

**Teacher: Ashley Hufnagel**

**Overall lesson topic/title: Exploring Inertia (Activity 17)**

**Learning goals:**

- P.FM.05.41 Explain the motion of an object relative to a point of reference.
- P.FM.05.42 Describe the motion of an object in terms of distance, time and direction, as the object moves, and in relationship to other objects.

**Rationale:**

- Explore Ideas about Patterns, Students Explain Patterns in their small groups
- Students Explain Patterns to the whole group.
- Teacher Introduces Scientific Ideas about inertia.
- Compare Student & Scientific Ideas about inertia and their personal experiences.
- Students will apply to near contexts by doing the table and chair activity with teacher support.

**Materials & supplies needed:**

*Per Group:*

- 1 circular track
- 1 metal marble
- 1 glass marble
- 1 piece of poster
- 3 markers
- 1 "Around a Curve" procedure sheet

**Procedures and approximate time allocated for each event**

- **Introduction to the lesson** (What will I say to help children understand the purpose of the lesson? How will I help them make connections to prior lessons or experiences? How will I motivate them to become engaged in the lesson?)  
(10 minutes)

*Ask a question:*

- What happens when you take a turn to fast in a car?  
Allow 2-3 students to share out their experience. Ask questions like, "What did the car do?" "What did your body do?" "How did it feel?" "Do you ever notice this when you are doing any other activities?"
- Ask the students to WATCH at the direction the sled riders compared to their sleds in AFV.
- Tell the students that they are going to do the same type of observing, without quantitative data, with their next investigation, which they set up the previous day.

- **OUTLINE of activities during the lesson** (Include details about how I will begin and end each activity; what discussion questions I will use; How will key ideas be expressed? What kinds of specific activities or tasks will I engage them in? How I will help children understand behavior expectations during the lesson; when/how I will distribute supplies and materials) Identify each activity and the estimated time for each.

**Around a Curve Explore (15-20 minutes)**

Students will follow the procedure from their textbook, "Inertia Around a Curve" (attached)

List the materials that each group will need on the board.

Have someone from each group get the materials.

Go over the procedure with the students.

Highlight questions #12-15. They should be thinking about those questions as they do the experiment.

Students begin the experiment.

Walk around the room and take down anecdotal records and join in conversation if necessary.

Ask the students questions about what they are observing.

*“What just happened here? Why do you think that it happened?”*

*After they are done, come together as a class. “Who wants to explain what they noticed about the marbles’ speed and direction?”*

- *The marble was going in a circle inside the track.*
- *The marble was going in a straight line outside of the track.*

*Ask if they have noticed anything like that in their life.*

***Introduce Inertia (20-30 minutes)***

*Ask the students if they have any ideas about why the marble started to go straight.*

*Give them the statement: “Objects always want to move in a straight line, and they always want to go a constant speed.”*

*Ask, “What do think is wrong with this statement? What did you see with the marbles that would tell you otherwise?”*

*Students should notice that the track keeps the marble from going straight and the marble stops after slowing down on the ground.*

*Add on to the statement, “Objects always want to move in a straight line, and they always want to go a constant speed but other forces can change it.”*

*Ask students if they experience anything like this in their daily lives. Lead them to car rides, rollercoasters, and the AFV wipeout video, “When the sled hit the wall, it stopped. Why did the boy keep on going and slam into the wall?” – “Because objects like to keep going...”*

*Go back to the marbles, “What force stopped it from going in a straight line? What force slowed it down?”*

*Repeat “Objects....change it.”*

*Tell the students there is any easier way to talk about this scientific experience.*

*Tell the students that everything has this WANT to go in a straight line because objects RESIST changing their motion.*

*Be sure to differentiate between “motion” and “changing motion” because we will define acceleration later.*

*Define resistance.*

*“An object’s resistance to change its motion is an object’s inertia.”*

- ***Closing summary for the lesson*** *(How will I bring closure to the lesson and help children reflect on their experiences? How will I help them make connections to prior lessons or prepare for future experiences? What kind of feedback do I want from them at this time?)*  
*(5 minutes)*

*Have a student repeat what inertia is.*

*Have a student give an example of inertia.*

*Ask the students 2 questions:*

*“Which has more inertia, the table or the chair?”*

*Have two students demonstrate.*

*“Which has more inertia, Sparty, or a wolverine?”*

***Basis for assessment*** *(How will I gauge the students’ learning as I implement the lesson plan and once the lesson is completed? Specifically, what will I look for? How will I use what I am learning to inform my next steps?)*

*Along with the group discussion, there are also 4 questions that each group answers together. They are asked to identify the changes in the paths of the marbles. They should notice that the marble goes straight once out of the track.*

*There will be a review of inertia in the next day’s lesson when we introduce and define the force friction.*

**Adapted from:**

SEPUP. (2006). *Issues and Physical Science*. Lawrence Hall of Science, University of California at Berkeley. Published by Lab-Aids ®, Inc., Ronkonkoma, NY