Roller Coasters

Potential and Kinetic Energy in the real world.

Energy Energy is the ability to do work. Energy is anything that can make matter move or change.

Work is the use of force to move an object. The amount of work done depends on the amount of force exerted and the distance the object traveled.

Energy Transformation

The Law of Conservation of Energy states that energy cannot be created nor destroyed. Instead, it must be transformed into another type of energy.



How does energy change as a roller coaster moves?

Mechanical energy is changed to heat energy.

 The energy related to movement is changed because of the friction between wheels and the track. How does energy change as a roller coaster moves?

- As the ride continues, the coaster has less and less mechanical energy.
- The engineers who design roller coasters use math to figure out how much mechanical energy is converted throughout the ride. They make each hill that follows smaller to compensate for this decrease in mechanical energy.
 Eventually the roller coaster changes most of its mechanical energy and is able to come to a safe stop.

1.00 m

Mechanical Energy

Mechanical energy is the energy that an object has because of its motion or position.

Mechanical energy is either kinetic or potential.

Potential Energy

Stored energy - It is the energy that an object has because of its position or condition. - It can be changed to kinetic energy.



Examples of Potential Energy

- A roller coaster on the top of a hill has the potential to move due to gravity. The higher the hill the greater the potential energy.
- Gasoline that is stored in a car has the potential to move the car.
 Nutrients in food has the potential to move your body.

Kinetic Energy

The energy an object has because of its motion.

The amount of kinetic energy an object has is influenced by its <u>mass</u> and speed.



Examples of Kinetic Energy

A roller coaster that is full of people has a greater <u>amount of mass</u> than an empty roller coaster. A full roller coaster has more energy and force.

The higher the first drop, the greater the **speed** and total energy the roller coaster will have. A taller track gives the roller coaster more energy than a shorter one.

Label the coaster!



Brainstorm!

What are other examples of the transfer of potential and kinetic energy?

Brainstorm!

Draw the examples given by the class. Label the areas where potential and kinetic energy are the greatest.