



Flying High



Mini Fact:

Twelve new roller coasters opened at parks around the country this year.

Have you ever ridden a roller coaster? These thrill rides can be found at many amusement parks around the country. Parks advertise their rides as the tallest, longest or fastest coasters, hoping to draw kids and adults to try them out.

This week, The Mini Page learns more about how roller coasters became so popular and the science behind them.

Riding on science

You don't have time to think about it when you're screaming your way through steep hills and loops on a roller coaster, but your ride is demonstrating several properties of physics (FIZZ-iks), the science of matter and energy.

Roller coasters convert **potential energy**, or the energy that's built up as the car goes up the hill, into **kinetic energy** — the energy that takes you down the hill.

Roller coaster cars don't have motors. They work because of **gravity**, the force that pulls items back toward the Earth.

After the coaster cars are pulled up by a chain to the top of the steepest hill, gravity takes over to pull them down the track.



photo by Inferno Inaane

Momentum, or the force an object has when it is moving, keeps the cars going forward even as the track levels out or goes up a little bit. But **friction**, or the rubbing of the wheels on the tracks, slows the cars down.

As the roller coaster speeds up and slows down during the ride, your body feels different forces at work: gravity, **acceleration** and **inertia** (in-ER-sha). Inertia can be explained by saying that an object will stay still, or keep going, unless something else acts upon it. For instance, the roller coaster car would keep going forever if there were no friction or gravity to slow it down. These competing forces can make you feel as if you're weightless.

Roller coasters also have brakes to slow the cars at certain points along the way and at the end of the ride. Which force is demonstrated through the use of brakes?

Roller coaster Fact-a-roonies

- The **tallest** coaster is Kingda Ka at Six Flags Great Escape in Jackson, New Jersey. It stands 456 feet tall and has the tallest drop of 418 feet.

- The **fastest** roller coaster is in Abu Dhabi, which is part of the United Arab Emirates. The ride, Formula Rossa, is at Ferrari World and goes just over 149 mph!

- The **fastest wooden** roller coaster is Lightning Rod at Dollywood in Tennessee, which goes 73 mph.

The longest ride is the Steel Dragon at Nagashima Spa Land in Nagashima, Japan. At more than 8,100 feet long, the ride takes 4 minutes.



photo by Holiday Point

Sliding down

About 400 years ago, the Russians invented the first coasters. A rider climbed to the top of a tower, got into a sled and slid to the bottom over an ice-covered course. He or she would get off and climb to the top of a nearby tower and do it again. These rides were called Russian Mountains.

La Marcus Thompson was the father of the modern roller coaster. In the 1880s he invented the "switchback." People climbed a tower, rode down and got off at the end. They then climbed another tower at the end and rode back to where they started.



A switchback railway in California in the late 1800s.

Thompson's Switchback Railway opened at Coney Island in Brooklyn, New York, in 1884. It was a wooden roller coaster.

Steel coasters

Disney opened its Matterhorn Bobsled coaster in 1959, the first to use a tubular steel track. Using steel, coaster designers can bend tracks in any direction, which means they can include loops and corkscrews in the ride.

Resources



On the Web:

- youtu.be/khRTNdEgZqg
- youtu.be/ITcT1VeJfKc
- bit.ly/MPcoasters

At the library:

- "How It Works: Roller Coasters" by Precious McKenzie

Try 'n' Find

Words that remind us of roller coasters are hidden in this puzzle. Some words are hidden backward, and some letters are used twice. See if you can find:



- ACCELERATION,
- AMUSEMENT, DROP,
- FASTEST, FRICTION,
- GRAVITY, HILLS, INERTIA,
- KINETIC, LONGEST,
- MOMENTUM, PARK,
- PHYSICS, POTENTIAL,
- RIDE, ROLLER, STEEL,
- SWITCHBACK, THRILL,
- WOODEN.

W M A C C E L E R A T I O N P
K U K C A B H C T I W S K W O
M B G R K A M U S E M E N T R
O G K E I L O N G E S T R F D
M R R L N B U I N E R T I A W
E A A L E D X H I L L S D S O
N V P O T E N T I A L V E T O
T I P R I P H Y S I C S Q E D
U T A W C F R I C T I O N S E
M Y L E E T S L L L I R H T N

Cook's Corner

Choco-Chip Pumpkin Muffins

You'll need:

- 3 cups white or wheat flour
- 2 teaspoons baking powder
- 2 teaspoons baking soda
- 1 teaspoon salt
- 1 teaspoon cinnamon

- 1 (15-ounce) can pumpkin
- 1 cup canola oil
- 2 cups sugar
- 1/2 cup unsweetened applesauce
- 4 eggs
- 1 1/2 cups chocolate chips



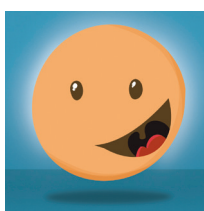
* You'll need an adult's help with this recipe.

What to do:

1. Combine flour, baking powder, baking soda and spices in a large bowl. Mix well.
2. Beat pumpkin, oil, sugar, applesauce and eggs in separate mixing bowl until smooth.
3. Add flour mixture gradually and stir until just moistened. Add chocolate chips and gently fold in.
4. Line muffin tins with paper liners; fill each liner with batter until 2/3 full.
5. Bake at 400 degrees for 20 to 25 minutes until done. Makes 2 dozen.

7 Little Words for Kids

Use the letters in the boxes to make a word with the same meaning as the clue. The numbers in parentheses represent the number of letters in the solution. Each letter combination can be used only once, but all letter combinations will be necessary to complete the puzzle.



1. in front (5) _____
2. robot car in the movies (11) _____
3. they cover a fish (6) _____
4. give up (4) _____
5. break (6) _____
6. armored rider on a horse (6) _____
7. not sick (7) _____

EAD	DAM	GHT	SCA
QU	ER	HEA	TRAN
LES	KNI	AH	LTHY
AGE	SFO	IT	RM

Answers: ahead, Transformer, scales, quit, damage, knight, healthy.

Mini Jokes



Randy: What's the best way to make a milkshake?

Cara: Put a cow on a roller coaster!

Eco Note



Researchers say male bottlenose dolphins communicate by calling on their bros by name. A University of Western Australia study found that dolphins use signature whistles for each other, and are the only animals besides humans to adopt names. Researcher Stephanie King says that using individual names helps the dolphins manage a complex social network of relationships.

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Thank You



The Mini Page thanks Tim Baldwin, communications director of American Coaster Enthusiasts, for help with this issue.

Teachers: For standards-based activities to accompany this feature, visit: bit.ly/MPstandards. And follow The Mini Page on Facebook!



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