Forces and Motion: Basics:
PhET Simulations -Physics - Motion
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1- Net Force:

a) Check the 3 boxes on the upper right corner: Sum of Forces, Values, and Speed.

b) Change the values of the forces on both sides. Notice the direction of the net force. Notice the direction of motion. What is the relationship between the direction of net force and the direction of motion.

2- Motion

a) Check the 4 boxes on the upper right corner: Force, Value, Masses and Speed

b) What is the relationship between force and speed and mass.

c) Apply a net force.

d) Calculate the acceleration: Net force = mass x acceleration.

e) The minimum force to push the box is 6 N. Calculate the coefficient of static friction Ms using this formula:

Fnet = Ms x m x 9.8

Calculate Ms.

f) Use the box with the unknown mass. Try to find the minimum force to move the box. Calculate the mass.

Use the formula:

Fnet = Ms x m x 9.8 . Use the value of Ms. that you calculated above.

3- Acceleration

a) Check all 6 boxes on the top left corner: Forces, Sum of Forces, Values, Masses, Speed. and acceleration

b) Compare the direction of the applied force and the direction of frictional force. Write your observation

c) Compare the values of the applied force to the value of the static frictional force. To move the box, the applied force has to be more or less than the frictional force?

d) What is the minimum force used to start moving the box?

e) Calculate the coefficient of static friction Ms using this formula:

Fnet = Ms x m x 9.8

f) Calculate the acceleration: Fnet = mass x acceleration

Compare your calculated value to the value shown for the white cursor of acceleration in the middle of the page. Are they the same?

g) Play with the friction cursor on the yellow box on the top left corner.

h) Notice how a lot of friction can change the value of the force needed to move the box? Write a relationship.

i) Notice how little of friction can change the value of the force needed to move the box? Write a relationship.