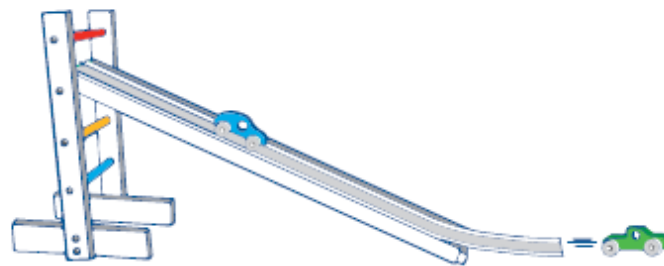




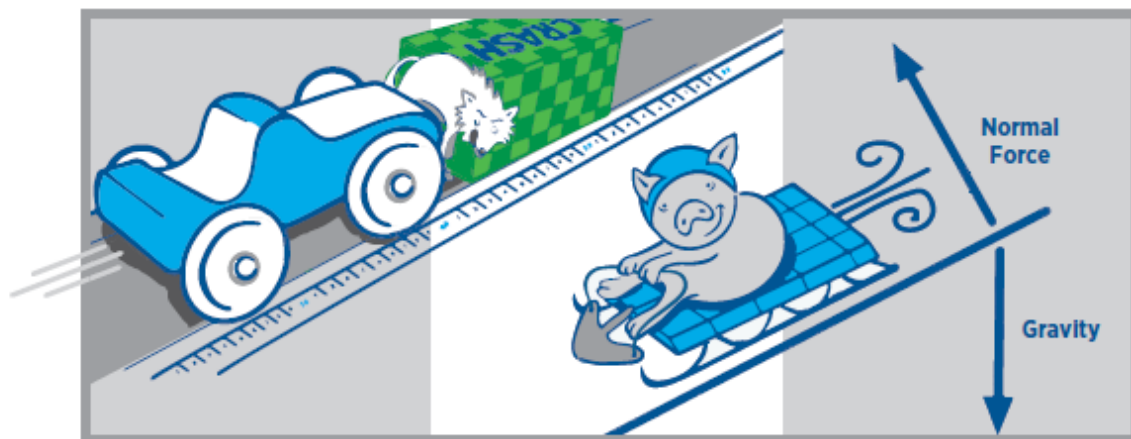
## WOW! on Wheels – STEM Labs Rolling Things

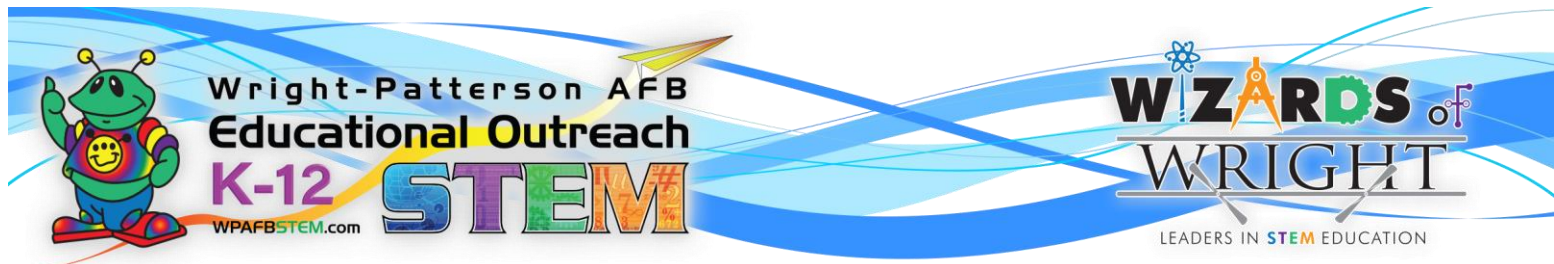
### Activity Details

The Rolling Things activity was originally purchased from and created by SAE International.  
<https://www.sae.org/learn/education/curriculum/rolling-things>



### **Rolling Things Activities**





## **Activity 1. Playing with Cars and Ramps**

### **INTRODUCTION** - *What will students do in this activity?*

Students begin to explore the cars and ramps. They are given a variety of toy cars and asked to observe differences between the cars and how they perform. Student pairs then investigate the cars and ramps in a non-structured way. Students make informal observations about why different cars might perform differently.

### **Objectives**

Students will:

Investigate and experience the materials that they will use over the course of the Rolling Things challenge.

### **Time**

Because this activity is done typically by two pairs of students at a time, it will take a while to rotate all of the students through the cars and ramps center. Refer to the Rolling Things Calendar for additional information. (*see WOW! on Wheels - Teaching Timeline*)

### **Materials**

(*see WOW! on Wheels – Materials and Set-up for materials list for each individual lesson*)

### **Preparation for the Activity**

Determine how students will be paired up during the challenge.

For *Presenting the Activity and Sharing and Interpreting*, place a ramp and its support in the center of the circle time area. Gather the cars so that they are easily accessible.

## **CLASSROOM ACTIVITY**

### **Presenting the Activity – as a whole group**

1. Gather students for circle time. Explain circle time procedures to students (see Introduction, for more information).
2. Show students the cars and ramp set. Explain that they will be exploring the cars and ramps over the next few weeks.

3. Hold up each car and explain to students how you are referring to them. Show the three cars and call them by the names shown in the illustration.



4. Explain that you are going to pass each car around. Ask the children to look closely and think about how the car might move.

5. Pass the convertible around to each student. Tell each student to hold and observe it for a short time and then pass the car to the next person.

6. Place the convertible at the top of the ramp. Ask students, “If I let the car go down this ramp, how do you think it will move?”

Give a few students a chance to speak and record their answers on a piece of chart paper or a whiteboard.

7. Release the convertible down the ramp several times and then discuss what students saw. Encourage them to make observations about what they saw as the car rolled.

Ask students the following questions:

- What did you notice about how the car moved?
- What surprised you?

8. Show students the truck and the sedan. Pass these cars around so that students have a chance to hold them and see and feel the differences between cars.

Put the truck, the sedan, and the convertible in the middle of the circle and discuss the differences that students see between the convertible, the sedan, and the truck. Encourage them to be as specific as possible in their descriptions. For example, ask:

- How are these cars alike? Different?
- How do you think each will move? Do you think they will move the same way? Differently? What makes you think that?



9. Tell students they can use all the cars, and they can make changes in the ramp. Show them how to make these changes.

10. Explain to students that they will be working in pairs throughout the Rolling Things challenge. Tell students with whom they will be paired.

***Facilitating Student Exploration – in pairs***

12. Accompany student groups to the area in which the cars and ramps are set up. Explain that they will be experimenting with the cars and ramps to see what they can find out about them.

Remind students how to adjust the ramp. As you sit with them, encourage students to talk about the features of the car they are rolling. For example, ask:

- Is it big or small?
- What types of wheels does it have?
- How is it shaped?
- How does it move?

13. Observe each team as each student launches his or her first car. Encourage students to talk to their partners as they play.

14. Periodically return to the cars and ramps area when necessary to either remind students to focus or to ask them what they have observed.

Young children may have trouble containing their enthusiasm. Make sure that all students are getting their turns.

15. After 10–15 minutes, return to the cars and ramps area and discuss with students what they have seen and done.

16. Pass out “Our Team”, to students. Ask students to write their names and their partners’ names on the paper. Then ask them to draw a picture of one interesting thing they did with their cars.

If students have difficulty writing their partners’ names, tell them to switch papers and have their partners write their own names.



*Sharing and Interpreting – as a whole group*

17. Gather students for circle time.

18. Post students' drawings (from "Our Team") for the rest of the class to see.

19. Discuss the drawings. Ask students, "What did you see in your classmates' drawings that seemed interesting?"

20. Explain that you have received a letter from a toy company that asks the class to do some research.

Read "Letter from EarthToy Designs", aloud to students. Discuss what EarthToy Designs wants them to do.

Ask students the following questions:

- What is the EarthToy Designs company? EarthToy Designs is a toy company.
- What do you think EarthToy Designs wants you to do?

Guide the discussion with questions and comments and by rereading the letter so students understand that the company wants them to test their cars and ramps set and give feedback on it.

**Included in the Rolling Things binder  
are Teacher Tips and all of the  
handouts referenced in the notes above.**



## **Activity 2. Crash and Bash**

### **INTRODUCTION** – *What will students do in this activity?*

Students are introduced to a “crash box” that they can crash their cars into. Student pairs then informally investigate what happens when cars crash into the box. Students make observations about why different cars might perform differently.

### **Objectives**

Students will:

Investigate how far a box moves when a car crashes into it.

Make observations about car performance.

**Activity 2: Included in the Rolling Things binder are *Time, Preparation for the Activity, Classroom Activity Specifics, Teacher Tips* and any necessary handouts.**

## **Activity 3. Getting to Know the Cars and Ramps**

### **INTRODUCTION** – *What will students do in this activity?*

Students talk and think about the cars and ramps more deeply. In pairs, students talk about their prior experiences, drawing on their prior knowledge. Students practice predicting and explaining their reasoning. Using their predictions, they create a class histogram.

### **Objectives**

Students will:

Draw on their knowledge about the phenomena they are exploring.

Make predictions.

Create a histogram.

**Activity 3: Included in the Rolling Things binder are *Time, Preparation for the Activity, Classroom Activity Specifics, Teacher Tips* and any necessary handouts.**

#### **Activity 4. Ramp Height**

##### **INTRODUCTION** – *What will students do in this activity?*

In this activity, students begin to work in a more structured way with the cars and ramps. Students experiment with how ramp height affects how far cars move the crash box. Pairs of students choose one car to work with and explore how far the car moves the crash box when it is rolled down different ramp inclines. They record their data on ramp height and how far the crash box moves in a table and begin to draw conclusions (or reinforce prior knowledge) about the effect that ramp height has on how far the crash box is displaced. They also record their observations through drawing.

##### **Objectives**

Students will:

Explore how scientists conduct trials.

Explore how the height of a ramp affects a car's momentum.

Share their results and discuss any conflicting results, as do scientists.

**Activity 4: Included in the Rolling Things binder are *Time, Preparation for the Activity, Classroom Activity Specifics, Teacher Tips* and any necessary handouts.**

#### **Activity 5. Car Weight**

##### **INTRODUCTION** - *What will students do in this activity?*

Students experiment and record how far a car moves a crash box as weight is added as cargo. Students begin to draw conclusions (or reinforce prior knowledge) about the effect that weight has on the strength of a crash. They also record their observations through drawing.

##### **Objectives**

Students will:

Explore how scientists conduct trials.

Investigate how weight affects a rolling car's momentum.

Share their results and discuss any conflicting results, as do scientists.

**Activity 5: Included in the Rolling Things binder are *Time, Preparation for the Activity, Classroom Activity Specifics, Teacher Tips* and any necessary handouts.**



## **Activity 6. Outfoxing the Big Bad Wolf**

### **INTRODUCTION** - *What will students do in this activity?*

Students hear the story *The Three Little Pigs' Sledding Adventure* and begin to relate it to the activities they've been doing. In the story, the three little pigs go sledding, each building a different type of sled (one of straw, one of sticks, and one of bricks). The big bad wolf hides at the bottom of the hill, hoping to jump out and catch them. The first two pigs, whose sleds are quite light (being made of straw and sticks), are easily stopped by the wolf. The third pig knocks over the wolf because of the momentum of his heavy sled.

### **Objectives**

Students will:

Connect their experiences in using the cars and ramps to a story involving the three little pigs.

**Activity 6: Included in the Rolling Things binder are *Time, Preparation for the Activity, Classroom Activity Specifics, Teacher Tips* and any necessary handouts.**

## **Activity 7. Make it Happen!**

### **INTRODUCTION** - *What will students do in this activity?*

Students continue experimenting with the cars and ramps. They create the conditions—by changing ramp height and car weight—that will allow their car to (1) be stopped by the big bad wolf (a toy wolf placed on the track) and (2) knock over the big bad wolf.

### **Objectives**

Students will:

This activity will allow you to assess students' understanding of what they've learned over the course of the challenge.

**Activity 7: Included in the Rolling Things binder are *Time, Preparation for the Activity, Classroom Activity Specifics, Teacher Tips* and any necessary handouts.**