

Name: _____

Period: _____

Ramp: Forces and Motion

Learning Objectives:

1. Use free body diagrams to explain the net (total) force on an object
2. Describe how the forces on an object change when the object is on a ramp
3. Relate energy, force, and motion with objects moving on a ramp

Directions:

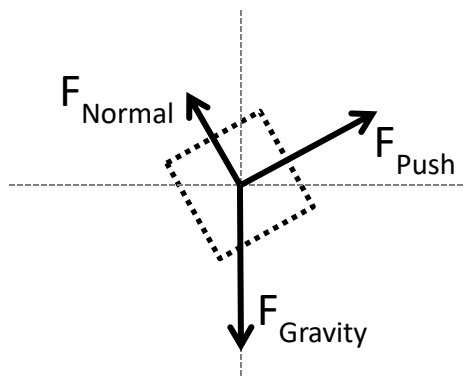
1. Explore the *Ramp: Forces and Motion* simulation with your partner. As you explore, talk about what you find with your partner.

2. Click “Show” on the **Free Body Diagram**. Push the **filing cabinet** back and forth while looking at the free body diagram. What makes the arrows change in length and direction?

3. What changes when you switch between ice and wood as you push the Filing Cabinet back and forth?

4. How does the *angle* of the ramp change the length and direction of the arrows in the **Free Body Diagram**?

5. On the right is an example of a **Free Body Diagram** for the crate being pushed up the ice ramp:



The **Free Body Diagram** must include:

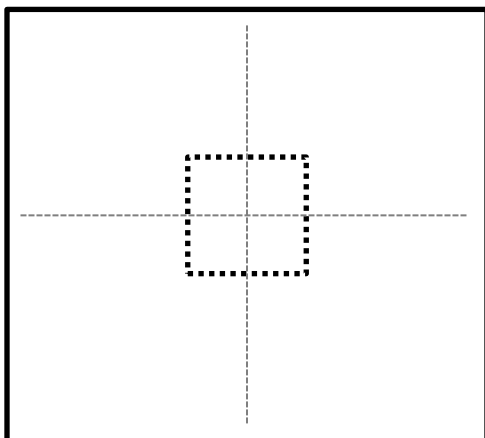
Object

Arrows representing forces (originating from the center of gravity)

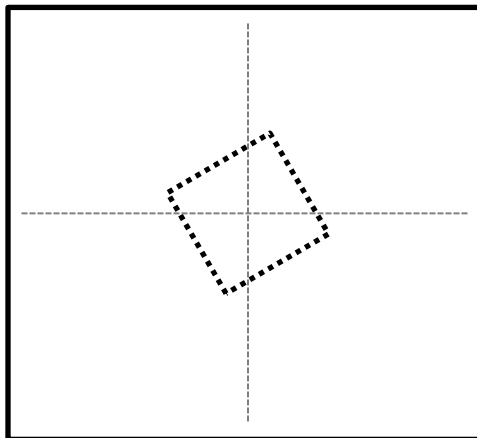
Labels on the force arrows

Draw a **Free Body Diagram** for each of the following situations:

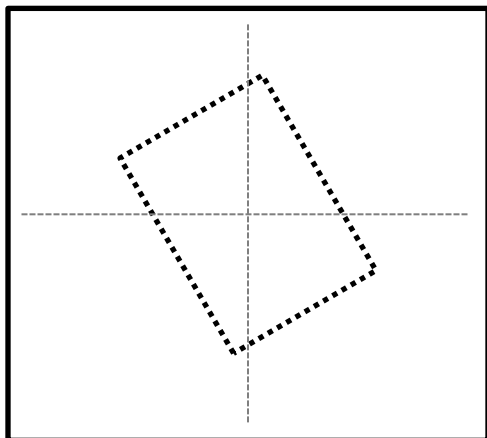
Crate Not Moving on Ice



Crate Not Moving on Wood Ramp



Fridge Pushed Down Wood Ramp



Fridge Pushed Up Ice Ramp

