

Chemistry 20 – Lesson 12 – Stereochemistry Activities

I. Activity #1 – Stereochemistry models

Purpose:

- To use VSEPR Theory to predict shapes around central atoms.
- To construct molecular models from a kit to test predictions.
- To ascertain the polarity of molecules.

Prelab Exercise:

Before using the model building kits, complete the table columns headed by **Prelab Exercise**.

Procedure:

Show your teacher that you have finished the **Prelab Exercise**. In the lab, construct models of each molecule using the correct coloured ball for each atom, sticks for single bonds, and springs for multiple bonds. Draw a diagram of the model under Representation of Actual Shape. If the model corresponds with the predicted shape, check it off. If not, consult the teacher. Determine whether the molecule is polar or not.

Prelab Exercise				Observations			
Molecular Substance	Lewis/Structural Diagram	For Each Central Atom		Predicted Shape Name	Representation for Actual Shape	Actual Shape Name	Polarity
		# LP	# BP				
NI_3							

Prelab Exercise				Observations			
Molecular Substance	Lewis/Structural Diagram	For Each Central Atom		Predicted Shape Name	Representation for Actual Shape	Actual Shape Name	Polarity
		# LP	# BP				
C ₂ Cl ₄							
CF ₄							
OCl ₂							
C ₂ F ₂							
HOF							

Prelab Exercise				Observations			
Molecular Substance	Lewis/Structural Diagram	For Each Central Atom		Predicted Shape Name	Representation for Actual Shape	Actual Shape Name	Polarity
		# LP	# BP				
NHF ₂							
C ₂ I Br							
C ₂ H F ₃							
CHClBr ₂							
H ₂ O ₂							



Prelab Exercise				Observations			
Molecular Substance	Lewis/Structural Diagram	For Each Central Atom		Predicted Shape Name	Representation for Actual Shape	Actual Shape Name	Polarity
		# LP	# BP				
CO ₂							
N ₂ H ₃ F							
CH ₃ OH							
C ₃ H ₆ (noncyclic)							



II. Activity #2 – Streams of polarity

Problem:

Which of various molecular compounds contain polar molecules?

Materials:

samples of various liquids	acetate or vinyl strips
50 mL buret and stand	paper towel
400 mL catch beaker	

Reference: Checkout Figure 9 on page 98 of the Nelson text.

Procedure:

1. Using the table below, draw the structural diagrams for each molecule and then predict the polarity of the molecule.
2. Charge either an acetate strip (+ charge) or a vinyl strip (– charge) by rubbing the strip with a paper towel.
3. Pour about 10 – 15 mL of the liquid in the closed buret.
4. Allow a thin stream of liquid to pour into the catch beaker. (For water, use a thin stream in the sink.)
5. Hold the charged strip near the stream and observe the effect. Record your result.
6. Repeat steps 2 to 5 for the other liquids.

Table:

Compound	Chemical Formula	Structural diagram	Polarity prediction	Polarity result
water	H ₂ O (l)			
methanol	CH ₃ OH (l)			
hexane	C ₆ H ₁₄ (l)			
octane	C ₈ H ₁₈ (l)			
pentane	C ₅ H ₁₂ (l)			
acetone	CH ₃ COCH ₃ (l)			

To complete the activity, answer the following questions:

What was the **purpose** for doing this activity?

Comment on how the observed polarity results matched, or failed to match, the predicted results.

Write-up:

- One write-up per person.
- Maximum of 1 person per group.

