

Speed and Motion Activity Bag

Races: Student Activity Guide

Have you ever run a race? The person that wins the race was the fastest, and the person in last was the slowest. In this activity, we will explore speed and how things move faster and slower.

Materials From The Bag

- Ping Pong Ball
- Marble
- Wooden Ball
- Tape Measure
- Craft Stick
- Food Tray
- Chipboard (extra thick paper)
- Labels

You Will Need

- Science Notebook or Student Activity Sheet from the teacher.

Preparation: Ramp Set-up

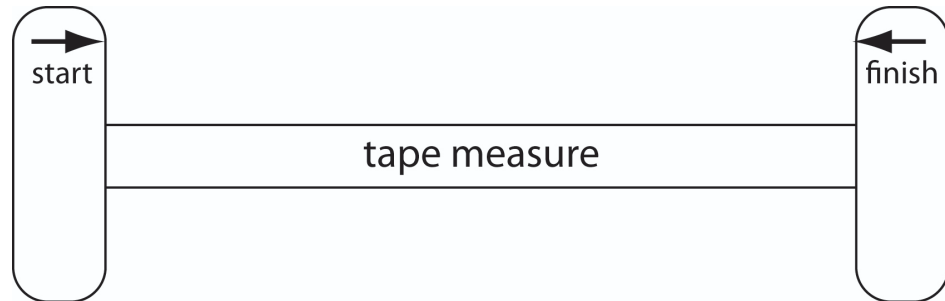
The ramp will be used in all three parts of this activity.

1. Find a smooth, flat surface longer than a meter. Use the tape measure to be sure it's long enough.
2. Stretch out the tape measure to its full length on the flat surface.
3. Stick a label to the surface at both ends of the tape measure. **Put the label on the surface, not on the tape measure, sticky side down.**

Races pg. 2

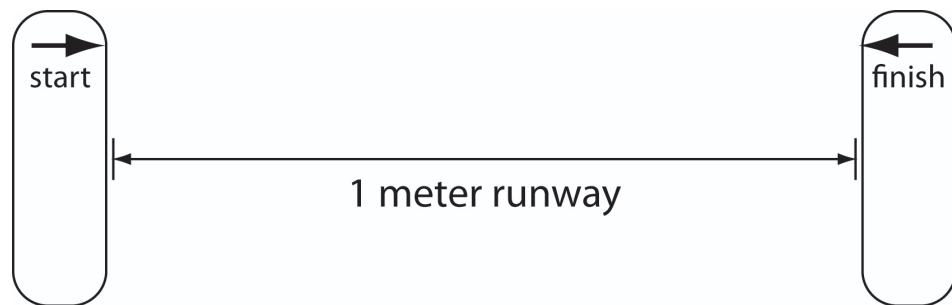
4. The labels are your start and finish lines. Write “Start” on one and “Finish” on the other. Draw an arrow on each label pointing at the tape measure. It should

look like this:

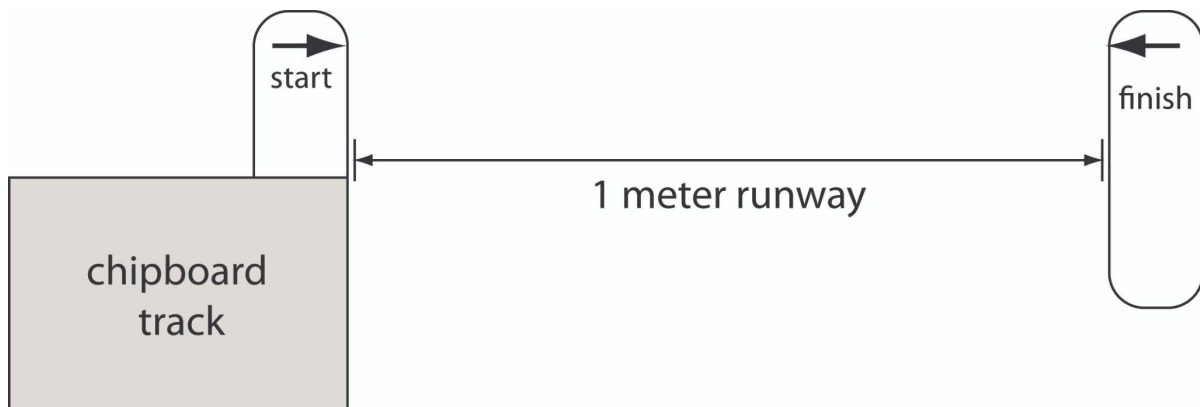


5. Remove the tape measure and leave the labels. This is the runway. It should

look like this:



6. Get the **chipboard** from the bag and place one end with its edge exactly on the start line. It should look like this:



Races pg. 3

7. Get the food tray from the bag and turn it upside down on the surface. **Lift the end of the chipboard not on the start line** and slide the upside-down food tray under it so the ramp slopes down, touching the start line. It should look like this:



Part 1: Single Ball - Exploration

1. Be sure your ramp looks like the picture above.
2. Take the ping pong ball, marble, and wooden ball out of the bag. Place them on the table and **do not roll them down the ramp**. If you want, you can roll them around on the table to see how they move.
3. Predict which ball will reach the finish line first, second, and third when rolled down the ramp. Explain your ideas for your prediction.
4. Place the ping pong ball at the top of the ramp. Release it and watch the ping pong ball cross the finish line. If the ping pong ball does not cross the finish

Races pg. 4

line, try again. Write down your observations.

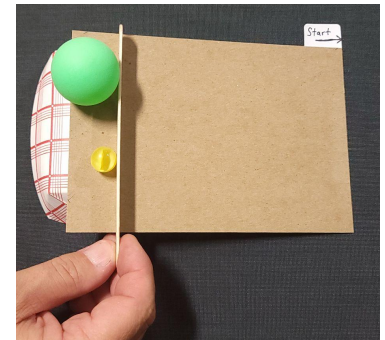
- Repeat step 4 with the marble and wooden ball. Based on your observations you may change your prediction from step 3.

Part 2: Races - Test Your Prediction

- Place the craft stick across the top of the ramp.





- Place the ping pong ball and marble at the top of the ramp. The craft stick will stop them from rolling down the ramp.



- To start the race, lift up the craft stick and watch the two balls race across the finish line. Circle the winner in the **Race Results** chart under **Race #1**.
- Repeat Step 3 two more times.

Races pg. 5

Race Results

Race 1		Race 2		Race 3	
Ping Pong	Marble	Ping Pong	Wood	Marble	Wood
					
					
					

5. Repeat steps 1-4 with the ping pong ball and the wooden ball. Record your results under **Race #2**.
6. Repeat steps 1-4 with the marble and the wooden ball. Record your results under **Race #3**.
7. Rank the balls from fastest to slowest based on your results. Explain how you determined your results.
8. Compare the results to your prediction from **Part 1**.

What's happening...

The ping pong ball, marble, and wooden ball traveled the same distance. Each ball took a different amount of time to travel the distance. Each ball went at a different

Races pg. 6

speed. **Speed** is the amount of time it takes for something to travel a certain distance.

Part 3: How Much Time Did Each Ball Take?

We stated that speed is the amount of time it takes for something to travel a certain distance. In this activity we will time how long it takes for each ball to travel one meter. You will need a timing device.

1. Place the marble at the top of the ramp.
2. Release the marble from the top of the ramp and **start the timer when the marble first touches the surface (crosses the start line). Stop when it crosses the finish line.** Do this a few times to practice.
3. After you practice, time the marble. Record your results.
4. Repeat **steps 1-3** with the ping-pong ball and wooden ball.

What's happening...

You may have noticed that the marble traveled the same distance as the ping pong ball in **less time**. Because of this the marble is **faster** than the ping pong ball. The ping pong ball traveled the same distance as the marble in **more time**. Because of this, the ping pong ball is **slower** than the marble.

9. Explain the results of the marble and wooden ball using the words faster, slower, and time.