## **Python Coding – Stoichiometry**

| SCIENCE TECHNOLOGY ENGINEERING MATH   |   |  | Science Unit Plan                      |  |                           |                     |
|---|---|--|--|--|---------------------------|---------------------|
| Teach   | ner: Pritchai   | -d                                       |  | Grade: 10th  | Course: Chemistry         |                     |
| Unit  | Fitle: Pythor   | 1 Coding – Stoichiometry                 |  | 1  |                           |                     |
| LEAR  | NING TAR  | GETS                                     |  |  |                           |                     |
| LT 16   | : I can balar   | nce a chemical equation to det           | ermine molar ratios.                   |  |                           |                     |
| LT 14   | LT 14: I can identify the reactants, products, and types of different chemical reactions: Composition, decomposition, double replacement, |  |  |  |                           |                     |
| 0   | -   | nt, and combustion.                      |  |  |                           |                     |
|   |   | <b>e e i</b>                             |  | mass, number of moles, number of p                               |                           | e at STP.           |
|   |   |  |  | nvert volume of gases at STP, moles                              |                           |                     |
| _   | OVERVIEV  |  |  | erall summary of the unit, activities, tas                       |                           |                     |
| After using Codecademy.com to learn the Python coding language, students will write a program using the Python code that will solve for the |   |  |  |  |                           |                     |
|   |   |  |  | ents seeking proficient for coding will                          |                           |                     |
|   |   | -  | ng will write a second                 | program that will perform stoichiome                             | etric calculations for an | unknown             |
|   |   | ume of a gas at STP.                     |  |  |                           |                     |
|   | IVATORS   |  | we                                     | ooks for the unit and supplemental activ<br>ebsites, literature) | -                         |                     |
|   |   |  |  | and possibly larger than life chemical                           |                           |                     |
|   |   |  |  | eactions. Observations will initially f                          |                           |                     |
|   |   |  |  | ive analysis of the reactions they have                          | conducted. All concept    | ots identified      |
|   |   | necessary in order for students          | -                                      | · ·  |                           |                     |
| Wk  | Learning  | Materials & Resources                    | Ins                                    | structional Procedures   | Differentiated            | Assessment          |
| 1   | Targets<br>I can  | Elephant Toothpaste                      | Essential Questions                    |  | InstructionRemediation    | Formative           |
| 1   | balance a   | 50-100 ml of 6% hydrogen                 | How can I describe a che               | mical reaction?  | RTI during                | Assessments         |
|   | chemical  | peroxide solution, saturated             | How is energy involved i               |  | PBL/RTI time.             | Students will       |
|   | equation to   | potassium iodide solution, liquid        |  | you determine that a chemical reaction has ta                    |                           | have an             |
|   | determine<br>molar  | dishwashing detergent, and food coloring | place?<br>What factors will affect the | he rate of chemical reactions?                                   | Individual/group          | interactive         |
|   | ratios. (SPI  |  | What chemical reactions                |  | study time.               | practice<br>through |
|   | 3221.3.4)   | Sugar Snake Ingredients                  |  | is represented by a chemical equation?                           | Enrichment                | CK12.org that       |
|   | ,   | Sugar and Concentrated Sulfuric          |  | veyed by a chemical formula?                                     | Application               | will require        |
|   |   | Acid                                     |  | Day 1  | opportunities in          | students to get     |

|     |                                    | Demonstration   | the inquiry lab     | 10 questions                 |
|-----|------------------------------------|---|---------------------|------------------------------|
|     | Flipped Classroom                  | Create Elephant Toothpaste or Sugar Snake   | design for more     | correct before               |
|     | Chemistry_Flexbook Textbook        | • Elephant Toothpaste directions can be found on the  | difficult/challengi | moving on to                 |
|     | from <u>ck12.org</u>               | Internet. Use of hydrogen peroxide 6% will produce the  | ng topics or        | next topic.                  |
|     | Instructor will need to choose     | same effect as using 30% but in more controlled reaction.   | combinations of     | Instructor can               |
|     | textbook reference materials,      | This would also allow you to question students on the   | elements.           | assess                       |
|     | assign students to a class, and    | effect of increasing concentration of hydrogen peroxide   |                     | difficulty of                |
|     | identify relevant assignments for  | to 30% or decreasing it to 3%.  | Learning Styles     | questions as                 |
|     | students.                          | <ul> <li>Take all responses as to what the students</li> </ul>  | Visual              | easy, medium,                |
|     |                                    | believe the products are.   | Aural<br>Verbal     | and difficult.               |
|     | Inquiry Activity                   | <ul> <li>Sugar Snake has special safety precautions and should<br/>not be done by the students. If you do this</li> </ul> | Physical            | Students will                |
|     | 36 colored paper clips (12 each of | not be done by the students. If you do this demonstration, use proper safety precautions. Whenever                        | Social              | submit lab                   |
|     | 3 different colors)                | you deal with concentrated sulfuric acid, you should wear   | Solitary            | report for                   |
|     | Prentice Hall Chemistry            | gloves, eye protection, and a lab coat. Consider the  | Solivery            | evaluation                   |
|     |                                    | beaker a loss, since scraping burnt sugar and carbon off  |                     | using                        |
|     |                                    | of it isn't an easy task. It is preferable to perform the   |                     | Dropbox.                     |
|     |                                    | demonstration inside of a fume hood.  |                     | Comments by                  |
|     |                                    | <ul> <li>Take all responses as to what the students</li> </ul>  |                     | instructor are               |
|     |                                    | believe the products are.   |                     | then addressed               |
|     |                                    | <ul> <li>Advantages to this demonstration – extremely</li> </ul>  |                     | and revised to               |
|     |                                    | exothermic reaction allows for review of states   |                     | meet safety                  |
|     |                                    | of matter and heat notation when writing a  |                     | concerns and appropriatenes  |
|     |                                    | chemical equation.<br>Direct Instruction  |                     | s of activity.               |
|     |                                    | Word Equation   |                     | Students                     |
|     |                                    | Chemical Equation   |                     | complete                     |
|     |                                    | Chemical Formula Notation   |                     | revisions and                |
|     |                                    | Flipped Classroom   |                     | resubmit for                 |
|     |                                    | • Students have registered in specified teacher group of ck12.org.  |                     | final approval.              |
|     |                                    | Assignment for class on day 2 is to read 11.3 Balancing Equations.  |                     |                              |
|     |                                    | There are three videos that demonstrate how to balance equations  |                     | Summative                    |
|     |                                    | if further instruction is needed.   |                     | Assessment                   |
|     |                                    | Day 2   |                     | Inquiry-based, self-designed |
|     |                                    | Inquiry Activity  |                     | laboratory                   |
|     |                                    | Modeling Chemical Reaction  |                     | procedure is                 |
|     |                                    | • Each of the 36 paper clips represents an atom of oxygen,  |                     | the summative                |
|     |                                    | hydrogen, and carbon.   |                     | for this week.               |
|     |                                    | <ul> <li>Students create molecules of hydrogen gas, oxygen gas, and<br/>methone</li> </ul>                                |                     | Requirements                 |
|     |                                    | methane.  |                     | for successful               |
|     |                                    | • Students "react" molecules and record each molecule reacted and formed in a balanced equation. Students are given two   |                     | completion are               |
|     |                                    | examples and then allowed to create their own combinations:   |                     | outlined in                  |
|     |                                    | $\circ$ H <sub>2</sub> +O <sub>2</sub> $\rightarrow$ H <sub>2</sub> O   |                     | Instructional                |
|     |                                    | $\circ \underline{\qquad} CH_4 + \underline{\qquad} O_2 \rightarrow \underline{\qquad} CO_2 + \underline{\qquad} H_2O$    |                     | Procedures.                  |
|     |                                    | Independent/Partner Practice  |                     |                              |
| L I | 1                                  | 1   | 1                   | I                            |

| Attention Grabber       By 3         Attention Grabber       Self-directed study         Attention Grabber       Use link below to Amazing         Chemical Reactions at beginning       Day 45         Hey Check This Out!!       Hey Check This Out!!         Hey Check This Out!!       Hey Check This Out!!         Hey Check This Out!!       Hey Check This Out!!         Hey Check This Out!!       Attention Grabber         Use link below to Amazing       Chemical Reactions atrivity usos needing additional submet will beginning of Class to spark students's interest in chemical reactions. Many of the reactions atrivity usos needing additional reactions. Many of the reactions atrivity instreme the chemical reactions. Many of the reactions atrivity instreme the chemical reactions. Many of the reactions atrivity those needing additional school so it allows students to see some of the unusual reactions. Many of the reactions atrivity the spark students' inferst in chemical reactions. Many of the reactions atrivity these poses of chemical reactions and answer the following questions.         Marzing Chemical Reactions https://www.youtube.com/watch?v=/Difl/2v414       Hey Check This Out!!         * Student's not reactions.       Hey Check The Out!!         • How does one distinguish between a       • Student's mode chemical reactions and answer the following questions.         • How does one reaction that occurred?       • How does one reaction that occurred?         • How does one predict the products of each type of reactions?       • Ho  |          |                    |   |
|--|----------|--------------------|---|
| Image: Self-directed study         Self-direc  |          |                    | <ul> <li>Students will convert word equations to chemical equations and</li> </ul>  |
| Self-directed study       Self-directed study         Attention Grabber       Students not needing additional teacher directed instruction are free to progress through the practice activity on CK12 carg. Students requiring additional assistance will sit in predetermined area for ease of monitoring and assistance will sit in predetermined information of a 20 xviii identify those needing additional intervention from instructor.         Use link below to Amazing Chemical Reactions at beginning of Day 45 to students for store would be card watchy-fr@fl/2014 beginning of class to spark students intervention from instructor.         Mary of the reactions.       Hey Check This Out!         Attention Grabber       Hey Check This Out!         Mary of the reactions are not safe for high school so it allows students to see some of the unusual reactions.         Mary of the reactions are not safe for high school so it allows students to see some of the unusual reactions.         Mary of the reactions are not safe for high school so it allows students to see some of the unusual reactions.         Mary of the reactions are not safe for high school so it allows students to see some of the unusual reactions.         Marge Chemical Reactions https://www.voutube.com/watch?         https://www.voutube.com/watch?         wellong Diplocation Advector of the unusual reaction and answer the following questions.         verification of the work of the inductor student is chemical reaction and answer the following questions.         verification of the work of the products of each type of reaction?         • How   |          |                    | *   |
| <ul> <li>Studens not needing additional teacher direct instruction are free to progress through the practice activity on CK12 org. Students requiring additional assistance. Modeling Chemical Reactions at bigming of Day 4/5</li> <li>Attention Grabber Use link below to Amazing Chemical Reactions at bigming of Day 4/5 to spark students' students' interest in chemical reactors. Many of the reactors are not stafe for high school so it allows students to see some of the unusual reactions.</li> <li>Amazing Chemical Reactions</li> <li>Amazing Chemical Reactions</li> <li>Amazing Chemical Reactions</li> <li>Many of the reactors are not stafe for high school so it allows students to see some of the unusual reactions.</li> <li>Many of the reactors are not stafe for high school so it allows students to see some of the unusual reactions.</li> <li>Manzing Chemical Reactions</li> <li>Mittes: <i>Vwww voutube con/watch?</i></li> <li>Students will receive their Inquiry Lab Design topic. This lab requires student to design and conduct a laboratory exercise that will identify the five types of chemical reactions and answer the following questions.</li> <li>Inquiry Lab Design</li> <li>Students will receive their Inquiry Lab Design topic. This lab requires student to design and conduct a laboratory exercise that will identify the five types of chemical reactions and answer the following questions.</li> <li>Ouble, displacement/replacement</li> <li>Sputhesis/composition</li> <li>Oubuk displacement/replacement</li> <li>Sputhesis/composition</li> <li>We would nee write a balanced chemical equation for each reaction frage the products of cach type of reaction?</li> <li>What are possible indicators that a chemical reaction has occurred?</li> <li>Work does one required to make any needed solutions, design and submit their hab proposal an word format. Instructor will evaluate student design, request revisions, and approve of disagnove laboratory exercise?</li> <li>Wha</li></ul>  |          |                    |   |
| Attention Grabher         Use link below to Amzring         Chemical Reactions at beginning         of Device 1 Reactions at rot stafe         merest in chemical reactions,<br>Many of the reactions are not stafe         Many of the reactions are not stafe         Many of the reactions are not stafe         Many of the reactions are not stafe         https://www.youtube.com/watch?         v= ForPhi/Xv114         Numaring Chemical Reactions<br>https://www.youtube.com/watch?         v= Sudents will receive their Inquiry Lab Design topic. This lab<br>requires students' inferest relations.         0       How does one distinguish between a         • Students' will receive their Inquiry L  |          |                    | Self-directed study   |
| Attention Grabher         Use link below to Amzring         Chemical Reactions at beginning         of Device 1 Reactions at rot stafe         merest in chemical reactions,<br>Many of the reactions are not stafe         Many of the reactions are not stafe         Many of the reactions are not stafe         Many of the reactions are not stafe         https://www.youtube.com/watch?         v= ForPhi/Xv114         Numaring Chemical Reactions<br>https://www.youtube.com/watch?         v= Sudents will receive their Inquiry Lab Design topic. This lab<br>requires students' inferest relations.         0       How does one distinguish between a         • Students' will receive their Inquiry L  |          |                    |   |
| Attention Grabber         Use link below to Amazing         Chemical Reactions at beginning         of Day 4/5 to spart students'         interest in chemical reactions         Many of the reactions at not safe         for high school so it allows         students' requiring additional intervention.         Dy 4/5         Hey Check This Out!         • Attention Grabber - Use link to Amazing Chemical Reactions at https://www.youtabe.com/watch?=Folip?4414 beginning of class         to spart students' interest in chemical reactions.         Many of the reactions are not safe for high school so it allows         students will receive their Inquiry Lab Design topic. This lab         mussual reactions.         Amazing Chemical Reactions.         https://www.youtabe.com/watch?         v=ForPij2v414         • Students will receive their Inquiry Lab Design topic. This lab         requires attendent design and conduct a laboratory exercise that will identify their types of chemical reactions.         • Divise?/www.youtabe.com/watch?         v=ForPij2v414         • How does one disting its hourcent         • Dowable, displacement/replacement         • Dowable, displacement/replacement         • Dowable, displacement/replacement         • Dowable, displacement/replacement         • Dow does one predict t  |          |                    |   |
| Attention Grabber       Use link below to Amazing       Attention Grabber       Use link below to Amazing         Use link below to Amazing       Chemical Reactions at beginning of Day 4/5 students' in chemical reactions.       Bay 4/5         Hey Check This Out!       • Hey Check This Out!       • Hey Check This Out!         Antention Grabber       Use link to Amazing Chemical Reactions at bigming of Day 4/5 students' in chemical reactions.         Many of the reactions.       Harting Chemical Reactions are not safe for high school so it allows students to see some of the unusual reactions.         Amazing Chemical Reactions https://www.youtbe.com/watch?       • Students will receive their Inquiry Lab Design topic. This lab requires student to design and conduct a laboratory exercise that will identify the five types of chemical reactions and answer the following questions.         • How does one distinguish between a       • Students will receive their Inquiry Lab Design topic. This lab requires student to design and conduct a laboratory exercise that will identify the five types of chemical reactions and answer the following questions.         • How does one distinguish between a       • Students will cancel the products of each type of reaction has courted?         • How does one predict the products of each type of reaction has courted?       • How does one predict the products of each type of reaction?         • How does one predict the product of the ach product?       • How does one predict the products of each type of reaction?         • How does one predict the products of each type of reacti  |          |                    |   |
| Reaction activity and independent practice done on day 2will identify those needing additional intervention from instructor.<br><b>Day 4/5</b><br>Hey Check This Out!<br>Attention Grabber<br>Use link helw to Amazing<br>Chemical Reactions thogenning<br>of Day 4/5 to spark students'<br>interest in chemical reactions.<br>Many of the reactions are not stafe<br>for high school so it allows<br>students to see some of the<br>unusual reactions.<br><u>Amazing Chemical Reactions</u><br>https://www.youtbe.com/watch?<br>v=Fo/Pjj7v414<br>• Fo/Pjj7v414<br>• Gold Hermitian Stafe Students' interest in chemical reactions.<br>• Students will receive their Inquiry Lab Design topic. This lab<br>requires student of the five types of chemical reactions and answer the<br>following questions.<br>• Double, displacement/replacement<br>• Double, displacement/replacement<br>• Double, displacement/replacement<br>• Double, displacement/replacement<br>• Double inductors that a chemical reaction has<br>occurred?<br>• How does one distinguish between a<br>• Double, displacement/replacement<br>• Double, displacement/replacement<br>• Double displacemen |          |                    |   |
| Attention Grabber       Use link below to Amazing       General Reactions at beginning of Day 4/5         Hey Check This Out!       Day 4/5         Hey Check This Out!       Hey Check This Out!         Statement of the control of the co  |          |                    |   |
| Attention Grabber<br>Use link below to Amazing<br>Chemical Reactions at beginning<br>of Day 4/5 to spark students'<br>interest in chemical reactions.<br>Many of the reactions are not safe<br>for high school so it allows<br>students to see some of the<br>unusual reactions.       • Attention Grabber - Use link to Amazing Chemical Reactions at<br>https://www.voutube.com/watch/w-io/Pi/Yv41/beginning of class<br>to spark students' interest in chemical reactions.<br>Many of the reactions are not safe<br>for high school so it allows<br>students to see some of the<br>unusual reactions.         Amazing Chemical Reactions<br>https://www.voutube.com/watch?<br>v=FolPi]Tv414       Inquiry Lab Design         • How does one distinguish between a<br>• Single displacement/replacement<br>• Double, displacement/replacement<br>• Double, displacement/replacement<br>• Double, displacement/replacement<br>• Double, displacement/replacement<br>• Double, displacement/replacement<br>• Orbustion reaction<br>• How does one predictors what a chemical reaction has<br>occurred?<br>• How does one predict be products of each type of<br>reaction?<br>• How does required in the aboratory exercise?<br>• What are the disposal methods required for each product?<br>• Students will conduct indepondent research, design and submit<br>their lab proposal in word format. Instructor will evaluate student<br>design, request revisions, and approve a disging and submit<br>their lab proposal in word format. Instructor will evaluate student<br>design, request revisions, and approve aboratory<br>exercise. Students are required to make any needed solutions,<br>check inventory for chemicals, request purchase of needed items,<br>sapply items that can be purchased locally, and design data tables.<br>All set-up and cleanup of laboratory exercise is the student's<br>responsibility.   |          |                    |   |
| Attention Grabber       Hey Check This Out!!         Use link below to Amazing       Chemical Reactions at beginning         of Day 4/5 to spark students'       Attention Grabber - Use link to Amazing Chemical Reactions at https://www.youtube.com/watch?v=PoPi/I7v414 beginning of class         Many of the reactions are not safe for high school so it allows students to see some of the unusual reactions.       Many of the reactions are not safe some of the unusual reactions.         Amazing Chemical Reactions       Https://www.youtube.com/watch?v=PoPi/I7v414       Inquiry Lab Design topic. This lab requires student to design and conduct a laboratory exercise that will identify the five types of chemical reactions and answer the following questions.         v=ForPi/I7v414       • How does one distinguish between a       • Single displacement/replacement         • Double, displacement/replacement       • Synthesis/composition       • Combustion reaction share of each type of reaction?         • How does one predict the products of each type of reaction that occurred?       • How woold one write a balanced chemical equation for each reaction that occurred?         • How woold one write a balanced chemical equation for each reaction that cocurred in the disport prove albagrove laboratory exercise.         • What are the disposal methods required to make any needed solutions, check inventory for chemicals, request provide and tata tables. All set-up and cleanup of laboratory exercise is the student's responsibili'.   |          |                    |   |
| Use link below to Amazing<br>Chemical Reactions at beginning<br>of Day 4/5 to spark students'<br>interest in chemical reactions.<br>Many of the reactions are not safe for high school so it allows<br>students to see some of the<br>unusual reactions.       • Attention Grabber - Use link to Amazing Chemical Reactions at<br>https://www.youtube.com/watch?v=Y6Pij2v614 beginning of class<br>to spark students' interest in chemical reactions.<br>Many of the reactions are not safe for high school so it allows<br>students to see some of the<br>unusual reactions.         Amazing Chemical Reactions<br>https://www.youtube.com/watch?y<br>v=ForPij7/v414       • Students will receive their Inquiry Lab Design topic. This lab<br>requires student to design and conduct a laboratory exercise that<br>will identify the five types of chemical reactions and answer the<br>following questions.         • How does one distinguish between a       • Single displacement/replacement<br>• Double, displacement/replacement<br>• Double, displacement/replacement<br>• Double, displacement/replacement<br>• Double, displacement/replacement<br>• Double, displacement/replacement<br>• Decomposition<br>• How does one predict the products of each type of<br>reaction?         • How does one predict the products of each type of<br>reaction?       • How does one predict the products of each type of<br>reaction?         • How would one write a balanced chemical equation for<br>each reaction that occurred in the laboratory exercise?<br>• What are the disposal methods required for each product?         • Students will conduct independent research, design and submit<br>their lab proposal in word format. Instructor will evaluate student<br>design, request revisions, and approve or design data tables.<br>All set-up and cleanup of laboratory exercise is the student's<br>responsibility.  |          | Attention Grabber  |   |
| Chemical Reactions at beginning<br>of Day 4/5 to spark students'<br>interest in chemical reactions.<br>Many of the reactions are not safe<br>for high school so it allows<br>students to see some of the<br>unusual reactions.       https://www.youtube.com/watch?v=FoTPij/z4141 beginning of class<br>some of the unusual reactions.<br>Many of the reactions are not safe<br>for high school so it allows<br>students to see some of the<br>unusual reactions.       Intury Lab Design<br>to begin the unusual reactions.         Amazing Chemical Reactions<br>https://www.youtube.com/watch?<br>v=FoTPij/Zv414       Numine the unusual reactions.       Intury Lab Design<br>to design and conduct a laboratory exercise that<br>will identify the five types of chemical reactions and answer the<br>following questions.         0       How does one distinguish between a<br>• Double, displacement/replacement<br>• Students will conduct on the abaratory exercise?<br>• How does one predict the products of each type of<br>reaction?<br>• How does one predict the products of each type of<br>reaction that occurred in the laboratory exercise?<br>• What are the disposal methods required for each product?<br>• Students will conduct independent research, design and submit<br>their lab proposal in word format. Instructor will evaluate student<br>design, request revisions, and approve or disapprove laboratory<br>exercise. Students are required to make any needed solutions,<br>check inventory for chemicals, request purchase of locally, and design data tables.<br>All set-up and cleanup of laboratory exercise is the student's<br>responsibility.   |          |                    |   |
| of Day 4/5 to spark students'<br>interest in chemical reactions.<br>Many of the reactions are not safe<br>for high school so it allows<br>students to see some of the<br>unusual reactions.       to spark students' interest in chemical reactions.<br>Many of the reactions are not safe<br>unusual reactions.         Amazing Chemical Reactions<br>https://www.youtube.com/watch?       To super the five types of chemical reactions and answer the<br>following questions.         v=ForPji7v114       Students will receive their Inquiry Lab Design topic. This lab<br>requires student to design and conduct a laboratory exercise that<br>will identify the five types of chemical reactions and answer the<br>following questions.         • How does one distinguish between a       Students will receive their Inquiry Lab Design topic. This lab<br>requires student to design and conduct a laboratory exercise that<br>will identify the five types of chemical reactions and answer the<br>following questions.         • How does one distinguish between a       Students will consustion reaction         • Obuble, displacement/replacement       Double, displacement/replacement         • Double, displacement/replacement       Obuble, displacement/replacement         • Double, displacement/replacement       Not be composition         • How does one predict the products of each type of<br>reaction?       How does one predict the products of each type of<br>reaction?         • How would one write a balanced chemical equation for<br>each reaction that occurred in the laboratory exercise?       What are the disposal methods required for each product?         • How does one predict the products of needed bitems,<br>supply items that c   |          |                    |   |
| interest in chemical reactions.         Many of the reactions are not safe<br>for high school so it allows<br>students to see some of the<br>unusual reactions.         Amazing Chemical Reactions<br>https://www.youtube.com/watch?y<br>v=FolPij7v414         · Students will receive their Inquiry Lab Design topic. This lab<br>requires student to design and conduct a laboratory exercise that<br>will identify the five types of chemical reactions and answer the<br>following questions.         · Single displacement/replacement         · Double, displacement/replacement         · Some of the unusual reaction?         · How does one distinguish between a         · Single displacement/replacement         · Obube, displacement/replacement         · Single and cators that a chemical reaction has<br>occurred?         · How does one predict the products of each type of<br>reaction?         · How would one write a balanced chemical equation for<br>each reaction fraction?         · How does one predict the disposal methods required for each product?         · Students will conduct independent research, design and submit<br>their lab proposal i  |          |                    |   |
| Many of the reactions are not safe<br>for high school so it allows<br>students to see some of the<br>unusual reactions.       some of the unusual reactions.         Amazing Chemical Reactions<br>https://www.youtbe.com/watch?       Inquiry Lab Design doi: This lab<br>requires student to design and conduct a laboratory exercise that<br>will identify the five types of chemical reactions and answer the<br>following questions.         v=FofPij7v414       • How does one distinguish between a         • Single displacement/replacement       • Synthesis/composition         • Double, displacement/replacement       • Orbustion reaction<br>• Decomposition         • What are possible indicators that a chemical reaction has<br>occurred?       • What are possible indicators that a chemical reaction has<br>occurred?         • How would one write a balanced chemical equation for<br>each reaction that occurred in the laboratory exercise?       • What are the disposal methods required for each product?         • Students will conduct independent research, design and submit<br>their lab proposal in word format. Instructor will evaluate student<br>design, request revisions, and approve of disapprove laboratory<br>exercise. Students are required to make any needed solutions,<br>check inventory for chemicals, request purchase of design data tables.<br>All set-up and cleanup of laboratory exercise is the student's<br>responsibility.         • Flipped Classroom       • Flipped Classroom   |          |                    |   |
| for high school so it allows<br>students to see some of the<br>unusual reactions.       Inquiry Lab Design         Amazing Chemical Reactions<br>https://www.youtube.com/watch?       • Students will receive their Inquiry Lab Design topic. This lab<br>requires student to design and conduct a laboratory exercise that<br>will identify the five types of chemical reactions and answer the<br>following questions.         v=Fo(P)j7v414       • How does one distinguish between a         • Single displacement/replacement       • Double, displacement/replacement         • Double, displacement/replacement       • Oromosition         • Combustion reaction       • What are possible indicators that a chemical reaction has<br>occurred?         • How would one write a balanced chemical equation for<br>each reaction that occurred in the laboratory exercise?         • What are the disposal methods required for each product?         • Students will conduct independent research, design and submit<br>their lab proposal in word format. Instructor will evaluate student<br>design, request revisions, and approve or disapprove laboratory<br>exercise. Students are required to make any needed solutions,<br>check inventory for chemicals, request purchase of needed items,<br>supply items that can be purchased locally, and design data tables.<br>All set-up and cleanup of laboratory exercise is the student's<br>responsibility.   |          |                    |   |
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| unusual reactions.       Students will receive their Inquiry Lab Design topic. This lab requires student to design and conduct a laboratory exercise that will identify the five types of chemical reactions and answer the following questions.         v=ForPij7v414       • How does one distinguish between a         • Single displacement/replacement       • Single displacement/replacement         • Double, displacement/replacement       • Double, displacement/replacement         • Decomposition       • Combustion reaction         • What are possible indicators that a chemical reaction has occurred?       • How would one write a balanced chemical equation for each reaction that occurred in the laboratory exercise?         • How would one write a balanced chemical equation for each reaction that occurred in the laboratory exercise?       • What are the disposal methods required for each product?         • Students will conduct independent research, design and submit their lab proposal in word format. Instructor will evaluate student design, request revisions, and approve of chemicals, request provident do reaced items, supply items that can be purchased locally, and design data tables. All set-up and cleanup of laboratory exercise is the student's responsibility.         Flipped Classroom       Flipped Classroom  |          |                    |   |
| Amazing Chemical Reactions<br>https://www.youtube.com/watch?       intervention first to design and conduct a laboratory exercise that<br>will identify the five types of chemical reactions and answer the<br>following questions.         v=FofPjj7v414       O How does one distinguish between a         Base of the state of the sta   |          |                    |   |
| Amazing Chemical Reactions       will identify the five types of chemical reactions and answer the following questions.         https://www.youtube.com/watch?       • How does one distinguish between a         y=ForPjj7v414       • How does one distinguish between a         • Single displacement/replacement       • Double, displacement/replacement         • Double, displacement/replacement       • Combustion         • Combustion reaction       • Combustion reaction         • How does one predict the products of each type of reaction?       • How does one predict the products of each type of reaction?         • How would one write a balanced chemical equation for each reaction that occurred in the laboratory exercise?       • What are the disposal methods required for each product?         • Students will conduct independent research, design and submit their lab proposal in word format. Instructor will evaluate student design, request revisions, and approve or disapprove laboratory exercise. Students are required to make any needed solutions, check inventory for chemicals, request purchased locally, and design data tables. All set-up and cleanup of laboratory exercise is the student's responsibility.         Flipped Classroom       Flipped Classroom   | u        | inusual reactions. |   |
| https://www.youtube.com/watch?       following questions.         v=FofPjj7v414       • How does one distinguish between a         • Single displacement/replacement       • Single displacement/replacement         • Double, displacement/replacement       • Synthesis/composition         • Doubstion reaction       • Combustion reaction         • How does one predict the products of each type of reaction?       • How would one write a balanced chemical equation for each reaction that occurred?         • What are the disposal methods required for each product?       • What are the disposal methods required for each product?         • Students will conduct independent research, design and submit their lab proposal in word format. Instructor will evaluate student design, request revisions, and approve or disapprove laboratory exercise. Students are required to make any needed solutions, check inventory for chemicals, request purchase of needed items, supply items that can be purchased locally, and design data tables. All set-up and cleanup of laboratory exercise is the student's responsibility.         Flipped Classroom   |          |                    |   |
| v=FofPij7v414 <ul> <li>How does one distinguish between a</li> <li>Single displacement/replacement</li> <li>Double, displacement/replacement</li> <li>Synthesis/composition</li> <li>Decomposition</li> <li>Decomposition</li> <li>Ombustion reaction</li> <li>What are possible indicators that a chemical reaction for each reaction that occurred?</li> <li>How would one write a balanced chemical equation for each reaction that occurred in the laboratory exercise?</li> <li>What are the disposal methods required for each product?</li> </ul> <li>Students will conduct independent research, design and submit their lab proposal in word format. Instructor will evaluate student design, request revisions, and approve or disapprove laboratory exercise. Students are required to make any needed solutions, check inventory for chemicals, request purchase of needed items, supply items that can be purchased locally, and design data tables. All set-up and cleanup of laboratory exercise is the student's responsibility.</li>  |          |                    | will identify the five types of chemical reactions and answer the                   |
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| <ul> <li>Double, displacement/replacement</li> <li>Synthesis/composition</li> <li>Decomposition</li> <li>Combustion reaction</li> <li>What are possible indicators that a chemical reaction has occurred?</li> <li>How does one predict the products of each type of reaction?</li> <li>How would one write a balanced chemical equation for each reaction that occurred in the laboratory exercise?</li> <li>What are the disposal methods required for each product?</li> <li>Students will conduct independent research, design and submit their lab proposal in word format. Instructor will evaluate student design, request revisions, and approve or disapprove laboratory exercise. Students are required to make any needed solutions, check inventory for chemicals, request purchase of needed items, supply items that can be purchased locally, and design data tables. All set-up and cleanup of laboratory exercise is the student's responsibility.</li> </ul>   | <u>v</u> | v=FofPjj7v414      | • How does one distinguish between a  |
| <ul> <li>Double, displacement/replacement</li> <li>Synthesis/composition</li> <li>Decomposition</li> <li>Combustion reaction</li> <li>What are possible indicators that a chemical reaction has occurred?</li> <li>How does one predict the products of each type of reaction?</li> <li>How would one write a balanced chemical equation for each reaction that occurred in the laboratory exercise?</li> <li>What are the disposal methods required for each product?</li> <li>Students will conduct independent research, design and submit their lab proposal in word format. Instructor will evaluate student design, request revisions, and approve or disapprove laboratory exercise. Students are required to make any needed solutions, check inventory for chemicals, request purchase of needed items, supply items that can be purchased locally, and design data tables. All set-up and cleanup of laboratory exercise is the student's responsibility.</li> </ul>   |          |                    | <ul> <li>Single displacement/replacement</li> </ul>                                 |
| <ul> <li>Synthesis/composition</li> <li>Decomposition</li> <li>Combustion reaction</li> <li>What are possible indicators that a chemical reaction has occurred?</li> <li>How does one predict the products of each type of reaction?</li> <li>How would one write a balanced chemical equation for each reaction that occurred in the laboratory exercise?</li> <li>What are the disposal methods required for each product?</li> <li>Students will conduct independent research, design and submit their lab proposal in word format. Instructor will evaluate student design, request revisions, and approve or disapprove laboratory exercise, supply items that can be purchased locally, and design data tables. All set-up and cleanup of laboratory exercise is the student's responsibility.</li> <li>Flipped Classroom</li> </ul>   |          |                    |   |
| <ul> <li>Decomposition         <ul> <li>Combustion reaction</li> <li>What are possible indicators that a chemical reaction has occurred?</li> <li>How does one predict the products of each type of reaction?</li> <li>How would one write a balanced chemical equation for each reaction that occurred in the laboratory exercise?</li> <li>What are the disposal methods required for each product?</li> </ul> </li> <li>Students will conduct independent research, design and submit their lab proposal in word format. Instructor will evaluate student design, request revisions, and approve or disapprove laboratory exercise. Students are required to make any needed solutions, check inventory for chemicals, request purchase of needed items, supply items that can be purchased locally, and design data tables. All set-up and cleanup of laboratory exercise is the student's responsibility.</li> <li>Flipped Classroom</li> </ul>   |          |                    |   |
| <ul> <li>Combustion reaction</li> <li>What are possible indicators that a chemical reaction has occurred?</li> <li>How does one predict the products of each type of reaction?</li> <li>How would one write a balanced chemical equation for each reaction that occurred in the laboratory exercise?</li> <li>What are the disposal methods required for each product?</li> <li>Students will conduct independent research, design and submit their lab proposal in word format. Instructor will evaluate student design, request revisions, and approve or disapprove laboratory exercise. Students are required to make any needed solutions, check inventory for chemicals, request purchase of needed items, supply items that can be purchased locally, and design data tables. All set-up and cleanup of laboratory exercise is the student's responsibility.</li> <li>Flipped Classroom</li> </ul>  |          |                    |   |
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| All set-up and cleanup of laboratory exercise is the student's responsibility.<br>Flipped Classroom  |          |                    |   |
| responsibility.<br>Flipped Classroom   |          |                    |   |
| Flipped Classroom  |          |                    |   |
|  |          |                    |   |
| Students will need to used a sections 11.4 to 11.0 for heat-security   |          |                    |   |
| Students will need to read sections 11.4 to 11.9 for background  |          |                    | <ul> <li>Students will need to read sections 11.4 to 11.9 for background</li> </ul> |

|  |   |   | information on types of chemical reactions. This reading will take<br>place at home and class time will be used for small group or one-<br>on-one instruction.   |   |  |
|--|---|---|--|---|--|
| Δ ic<br>r<br>p<br>a<br>d<br>c<br>r<br>C<br>n<br>d<br>o<br>r<br>r<br>c<br>S | a can<br>identify the<br>reactants,<br>products,<br>and types of<br>different<br>chemical<br>reactions:<br>Compositio<br>n,<br>decompositi<br>on, double<br>replacement<br>single<br>replacement<br>and<br>combustion.<br>SPI<br>3221.3.2 | Single-replacement reaction<br>Mossy Zinc and Hydrochloric<br>Acid<br>Double-replacement reaction<br>Potassium Chromate and Silver<br>Nitrate<br>Lead (II) Nitrate and Potassium<br>Iodide<br>Video resource<br>https://www.youtube.com/watch?<br>v=7hVKb4ROjZw#t=379<br>Synthesis Reaction<br>Magnesium Ribbon<br>https://www.youtube.com/watch?<br>v=nsEkKIiOz7Q<br>Decomposition Reaction<br>Hydrogen Peroxide 3% and active<br>yeast (catalyst)<br>VERY STRANGE video link but<br>will leave a lasting impression on<br>students.<br>https://www.youtube.com/watch?<br>v=ritaljhhk7s<br>Combustion Reaction<br>Bunsen burner and fuel source<br>Review of all five types of<br>reactions<br>https://www.youtube.com/watch?<br>v=nsEkKIiOz7Q | <ul> <li>Day 6</li> <li>Small group discussion</li> <li>Students will read information related to the five types of chemical reactions located in ckl2.org. before coming to class on day 6. Each day the students will have the opportunity, during class, to receive small group instruction on the five types of reactions. Demonstrations will identify the type of reaction focus for that day. Students are to complete the practice problems in ckl2.org for single replacement and double replacement reactions.</li> <li>Demonstration</li> <li>Single-replacement reaction – Drop a small piece of mossy zinc into a test tube containing10mL of 6M hydrochloric acid. Immediately place an inverted test tube and collect the hydrogen gas being given off. Place a lit match at the base of the inverted test tube and listen for the "bark" sound that is the hydrogen gas exploding. Do not bring lit match close to hydrochloric acid.</li> <li>Double-replacement reaction – Add silver nitrate drop by drop to approximately 50 mL of potassium chromate OR add potassium iodide drop by drop by drop to lead (II) nitrate.</li> <li>Research</li> <li>Students will continue research using online resources, and/or laboratory manuals provided by instructor. Students should identify a laboratory investigation they would like to complete the rab Report template created by the science department. This Lab Report template created by the science department. This Lab Report template creation – Add some active yeast to a Ziploc baggie to serve as your catalyst. Experiment with appropriate amounts. Add hydrogen peroxide to the bag and zip it closed. You may need to shake the bag to initiate reaction. Bag will expand as the decomposition of the hydrogen peroxide occurs. You may need to open the bag some to allow the oxygen gas to escape.</li> <li>Small group discussion</li> <li>Students will read information related to the five types of chemical iteraction located in ckl2.org, before coming to class on day 6. Each day the students will have the opportunity, durin</li></ul> | RemediationRTI duringPBL/RTI time.FlippedClassroom willallow forindividual orgroup study time.Small groupintervention withinstructor willalso be available.EnrichmentApplicationopportunities tomoredifficult/challenging topics orcombinations ofelements. Inquirybased laboratorydesign will allowstudents to choosemore challengingexplorations.Ck12.orgmodifies practicequestions basedon success rate atvarious levels.Practice questionswill beautomaticallyadjusted tochallenge studentswith moredifficult questionswhen appropriate.Learning Styles | Formative<br>Assessments<br>Students will<br>have an<br>interactive<br>practice<br>through<br>CK12.org that<br>will require<br>students to get<br>10 questions<br>correct before<br>moving on to<br>next topic.<br>Instructor can<br>assess<br>difficulty of<br>questions as<br>easy, medium,<br>and difficult.<br>Molar Mass,<br>Mass to<br>Moles,<br>Particles, to<br>Moles,<br>Particles, to<br>Moles,<br>Volume to<br>Moles<br>evaluations<br>will be given<br>before moving<br>onto the next<br>item.<br>Students will<br>submit lab<br>report for<br>summative<br>evaluation<br>using Edmodo.<br>This is only<br>done after the<br>students have |

|   |           |                                |  | x 7' 1        |               |
|---|-----------|--------------------------------|--|---------------|---------------|
|   |           |                                | receive small group instruction on the five types of reactions.            | Visual        | had a peer    |
|   |           |                                | Students are to complete the practice problems in ck12.org for             | Aural         | review and    |
|   |           |                                | synthesis and decomposition reactions.                                     | Verbal        | addressed     |
|   |           |                                | Research   | Physical      | those         |
|   |           |                                | • Students will continue research using online resources, and/or           | Social        | comments      |
|   |           |                                | laboratory manuals provided by instructor. Students should                 | Solitary      | made in the   |
|   |           |                                | identify a laboratory investigation they would like to complete for        |               | peer          |
|   |           |                                | synthesis and decomposition reactions. Once students have                  |               | evaluation.   |
|   |           |                                | identified their activities, they will complete the Lab Report             |               |               |
|   |           |                                | template created by the science department. This Lab Report must           |               |               |
|   |           |                                | be submitted via Dropbox and approved before students are                  |               |               |
|   |           |                                | allowed to proceed.  |               |               |
|   |           |                                | Day 8  |               |               |
|   |           |                                | Demonstration  |               |               |
|   |           |                                | Combustion reaction – This demonstration involves discussion of            |               |               |
|   |           |                                | the Bunsen burner and fuel that is used in the science lab. No             |               |               |
|   |           |                                | other materials are needed other than the burner, lighter, and fuel.       |               |               |
|   |           |                                | Small group discussion   |               |               |
|   |           |                                | • Students will read information related to the five types of chemical     |               |               |
|   |           |                                | reactions located in <u>ck12.org.</u> before coming to class on day 6.     |               |               |
|   |           |                                | Each day the students will have the opportunity, during class, to          |               |               |
|   |           |                                | receive small group instruction on the five types of reactions.            |               |               |
|   |           |                                | Students are to complete the practice problems in ck12.org for             |               |               |
|   |           |                                | combustion reactions.  |               |               |
|   |           |                                | Research   |               |               |
|   |           |                                | • Students will continue research using online resources, and/or           |               |               |
|   |           |                                | laboratory manuals provided by instructor. Students should                 |               |               |
|   |           |                                | identify a laboratory investigation they would like to complete for        |               |               |
|   |           |                                | a combustion reaction. Students will be limited on choices with            |               |               |
|   |           |                                | this reaction type but should still research the reaction type. Once       |               |               |
|   |           |                                | students have identified their activity, they will complete the Lab        |               |               |
|   |           |                                | Report template created by the science department. This Lab                |               |               |
|   |           |                                | Report must be submitted via Dropbox and approved before                   |               |               |
|   |           |                                | students are allowed to proceed.   |               |               |
|   |           |                                | Day 9/10   |               |               |
|   |           |                                | Summarizing Strategy   |               |               |
|   |           |                                | • Students will complete the self-designed laboratory exercise             |               |               |
|   |           |                                | addressing all five of the types of chemical reactions, correctly          |               |               |
|   |           |                                | identify the reactants and products, and balance each equation             |               |               |
|   |           |                                | identifying the correct mole ratios. Use of standard chemical              |               |               |
|   |           |                                | equation notation, such as identifying solids, liquids, gases, and         |               |               |
|   | T         |                                | heat transfer, are required.   | D L' - C      |               |
| 3 | I can     | Engagement Activity            | Day 11   | Remediation   | Formative     |
|   | convert   | Silly song but popular choice  | Peer Review and Final Edits for laboratory exercise addressing all five of | RTI during    | Assessments   |
|   | among the | "A Mole is a Unit"             | the types of chemical reactions.   | PBL/RTI time. | Students will |
|   | following | https://www.youtube.com/watch? | • Students will complete their lab report from their laboratory            |               | submit lab    |

|                     | D T511 (0.15                      | · · · · · · · · · · · · · · · · · · ·  | <b>F1</b> 1                       |                               |
|---------------------|-----------------------------------|--|-----------------------------------|-------------------------------|
| quantities of a     | v=PvT51M0ek5c                     | exercises last week and seek one student to peer review the report.                  | Flipped<br>Classroom will         | report for teacher            |
|                     |                                   | Revisions based on reviews will be addressed and lab report is to                    |                                   |                               |
| substance:          |                                   | be submitted to Edmodo for final teacher evaluation.                                 | allow for                         | evaluation                    |
| mass,               | Lurica to "A Mala is a Unit"      | Day 12   | individual or                     | using<br>Drambay              |
| number of           | Lyrics to "A Mole is a Unit"      | Engage   | group study time.                 | Dropbox.                      |
| moles,              | http://www.exploratorium.edu      | Song "A Mole is A Unit" by Michael Offutt  | Small group                       | Comments by                   |
| number of           | More serious video intro "How     | • Students are challenged to check the information given in the                      | intervention with instructor will | instructor are then addressed |
| particles,<br>molar | big is a mole?"                   | song.  | also be utilized.                 | and revised to                |
| volume at           | https://www.youtube.com/watch?    | • Examples   | also be utilized.                 | meet safety                   |
| STP. (SPI           | v=TEl4jeETVmg                     | <ul> <li>A mole of paper would go to the moon and back</li> </ul>                    | Enrichment                        | concerns and                  |
| 3221.3.5)           | <u>v-rei+jeerving</u>             | <ul><li>eighty billion times</li><li>Mole of marshmallows would weigh five</li></ul> | Application                       | appropriatenes                |
| 5221.5.5)           | TEDEd lesson link                 | <ul> <li>Mole of marshmallows would weigh live<br/>million trillion tons</li> </ul>  | opportunities to                  | s of activity.                |
|                     | http://ed.ted.com/lessons/daniel- | Flipped Classroom  | more                              | Students                      |
|                     | dulek-how-big-is-a-mole-not-the-  |  | difficult/challengi               | complete                      |
|                     | animal-the-other-one              | option II  | ng topics or                      | revisions and                 |
|                     |                                   | <ul> <li>Students are to read about Avogadro and molar mass in flexbook.</li> </ul>  | combinations of                   | resubmit for                  |
|                     | Flipped Classroom Chemistry       | <ul> <li>Additional reading:</li> </ul>  | elements. Inquiry                 | final approval.               |
|                     | Flexbook Textbook from ck12.org   | http://www.scientificamerican.com/article.cfm?id=how-                                | based laboratory                  | inimi uppi o tun              |
|                     | Instructor will need to choose    | was-avogadros-number   | design will allow                 | Students will                 |
|                     | textbook reference materials,     | • Practice with content information via $ck12.org$                                   | students to choose                | have an                       |
|                     | assign students to a class, and   | • Option B   | more challenging                  | interactive                   |
|                     | identify relevant assignments for | • Complete TEDEd lesson at the following link  | explorations.                     | practice                      |
|                     | students.                         | <ul> <li>http://ed.ted.com/lessons/daniel-dulek-how-big-is-a-</li> </ul>             |                                   | through                       |
|                     |                                   | mole-not-the-animal-the-other-one  | Ck12.org                          | CK12.org that                 |
|                     | Lab Report Rubric for students to | Small Group Instruction  | modifies practice                 | will require                  |
|                     | peer review lab reports before    | • Students needing assistance on assigned material or not ready for                  | questions based                   | students to get               |
|                     | final submission.                 | Molar Mass formative assessment will meet with instructor in                         | on success rate at                | 10 questions                  |
|                     |                                   | small groups. Once students have demonstrated understanding of                       | various levels.                   | correct before                |
|                     |                                   | molar mass, they may complete the Molar Mass Evaluation and                          | Practice questions                | moving on to                  |
|                     |                                   | then move forward to conversions.  | will be                           | next topic.                   |
|                     |                                   | Independent Study  | automatically                     | Instructor can                |
|                     |                                   | <ul> <li>Students that encountered no problems in reading or practice</li> </ul>     | adjusted to                       | assess                        |
|                     |                                   | assessment will take the Molar Mass Evaluation before moving on                      | challenge students with more      | difficulty of                 |
|                     |                                   | to conversions.  | difficult questions               | questions as easy, medium,    |
|                     |                                   | Python Coding  | if appropriate.                   | and difficult.                |
|                     |                                   | • Students will write Python code to determine the molar mass of                     | n appropriate.                    | and unneut.                   |
|                     |                                   | any compound given its formula and atomic mass. Work this                            | Learning Styles                   |                               |
|                     |                                   | week will focus on manipulating various binary and ternary                           | Visual                            |                               |
|                     |                                   | compounds and determining molar mass for each. Students can                          | Aural                             |                               |
|                     |                                   | use the Molar Mass Evaluation examples to assess if their Python                     | Verbal                            |                               |
|                     |                                   | code is correct for calculating molar mass of compounds.                             | Physical                          |                               |
|                     |                                   | Day 13   | Social                            |                               |
|                     |                                   | Flipped Classroom  | Solitary                          |                               |
|                     |                                   | • Conversions between Moles and Mass – <u>ck12.org</u>                               | -                                 |                               |
|                     |                                   | Small Group Instruction/Independent Study  | <u> </u>                          |                               |

| - | -                    |   |   |                                   | 1                            |
|---|----------------------|---|---|-----------------------------------|------------------------------|
|   |                      |   | <ul> <li>Students choose which level of instruction is needed. There will be a short 10 to 15 minute class discussion on topic before moving to appropriate areas of the room. Students may use this time to work on Python coding and to check each other's progress or seek assistance from the coding experts on Python.         <ul> <li>Day 14/15</li> </ul> </li> <li>Science Snapshot of the Day         <ul> <li>Three question assessment to get students thinking about molar mass and conversions to and from the mole.             <ul> <li>Sample questions – How many moles of water are in 25.0 grams of water? How many grams of sodium chloride are in 100.0 grams of sodium chloride?</li> <li>After students have had time to answer questions independently, volunteers will airplay on Promethean Board their solutions for class discussion on problem solving technique and accuracy.</li> </ul> <ul> <li>Flipped Classroom</li> <li>Students will spend 10 to 15 minutes discussing the reading from previous night.</li> </ul> </li> </ul></li></ul> |                                   |                              |
|   |                      |   | <ul> <li>Summary questions are supplied at end of reading and will serve as discussion guides.</li> <li>What are the similarities between conversions of mole and mass and moles to volume or particles?</li> </ul>   |                                   |                              |
|   |                      |   | • What are the differences?   |                                   |                              |
|   |                      |   | Guided/Independent Practice   |                                   |                              |
|   |                      |   | • Students will practice mass to volume and mass to particle problems in class. This will allow instructor to assist in the use of  |                                   |                              |
|   |                      |   | equivalence statements and problem solving technique. What is   |                                   |                              |
|   |                      |   | not finished in class must be completed by next class session.  |                                   |                              |
| 4 | I can                | Teacher created group study                                     | Day 16  | Remediation                       | Formative                    |
|   | convert<br>among the | questions in question/answer<br>format. There is some prep time | Independent Practice  | RTI during<br>PBL/RTI time.       | Assessments<br>Students will |
|   | following            | needed for this but both students                               | • Students will complete a group tutoring practice assessment that requires them to give each other a problem to solve. One person,   |                                   | have an                      |
|   | quantities           | are responsible for different parts                             | person B has the question and hints to solve the problem while the  | Flipped                           | interactive                  |
|   | of a                 | of the practice.  | other person, person A has to solve. The hints given can be used  | Classroom will                    | practice                     |
|   | substance:<br>mass,  | <i>Example:</i><br><i>What mass of carbon dioxide is</i>        | to help guide students. When person A has completed the problem, person B verifies the answer. Attention to details such as   | allow for<br>individual or        | through<br>CK12.org that     |
|   | number of            | produced when 44.1 g of propane                                 | correct number of significant digits, unit of measurement, and  | group study time.                 | will require                 |
|   | moles,               | reacts with sufficient oxygen?                                  | identification of substance will be assessed. Person A then gives a   | Small group                       | students to get              |
|   | number of particles, | Q: What are the reactants?                                      | different problem to person B and helps them solve the problem  | intervention with instructor will | 10 questions correct before  |
|   | molar                | A:  | using identified hints. It is the responsibility of the partners to coach each other on finding the solution.   | also be utilized.                 | moving on to                 |
|   | volume at            | Q: What is the formula for                                      | <ul> <li>See Materials and Resources for a sample of question/hint format.</li> </ul>   |                                   | next topic.                  |
|   | STP. (SPI            | propane?  | Day 17  | Enrichment                        | Instructor can               |
|   | 3221.3.5)            | A:<br>Q: What is the formula for                                | Summative Assessment  | Application opportunities to      | assess<br>difficulty of      |
|   |                      | oxygen? (Hint: Diatomic   | • Students will complete a teacher written summative requiring students to balance chemical equations, classify reactions, and  | more                              | questions as                 |
| L | L                    | `   |   | 1                                 | -                            |

|  | molecule)<br>A:<br>Q: What is the product? What is<br>formed? (Hint: This is a<br>combustion reaction.)  | convert from mass to number of moles, number of particles,<br>and/or molar volume.<br>Day 18<br>Remediation<br>• Students will work in pairs to correct items from summative  | difficult/challengi<br>ng topics or<br>combinations of<br>elements. Inquiry<br>based laboratory<br>design will allow   | easy, medium,<br>and difficult.<br>Students will   |
|--|--|---|--|--|
|  | <ul> <li>A:</li> <li>Q: What is the formula for carbon dioxide? What is the formula for water?</li> <li>A:</li> <li>Q: What is the equation for this reaction?</li> <li>A:</li> <li>Q: What is the balanced equation for the reaction?</li> <li>A:</li> <li>Q: What is the balanced equation?</li> <li>A:</li> <li>Q: What are you given?</li> <li>A:</li> <li>Q: What is the unknown?</li> <li>A:</li> <li>Q: What are your equivalency statement(s)?</li> <li>A:</li> <li>Q: What is the mole ratio?</li> <li>A:</li> <li>Q: How do you set up the problem?</li> <li>A:</li> <li>Q: What is the answer?</li> <li>A:</li> </ul> | <ul> <li>assessment given on day 17. Mastery of the three concepts assessed is critical for understanding of stoichiometry, the next item of study.</li> <li>Day 19/20</li> <li>Inquiry Lab Design</li> <li>In order to prepare for the stoichiometric laboratory summative assessment students will revise their laboratory exercises to predict the amounts of reactants produced in each experiment. This revision will require their use of stoichiometry. The new laboratory exercise will change the focus from a qualitative evaluation to a quantitative evaluation. In addition, students will record their percent error and account for possible errors in their techniques used in the experiment.</li> <li>Students will analyze data from their laboratory exercises on types of chemical reactions. One part of the lab report conclusion requires students to "Discuss possible errors that could have occurred in the collection of the data (experimental errors)." Students are to address the possible errors in the next lab.</li> <li>Students will select one of the five experiments and revise the laboratory procedures for one of the five to be used in a stoichiometric analysis of the reaction. Students will need to implement revisions in procedure that were identified as areas of possible errors.</li> <li>This laboratory exercise will require students to identify a given amount of reactant and predict the amount of product produced at the end of the experiment. Students will complete this laboratory exercise by using this amount of reactant and determining their percent error</li> </ul> | design will allow<br>students to choose<br>more challenging<br>explorations.<br>Ck12.org<br>modifies practice<br>questions based<br>on success rate at<br>various levels.<br>Practice questions<br>will be<br>automatically<br>adjusted to<br>challenge students<br>with more<br>difficult questions<br>if appropriate.<br><u>Learning Styles</u><br>Visual<br>Aural<br>Verbal<br>Physical<br>Social<br>Solitary | students will<br>submit lab<br>report for<br>evaluation<br>using<br>Dropbox.<br>Comments by<br>instructor are<br>then addressed<br>and revised to<br>meet safety<br>concerns and<br>appropriatenes<br>s of activity.<br>Students<br>complete<br>revisions and<br>resubmit for<br>final approval. |
| 5 I can<br>identify an<br>solve<br>stoichiome<br>ry problem<br>that<br>interconve<br>volume of<br>gases at<br>STP,<br>moles, and | everyday examples of<br>stoichiometric calculations. Also,<br>will be an excellent example for<br>extension to limiting reactants.<br>rt<br>Flipped Classroom<br>Chemistry Flexbook Textbook<br>from ck12.org  | after completing the lab.         Day 21         Stoichiometry introduction with a food example.         • S'mores – 10 graham crackers, 10 squares chocolate, and 4 marshmallows         • Sandwich example in ck12.org "Everyday Stoichiometry"         • If real food is not desirable, play food or recipe manipulation to serve for unusual number of servings could be given.         Whole class discussion         • Mass-Mass Stoichiometry         • Mole Ration         • Students need to complete the Mass-Mass Stoichiometry Practice   | Remediation<br>RTI during<br>PBL/RTI time.<br>Flipped<br>Classroom will<br>allow for<br>individual or<br>group study time.<br>Small group<br>intervention with   | <u>Formative</u><br><u>Assessments</u><br>Students will<br>have an<br>interactive<br>practice<br>through<br>CK12.org that<br>will require<br>students to get<br>10 questions   |

|   | mass. (SPI   | textbook reference materials,     | in ck12.org before next class.   | instructor will                  | correct before                     |
|---|--------------|-----------------------------------|--|----------------------------------|------------------------------------|
|   | 3221.3.6)    | assign students to a class, and   | <ul> <li>Announced formative assessment on day 22. Use quiz that is</li> </ul>                                     | also be utilized.                | moving on to                       |
|   | ,            | identify relevant assignments for | supplied to teacher in ck12.org or use one designed by teacher.  |                                  | next topic.                        |
|   |              | students.                         | Day 22   | Enrichment                       | Instructor can                     |
|   |              |                                   | Small Group Instruction  | Application                      | assess                             |
|   |              |                                   | Mass-Volume Stoichiometry  | opportunities to                 | difficulty of                      |
|   |              |                                   | • Students will work on mass-volume stoichiometry problems in  | more                             | questions as                       |
|   |              |                                   | small groups. Teacher will move from group to group offering   | difficult/challengi              | easy, medium,                      |
|   |              |                                   | assistance where needed.   | ng topics or                     | and difficult.                     |
|   |              |                                   | Flipped Classroom  | combinations of                  |                                    |
|   |              |                                   | <ul> <li>Students will need to read sections Volume-Volume</li> </ul>  | elements. Inquiry                | <u>Summative</u>                   |
|   |              |                                   | Stoichiometry. This reading will take place at home and class  | based laboratory                 | <u>Assessment</u> on stoichiometry |
|   |              |                                   | time will be used for small group or one-on-one instruction.   | design will allow                | will be                            |
|   |              |                                   | Day 23   | students to choose               | laboratory                         |
|   |              |                                   | Small Group Instruction  | more challenging                 | based.                             |
|   |              |                                   | Volume-Volume Stoichiometry  | explorations.                    | Students will                      |
|   |              |                                   | • Students will work on volume-volume stoichiometry problems in  | Ck12.org                         | revise                             |
|   |              |                                   | small groups. Teacher will move from group to group offering   | modifies practice                | laboratory<br>exercise from        |
|   |              |                                   | assistance where needed.   | questions based                  | previous week                      |
|   |              |                                   | Inquiry Lab Design   | on success rate at               | to incorporate                     |
|   |              |                                   | Preparation day for stoichiometric lab.  | various levels.                  | a quantitative                     |
|   |              |                                   | • Students that have completed mass-mass, mass-volume,   | Practice questions               | analysis. This                     |
|   |              |                                   | and volume-volume stoichiometric practice will prepare<br>for their laboratory exercise. Student not ready for lab | will be                          | revision will                      |
|   |              |                                   | will complete the three stoichiometric categories before   | automatically                    | also address                       |
|   |              |                                   | proceeding to the lab.   | adjusted to                      | any issues<br>encountered on       |
|   |              |                                   | Day 24/25  | challenge students               | first attempt.                     |
|   |              |                                   | Stoichiometric Summative Assessment  | with more                        | Percent error                      |
|   |              |                                   | Laboratory based. Students will complete the self-designed   | difficult questions              | will also be                       |
|   |              |                                   | laboratory exercise addressing stoichiometric calculations of  | if appropriate.                  | used to                            |
|   |              |                                   | product produced in a chemical reaction. Percent error will also be  | I                                | evaluate                           |
|   |              |                                   | used to evaluate effectiveness of student laboratory techniques.   | <u>Learning Styles</u><br>Visual | effectiveness of student           |
|   |              |                                   |  | Aural                            | laboratory                         |
|   |              |                                   |  | Verbal                           | techniques.                        |
|   |              |                                   |  | Physical                         | 1                                  |
|   |              |                                   |  | Social                           |                                    |
|   |              |                                   |  | Solitary                         |                                    |
| 6 | I can        | Limiting Reactant and Percent     | This week of instruction is two fold. Students that have mastered the  | Remediation                      | Formative                          |
| 6 | identify and | Yield video                       | concept of mass-mass, mass-volume, and volume-volume will continue on  | RTI during                       | Assessments                        |
|   | solve        | https://www.youtube.com/watch?    | an advanced pathway of instruction going beyond the standards identified.  | PBL/RTI time.                    | Students will                      |
|   | stoichiomet  | v=LicEaaXhlEY#t=270               | Students still requiring assistance on key concepts will continue small  |                                  | have an                            |
|   | ry problems  |                                   | group or individual instruction. Activities will be identified as  | Flipped                          | interactive                        |
|   | that         |                                   | ADVANCED or PROFICIENT. Variation in laboratory exercise will occur  | Classroom will                   | practice                           |
|   | interconvert |                                   | on day 29/30. Students will need to use classroom time or arrange for a  | allow for                        | through                            |
|   | volume of    | ADVANCED SUMMATIVE                | time during the school day to get materials together for the lab on day  | individual or                    | CK12.org that                      |

| gases at<br>STP,<br>moles, and<br>mass. (SPI<br>3221.3.6) | LABORATORY ASSESSMENT<br>Flinn Scientific—Teaching<br>Chemistry <sup>TM</sup> eLearning Video<br>Series<br>A video of the <i>Target Mole Lab</i><br>activity, presented by Bob Becker,<br>is available in <i>Mole Relationships</i><br>and the Balanced Equation and in<br>Bob Becker Target Labs, part of<br>the Flinn Scientific—Teaching<br>Chemistry eLearning Video<br>Series. | <ul> <li>29/30.</li> <li>Day 26</li> <li>PROFICIENT – Small group or individual instruction <ul> <li>Individualized instruction on identified areas of need.</li> <li>Practice exercises in ck12.org reveals missed concepts for each student and will allow for focus, individualized remediation.</li> </ul> </li> <li>ADVANCED – Small group or individual instruction <ul> <li>Limiting Reactant and Percent Yield</li> <li>https://www.youtube.com/watch?v=LicEaaXhlEY#t=270</li> <li>Students will watch this video and along with their reading and support materials in ck12.org complete the Limiting Reactant and Percent Yield Practice problems</li> <li>Day 27</li> </ul> </li> <li>PROFICIENT – Day 26 and Day 27 are the same.</li> <li>Small group or individual instruction <ul> <li>Individualized instruction on identified areas of need.</li> <li>Practice exercises in ck12.org reveals missed concepts for each student and will allow for focus, individualized remediation.</li> </ul> </li> <li>ADVANCED – Day 26 and Day 27 are the same.</li> <li>Small group or individual instruction <ul> <li>Limiting Reactant and Percent Yield</li> <li>https://www.youtube.com/watch?v=LicEaaXhlEY#t=270</li> </ul> </li> <li>Students will watch this video and along with their reading and support materials in ck12.org complete the Limiting Reactant and Percent Yield</li> <li>https://www.youtube.com/watch?v=LicEaaXhlEY#t=270</li> <li>Students will watch this video and along with their reading and support materials in ck12.org complete the Limiting Reactant and Percent Yield Practice problems</li> <li>Written Summative Assessment on conversions involving massmass, mass-volume, and volume-volume stoichiometric calculations on Day 28. Advanced grade will require demonstration of limiting reactants and percent yield mastery. Day 28</li> </ul> <li>Summative Assessment <ul> <li>Teacher created written assessment of identification and solving of stoichiometry PROFICIENT Summative Laboratory Assessment</li> <li>Laboratory based. Students will complete the se</li></ul></li> | group study time.<br>Small group<br>intervention with<br>instructor will<br>also be utilized.<br><u>Enrichment</u><br>Application<br>opportunities to<br>more<br>difficult/challengi<br>ng topics or<br>combinations of<br>elements. Inquiry<br>based laboratory<br>design will allow<br>students to choose<br>more challenging<br>explorations.<br>Ck12.org<br>modifies practice<br>questions based<br>on success rate at<br>various levels.<br>Practice questions<br>will be<br>automatically<br>adjusted to<br>challenge students<br>with more<br>difficult questions<br>if appropriate.<br><u>Learning Styles</u><br>Visual<br>Aural<br>Verbal<br>Physical<br>Social<br>Solitary | will require<br>students to get<br>10 questions<br>correct before<br>moving on to<br>next topic.<br>Instructor can<br>assess<br>difficulty of<br>questions as<br>easy, medium,<br>and difficult. |
|---|---|---|--|--|
|---|---|---|--|--|