Navigation

With your class

What does it mean to be "distracted"?

How do you think being distracted may affect whether or not you will avoid a collision?

Analyze Video of a Car Stopping

With your class

Watch the videos of the car braking:

1. when the driver is undistracted

2. when the driver is distracted

What differences do you notice?

Analyze Video of a Car Stopping

With your class

We will use a strip of paper to create a position-line.

For the first video (undistracted driver), mark the important positions that can help us analyze the way the car moves.

Analyze Video of a Car Stopping

With your class

What information do we need in order to calculate the actual distances between the positions we identified?

Create a Position-Line

The car in the video clip is 4.5 meters long.

- Find the length of the car in the video clip at the scale that we watched it. Record this on your handout.

- Find the length of each position interval that we identified (the lengths between the important positions) at the same scale. Record these on your handout.

- Calculate a "scaling ratio" of the actual length of the car to the measured car length. Use this ratio with the measured distances to calculate the actual distances in real life.

- Label the actual distances we calculated on the position-line.

Make a Prediction

With your class

Will the distances we calculated (reaction and braking) change if the driver is distracted? How?

Analyze the Distracted Driver Video

With your class

On a second position-line, let's mark the same important positions that we marked for the first video.

Then calculate the actual distance between each of those positions so we can compare across them.

Analyze the Distracted Driver Video

On your own

- How did our predictions match the data?

- How were they different from the data?

→ Be ready to share with the class.

Navigation

Turn and Talk

What was different about how the distracted driver was driving that could explain why these distances were different?

→ Be ready to share with the class.

Home Learning

On your own

Read about how being distracted affects how long it takes a driver to react.

→ Be ready to share with the class.

Navigation: Return to the Home Learning

With your class

- What insights did looking at distances give us into the system during our investigations of the videos?

- How much does the driver's being distracted impact the time it takes for the car to stop?

Navigation: Look at Timing

Turn and Talk

How could looking at the timing of each scenario (undistracted versus distracted) help us understand how being distracted could change the outcome of a possible collision?

➔ Be ready to share with the class.

Analyze the Time Intervals for Driver #1

With your class

Use a new strip of paper to construct a timeline of the undistracted driver. Start by creating tick marks using the relevant unit of time.

Use the time code from the video to figure out the time associated with each important position we identified. Then determine the length of each time interval and add this information to the timeline.

Time and Position

Turn and Talk

What could we do to visualize what is happening in both time and position and look for a relationship between these?

➔ Be ready to share with the class.

Turn and Talk about variables

Turn and Talk

Which of these variables do you think determines the other?
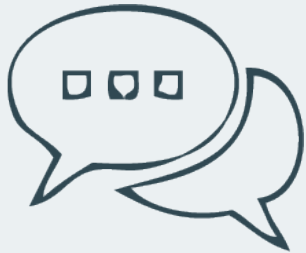
➔ Be ready to share with the class.

Create a Position versus Time Graph

With your class

1. Combine position and time for the **undistracted driver**.

2. Plot the intersections for each important position/time.

3. Determine the lines between the points.

4. Copy the plot the class makes onto a new piece of paper for your notebook.

Interpret the Position versus Time Graph

Turn and Talk

What information do these lines give us about the motion of the car at that position and time?

➔ Be ready to share with the class.

Interpret the Position versus Time Graph

With your class

What can the slope of the line in a position versus time graph tell us about how an object is moving?

On your own

For a position versus time graph:

A. What does a steeper slope mean about the motion of the object?

B. What would it mean about the motion of the object if the slope were zero (a flat line)?

C. What would it mean if the slope were negative?

Interpret the Position versus Time Graph

With your class

Add a line to the graph to show how the car was moving after time 3.

Is there anywhere on the graph where we need to adjust the slope of the line to better show how the car was moving?

Create a Position versus Time Graph

Turn and Talk

1. How can we represent the obstacle in our plots to show why the car did not hit it?

2. What if the obstacle had been closer to the car? How would the plot look different?

➔ Be ready to share with the class.

Create a Position versus Time Graph

With a partner

1. Using a new color, combine position and time for the **distracted driver**.

2. Plot the intersections for each important position/time.

3. Draw the lines between the points.

4. Add the obstacle (this should be in the same place on the *y*-axis as it was in the previous plot).
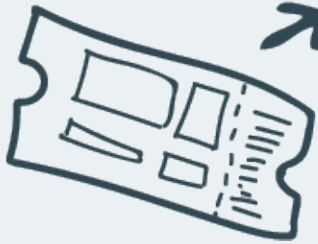
Debrief the Position versus Time Graph

With your class

What differences did you notice that could explain why being distracted increases the likelihood of a vehicle collision?

Exit Ticket: What else affects reaction time?

On your own

What else could increase a driver's reaction time other than whether the driver is distracted?

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