

## Roller Coasters, Energy Machines - Web Quest

An Investigation of Potential and Kinetic Energy

*\*Label and Number your **OWN** paper. Answer the following on that paper.*

**A.** Take a virtual ride on the Millennium Force at Cedar Point! Follow Link below and scroll down to the video and click play.

<https://www.cedarpoint.com/rides/Roller-Coasters/Millennium-Force>

1. Think about and describe what a roller coaster has to do with energy?

**B.** Check out the energy in a roller coaster ride!

*Read the article, from start to finish, to answer the questions below. The article has 10 “pages”.*

*Click the blue **NEXT** to advance to the next page. (Ignore the ads. They’re why it free!)*

[How Roller Coasters Work | HowStuffWorks](#)

2. What three things *drive* a roller coaster?

3. From where, is it believed, did roller coasters have their origin? Explain.

4. What was the name of the first American “coaster”?

5. What two things keep a roller coaster moving for most of the ride?

6. The initial ascent of a roller coaster is to build up a reservoir of \_\_\_\_\_ .

(The “Click play...” part may or may not work depending on your computer, but you can try it.)

7. At every point on a roller-coaster ride, gravity is pulling you \_\_\_\_\_ .

8. How does Newton’s First Law of Motion relate to the sensations you feel on a coaster?

9. Acceleration forces are measured in \_\_\_ - \_\_\_\_\_.

10. What is the actual shape of a loop-d-loop? (hint, it’s not a circle)

11. What is the reason behind not having perfect circle loop-d-loops? Explain

**C.** Answer the following with you OWN resources, without the computer:

12 .What is potential energy?

13. What is the formula for calculating PE?

14. What is kinetic energy?

15. What is the formula for calculating KE?

**D.** Open the link below. Click the VIEW button.

<http://illinois.pbslearningmedia.org/resource/hew06.sci.phys.maf.rollercoaster/energy-in-a-roller-coaster-ride/>

16. What do you notice about the relationship between potential and kinetic energy and the path of the coaster? (Look at the Pie Chart) Explain

17. When is Kinetic Energy the greatest?

18. When is it the LEAST?

19. When is Potential Energy the greatest?

20. When is it the LEAST?

**E.** Take a second virtual ride, this time on the Top Thrill Dragster!

<https://www.cedarpoint.com/rides/Roller-Coasters/Top-Thrill-Dragster>

21. Make a sketch of what the roller coaster TRACK looks like. Label the point at which the coast has the greatest potential energy AND then the greatest kinetic energy.

**F.** Create your own coaster! Keep in mind all that you have learned about potential and kinetic energy to make this coaster run!

<http://www.learner.org/interactives/parkphysics/coaster/>

22. If you are riding in your roller coaster, how do you think your speed is related to your kinetic energy?

23. What makes a successful roller coaster?

**G.** Roller Coasters are an engineering marvel and their design and construction takes years of work even before a shovel of dirt is moved. PUT YOUR EARBUDS IN and watch the following link. As you watch, think of all the challenges that might occur when building a roller coaster and the different skills each job would require.

[National Geographic Megastructures - World's Fastest Roller Coaster](#)

24. Of all the careers related to the design AND construction of a modern roller coaster, **explain** which one sounds like something you would like to do in the future.

