Mechanical Energy Explorations with Energy Skatepark
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Student guide: Name:_____

Start:

Google | Phet Energy Skate Park | 🔍

1. Click on the first link

2. Click on the **Run Now!** button.

3. Explore the simulation with your partner and complete the following checklist:

   € Move the blue dots on the track and run the skater.

   € Try out different locations.
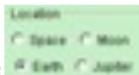
   € Try different skaters.

   € Try the different energy graphs.
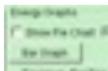
   € Add friction to a track.

Time to explore potential energy, kinetic energy and conservation of energy.

4. Reset the simulation.   Then make your screen look like the picture by

   - clicking to open the underline bar graph

   - dragging the graph closer to the track.

   - ask if you need help
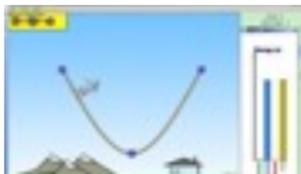
a. 👓👓 Discuss the changes in the bar graph as the skater moves on the track

Use the symbols to fill in the data table: **(↑ increases, ↓**

Skater's movement		Potential energy **(↑↓ S)**	Kinetic energy **(↓↑ S)**	Total energy **(↑↓ S)**
Down the hill				
Up the hill				

decreases, S for stays the same)

👓👓 Discuss any patterns you see for the energy data table.

5. Change the skater and repeat #4.

6. ✏️ **Add symbols (↓ ↑ S)** to complete the observation statements:

As an object moves **down the track**, the kinetic energy _____ and the potential energy _____.   When the object moves **up the track** the kinetic energy _____ and the potential energy _____.

7. Look at your data table and focus on the **Total energy** column. Write a statement or two about the "total energy" of the object moving up and down the track.

Name_____

Time to explore friction!
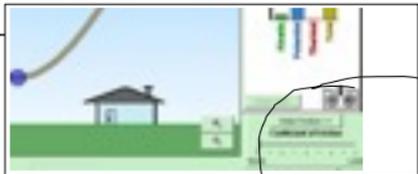
1. Reset the simulation.

   a) Open the bar graph again

   b) Click [Track Friction].

   c) Move the slider to change the friction

Discuss the changes in the bar graph as the skater moves up and down on the track.

Use the symbols to fill in the data table.   (↑ increases, ↓ decreases, S

Skater's movement	Potential energy (↑ ↓ S)	Kinetic energy (↓ ↑ S)	Total energy (↑ ↓ S)	_____ (↑ ↓ S)
Down hill				
Up the hill				

stays the same)

Discuss any patterns you see in the data table.

2. **Change the skater and repeat this part of the activity.**

   Add arrows the complete the following observations. **(↑ ↓ S)**

- As an object **moves down** the track, the kinetic energy _____ and the potential

    energy _____.   The total energy _____.

- After watching the bar graph while the object <u>is moving</u>, especially with **"lots"** of friction,

    write a title for the last column. Use the symbols to fill in the last column.

    -complete the observation statement:

       ☼ As the skater moves with friction, the **kinetic energy** and **potential energy** both ____,

    the **thermal energy**_____ and the **total energy** _____.

    ✎ Write a possible explanation for this. _____

    _____

- 👀 Discuss **what changed** and **what stayed the same** when friction added to the skate
    park .

    _____

    _____

    _____

- Which situation, with friction or without friction, is more similar to your everyday
    experience on a skateboard or bicycle? Write at least 2 sentences to explain your answer.

    _____

    _____

    _____