

Name:

Date:

Class:

Roller Coaster Final Model Handout

Objective: To build a model of your roller coaster that shows where its potential energy comes from and how its kinetic energy changes over time, and use evidence to explain it in writing.

Phase 1: Review Your Evidence

ASK & RESEARCH

What do you already know from Lesson 4? What are we building toward today?

Instructions: Think back to your Energy Skate Park trials, where you changed height, mass, and friction. Answer the following questions.

**What did your data show about where your coaster had the most potential energy?
Where did it have the most kinetic energy?**

Most Potential Energy:

Most Kinetic Energy:

You already found the answer to last activity's mystery: Energy doesn't disappear, it changes form, and a little always leaks out as heat due to friction.

Quick check: What evidence from your Energy Skate Park trials supports this?

Today you'll go further by building a model that shows exactly where your car's potential energy comes from and how its kinetic energy changes as it moves, using your own coaster as evidence. Gather:

- Your team's original paper roller coaster.
- Your data notes or screenshots from the Energy Skate Park simulation.
- Poster paper or a whiteboard, plus markers in at least two colors.

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Phase 2: Build Your Model

★ **Your Challenge:** Build a labeled model of your roller coaster that shows where potential energy comes from, how kinetic energy changes as the car moves, and where both are at their maximum and then explain it in writing using eight specific vocabulary words.

PLAN

Decide with the team how you'll divide the work: who traces the track, who labels components, who marks the energy points.

You will label at least three points on your track (for example, A, B, C). At each point, decide: Is the car at its fastest, or does it have the most stored energy?

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CREATE

Build your labeled model, then check it against the criteria below.

Sketch or photograph the team's labeled model, and paste or attach it in the box below.

Check your model against this list: Does it label the base, track, every hill/loop/turn, the catch mechanism, and the car? Does it use directional arrows to show the car's motion? Are at least three points labeled with the correct energy type?

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Point	Height (High / Low)	Speed (Fast / Slow)	Energy Type (Max PE or Max KE)
A			
B			
C			
D			
E			
F			

IMPROVE

Check your point log against your model and fix any point where the energy type doesn't match its height and speed.

If a point's energy type doesn't match (for example, a low point marked as maximum potential energy), relabel it correctly before moving on to Phase 3.

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Phase 3: Analyze & Explain

Complete this part on your own, using the team's labeled model and point log.

Look for the patterns in your own model. Complete each sentence below using evidence from your labeled points. (Example: As the car's height increases, its potential energy increases.)

As the car's height increases, its _____ energy _____.

As the car's speed increases, its _____ energy _____.

As friction acts on the car, some of its mechanical energy _____.

Now fill in each blank using evidence from your model:

The kinetic energy in my model is greatest at

The potential energy in my model is greatest at

Energy is lost to thermal energy (friction) at

Even so, the total amount of energy in my system stays the

Write your final model paragraph:

- Walk your reader through your model from start to finish, point by point.
- Explain where your car's potential energy comes from, give evidence for how its kinetic energy changes as it moves, and explain what happens to the energy that converts to heat due to friction.
- Your paragraph **MUST** use all eight of these words: kinetic energy, potential energy, mass, speed, height, work, gravity, force.

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