



Machines

STEM Sims





Lesson 11: Pulleys, All Together Now

Pulleys are another type of simple machine often encountered in our daily lives. Pulley systems come in many different forms, such as single, multiple, fixed, and moveable pulleys. Are you ready to do some heavy lifting to investigate pulleys?

Doing the Science


1. Start the Machines Simulation by clicking on the “Sim” tab.
2. Click the “Pulleys” button at the bottom of the screen.
3. Select the top-left pulley (Single, Fixed) from the four pulley buttons at the screen bottom.
4. Use the Newton Converter button at the bottom right-hand corner of the screen if you need help converting the hanging mass from kilograms to newtons for the Force on Mass Due to Gravity column.
5. Click the green “Pull” button on the Force Device in the middle of the screen.
6. Note and record in Table 1 the height the 1.0-kg mass lifts off the ground, the applied force and the distance the Force Device pulled the string that is displayed on the Force Device.
7. Click the “Reset” button.
8. Click on the 2.0-kg mass to replace the 1.0-kg mass on the pulley. Repeat the experiment with the 2.0-kg mass.
9. Make sure to note and record your data in Table 1.
10. Click on the 1.0-kg mass to replace the 20-kg mass on the pulley.
11. Select the top-right pulley (Single, Moveable) from the four pulley buttons at the bottom of the screen. Repeat steps 4 – 10.
12. Select the bottom-left pulley (Compound, Moveable) from the four pulley buttons at the bottom of the screen. Repeat steps 4 – 10.
13. Select the bottom-right pulley (Compound, Moveable) from the four pulley buttons at the bottom of the screen. Repeat steps 4 – 10.

Table 1. Force and Distance Moved

Pulley	Mass (kg)	Force on Mass Due to Gravity (N)	Height Mass Lifted (m)	Applied Force (N)	Distance Force Device Moved String (m)
	1				
	2				
	1				
	2				
	1				
	2				
	1				
	2				

Do You Understand?

1. For each pulley system, describe how the effort force exerted by the Force Device compared to the force on the hanging mass due to gravity.

2. For each pulley system, describe how the distance the Force Device moved the string (input distance) compared to the distance the hanging mass moved (output distance).

3. For each pulley system, describe and discuss how the pulley was useful in accomplishing a task.