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.

VIEW multiple representations of the skater's energy

REMOVE thermal energy from the system

CONTROL the playback speed

USE the grid to measure height

CONTROL how much friction is on the track

EXPLORE three different tracks

Playground Screen

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

CLICK to edit the track

DRAG up pieces to build your track

MEASURE the skater's speed

CHOOSE if the skater will stick to track or fall off

RETURN the skater to most recent release point

Customization Options

Query parameters allow for customization of the simulation, and can be added by appending a '?' to the sim URL, and separating each query parameter with a '&'. The general URL pattern is:

`…html?queryParameter1&queryParameter2&queryParameter3`

For example, in Energy Skate Park: Basics, if you only want to include the 1st and 2nd screens (`screens=1,2`), with the 2nd screen open by default (`initialScreen=2`) use:

https://phet.colorado.edu/sims/html/energy-skate-park-basics/latest/energy-skate-park-basics_all.html?screens=1,2&initialScreen=2

To run this in Spanish (`locale=es`), the URL would become:

https://phet.colorado.edu/sims/html/energy-skate-park-basics/latest/energy-skate-park-basics_all.html?locale=es&screens=1,2&initialScreen=2

Query Parameter and Description	Example Links

`screens` - specifies which screens are included in the sim and their order. Each screen should be separated by a comma. For more information, visit the Help Center.	`screens=1`
	
	`screens=2,1`

`initialScreen` - opens the sim directly to the specified screen, bypassing the home screen.	`initialScreen=1` `initialScreen=3`
`locale` - specify the language of the simulation using ISO 639-1 codes. Available locales can be found on the simulation page on the Translations tab. Note: this only works if the simulation URL ends in "_all.html".	`locale=es` (Spanish) `locale=fr` (French)
`allowLinks` - when `false`, disables links that take students to an external URL. Default is `true`.	`allowLinks=false`

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.

Rouinfar, August 2023
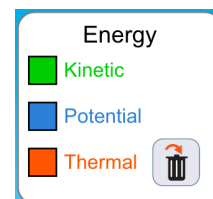
Suggestions for Use

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 Parks: Basics here.

For more tips on using PhET sims with your students, see Tips for Using PhET.