts: <u>Part 1</u> and <u>Part 2</u>	Today: • <u>Study Guide</u> • <u>Unit 4 Practice Test</u> (ActivInspire) **To help you study here is a blank <u>VSEPR chart</u> and a filled in <u>VSEPR chart</u> HW: • Study for Test • Review by drawing some of these <u>Extra Structures</u> • Optional: <u>Self-Test</u> (skip #19-20) -The Key is Online in two Parts: <u>Part 1</u> and <u>Part 2</u>	Today: • Unit 4 Test	Today: • Go over Test • Possibly 1-2 of the following labs: 1. <u>Chromatography Lab</u> -What is the most polar "color" in Mr. Sketch Marker? 2. Kool-Aid Chromatography Lecture & Demo (Polarity) 3. <u>Polarity Mini-Lab</u> (Al foil, Vegetable oil, water, & food coloring) 4. Polarity Activity: -Shaving Cream, Food Coloring, & Index Card Demo: -<u>Magic Wand</u> **Use Magic Wand Ppt (H₂O - have 8 set-ups for each group) HW: -Study for retake
M 11/23	T 11/24	W 11/25	Th 11/26	F 11/27
Thanksgiving Break!!				

Chapter	Topic	Read	Outline	"Recommended" Book Problems
2.8	Nomenclature	✓	✓	#43-44, 48-49, 52-53
2.7 / 9.1	Bonds, Lewis Dot, Octet Rule	✓	✓	#4-11
9.2	Ionic Bonds	✓	✓	#16-20
9.3	Covalent Bonds	✓	✓	-
9.5	Electronegativity & Polarity	✓	✓	#40-43, 45-48, 51-52
10.1	Lewis Structures, Octet Exceptions	✓	✓	#1, 3, 5-9, 11, 17, 19
10.2	VSEPR, Molecular Shapes	✓	✓	-
11.1	Hybridization (sp, sp ² ,)	✓	✓ Only Briefly	#1, 5, 6, 9
11.2	Sigma & pi bonds	✓	✓ Only Briefly	#20-21, 23

****The following calendar is NOT being used this year****

Today: - Watch Drawing Lewis Structures Video (NCl₃, CO₂, CO₃²⁻) <i>covers FIOE method, TOGGLE, BO, brackets, resonance (Kentucky Zorse), and Octet Rule Breakers</i> - Work on your Molecule Table drawings <i>Demo: Golfball drop w/ Pie-Tin, Cup, & Toilet Paper Roll (could use plastic eggs)</i> HW: - Outline Ch 2, 9-11	Today: - Work on your Molecule Table drawings **If you need help with drawing structures A-P on the Molecule Table, then watch these videos.....: Structures A-H Structures I-P <i>Demo: Falling Hex Nuts & Siring</i> HW: - Outline Ch 2, 9-11 - Update Molecule Table	Due Today: - Once you finish the Outline Ch 2, 9-11 Upload it Here Today: - Watch Electron Domains Video - Optional: Watch Annenberg Chemistry Video "Making Molecules" (0-16:45min) <i>Demo: 2L bottle balancing act, Finger Balancing Act</i> HW: - Update Molecule Table	Today: VSEPR Theory NOTES - Watch VSEPR Theory Video (it uses the Molecule Shapes PhET OR could use Models 360 Online) -Cover 2-4 domains today (Use Model Kits & PhET to fill out 4 domains) <i>Demo Video: Tetrahedral vs Tetrahedron w/ potato pieces, toothpicks, and soapy water</i> HW: - Update Molecule Table	Today: VSEPR Theory Video (using Molecule Shapes PhET OR could use Models 360 Online) -Cover 5-6 domains today (Use Styrofoam Balls, Pipe Cleaners, & Molecule Shapes PhET to fill out 5-6 domains) VSEPR Theory & Balloons Demo Video <i>Demo: VSEPR dog toy</i> HW: - Update Molecule Table - Optional: Self-Test (skip #19-20) -The Key is Online in two Parts: Part 1 and Part 2
Due Today: - Once you finish the Molecule Table Upload it Here (Here is the KEY) Today: Polarity Video -Nonpolar—dipoles cancel -Polar—dipoles <u>don't</u> cancel	Today: Work on the NEXT Molecule List drawings <i>(This is the original honors chem version with several Octet Rule breakers)</i> **If you need help with drawing structures A-X on this Molecule Table, then watch this video.....:	Today: Study Guide - Work on Optional Self-Test Unit 4 Practice Test (ActivInspire) **To help you study here is a blank VSEPR chart and a filled in VSEPR chart	Today: Unit 4 Test	Today: - Go over Test Possibly 1-2 of the following labs: Chromatography Lab -What is the most polar "color" in Mr. Sketch Marker? Polarity Mini-Lab

• Polarity Pyramid on VSEPR Chart • Polarity PhET (<i>Only if necessary</i>) • Quick Molecules & Light PhET • Microwaves Only (<i>Which type of molecule is affected: NP or P?</i>) Demo: Magic Wand **Use Magic Wand Ppt (H₂O have 8 set ups for each group) HW: • Optional: Self-Test (<i>skip #19-20</i>) • The Key is Online in two Parts: Part 1 and Part 2	• Video KEY • Picture KEY • Optional: Watch Annenberg Chemistry Video "Making Molecules" (16:45-27:30min) Demo: SF₆ in Balloon SF₆ in blender w/ Tesla Coil HW: • Optional: Self-Test (<i>skip #19-20</i>) • The Key is Online in two Parts: Part 1 and Part 2	HW: • Study for Test • Review by drawing some of these Extra Structures		(Al foil, Vegetable oil, water, & food coloring) • Polarity Activity: Shaving Cream, Food Coloring, & Index Card HW: Study for retake
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