



Machines

STEM Sims

Lesson 1: Rubbed the Wrong Way

Friction is a force that opposes the motion of objects due to surface unevenness. The rougher the surface, the greater friction an object experiences as it moves across the surface. Can you conduct an experiment about friction without any friction between you and your lab partners?

Doing the Science

1. Start the Machines Simulation by clicking on the “Sim” tab.
2. Click the “Inclined Planes” button at the bottom of the screen.
3. Make sure that the inclined plane angle is set on 0° and the 1.0-kilogram mass is attached to the Force device.
4. Click the “Pull” button on the Force device. Note and record in Table 1 the initial force value displayed in the Force Device *before* the mass begins to move (Max) and the force value *after* the mass is moving (Current).
5. Click the “Reset” button.
6. Click on the 2.0-kilogram mass to replace the 1.0-kilogram mass on the inclined plane.
7. Repeat step 4, making sure to note and record your data in Table 1.

Table 1. Frictional Forces

Mass (kg)	Force Before Mass Begins Moving (Max Force in Newtons)	Force While Mass Is Moving (Current Force in Newtons)
1.0		
2.0		

Do You Understand?

1. How did the force required to start the mass moving compare to the force required to keep the mass moving? Provide a reason for this difference in required forces.

2. If the inclined plane surface was significantly rougher, how would the forces required to move the masses have changed? Please provide a reason for your answer.