



# Fourth Grade Science

# 4th Grade Science: Summer Activity 1

## Potential and Kinetic Energy



Directions: This handout can also accompany a KCSatHome Teacher Video. If you have access to the video, watch the video before doing this activity. You can find the videos at <https://www.knoxschools.org/Page/21816>

### How does the height of hills affect a roller coaster?

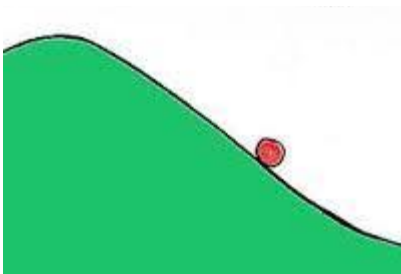
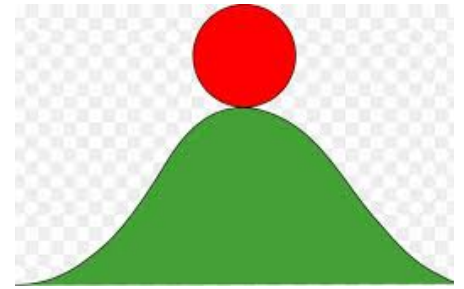
Directions: In the box below, draw what you think would be the perfect roller coaster. Include at least 2 hills.



## Part 1

**Directions:** Read the text below to learn about potential and kinetic energy.

**Potential energy** is the stored energy an object has because of its position or state. An object with potential energy is not using its energy now. The energy is stored in the object and can be used at a later time. The higher an object is, the more potential energy it has. For example, a person sitting on a bicycle has potential energy. A person sitting on a bicycle on top of a hill has more potential energy than if sitting on a flat surface. The higher an object is above the surface, the more potential energy it has.



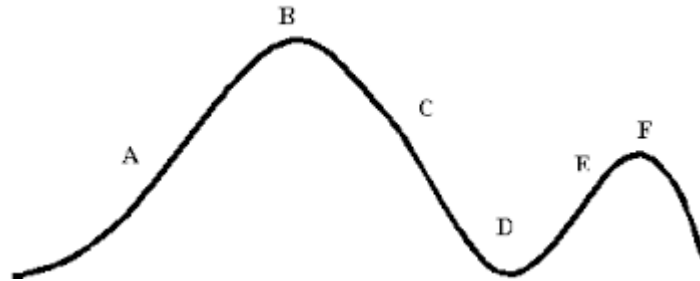
**Kinetic energy** is the energy an object has because of its motion. If you kick a soccer ball, it has kinetic energy. When the soccer ball stops, it no longer has kinetic energy. As long as an object is moving, it has kinetic energy. Kinetic energy also depends on an object's speed. The faster an object is moving, the more kinetic energy it has.

Potential and Kinetic energy work together like the example below. As the girl rides up the hill, she loses kinetic energy and gains potential energy because she is moving up the hill. As she sits on top of the hill, she has the most potential energy. As she starts back down the hill, she gains kinetic energy and loses potential energy.



## Part 2

### How does a roller coaster use potential and kinetic energy?



When the car of a roller coaster is sitting and waiting for the ride to begin, it has potential energy. As the ride starts to move, the roller coaster is using kinetic energy.

Why does point B have the most potential energy?

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Look back at your drawing of your roller coaster. Would it have worked? Why or why not?

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### Part 3

**Directions:** Dolly Parton has contacted you to design the newest roller coaster at Dollywood. You must create a design that will have the right amount of potential and kinetic energy to be an exciting roller coaster. You will draw your design in the box below.

1. Draw a roller coaster in the box provided. (It must have at least two hills)
2. Draw 2 cars showing potential energy. Label each car with potential energy.
3. Draw 2 cars showing kinetic energy. Label each car with kinetic energy.

