

## Intro and Friction Screens

Students can explore different tracks and investigate the relationship between the kinetic energy, potential energy, and thermal energy of the skater. In the Intro screen, the track is frictionless. In the Friction screen, students can control the amount of friction between the track and skater.

This screenshot shows the Intro and Friction screens of the Energy Skate Park: Basics simulation. The interface includes an energy graph on the left, a central track with a skater, and a control panel on the right. Callouts provide the following information:

- View multiple representations of the skater's energy:** Points to the energy graph showing Kinetic, Potential, Thermal, and Total energy.
- Remove thermal energy from the system:** Points to the trash icon next to the Thermal energy bar.
- Control the playback speed:** Points to the Slow Motion and Normal buttons.
- Use the grid to measure height:** Points to the Grid checkbox in the control panel.
- Control how much friction is on the track:** Points to the Friction slider.
- Explore three different tracks:** Points to the track selection icons.

## Playground Screen

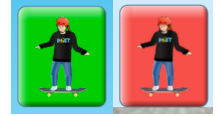
Build your own tracks, ramps, and jumps for the skater.

This screenshot shows the Playground screen of the Energy Skate Park: Basics simulation. The interface includes a track editor, a speedometer, and a control panel. Callouts provide the following information:

- Click to edit the track:** Points to the track editor icons (scissors, red dot, and red X).
- Drag up pieces to build your track:** Points to the track editor icons.
- Measure the skater's speed:** Points to the speedometer.
- Choose if the skater will stick to track or fall off:** Points to the Speed checkbox in the control panel.
- Return the skater to most recent release point:** Points to the Restart Skater button.

## Complex Controls

When the skater exits the screen, two additional return skater buttons appear on the screen. Clicking on either button will return the skater to the location of the button. The green button appears where the skater was most recently released, and the red button appears at the starting position of the skater on the ground next to the track.

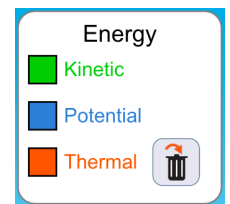


## Model Simplifications

When the skater lands on the track, the vertical component of his kinetic energy is converted to thermal energy. You can do experiments where there is no loss to thermal energy (only PE and KE conversions) by turning friction off and by making sure the skater doesn't leave the track.

## Insights into Student Use

Students may not notice or use the remove heat button located in the bar graph and pie chart. This feature is particularly useful to remove the heat that is created by the skater's initial collision with the track when the goal is to consider only the PE and KE in a frictionless environment.



## Suggestions for Use

### Sample Challenge Prompts

- Design an experiment to determine the relationship between kinetic energy and speed.
- Build a track with a loop that the skater can complete.
- At what point on the track does most of the energy get transferred to thermal energy? Why?

### Clicker Questions

- Given the energy bar graph, determine the skater's speed.
- Match the skater's energy pie chart with his location on the track.
- If the skater's kinetic energy is getting larger, determine the direction of his motion.
- Determine if the skater can make it over a hill given his starting location.

See all published activities for Energy Skate Park: Basics [here](#).

For more tips on using PhET sims with your students, see [Tips for Using PhET](#).