## Montessori Lesson Plan

| School: Creative World of Montessori | Teacher: Tracy Sturgis |
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| Subject/Topic(s): Science – Forces | |
| Grade Level: 7 & 8 | Theme: Invention & Construction |

Curriculum Components Included: x Hands on Lab ❑Mini-Whole Grp ❑Lesson-Small Grp x Student engagement during lesson x Shelfwork ❑Rubric ❑Self-Assessment ❑Seminar/Qs ❑Interdisciplinary ❑ Outside Opportunity

Seven Gateways for Adolescence addressed in this lesson: ❑Deep Connection ❑Silence & Solitude ❑ Meaning & Purpose x Joy & Delight x Creative ❑Transcendence ❑Initiation

Standards/Objectives

8.PS.2 Forces can act to change the motion of objects.
Forces can be added. The new force on an object is the sum of all the forces acting on the object.
Kinetic friction and drag are forces that act in a direction opposite the relative motion of objects.

| Materials: Teacher | Materials: Student | Time/Dates |
|---|---|---|
| • Lesson #5 –Why does a Ball Keep Moving After You Throw It? From *Where'd They Get That Idea? Vol. 1*<br>• Prep handouts<br>• Copy STEM Lab from ScienceFusion p.49-52<br>• Skateboard, doll<br>• Gather student supplies | • Pencil<br>• Handouts<br>• Lesson #3 –" Forces" from ScienceFusion<br>• Plastic bottles- different sizes<br>• 2 sizes of straws<br>• Scissors<br>• Clay<br>• Paper<br>• Tape<br>• Meter stick | • 8/25-8/30/19 |

| Facts/Skills (Prior Knowledge) | Concepts/Big Ideas |
|---|---|
| • | • Unbalanced forces cause change in the motion of objects, and these changes can be predicted and described.<br>• Newtons 1st, 2nd, & 3rd laws<br>• Newton's 1st law is counterintuitive (rest & uniform motion are the same) and goes against our general experience of how things move |

Lesson Relates to Theme (Note: Every content lesson will not directly relate to the theme)

"Usually when we hear the phrase, 'building blocks,' we think of objects. In physics, we may think of atoms; in geometry, points. But the true building blocks of science, real bases on which the theory is built, are the laws of nature which the theory stipulates," ((Where'd…Idea, 42)

Connection to Elementary Material or Lesson

| Step-by-Step Procedures |
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| 1st Period Lesson – 20 minutes (Include steps and materials)<br>• (Outside or in the gym if raining) Talk about questions while throwing/rolling/catching/observing movement of different sized balls. Why does a ball keep moving after you throw it? Why do objects slow down when you put them in motion? Why is it harder to get something to start moving or to stop |

<table>
<tr><td colspan="2">moving or are they the same? Could something move forever? Would a ball go on forever if it were thrown in space?<br>• “If you had to write a law describing the movement, what would it be?” Introduce pp.45-48</td></tr>
<tr><td><u>2nd Period – Recognition (Shelfwork)</u><br>• Matching Newton’s Laws to definitions and examples</td><td><u>2nd Period – Recall Practice</u><br>• Mon: Pages 45-48 (Where’d, Lesson #5) Individual & group<br>• Mon or Tues: Lab: First Law of Skateboarding (ScienceFusion)<br>• Lesson #3 from ScienceFusion, start individual then move into pairs<br>• Wed: STEM Guided Inquiry Lab: Newton’s Laws of Motion – making a rocket (ScienceFusion) (take home Lesson # 3 if not finished<br>• Thurs: Forces quiz done individually and talked through together<br>• Thurs: work on assessment for Friday</td></tr>
<tr><td colspan="2"><u>3rd Period – Student Application</u><br>Forces, Motion, & Newton’s Laws – Alternative Assessment p. 10, allows students the choice of a static and an acceleration situation, 6 types of forces to analyze about those situations, and how to communicate analysis</td></tr>
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<tr><th colspan="3">Plan for Differentiation</th></tr>
<tr><td><u>Teaching</u></td><td><u>Work</u></td><td><u>Assessment</u><br>Choice of working alone or with partner on Student Application</td></tr>
<tr><td colspan="3"><u>Outside Support: Who, What, How</u></td></tr>
<tr><th colspan="3">Formal Assessments</th></tr>
<tr><td colspan="3"><u>Formative Assessments</u><br>Shelf work, checking classwork pages</td></tr>
<tr><td colspan="3"><u>Summative Assessment</u><br>Ability to communicate understanding of analysis from Student Application</td></tr>
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