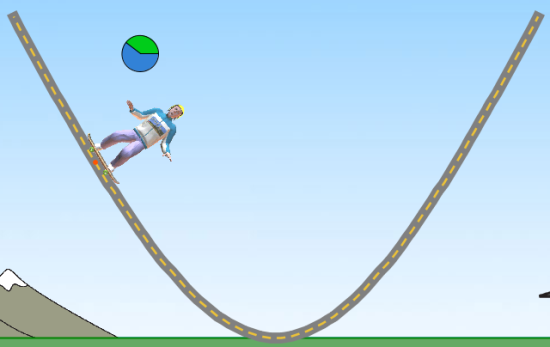
**First Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Last Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Grade 5. Class \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

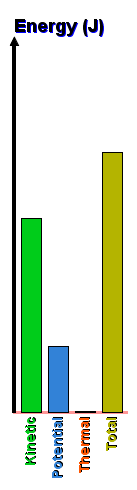
**Energy Skate Park Pre-Lab**

1. **The picture to the right shows the skater on the ramp. In the next moment, the *kinetic energy* of the skater gets *smaller.***

For each quantity, write whether it will be *increasing*, *decreasing*, or *staying the same*.

Explain your answer in the box on the right.

|  |  |  |
| --- | --- | --- |
| **Quantity** | **Increasing/Decreasing/Same** | **Explain your answer** |
| *Height* of the skater off the ground |  |  |
| *Potential energy* of the skater |  |  |
| *Speed* of the skater |  |  |



1. **The bar graph shows the energy of the skater.**



**A**

**B**

**C**

**D**

**E**

Where could the skater be on the track? \_\_\_\_\_\_\_\_

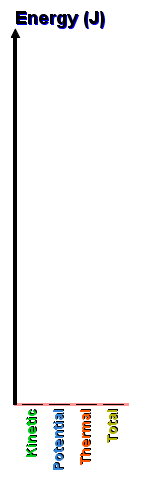
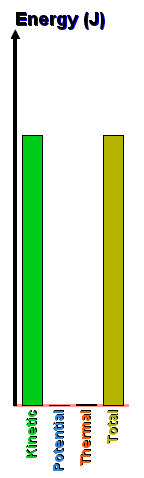
Explain your answer

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. **The skater starts moving to the right and then slows to a stop.**

On the right, *draw* what the Energy Chart will look like *when the skater is stopped*.

**DRAW**



**Stopped**

**Moving to the Right**

Explain your answer

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Your friend plays soccer. Describe a situation in a soccer game where your friend would have:

*High* Kinetic Energy:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*Low* Kinetic Energy:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**First Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Last Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Grade 5. Class (circle one) A, B, C**

**Energy Skate Park**

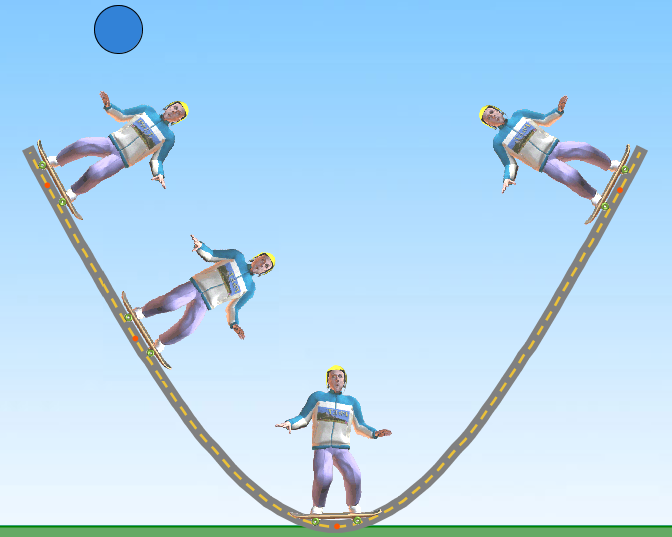
**Learning Objectives**

* Explain the relationship between total energy and kinetic, potential, and thermal energy
* Explain how changing track friction affects kinetic, potential, and thermal energy.
* Design a skate park using the concepts of mechanical energy and energy conservation.

1. Explore the simulation. Describe how the skater moves.
2. Describe how the skater’s *height* is related to the skater’s *speed* at different points on the track.
3. **Go to the “Introduction” tab.**

In the table below, write down whether each quantity *increases, decreases*, or *stays the same.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Skater’s Movement |  | Potential Energy | Kinetic Energy | Total Energy |
| Up the hill | v |  |  |  |
| Down the hill | v |  |  |  |

1. The picture shows the skater starting at the top of the ramp (position 1). Draw the pie chart for the skater at positions 2, 3, and 4.

1

4

Explain your reasoning for each point:

2

2:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3

3:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. **Go to the “Friction” tab.**

v

The skater is moving *to the right* along flat ground.

In the table below, write down whether each quantity is

*increasing, decreasing*, or *staying the same*.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Track Friction | Potential Energy | Kinetic Energy | Thermal Energy | Total Energy |
| Zero |  |  |  |  |
| Greater than Zero |  |  |  |  |

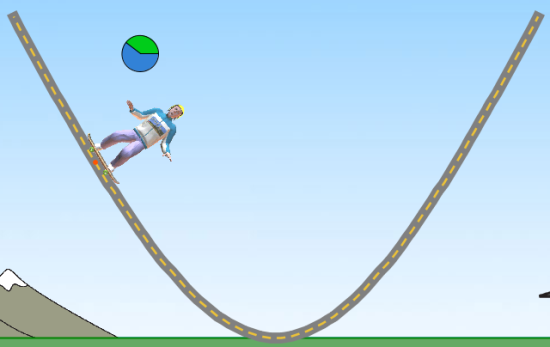
1. The skater is started at the top of the track. The table below shows *Energy Bar Charts* for the skater.

In the table, draw where you think the skater is on the track, and if you think friction is *on* or *off*.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  |  |  |  |
| Draw  Skater Position | C:\Users\Noah\Desktop\u-track.png | C:\Users\Noah\Desktop\u-track.png | C:\Users\Noah\Desktop\u-track.png | C:\Users\Noah\Desktop\u-track.png |
| Friction *on* or *off* |  |  |  |  |

1. Design your own skate park! *Draw your skate park on another sheet of paper.*

**First Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Last Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Grade 5. Class (circle one) A, B, C**

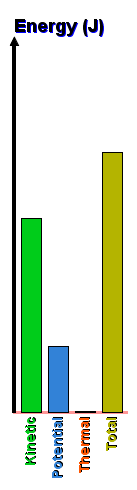
**Energy Skate Park Post-Lab**

1. **In the next moment, the *kinetic energy* of the skater gets *smaller.***

For each quantity, write whether it will be *increasing*, *decreasing*, or *staying the same*.

Explain your answer in the box on the right.

|  |  |  |
| --- | --- | --- |
| **Quantity** | **Increasing/Decreasing/Same** | **Explain your answer** |
| *Height* of the skater |  |  |
| *Potential energy* of the skater |  |  |
| *Speed* of the skater |  |  |



1. **The bar graph shows the energy of the skater.**



**A**

**B**

**C**

**D**

**E**

Where could the skater be on the track? \_\_\_\_\_\_\_\_

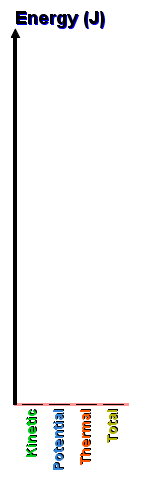
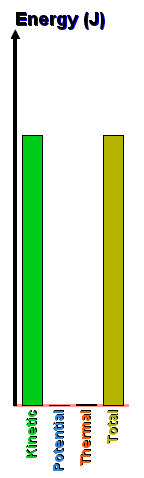
Explain your answer

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. **The skater starts moving to the right and then slows to a stop.**

On the right, *draw* what the Energy Chart will look like *when the skater is stopped*.

**DRAW**



**Stopped**

**Moving to the Right**

Explain your answer

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Your friend plays soccer. Describe a situation in a soccer game where your friend would have:

*High* Kinetic Energy:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*Low* Kinetic Energy:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. How ***useful for your learning*** was this science activity, compared to other science class activities? (circle)

More useful About the same Less useful

How ***enjoyable*** was this science class activity, compared to other science class activities? (circle)

More enjoyable About the same Less enjoyable

Why did you or did you not find it useful or enjoyable?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_