TO: Greg Johnson

FROM: Robertha Brown

DATE: June 23, 2014

RE: NGSS – Lesson Plan #2
## Science Lesson Planning Template

### Context Issues of the Lesson

<table>
<thead>
<tr>
<th>Unit or Lesson Title:</th>
<th>Push and Pull – Tug of war</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade Level</td>
<td>Grade K</td>
</tr>
<tr>
<td><strong>Topic/Theme/Nature of the Investigation:</strong></td>
<td>Nature of the Investigation – Inquiry Theme - The position of the observer and object affect the description of motion.</td>
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<tr>
<td><strong>NGSS Performance Expectation(s):</strong></td>
<td>K-PS2-1. Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object. K-PS2-2. Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.</td>
</tr>
<tr>
<td><strong>NGSS Dimension 1 component</strong></td>
<td>Analyzing and Interpreting Data – Analyze data to compare data sets for consistency and using graphing charts. Describe the position of an object (above, below, in front of, behind, on) in relation to other objects around it.</td>
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<tr>
<td><strong>NGSS Dimension 2 component</strong></td>
<td></td>
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<tr>
<td><strong>NGSS Dimension 3 component</strong></td>
<td></td>
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<tr>
<td><strong>Duration:</strong></td>
<td>4 class periods</td>
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</tbody>
</table>
### Engage

**PURPOSE:**
- to convey the context of the lesson(s)/unit by conveying an important Key Question
- to engage students in investigations that reveal their thinking to themselves and the teacher
- to record the initial ideas of students
- to engage their interest

**What is the teacher doing? What are the students doing?**

The teacher is setting the tone for the activity. Describe is to tell or depict in spoken or written words the position of an object in relation to other objects around it.

The students are constructing the materials to recognize that the description of the position of an object differs with the location of the observer.

Describe the direction of a moving object (for example: away from or closer to) from different observers’ view and discussing the following questions:
- What are we trying to investigate?
- What are we attempting to prove with these materials?
- How will we record the data (our findings)?
- What variables will we change?
- How will we display our findings?

### Explore

**PURPOSE:**
- to test ideas and develop knowledge using explorations, investigations, experiments
- to modify and record ideas as they change due to activities
- to develop new questions and testable hypotheses

<table>
<thead>
<tr>
<th>Activities (list)</th>
<th>Driving Question</th>
</tr>
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</table>
| 1. Explore the motion of different objects by allowing students to work in groups with different sizes of balls, toy cars or trucks, cylinders, blocks, and cubes. | What is a push?  
What is a pull?  
How does observation and position of objects explain movement? |
| 2. Students explore the motion of the objects that roll and slide.               |                                                                                 |

**Student Communication Product:** (written report, oral presentation, poster, etc.)

(consider showing “Models” of student products to help student identify characteristics of quality)

Student Communication Product: Oral Presentation

Students in small groups (not more than 5) will present and explain their findings to the teacher or the entire class.

### Explain

**PURPOSE:**
- to answer the Key Question through student explanations
- to provide students with relevant vocabulary, formal definitions and explanations of concepts

**Content Media:** (written material, video, teacher lecture, technology)
Students will learn the definitions of push, pull, direction, speed, shape, size, mass, at rest, above, below, in front of, behind, on, under, between, on top, away from, closer to, toward, fast, faster, slow, slower, north, south, east, west, right, left, different shapes (circle, square, triangle, cone, cylinder, sphere) weight

Student Communication Product: (assessment, unit test, written report, oral presentation, poster, etc.)

Student Communication Product will consist of a poster and classroom group observation / anecdotal. Create a T chart to assist in explaining push and pull.

Elaborate

PURPOSE:
- to extend students' conceptual understanding through application or practice in new settings

Activities:

1. Students are given the opportunity to explore different kinds of motion, rolling, sliding bouncing, hopping, walking, running, etc.
2. Practice left and right in terms of describing the motion and position of objects.

Content Media: (written material, video, teacher lecture, technology)
www.pbs.org; www.mygenious.com;
http://www.scholastic.com/teachers/activity/force-and-motion-6-studyjams-interactive-science-activities; Share ideas through purposeful conversation about how pushes or pulls affect the speed or direction of moving objects.

Extending/Application Questions for Whole/Small Group Discourse:

1. Students plan and conduct simple investigations into the motion of objects down ramps at different angles. The investigations include distance traveled and comparisons of distance of different shaped objects.
2. Use a balance and have students make comparisons of motion of same shaped objects with different masses.
3. Make observations of falling objects of different shapes and sizes that are dropped from the same distance.

Student Communication Product (assessment): (unit test, written report, oral presentation, poster, etc.)

Oral Presentation and Poster competition
**Evaluate**

PURPOSE: Reflecting on knowledge is the application of scientific knowledge to new and different situations. Reflecting on knowledge requires careful analysis of evidence that guides decision making and the application of science throughout history and within society. Develop strategies for information gathering (ask an expert, use a book, make observations, conduct simple investigations, and watch a video).

<table>
<thead>
<tr>
<th>Skill/Reasoning Learning Objectives</th>
<th>Assessment Instrument</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Formative Assessment</td>
<td>Grade journal entries</td>
</tr>
<tr>
<td>- Use the students’ discussion and trial and error investigations with the motion of different objects and the ramps to assess their ability to make observations of how objects move and fall down, and to plan and conduct simple investigations.</td>
<td>Observations</td>
</tr>
<tr>
<td>- Use the class discussion and class chart to assess the students’ ability to describe motion.</td>
<td></td>
</tr>
<tr>
<td>- Use student descriptions of motion in different positions in the room.</td>
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<tr>
<td>- Check student observation / pictures / journal entries to determine if observations are appropriate/applicable.</td>
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<tr>
<td>- Student conversations in their groups can be used as a basis for monitoring understanding.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Knowledge Learning Objectives</th>
<th>Assessment Instrument</th>
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<tbody>
<tr>
<td>Summative Assessment</td>
<td>Handwriting, spelling, correct answer grade</td>
</tr>
<tr>
<td>- Circle the pictures that demonstrate a push.</td>
<td></td>
</tr>
<tr>
<td>- Place an X on the pictures that demonstrate a pull.</td>
<td>Write a brief informational piece such as a page for a class book using drawings, words, word-like clusters, and/or sentences.</td>
</tr>
<tr>
<td>- Circle the word that best describes the position of the ball.</td>
<td>Observe how students do their experiment and how they work in groups.</td>
</tr>
<tr>
<td>- Draw an arrow that shows the path the ball will fall.</td>
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</table>
Push or Pull – Tug of War

Explain that you are going to use a force, either a push or a pull, to make objects move. Demonstrate to the class how to move the objects by pushing or pulling. Have a child stand in front of the group and whisper in her ear to either push or pull an object. The rest of the class should guess whether she made the object move by pushing or pulling.
Directions for each child

1. Color and cut out the Push and Pull boxes.
2. Sort the boxes into two piles: pictures that show pushes and pictures that show pulls.
3. Label the top of one side of the construction paper with the word push as shown. Glue each of the pictures that show pushes below the label.
4. Label the top of the other side of the construction paper with the word pull. Glue each of the pictures that show pulls below the label.
Set in Motion

Cut apart the cards in Set 1.
Glue them in order to show the child pushing the ball.

Cut apart the cards in Set 2.
Glue them in order to show the children pulling the rope.