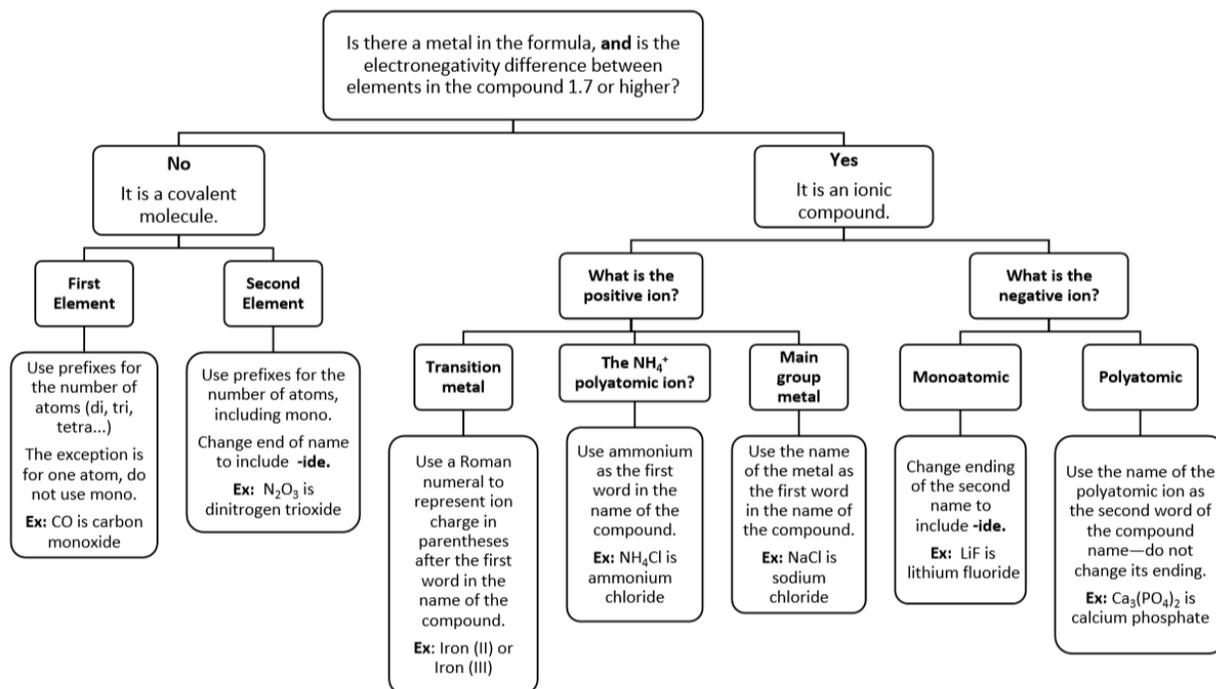


Module 3 Chemistry Success Guide

Assignment Title	Chemistry
3.01 Valence Electrons	<p>✓ Download the Chemistry Journal on page 1 - use this document to take notes as you read through the lesson</p> <p>✓ Complete 3.01 Valence Electrons Quiz</p> <p>Student Help:</p> <ul style="list-style-type: none">• Watch the following video for help with valence electrons: https://www.khanacademy.org/science/chemistry/electronic-structure-of-atoms/electron-configurations-jay-sal/v/valence-electrons
3.02 Ionic Bonding	<p>✓ Download the Chemistry Journal on page 1 - use this document to take notes as you read through the lesson</p> <p>✓ Complete 3.01 Ionic Bonding Quiz</p> <p>Student Help</p> <p>Watch the following live lesson for help with writing formulas of ionic compounds: http://laurelsprings.adobeconnect.com/pia5q37d4808/</p>
3.03 Covalent Bonding	<p>✓ Download the Chemistry Journal on page 1 - use this document to take notes as you read through the lesson</p> <p>✓ Complete 3.01 Covalent Bonding Quiz</p> <p>Student Help:</p> <ul style="list-style-type: none">• Don't forget the 7 diatomic molecules! These are never found alone. I remember them by the name BRINClHOFF (pronounced Brinkle Hoff) (Br₂, I₂, N₂, Cl₂, H₂, O₂, F₂)• Watch the following iClass for help with ionic and covalent bonding: http://laurelsprings.adobeconnect.com/p83u3qx5r69g/
3.04 Nomenclature	<p>✓ Download the Chemistry Journal on page 1 - use this document to take notes as you read through the lesson</p> <p>✓ Complete 3.04 Nomenclature Quiz</p> <p>Student Help</p> <ul style="list-style-type: none">• Watch the following video to see how to determine if you have an ionic or covalent bond: https://getchemistryhelp.com/chemistry-lesson-identifying-ionic-vs-molecular-compounds/• Watch the following video for help with naming compounds: https://safeyoutube.net/w/Stef <p>You may use the following flowchart while completing the quiz</p>

Naming Compounds and Molecules Flowchart



3.05
Molecular
Structure

- ✓ Download the Chemistry Journal on page 1 - **use this document to take notes as you read through the lesson**
- ✓ Complete the Molecular Structure Lab - **Download the Lab Report on page 4 of the lesson. This is a hands on lab!**

Student Help

- Watch the following iClass for help with VSEPR theory:
<http://laurelsprings.adobeconnect.com/ponx9x0e7sf6/>
- Watch the following video for an Introduction to VSEPR theory:
<https://safeyoutube.net/w/Oldf>
- Watch the following video for help with VSEPR theory and molecular Geometry:
<https://safeyoutube.net/w/Qldf>



You will need to take pictures before, during and after the lab. One picture must show you completing the lab.

Note: Be sure to save your file as a .docx or .rtf. Turnitin.com cannot read .pages files (File -> Export To -> .docx).

Google Docs users (File -> Download As -> .docx)

***Turnitin.com cannot read handwritten work. All work should be typed :)**

- Use the chart below to help fill out the VSEPR molecule shape and Molecular Structure sections of the data tables. This chart will also help you draw your molecules. The Electron Geometry column on the chart is what you will use for the VSEPR molecule shape in the data on your lab report.

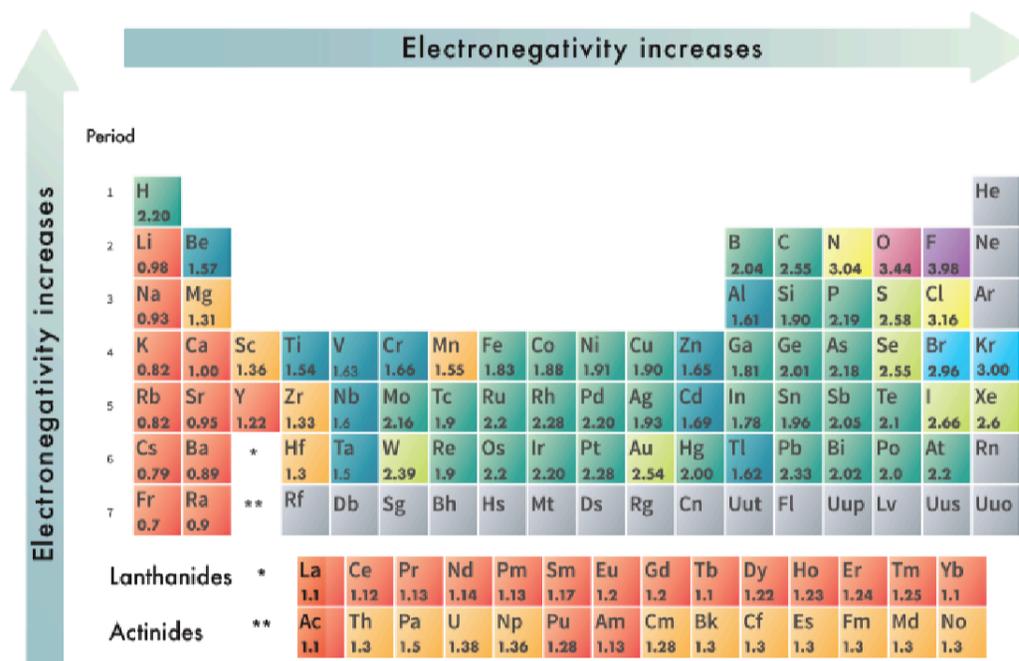
VSEPR Theory (Molecular Shapes)

A = the central atom, X = an atom bonded to A, E = a lone pair on A

- "Domain" refers to the sum of bonded atoms and lone pairs of electrons surrounding the central atom.
- There are lone pairs on X or other atoms, but we are only concerned with the bonds around atom A.
- Each bond is represented in this table as a line, whether the bond is single, double, or triple.
- Any atom bonded to the center atom counts as one bond, even if it is bonded by a double or triple bond.
- The number of bonded atoms plus lone pairs on the central atom always adds up to the total number of domains. For example, water central atom is oxygen, it has two lone pairs, and it is bonded to two atoms of hydrogen. Its domain is $2 + 2 = 4$.

Total Domains	Generic Formula	Picture	Bonded Atoms	Lone Pairs	Molecular Shape	Electron Geometry	Example
1	AX		1	0	Linear	Linear	H ₂
2	AX ₂		2	0	Linear	Linear	CO ₂
	AXE		1	1	Linear	Linear	CN ⁻
3	AX ₃		3	0	Trigonal planar	Trigonal planar	AlBr ₃
	AX ₂ E		2	1	Bent	Trigonal planar	SnCl ₂
	AXE ₂		1	2	Linear	Trigonal planar	O ₂
4	AX ₄		4	0	Tetrahedral	Tetrahedral	SiCl ₄
	AX ₃ E		3	1	Trigonal pyramid	Tetrahedral	PH ₃
4	AX ₂ E ₂		2	2	Bent	Tetrahedral	SeBr ₂
	AXE ₃		1	3	Linear	Tetrahedral	Cl ₂

- The electronegativity chart can help you predict if a substance is polar, nonpolar or ionic



Lab Report

Molecular Structure Lab Report: Determining Polarity

Instructions: For this investigative phenomenon, you will investigate why certain substances, such as oil and vinegar, don't mix. To do so, you will combine various compounds, compare their solubility, and determine their polarity. Fill in each section of this lab report and submit it to your instructor for grading.

Title:

Objective(s): What are you trying to learn during this lab?

Hypothesis:

1. Using the chart below, predict whether each solute will dissolve in each solvent based on their polarity.

Solute	Solvent	Will substances mix or not?	Do I think the solute is polar, nonpolar, or ionic?	Do I think the solvent is polar, nonpolar, or ionic?

Procedures:

This lab already includes materials and a summary of steps to follow. List and explain your controlled variables, independent variable, and dependent variable for this lab.

Materials

- deionized (distilled) water
- rubbing alcohol
- vegetable oil
- iodine solution
- sodium chloride (salt)
- acetic acid (vinegar)
- test tubes or clear plastic cups
- tablespoon and teaspoon
- stirring sticks
- permanent marker for labeling

Safety

- Always wear eye protection and use gloves when handling chemicals in a laboratory area.
- Students should wash their hands thoroughly before leaving the laboratory area.
- Dispose of any chemicals by washing used test tubes with soap and water or washing used cups then throwing them away in a trash bin.

Variables:

Remember, **controlled variables are factors that remain the same throughout the experiment. An independent (test) variable changes so that the experimenter can see the effect on other variables. The dependent (outcome) variable will change in response to the test variable.**

Controlled variables:

Independent Variable:

Dependent Variable:

Summary of Steps: Read these directions at least twice!

- Using the steps for predicting the polarity of compounds, determine the polarity of water (H₂O). Place your answers in table one. Once you have successfully predicted the polarity of water, you will be able to determine the polarity of the other compounds using steps two through five of the experiment.
- Put about 2 tablespoons of deionized water into each of two labeled test tubes or clear cups. Add about 2 tablespoons of rubbing alcohol to one cup and 2 tablespoons of iodine solution to the other. Mix the contents with a stirring stick. In table two, indicate whether the solutes (vinegar and iodine solution) are soluble in the solvent (water). Then conclude whether the compound is polar, nonpolar, or ionic. (**Hint:** Like substances dissolve like substances, and polar solvents dissolve ionic compounds.)
- Put about 2 tablespoons of vegetable oil into each of two labeled test tubes or clear cups. Add about 2 tablespoons of rubbing alcohol to one cup and 1 teaspoon of salt to the other. Mix the contents with a stirring stick. In table two, indicate whether the solutes (rubbing alcohol and salt) are soluble in the solvent (vegetable oil). Then conclude whether the compound is polar, nonpolar, or ionic.
- Put about 2 tablespoons of rubbing alcohol into each of two labeled test tubes or clear cups. Add about 2 tablespoons of water to one cup and 2 tablespoons of vinegar to the other. Mix the contents with a stirring stick. In table two, indicate whether the solutes (water and vinegar) are soluble in the solvent (rubbing alcohol). Then conclude whether the compound is polar, nonpolar, or ionic.
- Put about 2 tablespoons of vinegar into each of two labeled test tubes or clear cups. Add about 2 tablespoons of iodine solution to one cup and 2 tablespoons of vegetable oil to the other. Mix the contents with a stirring stick. In table two, indicate whether the solutes (iodine solution and vegetable oil) are soluble in the solvent (vinegar). Then conclude whether the compound is polar, nonpolar, or ionic.

Data:

Table 1:

Reference the VSEPR geometry chart and the electronegativity chart from the lesson to fill in the table below. **The charts are also above in this document with more detailed directions. The VSEPR sketch should show bond angles.**

Compound:	Lewis structure	Difference in electronegativity of each bond	VSEPR sketch	Polar, nonpolar, or ionic	VSEPR molecule shape	Molecular structure
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Table 2:

(Hint: Like substances dissolve like substances, and polar solvents dissolve ionic compounds.)

Solute

Solvent

Soluble or
insoluble?

Is the solute
polar, nonpolar,
or ionic?

Is the solvent
polar, nonpolar,
or ionic?

Conclusion

Write a conclusion statement that addresses the following questions: Don't forget to answer the following questions!

- Explain how you determined the polarity of all your compounds by first predicting the polarity of water, and then mixing different solutes and solvents to find the polarities of the other substances.
- Were any of your substances difficult to identify as polar, nonpolar, or ionic? Explain.
- Which of your polarity and solubility predictions were correct?
- How do you think the investigation can be explored further?

Post-Lab Reflection Questions

Answer the reflection questions using what you have learned from the lesson and your experimental data. It will be helpful to refer to your chemistry journal notes. Answer questions in complete sentences.

1. Predict the polarity and molecular structure of formaldehyde, a compound used to preserve animal specimens, and ammonia, a compound used in many household cleaning products.

Compound:

Lewis
structure

Difference in
electronegativity
of each bond

VSEPR
sketch

Polar,
nonpolar,
or
ionic?

VSEPR
molecular
shape

Molecular
structure

2. Based on their polarity, **which compounds from your experiment** could mix with formaldehyde and ammonia?

3.06 Forces and Bonds

✓ Download the Chemistry Journal on page 1 - **use this document to take notes as you read through the lesson**

✓ Complete 3.06 Forces and Bonds Quiz

Student Help

- Watch the following video to learn more about intermolecular forces: <https://safeyoutube.net/w/dJdf>
- A second video to help with intermolecular forces: <https://safeyoutube.net/w/gJdf>

Molecules and Compounds Module Discussion	<p>✓ Post your discussion on the discussion board and respond to two students. Your discussion posting should be 3 paragraphs long and provide the following information:</p> <ol style="list-style-type: none"> 1. What was the most challenging topic for you to learn in the module? 2. How did you learn the material? 3. What is a real world example of the topic you had a challenge learning about? <p>Student Help</p> <ul style="list-style-type: none"> • Click the following link to see an example of what we are looking to see in a discussion posting: https://www.smore.com/3cazh-discussion-based-assessment
3.08 Molecules and Compounds Review	<p>✓ Complete the Molecules and Compounds Review to help prepare for your Module Three Exam. This is also a great time to review your Chemistry Journals that you have taken notes in and ask questions about any topic you don't understand.</p>
3.09 Molecules and Compounds Exam	<p>✓ Complete the Molecules and Compounds Exam</p>