

What Makes Moving Objects stop?



Activity 7

Analyze Like a Scientist

Stopping Motion

Before you **read** the text, **look** at these words and phrases. **Think** about what the text will be about based on this list. Then, **answer** the question that follows.

- slow down
- moving objects
- friction
- force
- stop

Stopping Motion

Let's consider the effect of balanced and unbalanced forces in more detail. A book lying on a table is being pulled down by gravity and pushed up by the force the table exerts. When the forces on an object are balanced, the object does not move.

When the forces on an object are unbalanced, the object could start moving, move faster or slower, or change direction. If force causes motion, how does an object in motion STOP?

Moving objects only stop when a force of the same size is applied to them in the opposite direction from which they are moving. Sometimes it is easy to observe where the force that stops an object comes from. If a car crashes into a wall, it may stop. The wall applied a force to the car.



Car Crash

Life Skills I can use information to solve a problem.

But why does that same car roll slowly to a stop if it runs out of gas on a level road? In this case, the car is being slowed down by a force called **friction**. You have probably heard of **friction**. Friction is a force that is exerted when objects rub against each other. Friction is a force that opposes motion. In the case of the car, this includes when its tires rub on the road and when air flows over the car and rubs against its surface.

When a car runs into a wall, make a claim about the size of the force of the car compared to the size of the force of the wall.

What Is the Relationship between Force and Energy?



Activity 8

Investigate Like a Scientist

Hands-On Investigation: Rolling Cars

Now that you know more about the causes of motion, in this activity you will explore the effect of applying different amounts of force to an object. You will investigate this by rolling toy cars across the floor. First, use what you already know to **predict** how far the toy car or truck will roll. **Complete** the activity, **record** your data, and then **answer** questions about what you observed.

Make a Prediction

Write your claim here.

What materials do you need? (per group)

- Toy trucks, cars
- Measuring tape



What Will You Do?

1. Gather your toy cars and trucks.
2. Plan a way to measure the distance your cars will travel, and create a simple sketch of your plan.
3. Push a toy car hard from a starting point.
4. Record the distance the toy car rolls.
5. Repeat steps 3 and 4 several times, and find the average.
6. Predict what will happen if you push your toy car very gently.

7. Push a toy car very gently from the starting point you used in step 3.
8. Record the distance the toy car rolls.

Record your data in the table.

Trial	Type of Push	Distance
1	Hard	
2	Hard	
3	Hard	
4	Hard	
Average hard push distance		
5	Gentle	
6	Gentle	
7	Gentle	
8	Gentle	
Average gentle push distance		

Think About the Activity

Think about the data you collected. How does this data support or go against your hypothesis? **Describe** how you know. Then, **answer** the question.

My Claim _____

My claim is true because _____

Could the distance each car traveled have changed if you had used a different car or truck?



Talk Together What do you think caused the car to start and stop moving? What is your evidence? How does the car compare to the airplane you saw in Wonder?