

5E Lesson Plan: Energy, Force, Motion

Teachers: Ms. Flanigan, Dr. Jeffery, Ms. Scherer, Ms. Solis, Ms. Stephens

Date: 9/22/16

Subject/ grade level: 8th grade Science

Materials:

For Teacher Demonstration:

- 1) Hair Dryer
- 2) Ping Pong Ball
- 3) Access to Electrical outlet

For Group Demonstration:

- 1) Petri Dishes
- 2) Paper Plates with portion cut out (like PacMan)
- 3) Marbles

Entire Class:

- 1) Student vocabulary matching worksheet.
-

Process TEKS:

2) Scientific investigation and reasoning. The student uses scientific inquiry methods during laboratory and field investigations. The student is expected to:

A) Plan and implement comparative and descriptive investigations by making observations, asking well-defined questions, and using appropriate equipment and technology;

C) collect and record data using the International System of Units (SI) and qualitative means such as labeled drawings, writing, and graphic organizers;

D) construct tables and graphs, using repeated trials and means, to organize data and identify patterns; and

E) analyze data to formulate reasonable explanations, communicate valid conclusions supported by the data, and predict trends.

Content TEKS:

6) Force, motion, and energy. The student knows that there is a relationship between force, motion, and energy. The student is expected to:

A) demonstrate and calculate how unbalanced forces change the speed or direction of an object's motion;

<https://docs.google.com/presentation/d/1kbZN8oIIIE4OPnluXmkJBvJvJ7UqojKt923ARGmkRxMrY/edit?usp=sharing>

Engagement: 10 minutes

Teacher Demonstration:

During this time the teacher will introduce the Blow dryer demonstration to students to get them thinking about forces and how they can be applied.

1. The teacher will start the blow dryer on the lowest setting while there is a ping pong ball on top. The ping pong ball should seem like it is floating over the blow dryer.
 - * What do you think is causing the ping pong ball to stay in place?
 - * What kind of forces are at work here?
 - * What do you think will happen if we put the setting on the blowdryer on high?
 2. The teacher will then turn the blow dryer on high and the ball will fly off.
 - *What happened here?
 - *Why do you think the ball flew off? What kind of force was that?
-
- What two forces are exerted on the ball during the demonstration?
 - Are the two forces balanced?
 - What happens to an object when forces are balanced?
 - What happens to an object when forces are unbalanced?

After students have observed the demonstration they will take about 2 minutes to draw and describe what happened with the ping pong ball.

Exploration: 15 minutes

Group Demonstration:

- 1) Students should be divided up into their groups for this section.
- 2) Students will receive the materials listed at the beginning under group demonstration.
- 3) For the first activity they will place a marble into the petri dish and make observations as they move the marble in a circular motion.
 - a) What do you notice about the marble as you spin it around?
 - b) What happens if you stop?

- c) What are the forces acting on the marble?
- 4) For the second demonstration students will use the plate and a marble and they will move the marble around the plate and make an observation about what happens when the marble falls through the whole.
 - a) What happened as you moved the marble this time?
 - b) What would we call this?
 - c) Did you make any observations after the marble fell? If so what did you see?

Explanation: 10- 15 minutes

At this time students will answer the questions on their papers and explain their observations they made during all three demonstrations. After students are done discussing what they learned the teacher will present a presentation on Force and Motion.

*What happened to your marble in the petri dish?

*What happened to your marble in the plate with a piece cut out?

*What balanced and unbalanced forces were involved in this investigation?

<http://eteamscc.com/wp-content/uploads/2014/11/Balanced-and-Unbalanced-Forces-and-Net-Force-Notes-Powerpoint.pdf>

Elaboration: 10 minutes

During this time students will complete a card sort about the different types of forces and motion. They will also be able to write in their science notebooks about what they learned and observed today.

Evaluate: 10 minutes

Students will be given a matching Vocabulary handout to complete as an assessment of whether they understood the concepts presented in this lesson. After students have completed the handout the class can discuss the answers and relate the vocabulary to certain scenarios that were presented in the demonstrations.