TEACHER WARNING

This lesson **revisits statistics on car crashes and fatalities.**

This may evoke heightened emotional states due to related traumatic events that teachers, students, and/or their families may have experienced. Please see the unit front matter, the teacher reference associated with this lesson, and the callouts in the *Teacher Guide* for guidance around how to support social and emotional needs as you move through this unit. Never ask students to share their personal experiences unless they

Slide A

Student Content Advisory

In this lesson, we will look back at data on traffic accidents and fatalities and discuss the physics of car crashes.

If needed, you can use strategies from the *Student Mindfulness Resource* handout.

If at any future point in the unit you find you need additional support, let your teacher or another trusted adult know how you are feeling.

Be aware that your teacher and/or your classmates may have experienced trauma related to this topic. Approach conversations about car crashes and car safety with respect, guided by your class's community agreements.

Looking Back

Turn and Talk

How does knowing the mass of the vehicles involved help us predict what will happen to each car after a vehicle collision?

Assessment

On your own

Use the results from a published paper to evaluate whether we can use mass to predict the outcomes of a collision, using what you learned about momentum conservation.

When you are finished, respond to question 7 by choosing a question from the DQB to answer. If you finish early, answer another one!

Navigation

With a partner

Choose one factor we have investigated that might be causing one of the patterns:

- Vehicle mass
- Speed limits
- Reckless driving (e.g., driving faster)
- Distracted driving (e.g., using phone)
- Road conditions

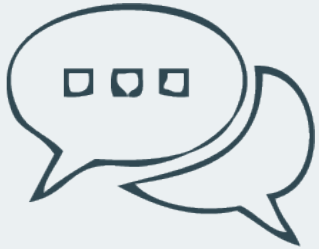
If you are right, what would you expect to see in a graph of that factor over time?

Use a whiteboard to sketch a prediction. Be ready to share which trend your graph would explain and why.

Correlation and Causality

With your class

Why might the factor that explains a trend follow the same pattern as that trend?



Turn and Talk

Is this evidence that one variable **caused** the other variable to change?

Analyze Data

On your own

- Identify key patterns in the data and then interpret each pattern.
- Are the data correlated to any of the trends we identified in Lesson 1?

With your group

Give each person a chance to describe whether their data correlate to any of the trends we identified in Lesson 1.

Compare Expected versus Actual Trends

With your class

- What correlations did you notice that surprised you?
- Can we say anything about which factor is causing these trends?
- What other factors could be making these correlations *weaker* than they might be otherwise?

Explore a Simulation

With a partner

- What variables can you change? How do you think each of these variables will affect what happens in a collision?
- Which of these variables might make one of the correlations that we identified *weaker*? Why?
- What new questions do you have after playing with the Gizmo? Write down at least one new question on a sticky note.

Engage in Mindfulness

Individual Think Time

How does learning about the physics of vehicle collisions affect the way you feel when you think about vehicle safety?

You will **not** be asked to share your reflection, and you do not need to write it down.

Before you leave, add your questions to the DQB.

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