

Hot wheels Speed Lab

TEACHER NOTES

This activity is a great introduction to speed and motion. Students measure the time it takes different toy cars to travel down the track and calculate their speed. Students look at the cars and think about what variables affect the car's speed.

TEACHING SEQUENCE

Before Class:

1. Gather Materials (for students working in groups of 4)
 - Meter sticks
 - Timers/stop watches
 - 4 race cars (hot wheels, matchbox, or similar)
 - Race track or ramps

I had hot wheels cars and tracks that I found at a garage sale and used these in my class. I used 4 pieces of straight track per group and this was a little bit longer than a meter. You can also use a ramp made out of cardboard or wood.

During the Activity

1. Students get their cars and first make observations about how they look and move. They use this to predict which car will be fastest, slowest, etc. and rank the cars.
2. Then students begin testing. Students will set up their ramps – making very gentle slope so the cars move slowly. I use one textbook to raise one side of the track to create the ramp.
3. Students measure and mark their starting line and ending line so their racetrack is 1 meter in length.
4. Students measure the time it takes each car to travel 1 meter. Repeat for 4 trials for each car. After completing measurements for part 1, students calculate their average walking speed.

After the Activity

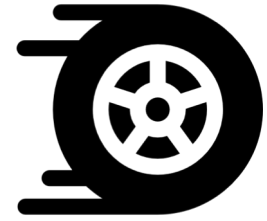
Students complete the conclusion questions and discuss results as a class.

Name: _____ Period: _____ Date: _____

Hot Wheels Speed Lab

OBJECTIVE

In this activity, you will predict which car will go the fastest and then measure the time it takes hot wheels race cars to travel 1 meter and calculate their speed



Describe your cars below and then make a prediction to rank them from fastest (1) to slowest (4)

	Describe your car below	Rank your car
A		
B		
C		
D		

PROCEDURE

1. Create a ramp by raising one side of your track.
2. Measure 1 meter from the top of the ramp and create a finish line at the bottom
3. Time how long it takes for the car to get to the bottom of the track (record in the DATA table).
4. Repeat step #4 three more times for car 1, recording the time in the table.
5. Repeat steps 3 & 4 for the remaining cars.
6. Calculate the average time for each car.
7. Calculate the speed for each car.

Speed Equation:

$$\text{Speed} = \frac{\text{distance}}{\text{time}}$$

Car	Distance (m)	Trial 1 (sec)	Trial 2 (sec)	Trial 3 (sec)	Trial 4 (sec)	Average time (sec)	Speed = distance/time (m/s)
A							
B							
C							
D							

Conclusion questions.

1. What two measurements do you need to know to calculate speed?
2. When calculating speed, are you calculating the fastest speed, average speed, or slowest speed? Explain.
3. Did all your cars travel at the same speed? If they did not, explain at least 2 factors that affected the speed of your car? (use 2 or more complete sentences)
4. What could you do to your car and/or the ramp to make the car go faster? (complete sentence)
5. What force is responsible for moving your car? (complete sentence)
6. Why is it important to do more than 1 trial when finding the speed of your car? (complete sentence)

Conclusion questions. **Sample student answers**

1. What two measurements do you need to know to calculate speed?

You need to know distance and time.

2. When calculating speed, are you calculating the fastest speed, average speed, or slowest speed? Explain.

We are calculating the averages speed. The speed changes as the car moves down the ramp – it is faster at some points than others, but we calculated the average speed to travel down the whole ramp.

3. Did all your cars travel at the same speed? If they did not, explain at least 2 factors that affected the speed of your car? (use 2 or more complete sentences)

My cars did not travel at the same speed. Some cars moved faster because they were heavier and some moved slower if their wheels did not spin as fast.

4. What could you do to your car and/or the ramp to make the car go faster? (complete sentence)

We could make the ramp steeper to make the cars go faster. Maybe adding weight to the car would make it go faster or adding something to reduce friction.

5. What force is responsible for moving your car? (complete sentence)

Gravity pulls the car down the ramp. Friction slows the cars down.

6. Why is it important to do more than 1 trial when finding the speed of your car? (complete sentence)

The cars move at slightly different speeds as they move down the ramp so this gives more accurate data.