

Velocity, Acceleration, and Gravity

Question: What is the relationship between speed, velocity, acceleration, and gravity.

Kentucky Core Content:

SC-M-1.2.1 The motion of an object can be described by its relative position, direction of motion, and speed. That motion can be measured and represented on a graph.

Objectives:

Students will be able to:

1. State the difference between speed, velocity and acceleration.
2. Explain what acceleration is and that gravity is one form of acceleration.

Materials:

For each group of 3 students

- Large Balloon
- Straw
- String (Length of the room, fishing line works best)
- Tape
- Tape measure
- Stop watch
- Washers of different sizes

Procedure/Time:

The first activity will take about 15 minutes to setup and approximately 10 minutes to perform.

Have students complete the following steps in groups of 3:

1. Slide the straw on the string. The straw must be able to move freely.
2. Attach the string tightly to two objects that will remain sturdy (For example, two chairs). The objects should be set on opposite ends of the room.
3. Inflate the balloon and attach it to the straw using tape.
4. Release the balloon.
5. Ask the students to determine how fast the balloon is going. (This leads to a discussion of speed that will take about 5 minutes. Ask the students: What is speed? How do we measure speed? How can we measure the speed of the balloon?)
6. Then have students each take a job: one to inflate the balloon, one to measure the length of the string from a starting point to an ending point, and one to measure the time it takes the balloon to get from the starting point to the ending point.
7. Once the length of the string has been measured, repeat the experiment 3 times, making sure that the student is timing the balloon.
8. Help students calculate the speed of the balloon (the equation of speed should have been defined during the earlier discussion).

Follow up the discussion on speed by introducing and defining velocity. Be sure to clarify the difference in speed and velocity. This should be followed by defining acceleration, how to calculate acceleration, the difference between mass and weight, and introducing gravity (This follow-up discussion will take approximately 10 minutes).

Ask students to design an experiment that would show the relationship between speed, velocity and acceleration.

Assessment:

Students will be assessed on the participation and results from the first activity as well as their experimental design.

Name _____

Velocity, Speed and Acceleration

Trial 1

Distance balloon traveled: _____ Time the balloon traveled: _____

Trial 2

Distance balloon traveled: _____ Time the balloon traveled: _____

Trial 3

Distance balloon traveled: _____ Time the balloon traveled: _____

Define Speed:

How do you measure speed?

Find the Speed of the balloon below:

Trial 1

Trial 2

Trial 3

What is the different between speed, velocity and acceleration?

Using the materials you have, design an experiment to show these differences.