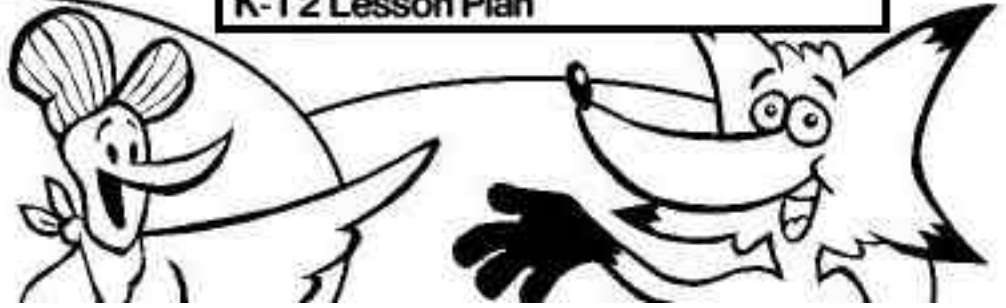




## K-12 Lesson Plan



### WATCH OUT!

Grade: First Grade

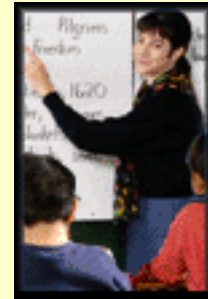
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### OVERVIEW

This hands-on lesson illustrates to students how heavier objects can have an effect on lighter objects. Through a class experiment using different sized balls and an inclined plane, students learn how a heavy object will push a lighter object. Students are led to connect this information to the safety messages for this lesson.

### SUGGESTED TIME ALLOWANCE

20-30 minutes

### OBJECTIVES

Students will be able to:

- Describe what happens to two different balls traveling down an inclined plane and the effect they have on one another.
- Summarize this effect and the reason why we must be careful around trains.
- Draw conclusions from the experiment.

### SAFETY MESSAGE:

- At railroad crossings, a sign called a crossbuck will warn you that you are near railroad tracks.

- Identify three railway advance warning signs.

National Academic Content Standards addressed by this lesson.

## **MATERIALS**

- Inclined plane (can use books and a board)
- 2 regular golf balls and 2 wiffle golf balls, or similar objects
- Paper and pencils for each student
- Overhead of warning signs

## **VOCABULARY**

Speed, weight, distance, crossbuck, railroad crossing

## **PROCEDURES**

### **TEACHER PREPARATION:**

Read the background information on railroad signs and signals. Test and prepare materials for class experiment.

### **MOTIVATION:**

Place an empty soda pop can on the floor in front of the students. Raise your foot over the empty can and explain your foot is a train and the soda can is a car. When you step on the can the force is approximate to a 30-car train with a locomotive. Ask students: *What do you think will happen to the can (car)? Let's try it and see. Now I have an experiment for us to try to better understand why we need to watch out for trains.*

### **ACTIVITY:**

1. Have the students note the difference in the weight of the golf balls. Place the regular golf ball (train) at the top of the plane and the wiffle ball (car) at the bottom. Release the ball and observe what happens. Repeat this a few times.
2. Reverse the position of the two balls and release the other ball from the top of the inclined plane. Repeat this action a few times. Have the students observe what happens when the balls are reversed.

3. Discuss how the heavier ball has an effect on the lighter ball: it can move and push it. The lighter ball has little, if no, effect on the heavier ball. *If the heavy ball is the train, what kind of impact can we expect when a train hits a car?*
4. Students should then draw their observations from both experiments on a piece of paper. Students should observe the heavier object having a greater effect on the lighter object: the heavier ball pushed the lighter ball.
5. Relate the heavier ball to a train and the lighter ball to a car. Explain to students: *Since trains are so much heavier than cars, we need to watch for signs that warn us of tracks and trains. Look at some of these warning signs that are near the tracks to help us stay safe.* Show the overhead of three signs: yellow circular advance warning sign, crossbuck and gates. Have students turn their paper over and choose one of these signs to include in a picture. This picture should illustrate why it is important to watch and obey warning signs around railroad tracks. Make sure your train looks larger than any cars in your picture. Have them entitle their picture "Watch out for Railroad Signs."

## **CONCLUSION:**

Have students come to the front of the room to show their picture in three different groups, depending upon which sign they chose to illustrate in their picture. Once in front of the room, discuss one of the three safety messages below with each group standing in front of the class.

- At railroad crossings a sign called a crossbuck will warn you that you are near railroad tracks.
- Some crossings have gates, lights and bells. When these are on that means **STAY BACK, STAY OFF**; a train is coming.
- Always cross the tracks at the correct places.

## **HIGHER ORDER THINKING**

To assure students are using critical thinking skills, pose questions such

as these at appropriate places within the lesson: *Can you think of other objects that have an effect on each other because of their different weights? Is there ever a time it is good to have a larger, heavier object hitting a smaller, lighter object?*

## **ASSESSMENT**

- Responses to discussion and drawing of conclusions (Describe what happens to two different balls traveling down an inclined plane and the effect they have on one another.)
- Participation in class discussion (Summarize this effect and the reason why we must be careful around trains.)
- Pictorial description of the outcome of the experiment and participation in discussion (Draw conclusions from the experiment.)
- Picture and participation in discussion of pictures (Identify three railway advance warning signs.)

## **EXTENSIONS**

**Arts:** Trace a train on a large piece of butcher paper, using the train art template. Have the students decorate the locomotive with crayons, markers or paint. Then have students create train cars, each one "carrying" a safety message on its side.

## **TEACHER RESOURCES**

Train art template

Background Information on Signs and Signals

*Sly Fox & Birdie* video clips (Quicktime required):

Throwing Objects at Trains

Playing in Boxcars

Driving Across the Tracks

*Sly Fox & Birdie* video

Video utilization tips for *Sly Fox & Birdie*

## **NATIONAL ACADEMIC CONTENT STANDARDS**

These standards are provided by the Mid-continent Regional Educational Laboratory (McREL) online publication, Content Knowledge: A Compendium of Standards and Benchmarks for K-12 Education. <<http://>

The following standards are addressed by the activities of this lesson:

**Arts: Visual Arts**

Level II: Elementary (Gr. K-4)

Standard 2: Knows how to use structures (e.g., sensory qualities, organizational principles, expressive features) and functions of art

Benchmark: Uses visual structures and functions of art to communicate ideas

**Life Skills: Thinking and Reasoning**

Level I: Primary (Gr. K-2)

Standard 4: Understands and applies basic principles of hypothesis testing and scientific inquiry

Benchmark: Understands that changing one thing sometimes causes changes in something else and that changing the same thing in the same way usually has the same result

**Science**

Level I: Primary (Gr. K-2)

Standard 12: Understands motion and the principles that explain it

Benchmark: Knows that the position and motion of an object can be changed by pushing or pulling

To see related standards for your state, search [Achieve's Clearinghouse](http://www.achievetest.org/achieveteststart.nsf/Search?OpenForm):  
< <http://www.achievetest.org/achieveteststart.nsf/Search?OpenForm> >

