NESSC Conference 2015 – High School Redesign in Action
Workshop Session:

A Sample System for Proficiency-Based Learning in the Classroom

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Google Site for this workshop:
https://sites.google.com/a/bsdvt.org/bhs-proficiency-resources/home

On this site, you can find links to:

- Molly's video about PBL in her chemistry classroom
- Additional sample materials from Molly's class and other science classes
- Amy's blog post about PBL in a physics classroom
- Materials developed by other teachers at Burlington High School who are experimenting with PBL in mathematics, humanities, world languages, and ELL classes

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Our working list of **Key Elements of Proficiency-Based Learning**:

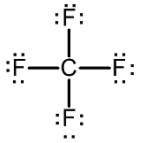
- Clear Learning Goals (Proficiencies)
  Ideally, these include higher-order thinking and transferable skills, and are linked to school graduate expectations, CCSS, and 21st century skills
- Frequent Assessment for Feedback and Accountability
- Multiple Chances to Reach Proficiency
- Autonomy & Flexible Supports
- Every Student Expected to Reach the Goals

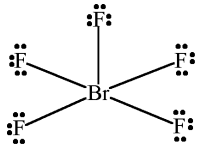
7F Quiz **Name:** _____

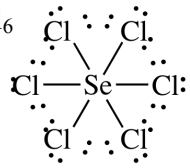
Proficiency 7F - I can determine the 3-D shape of small molecules using VSEPR.

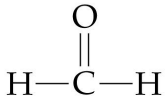
Directions: For all questions except #1, determine the molecular geometry of each molecule listed below. For examples with just a formula, draw a Lewis structure first. If given a name, first write the formula then draw a Lewis structure

1. What is VSEPR? How does it help explain the shape of small molecules?

2. CF_4  Molecular geometry: _____

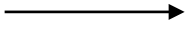
3. BrF_5  Molecular geometry: _____

4. $SeCl_6$  Molecular geometry: _____

5. CH_2O  Molecular geometry: _____

6. H_2O Molecular geometry: _____
   Lewis Structure:

7. CO_2 Molecular geometry: _____
   Lewis Structure:



8. CH_3Br Molecular geometry: _____
   Lewis Structure:

9. nitrogen trichloride Molecular geometry: _____
   Formula:
   Lewis Structure:

10. sulfur dioxide Molecular geometry: _____
    Formula:
    Lewis Structure:

Prefixes:

Mono	1
Di	2
Tri	3
Tetra	4
Penta	5
Hexa	6
Hepta	7
Octa	8
Nona	9
Deca	10

Unit 4: Electron Arrangement and Periodic Properties

Essential Questions

- □ How does an element's placement on the periodic table help us predict its properties?
- □ How do we know how electrons are structured within atoms when they are far too small to see?
- □ How does the electron structure in an atom of an element affect that element's properties?

Required Proficiencies	Preasses s.	Quiz 1	Quiz 2	Quiz 3
4A - I understand the relative wavelengths, energies, and frequencies of the parts of the electromagnetic spectrum. I can describe the relationship between wavelength, frequency and energy of a wave.				
Rate your own mastery of this proficiency. Remember that your rating can change over time. **New to Me ⟷ I Got This!**				
4B - I can explain how atomic spectra relate to movements of electrons in atoms.				
Rate your own mastery of this proficiency. Remember that your rating can change over time. **New to Me ⟷ I Got This!**				
4C - I can describe electron configurations in atoms and have a basic understanding of the shape of atomic orbitals. (Will have orbital filling diagram to refer to, limited to s and p orbitals)				
Rate your own mastery of this proficiency. Remember that your rating can change over time. **New to Me ⟷ I Got This!**				
4D - I can use the periodic table to draw Lewis structures for single elements.				
Rate your own mastery of this proficiency. Remember that your rating can change over time. **New to Me ⟷ I Got This!**				
4E - I can describe basic trends on the periodic table and use them to predict the properties of elements (reactivity, metal/nonmetal, atomic radius, valence electrons).				
Rate your own mastery of this proficiency. Remember that your rating can change over time. **New to Me ⟷ I Got This!**				

Vocabulary to Master

□ wavelength	□ electromagnetic spectrum	□ ground state	□ atomic radius
□ frequency	□ reactivity	□ energy level	□ Lewis structure
□ metal	□ periodic trend	□ orbital	□ valence electron
□ nonmetal	□ period	□ photon	□ electron configuration
□ metalloid	□ group	□ alkali metals	□ alkaline earth metals
□ halogens	□ transition metals	□ noble gases	□ hertz
□ atomic spectrum	□ excited state	□	□

Extension Proficiencies	Quiz 1	Quiz 2	Quiz 3
4F - I can calculate the energy, wavelength, or frequency of electromagnetic radiation. **(Extension of 4A)**			
Rate your own mastery of this proficiency. Remember that your rating can change over time. **New to Me** ⟷ **I Got This!**			
4G - I can write electron configurations using only the periodic table (including noble gas short cuts and elements with d and f orbitals). **(Extension of 4C)**			
Rate your own mastery of this proficiency. Remember that your rating can change over time. **New to Me** ⟷ **I Got This!**			
4H - I can describe periodic trends in electronegativity, ionization energy, and electron affinity. **(Extension of 4E)**			
Rate your own mastery of this proficiency. Remember that your rating can change over time. **New to Me** ⟷ **I Got This!**			
4I - I can explain why periodic trends in atomic radius, ionization energy, and electronegativity occur. (For example, I can explain why atomic radius decreases as you move across a period.) **(Extension of 4E)**			
Rate your own mastery of this proficiency. Remember that your rating can change over time. **New to Me** ⟷ **I Got This!**			

Additional Vocabulary to Master			
□ electronegativity	□ ionization energy	□ electron affinity	□ joules

NAME: _____

UNIT 7: COVALENT COMPOUNDS

Required Proficiencies

Proficiency	Preassessment Score (%)	Practice Completed	Quiz Score (%)	Practice Completed	Quiz Retake Score(s) (%)
7A					
7B					
7C					
7D					
7E					
7F					
7G					

Teacher Initials

I tutored _____on_____ and he/she scored 90% or higher on the quiz retake _____

I tutored _____on_____ and he/she scored 90% or higher on the quiz retake _____

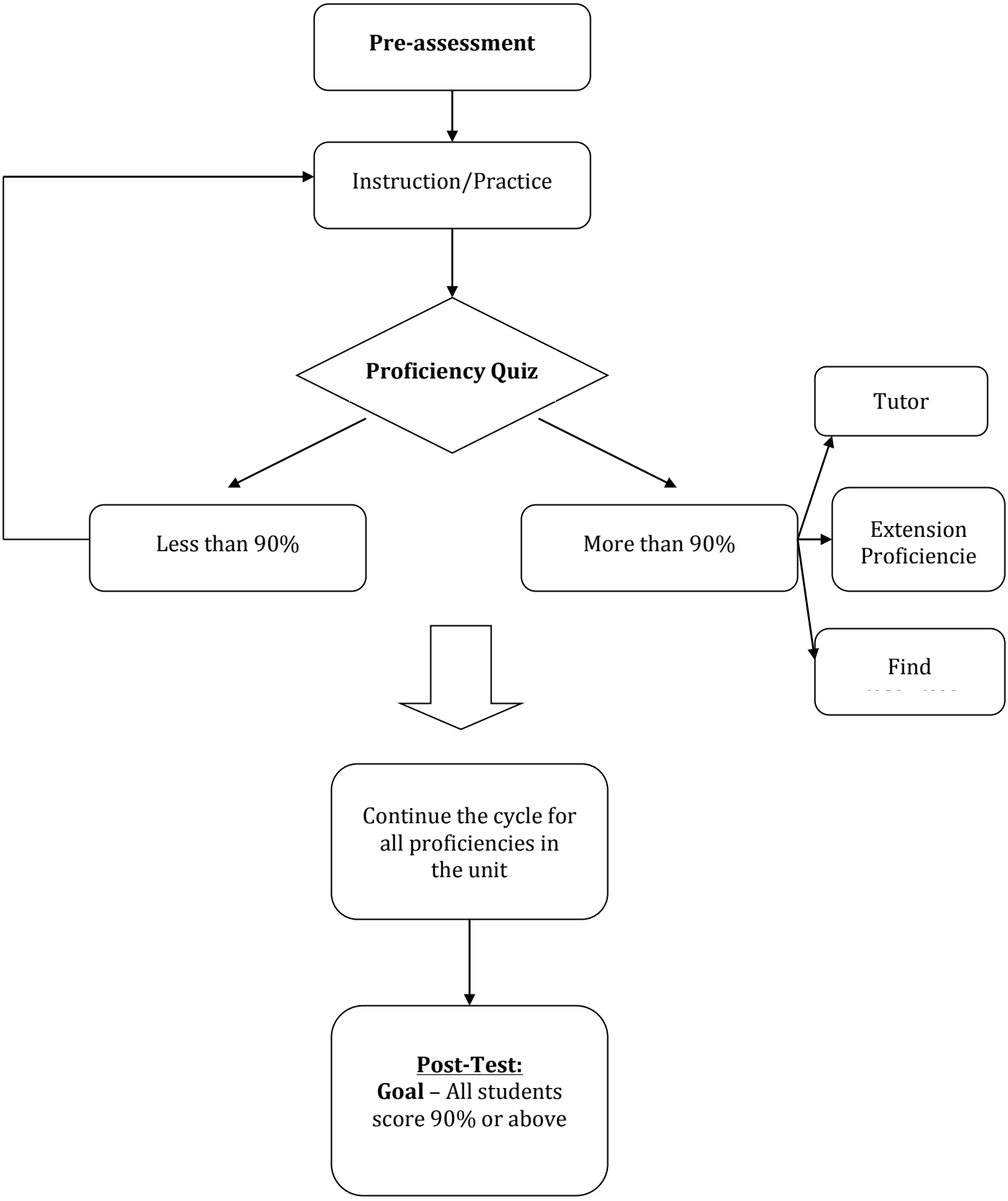
I tutored _____on_____ and he/she scored 90% or higher on the quiz retake _____

I tutored _____on_____ and he/she scored 90% or higher on the quiz retake _____

Extension Proficiencies

Proficiency	Practice Completed	Quiz Score (%)	Practice Completed	Quiz Retake Score (%)
7H				
7I				
7J				

Proficiency Based Learning Cycle



Unit 7– Covalent Compounds

Why?
Do a quick internet search for "dihydrogen monoxide" and you will see petitions to ban this hazardous chemical and fact sheets about its many dangers. You can read about how it is used as a performance enhancer for elite athletes, how it is used as a spray-on fire suppressant, and how it is a major ingredient in home-made bombs. You can also read about cities and towns that almost banned this dangerous chemical. Those bans did not go through in the end, however. Why not? Because as soon as someone with knowledge of basic chemistry hears about the push to ban dihydrogen monoxide, they start laughing. Can you figure out why? If you can't yet, you will be able to after you complete this unit.

Required Proficiencies

7A - I can name and write formulas for covalent compounds.

7B – I understand how and why covalent bonds form.

7C – I can draw Lewis structures for molecules with single bonds.

7D - I can draw Lewis structures for molecules with double bonds or triple bonds and for polyatomic ions.

7E - I can calculate the molar mass of a compound.

7F - I can determine the 3-D shape of small molecules using VSEPR.

7G - I can determine a molecule's polarity.

Extension Proficiencies

7H - I can name and write formulas for simple organic compounds (hydrocarbons).

7I - I can identify molecules that will display resonance and draw the possible resonance structures.
(complete after 7D)

7J - I can predict substance properties based on intermolecular forces.
(complete after 7F and G)