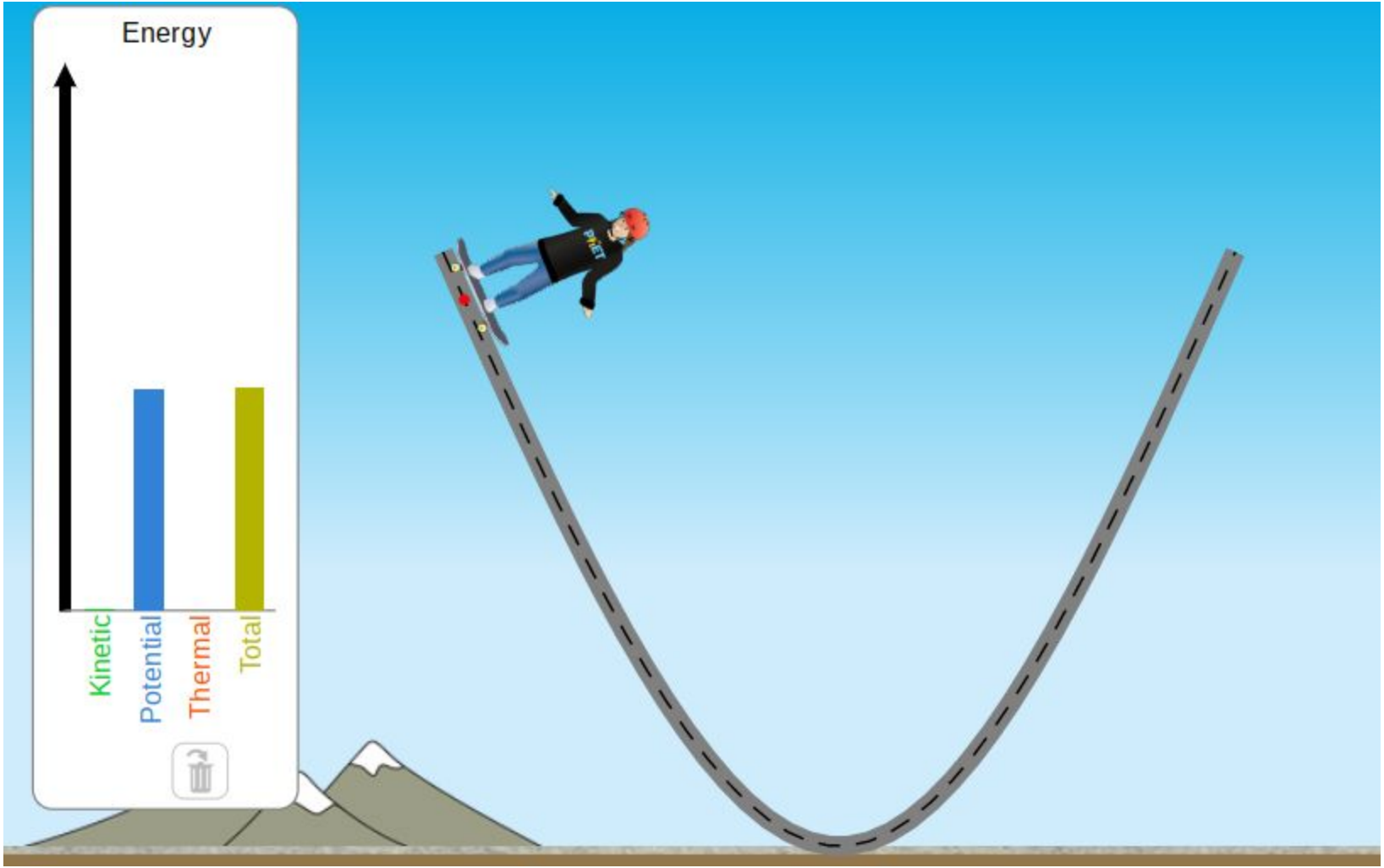
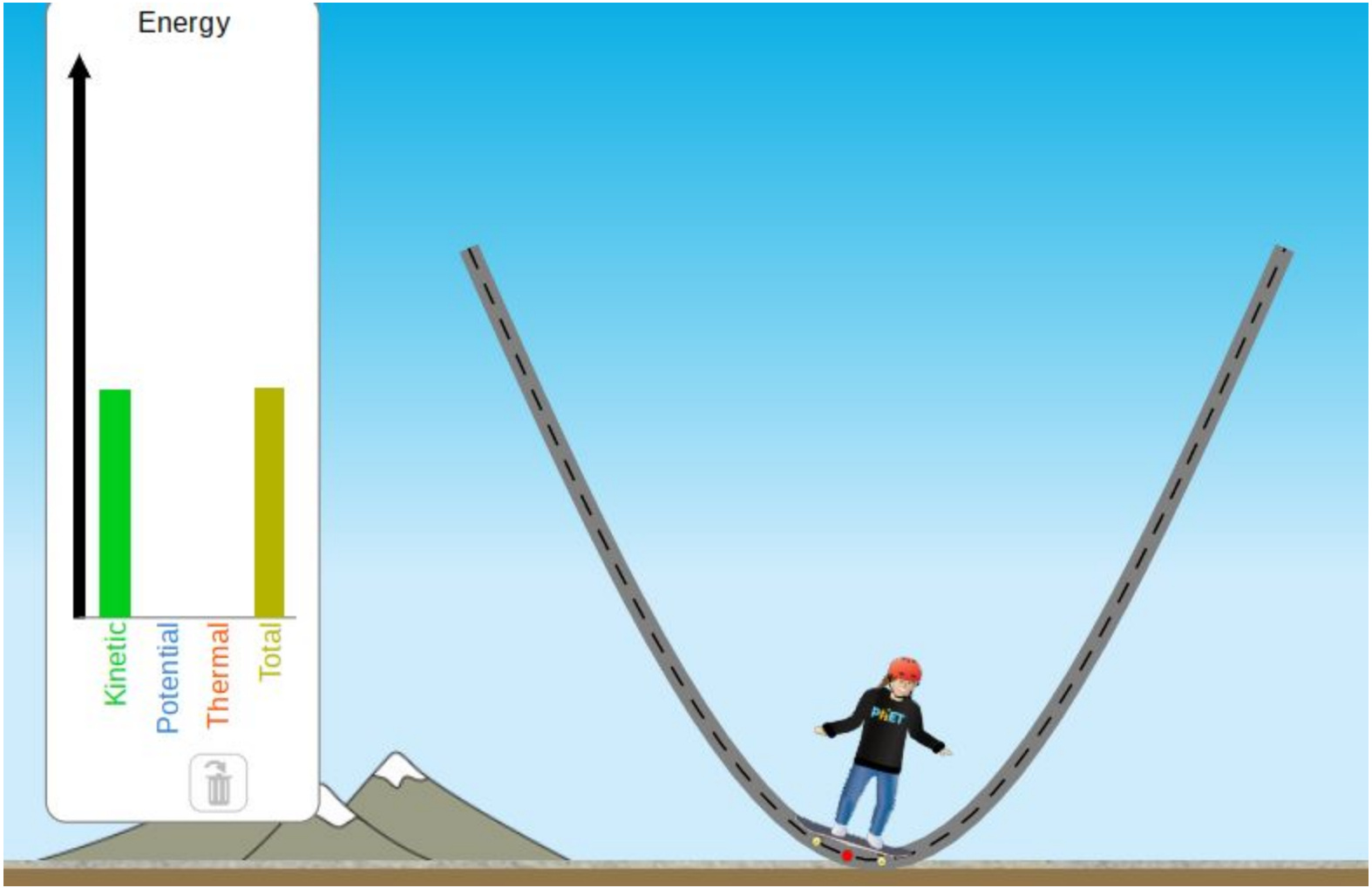
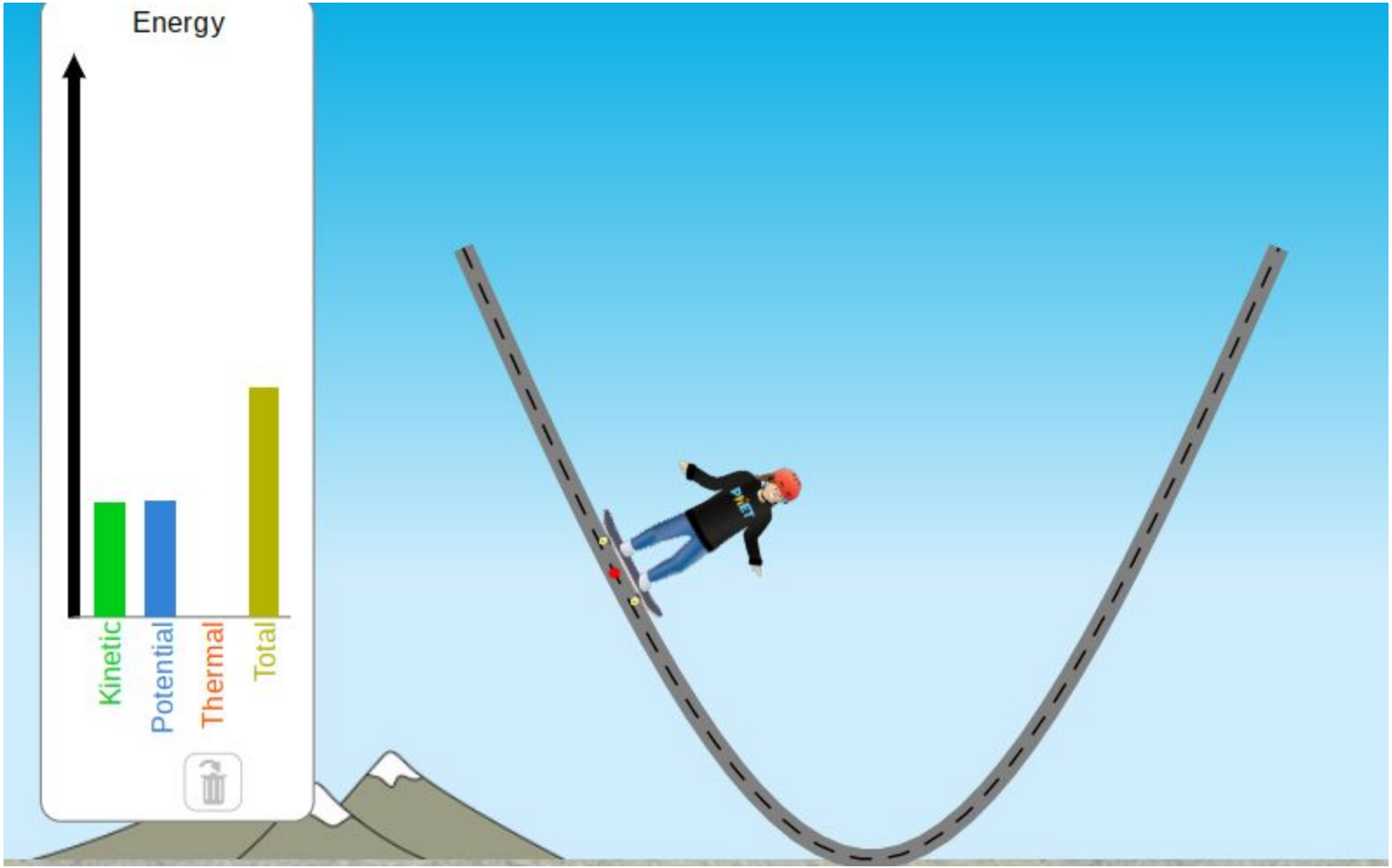
Conservation of Energy


Energy
Kinetic
Potential
Thermal
Total


Energy
Kinetic
Potential
Thermal
Total


Energy
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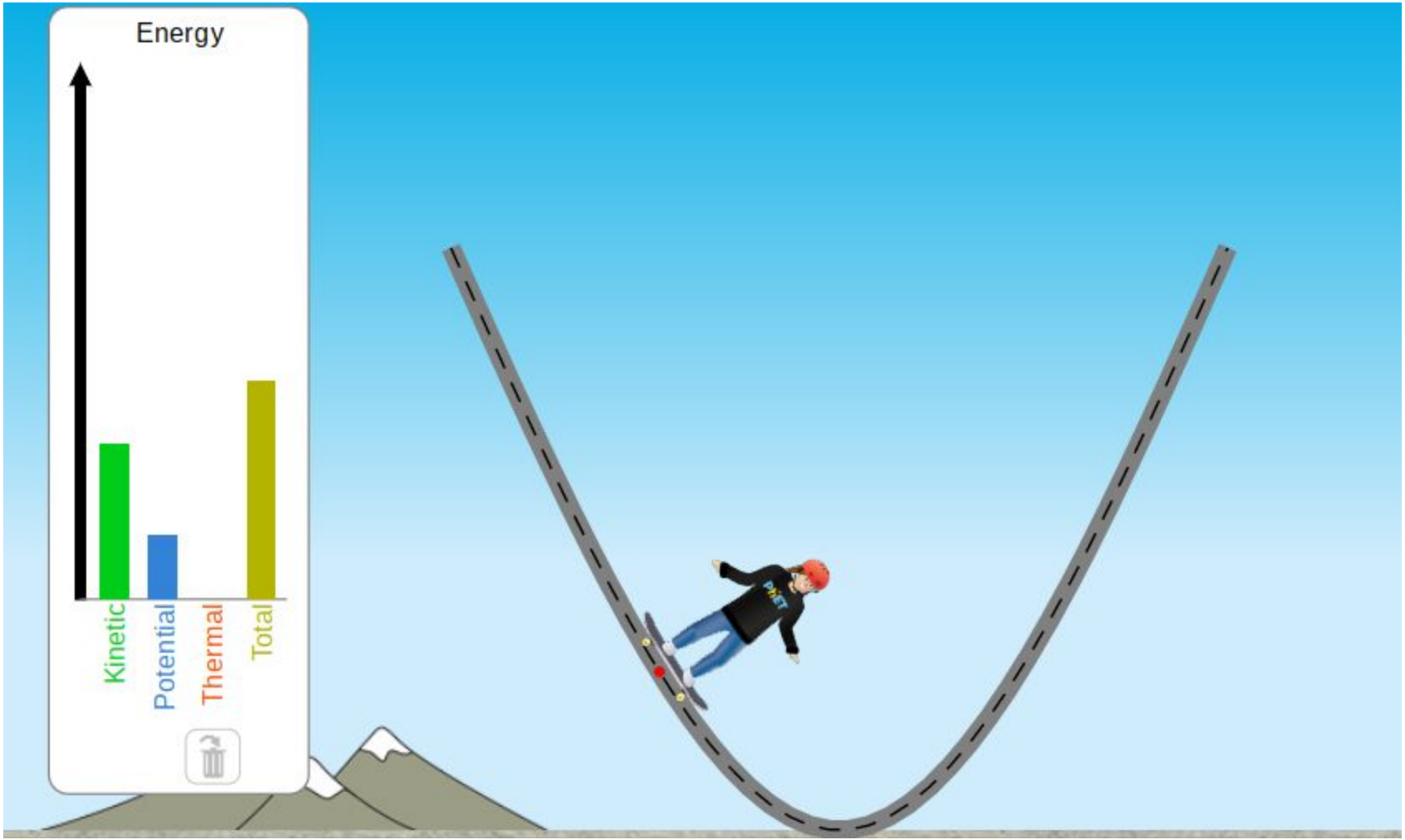
Thermal
Total


Energy
Kinetic
Potential
Thermal
Total

Conservation of Energy

The conservation of energy states that energy cannot be created nor destroyed.

Equation:

$KE_i + PE_i = KE_f + PE_f +$ Dissipated Energy

Calculating Conservation of Energy

0.55 kg rubber ball is dropped from rest at a height of 1.5 meters

1. What is the gravitational potential energy of the ball when it is dropped?

2. How fast is the ball moving when it hits the ground? (assume no air resistance)

3. During the collision with the ground the ball loses 0.8 Joules of energy. What is the maximum height the ball reaches on its rebound back up?

Part One - Calculating Potential Energy

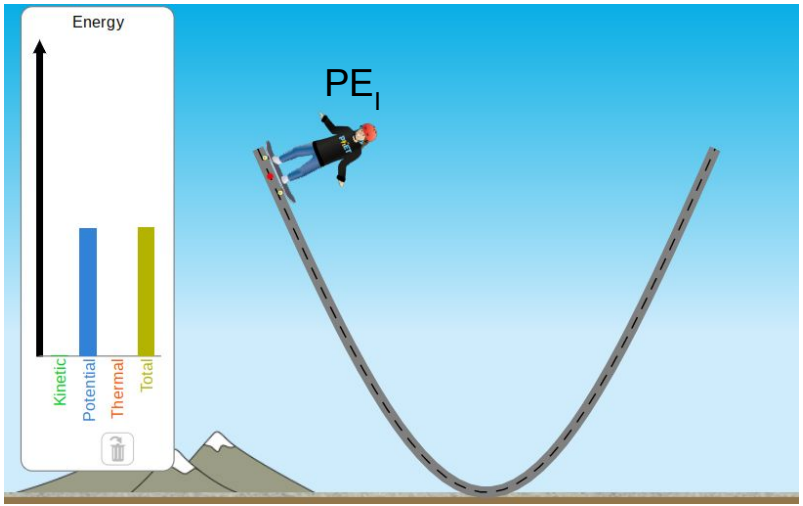
0.55 kg rubber ball is dropped from rest at a height of 1.5 meters

What is the gravitational potential energy of the ball when it is dropped?

$PE = mgh$

$PE = (0.55kg)(9.8m/s^2)(1.5)$

$PE = 8.05\ J$



Part 2 - Calculating Velocity

0.55 kg rubber ball is dropped from rest at a height of 1.5 meters

How fast is the ball moving when it hits the ground? (assume no air resistance)

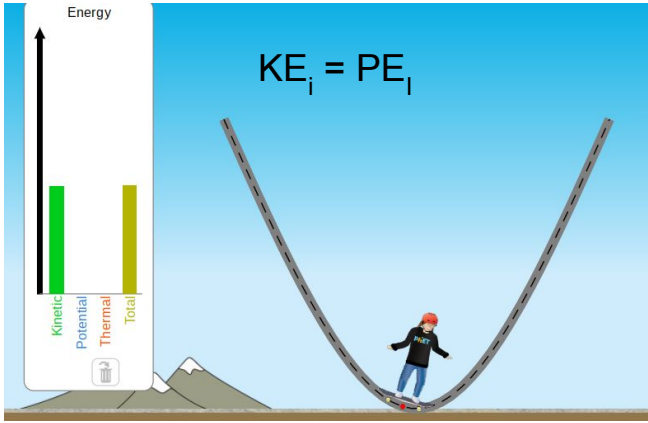
- If there is no air resistance, all of the potential energy is converted to kinetic energy.
- = Potential Energy(at max height) = Kinetic Energy
- - $KE = .5mv^2$
- $8.05 = (0.5)(0.55)\ v^2$

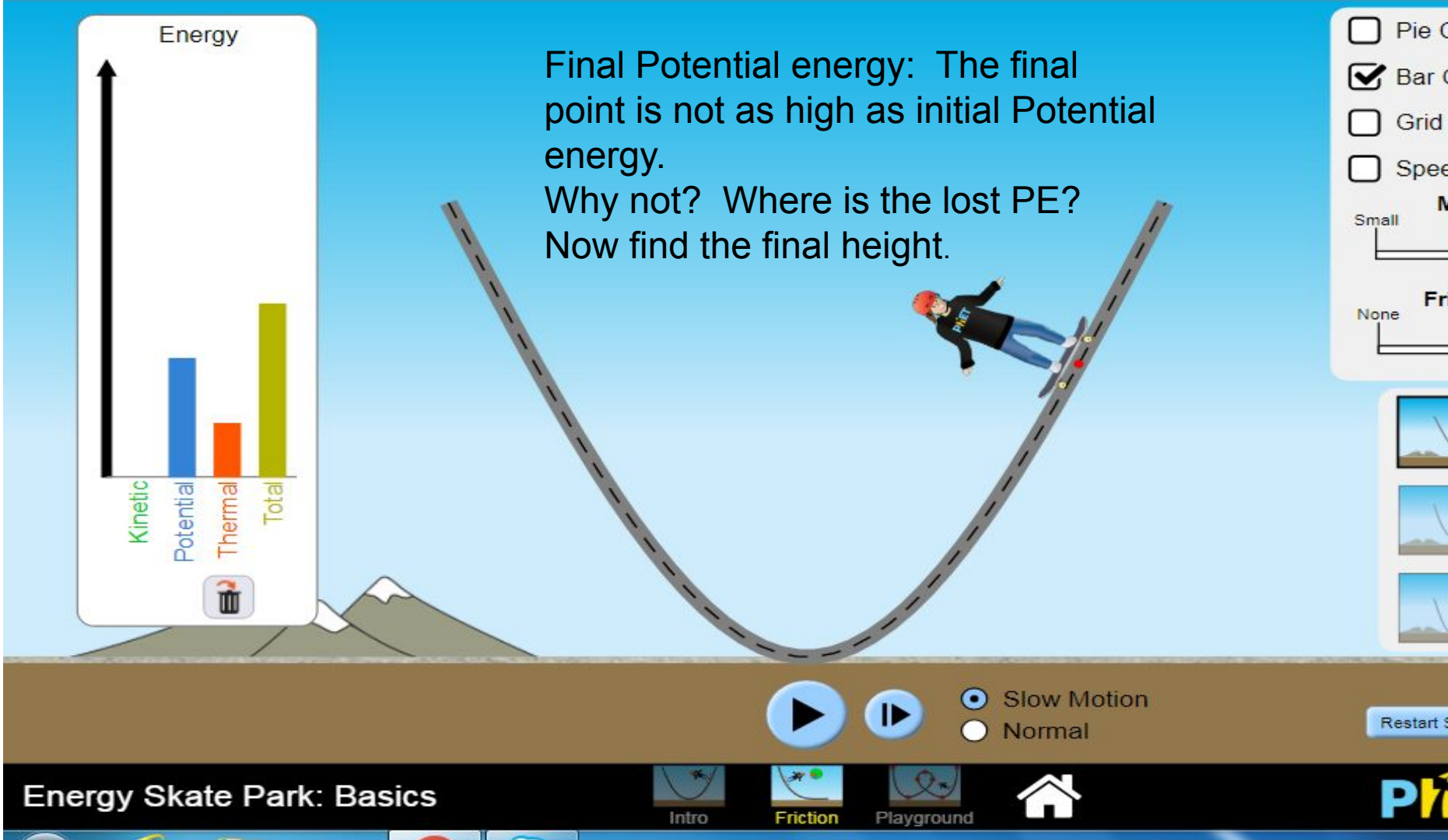
$\frac{8.05}{.275} = \frac{(0.275)\ v^2}{.275}$

$29.3 = v^2$

$\sqrt{29.3} = v$

$5.41\ m/s = v$




Energy
Kinetic
Potential
Thermal
Total
Final Potential energy: The final point is not as high as initial Potential energy.
Why not? Where is the lost PE?
Now find the final height.
Pie
Bar
Grid
Spee
Small
None
Slow Motion
Normal
Energy Skate Park: Basics
Intro
Friction
Playground

Part 3 - Calculating Height

0.55 kg rubber ball is dropped from rest at a height of 1.5 meters
During the collision with the ground the ball loses 0.8 Joules of energy. What is the maximum height the ball reaches on its rebound back up?
Conservation of Energy Equation:

$PE_i = PE_f$ - dissipated energy

$PE_f = 8.05J - .8J$

$PE_f = 7.25\ J$

$h = PE/(mg)$

$h = (7.25)/(.55*9.8) = 1.34m$

Calculating Conservation of Energy

0.35 kg rubber ball is dropped from rest at a height of 1.2 meters

1. What is the gravitational potential energy of the ball when it is dropped?

2. How fast is the ball moving when it hits the ground? (assume no air resistance)

3. During the collision with the ground the ball loses 1.5 Joules of energy. What is the maximum height the ball reaches on its rebound back up?

Part One - Calculating Potential Energy

0.35 kg rubber ball is dropped from rest at a height of 1.2 meters

What is the gravitational potential energy of the ball when it is dropped?

$PE = mgh$

$PE = (0.35kg)(9.8m/s^2)(1.2)$

$PE = 4.116\ J$

Part 2 - Calculating Velocity

0.35 kg rubber ball is dropped from rest at a height of 1.2 meters

How fast is the ball moving when it hits the ground? (assume no air resistance)

- If there is no air resistance, all of the potential energy is converted to kinetic energy.
- Potential Energy(at max height) = Kinetic Energy
- $KE = .5mv^2$
- $4.116 = .5 \times 0.35 \times v^2$

$4.116 = .175 \times v^2$

$\frac{4.116}{.175} = \frac{.175}{.175}$

$23.52 = v^2$

$\sqrt{23.52} = v$

$4.85 \text{ m/s} = v$

Part 3 - Calculating Height

0.35 kg rubber ball is dropped from rest at a height of 1.2 meters
During the collision with the ground the ball loses 1.5 Joules of energy. What is the maximum height the ball reaches on its rebound back up?

$PE_f = PE_i$ - dissipated energy

$PE_f = 4.116J - 1.5J$

$PE_f = 7.25\ J$

$PE_f = m \times g \times h$

$\frac{}{mg \quad mg}$

$h = PE_f/(mg)$

$h = (7.25)/(.35*9.8)$

$h = 7.25 / 3.43$

$h = 2.11\ m$