

Academic Montessori Lesson Plan

School: Gamble Montessori High School	Teacher: Maria Chal
Subject/Topic(s): Physical Science	
Grade Level: 9/10	Theme: Foundation
<u>Curriculum Components Included:</u> <input checked="" type="checkbox"/> Project <input type="checkbox"/> Mini-Whole Grp <input type="checkbox"/> Lesson-Small Grp <input checked="" type="checkbox"/> Student engagement during lesson <input checked="" type="checkbox"/> Shelfwork <input type="checkbox"/> Rubric <input type="checkbox"/> Self-Assessment <input type="checkbox"/> Seminar/Qs <input type="checkbox"/> Interdisciplinary <input type="checkbox"/> Outside Opportunity	
<u>Seven Gateways for Adolescence addressed in this lesson:</u> <input checked="" type="checkbox"/> Deep Connection <input type="checkbox"/> Silence & Solitude <input type="checkbox"/> Meaning & Purpose <input checked="" type="checkbox"/> Joy & Delight <input checked="" type="checkbox"/> Creative <input type="checkbox"/> Transcendence <input type="checkbox"/> Initiation	

<u>Standards/Objectives</u> Cognitive Demands for Science: -Designing Technological/Engineering Solutions for Science Concepts -Demonstrating Scientific Knowledge		
<u>Materials: Teacher</u> <ul style="list-style-type: none"> • Various types of shoes • Soccer ball • Experimental Design Article • Poster on CER 	<u>Materials: Student</u> <ul style="list-style-type: none"> • Bouncy Balls • Ramps • Toy Cars • Paper • Tape • Rubber bands • Marbles • Toilet Paper Rolls • Normal Class Supplies (students allowed to use creatively) • Whiteboard Easels • Clipboards 	<u>Time/Dates</u> Cycle 1, Lesson 3
<u>Facts/Skills (Prior Knowledge)</u> <ul style="list-style-type: none"> • Parts of an Experiment (this will be reviewed) • Claim & Evidence statements in science 	<u>Concepts/Big Ideas</u> <ul style="list-style-type: none"> • Developing scientific questions, designing experiments to test our questions, analyzing data, explaining experimental results with evidence 	
<u>Lesson Relates to Theme</u> (Note: Not every content lesson will directly relate to the theme) Foundations of Science in high school and beyond depend on the ability to follow this process of experimentation. This will also model how students will complete investigations and explain their findings throughout the entire course. This will be a foundational start for both building community and developing essential science skills.		
<u>Connection to Elementary Material or Lesson</u> (while not required in your lesson, consider how this could connect to elementary levels- list possible connection(s) below) They do learn some of the vocabulary of scientific experiments in elementary.		

Step-by-Step Procedures

1st Period Lesson – 20 minutes (Include steps and materials)

Teacher models the process for designing a scientific experiment, beginning with her own question. This is also an opportunity for the teacher to share one of her passions with her students: soccer. Often scientific questions will arise from things that we are authentically interested in or curious about. This can be part of the opening discussion.

Teacher’s questions: What type of shoe (IV) helps Ms. Chal juggle the soccer ball the most/best (DV)?

Teacher can use this demo to introduce the vocabulary of independent variable, dependent variable, control variable, constants, and repeated trials. Students will be involved in helping the teacher identify this as she prepares for the first round of experimentation.

Then teacher will juggle the ball in barefeet (control), sandals (IV 1), tennis shoes (IV 2), cleats (IV 3). Students can participate in counts & tallying on the white board on teacher prepared table. Teacher will repeat trials to discuss consistent scientific data.

*** Teacher can return to this table when ready for Claim & Evidence Lesson the following day.

2nd Period – Recognition (Shelfwork)*

- Student practice identifying the parts of an experiment with vocabulary, definitions, and various examples of experiments. They will match these through a card sort.
- Students check their work against control of error

2nd Period – Recall Practice

- Read (1st period) and respond to questions on experimental design article assignment.
- Extension (level up): Listen to “Press Play” podcast and identify the experimental parts of the scientists research around ‘play and relationships’

3rd Period – Student Application

- Students design their own experiments in small groups. Starting with their scientific question. They identify the parts of the experiment, find materials, establish a procedure, and test their data.
- Students use white boards to plan out their procedures and design a data collection table (check in with teacher may be required before starting experiment)
- Students will then gather materials and begin collecting data, with at least 3 repeated trials.
- Students write claim-evidence statements to explain their findings.

Plan for Differentiation (at least one should be filled in)

<u>Teaching</u>	<u>Work</u>	<u>Assessment</u>
<p>A hand out will be developed as a guide to Ms. Chal’s lesson for those students that will struggle to take notes will participating in an interactive lesson like this one.</p>	<p>Support:</p> <ul style="list-style-type: none"> • Students can listen to experimental design article assignment. • Students struggling to get their own experimental design started can use a reference sheet with some experimental questions/ideas to help get them started. <p>Level Up:</p> <ul style="list-style-type: none"> • Students that work more quickly will have time to listen to and identify experimental parts in a real podcast about play and relationships. • Students will be encouraged to redesign 	<p>Lab Report</p> <ul style="list-style-type: none"> • A design template with data table already made will be provided. • Claim-Evidence section will include sentence starters for writing.

	<p>their experiment or test another question if they are moving much more quickly than the rest of the group</p>	
<p><u>Outside Support: Who, What, How</u></p>		
<p>NPR</p>		
<p>Formal Assessments <i>in addition to</i> regular observation (at least one should be filled in;)</p>		
<p><u>Formative Assessments</u></p> <ul style="list-style-type: none"> • Answers on experimental design article assignment • Procedure check-in with teacher 		
<p><u>Summative Assessment</u> Lab Report from Experiments designed and implemented in groups. (This will include claim-evidence statements after another 1st period/2nd period lesson)</p>		

*Shelf Work: activity using manipulatives (non-electronic) that have a control of error/answer key that students use to check their own work; usually can be done over and over for practice throughout the cycle if necessary