# Forces and Motion using PhET's Force and Motion Basics HTML5
Part 2 – Friction

Name_____

Learning Objectives: Students will be able to
- Predict how forces can change motion.
- Provide reasoning and evidence to explain motion changing or not.

1. Open the **Forces and Motion Basics** simulation and play with the Friction screen for a few minutes.
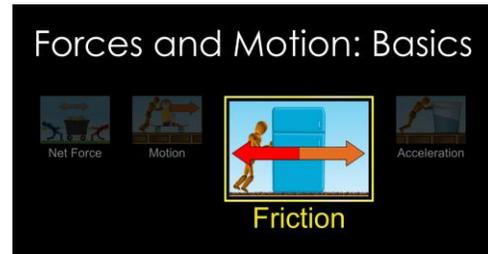
   a. How does the Friction screen differ from the Net Force and Motion screens?

   b. Also, what is something new you discovered**?**

2. Imagine that your friend, Sam is trying to move a box.
   a. Using what you learned by exploring, try drawing arrows to predict what might happen in the pictures below. (Try this part without using the simulation.)
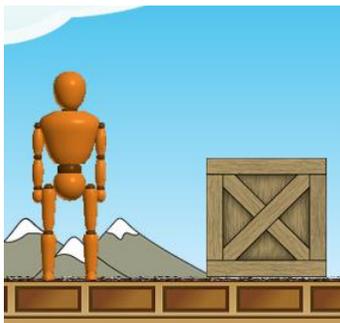
| **Sam not pushing** | **Sam pushing but box not moving** | **Sam pushing and box moving** |
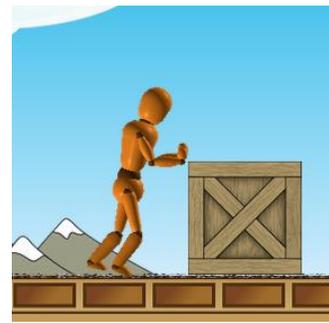
   b. Check your sketches using the sim and make corrections if needed. List any new ideas you discovered.

   c. What do you notice about the similarities and differences between the Applied Force arrow and the Friction Force arrows in each situation?

3. How can you make the Friction Force more? What shows you that the force is more?

4. In your own words,
    a. describe Friction Force.

    b. describe Applied Force.

5. Have Sam try to move the refrigerator. What's different from pushing the box?

    a. In the table, draw the **Sum of Forces arrow** for the different cases:
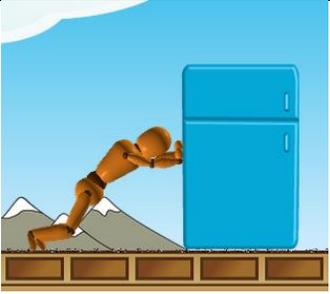
Sam not pushing	**Sam pushing but refrigerator not moving**	**Sam pushing and refrigerator moving**

    b. Were you able to move the refrigerator? If not, what would you have to change? Describe what you did.

6. Try pushing other things; you can even stack them. What have you discovered?

7. Can you find different ways to make the **Sum of Forces** arrow change?
    a. List at least three:

    b. In your own words, what is **Net Force**?

8. What are some ways you can change the speed?

9. Using your answers to Question #8, what general statement can you make about the **relationship between net force and how fast an object changes its speed.**