



Acceleration

STEM Sims

Lesson 5: How Does Acceleration Affect Vehicle Wear?

A truck is a complex machine. Both cars and trucks have many moving parts. These parts can wear out due to friction. Can the way a person drives affect how long the parts on a truck last? Put yourself in gear and start this investigation.

Here are some definitions to help you in your investigation.

Interaction - a way one thing affects another thing

Force - any push or pull on an object that results in an interaction with another object

Friction - a force that opposes the motion of an object

Speed - how fast something is moving

Acceleration - speeding up, slowing down, or changing the direction of an object

Doing the Science

1. Select the Sim tab to open the Acceleration simulation.
2. Select the gray truck on the left side of the screen by clicking on the truck.
3. Select a speed of 20 m/s.
4. Allow a couple of seconds for the truck to reach a constant speed. A box appears when the truck reaches a constant speed.
5. Choose an acceleration value of "2 m/s²." Allow the simulation to run.
6. Select the "Display Data" option. Click on the "Wear" graph tab.
7. Note and record in Table 1 the system wear of the truck.

8. Select the "Restart" option.
9. Choose the truck and the same speed as you did before.
10. Choose an acceleration value of 4 m/s^2 . Allow the simulation to run.
11. Select the "Display Data" option. Click on the "Wear" graph tab.
12. Note and record in Table 1 the system wear of the truck.
13. Select the "Restart" option.
14. Repeat steps 9-13 only using an acceleration of 6 m/s^2 .
15. Repeat steps 9-13 using accelerations of -2 m/s^2 , -4 m/s^2 , and -6 m/s^2 .

Table 1.

Trial	Speed (m/s)	Acceleration (m/s^2)	System Wear
1	20	2	
2	20	4	
3	20	6	
4	20	-2	
5	20	-4	
6	20	-6	

Do You Understand?

1. What happened when the truck had negative (-) accelerations as in trials 4 - 6?
2. How are system wear and acceleration related?
3. List two ways a person can reduce the wear of truck parts while driving.