

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 central area features a skater on a track with a pie chart representing energy and a bar graph showing Kinetic, Potential, and Thermal energy levels. The bottom interface includes playback controls (Slow Motion, Normal), a Restart Skater button, and navigation icons for Intro, Friction, and Playground. The PhET logo is in the bottom right corner.

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

Playground Screen

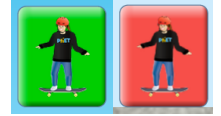
Build your own tracks, ramps, and jumps for the skater.

This screenshot shows the Playground screen of the Energy Skate Park: Basics simulation. The central area features a skater on a custom-built track with a speedometer. The bottom interface includes playback controls, a Restart Skater button, and navigation icons for Intro, Friction, and Playground. The PhET logo is in the bottom right corner.

- Click to edit the track**: Callout pointing to the edit tools (scissors, red dot, red X) on the track.
- Drag up pieces to build your track**: Callout pointing to the track pieces in the bottom left.
- Measure the skater's speed**: Callout pointing to the Speedometer.
- Choose if the skater will stick to track or fall off**: Callout pointing to the Speed checkbox in the settings panel.
- Return the skater to most recent release point**: Callout pointing 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.

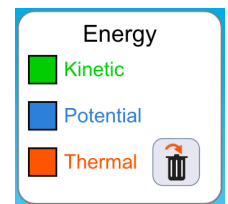


Model Simplifications

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](#).