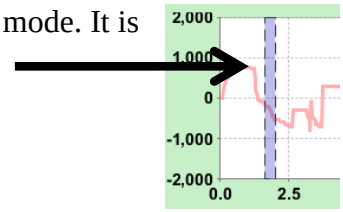
PhET Tips for Teachers **Ramp Force and Motion Simulation**

This revised simulation is based on The Ramp but does not include Energy/ Work

Tips for controls:

- Game tab - use the keyboard arrow buttons to apply force to the object.
- Be sure to try all the different tabs at the top of the simulation.
- If you are doing a lecture demonstration, set your screen resolution to 1024x768 so the simulation will fill the screen and be seen easily.
- Use the controls on the bottom to **Pause, Step**, or **Record** and **Playback** the motion. You must select **Record** before you start an experiment if you want it saved. The is grabbable in **Playback** mode. It is useful to relate the object's motion to the graphs.

- The vertical gray line in the graph is grabbable in **Playback** mode. It is useful to relate the object's motion to the graphs.



Important modeling notes / simplifications:

- Thermal Energy - the surface will heat up due to work done by friction. The friction coefficients *do not change* when the surface heats up.
- Using the "Clear Heat" button will remove the thermal energy. While the surface is wet (blue) the coefficients of friction are lowered until the surface is dry again (brown).
- If you want to explore how friction coefficient and mass effect friction forces, use the Friction Tab in the sim Force and Motion

Information regarding the game tab:

- In the game, the purpose is to use your experience from the other tabs to get objects into the house. Points are awarded based on use of energy.

Insights into student use / thinking:

- Some students may try to make changes while in the **Playback** mode and then hit **Play**; the sim will not run until **Record** is selected.

Suggestions for sim use:

- We designed the motion sims to be used in the following order: Moving Man, Forces & Motion, then Ramp-Force and Motion. (The sim called "The Ramp" is an older version, but contains energy graphs. We plan to write an energy sim to reach the learning goals)
- Two related sims are Ladybug Revolution and Ladybug Motion 2D.
- For tips on using PhET sims with your students see: **Guidelines for Inquiry Contributions** and **Using PhET Sims**
- The simulations have been used successfully with homework, lectures, in-class activities, or lab activities. Use them for introduction to concepts, learning new concepts, reinforcement of concepts, as visual aids for interactive demonstrations, or with in-class clicker questions. To read more, see **Teaching Physics using PhET Simulations**
- For activities and lesson plans written by the PhET team and other teachers, see: **Teacher Ideas & Activities**

Written by Trish Loeblein Noah S Podolefsky, last updated June 2011