

Lesson Plan

Description

Students will investigate quantitative relationships in chemical reactions and solve related problems using Python.

Learning Outcomes

- Students will learn about quantitative relationships in chemical reactions
- Students will learn about mole ratios
- Students will learn the basics of Python
- Students will practice computational thinking
- Students will code a Python program to calculate and solve mole ratio problems

Specific Expectations

SCH3U

D2.3 Solve problems related to quantities in chemical reactions by performing calculations involving quantities in moles,

Introduction

- Educators should have students organized into groups of 2 or 3 prior to the beginning of class.
- Introduction: View video <https://www.youtube.com/watch?v=c9beXPzJ-Fs>
- Educators will hand out the *Mole-to-Mole Stoichiometry with Python Handout*.
- After viewing the video, the educator will direct students, in pairs, to compare mole ratios and other real-world ratio examples (Ex. Baking/Cooking Recipes, Building Projects, Lottery Winning Chances, Number of Grade 9 students versus the entire student population). Students are encouraged to use words, drawings, different fonts, etc. to demonstrate their ideas on the *Mole-to-Mole Stoichiometry with Python Handout*.

<p>Action</p> <ul style="list-style-type: none"> ● Educators will present Slides 1-5 in the <i>Mole-to-Mole Stoichiometry Python Lesson PowerPoint</i> while students write down their ideas for the group discussion on the <i>Mole-to-Mole Stoichiometry with Python Handout</i>. ● Students will complete a Think-Pair-Share on Slide 6 and educators will facilitate a class discussion with the answer on Slide 7. ● Educators will present Slides 8-9 in the <i>Mole-to-Mole Stoichiometry Python Lesson PowerPoint</i> while students complete the same example question on their handout. ● Educators will present Slides 10-20 in the <i>Mole-to-Mole Stoichiometry Python Lesson PowerPoint</i> while students access an online Code Editor, Compiler, or Interpreter and follow along, completing the Python commands. <ul style="list-style-type: none"> ○ Programiz: Online Python Compiler https://www.programiz.com/python-programming/online-compiler/ ○ Online Python: https://www.online-python.com/ ● Educators will challenge students, in their groups, to solve a Python coding issue on Slide 17, and discuss the answer on Slide 18-20. ● Educators will challenge students to create a code that completes a calculation with integers and floats, facilitate discussion, and present a possible Example Code. ● Educators will challenge students to create a code that completes a mole ratio calculation with integers and floats, facilitate discussion, and present a possible Example Code. 	
<p>Consolidation/Extension</p> <ul style="list-style-type: none"> ● To consolidate the lesson, the educator will direct students, in their groups, to complete the Practice Problems on Slide 14 in the <i>Mole-to-Mole Stoichiometry with Python Handout</i>. 	
<p>Accommodations/Modifications</p> <p>Students have the opportunity to type, verbally record with speech-to-text software, and draw their answers.</p>	<p>Assessment</p> <p>Formative Assessment will be conducted throughout the lesson with class discussions, circulation of educator to groups, and review of Consolidation Practice Problems.</p>

Additional Resources

- Whiteboards and Dry Erase Markers
- Internet
- Internet Accessible Devices such as Chromebooks, Computers, or Ipads
- Code Editor, Compiler, or Interpreter and follow along, completing the Python commands.
 - Programiz: Online Python Compiler <https://www.programiz.com/python-programming/online-compiler/>
 - Replit: <https://replit.com/>
 - Online Python: <https://www.online-python.com/>
- Additional Python Internet Resources
 - <https://wiki.python.org/moin/BeginnersGuide/NonProgrammers>
 - <https://www.python.org/>
 - <https://wiki.python.org/moin/BeginnersGuide>
 - <https://docs.python.org/3/tutorial/introduction.html#using-python-as-a-calculator>