

PHET – Forces in One Dimension Discovery Activity

Setup

- Click on the link **PHET - Forces 1D**.
- Learn where the controls are to change objects, add/remove friction
- Learn where the controls are to change the friction coefficient
- Create the following set up:
 - Crate
 - Initial position = 0
 - Graph Applied Force
 - Graph Acceleration
 - Friction Off

Activity

1. Set the Applied Force to 100 N and click Go. Record the acceleration and calculate the ratio of applied force to acceleration. Repeat for the other values of Applied Force.

Applied Force (N)	Acceleration (m/s²)	Applied Force/Acceleration
200		
400		
600		
800		
1000		

- (a) Is the ratio of the force to the acceleration constant? If so, what does this tell you about the relationship between Force and Acceleration?

- (b) Start the crate moving and then see what you have to do to stop it. What do you have to do to stop the motion of the crate?

2. Turn Friction on. Click on the More Controls button, scroll down and set the value of static and kinetic friction to 0.2. Change the object to a Sleepy Dog. Set the Applied Force to 100 N and click Go. Record the values in the table below. Repeat for the remaining values of Applied Force.

Applied Force (N)	Frictional Force (N)	Total Force (N)	Acceleration (m/s²)	Total Force/Acceleration
100				
200				
300				
400				
500				

(a) Is the ratio of the force to the acceleration constant? If so, what does this tell you about the relationship between Force and Acceleration?

(b) Why does friction affect or not affect the relationship between Force and Acceleration?

3. Repeat #2 with your choice of object (you may change the mass of the object from the default if you wish). Set the coefficient of friction values to a number of your choosing from 0.1 – 0.5. Record the values below.

Object: _____

Mass of Object: _____

Coefficient of Static Friction: _____

Coefficient of Kinetic Friction: _____

Force Applied (N)	Frictional Force (N).	Total Force (N)	Acceleration (m/s²)	Total Force/Acceleration

- (a) Is the ratio of the force to the acceleration constant? If so, what does this tell you about the relationship between Force and Acceleration?

- (b) What does the ratio of Total Force/Acceleration represent?