Conservation of Energy

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Mechanical Energy

- **What types of energy have we learned about already?**
  - _____
  - _____
- **The sum of kinetic energy and all forms of potential energy**

2

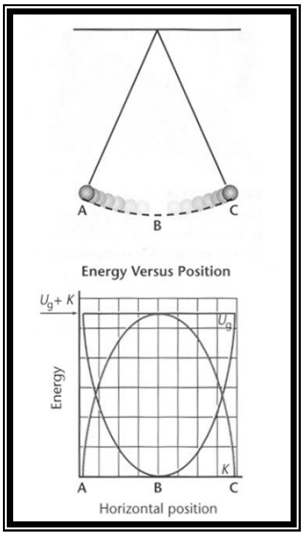
Law of Conservation of Energy

- **Energy cannot be created or destroyed. It can change form.**
- **Can only be proven when all forms of energy can be accurately measured.**
- **_____**
  _____
- **Let's look at a pendulum..**

3

Energy of a Pendulum

- **A simple pendulum will exhibit the law of conservation of energy during its motion.**
- **Notice the energy is _____, but the total energy will remain _____.**



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Law of Conservation of Energy

- **What happens to the gravitational potential energy of a ball as it is dropped?**
  - **_____**
- **What happens to the kinetic energy of a ball as it is dropped?**
  - **_____**

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Law of Conservation of Energy

- **How?**
  - **The _____ is converted into _____.**
- **When a ball is dropped and bounces back up, does it reach the same height?**
  - **_____**

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Law of Conservation of Energy

- **Why?**
  - **Some of the energy is converted into _____**
- **Friction and thermal energy _____ _____ the law is not followed, because we usually don't measure the temperature change.**

http://phet.colorado.edu/sims/html/energy-skate-park-basics/latest/energy-skate-park-basics_en.html

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Law of Conservation of Energy

- **The Math:**

$$ME_{before} = ME_{after}$$

$$K_{before} + U_{g\ before} = K_{after} + U_{g\ after}$$

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Sample problem

- **Starting from rest, a 25.0 kg child slides down a frictionless slide with an initial height of 3.00 m. What is her speed at the bottom of the slide?**

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Given: m = 25.0 kg

Before:	**After:**
h = _____	**h = _____**
v = _____	**v = _____**

Equation:

$$\frac{1}{2}mv_{before}^2 + mgh_{before} = \frac{1}{2}mv_{after}^2 + mgh_{after}$$

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Sample problem

- **A toy car of mass 2.50 kg starts at the top of a 1.05 m drop with a velocity of 0.30 m/s.**
  - **What is the velocity of the coaster at the top of the next hill that is 0.85 m high?**

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Given: m = 2.50 kg

Before:	**After:**
h = _____	**h = _____**
v = _____	**v = _____**

Equation:

$$\frac{1}{2}mv_{before}^2 + mgh_{before} = \frac{1}{2}mv_{after}^2 + mgh_{after}$$

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