

A red roller coaster car is shown on a white track, curving upwards. The background is a vibrant red with faint white line drawings of roller coaster tracks and cars. Handwritten mathematical formulas are scattered across the scene. At the top left, the formula $Q_\epsilon = \phi_\epsilon^*(\dots) + O(\epsilon^2)$ is written. At the bottom right, the formula $Q_1 = \lim_{\epsilon \rightarrow 0} \frac{1}{\epsilon}$ is written.
$$Q_\epsilon = \phi_\epsilon^*(\dots) + O(\epsilon^2)$$

THE SCIENCE OF FUN

THRILL

RIDE

$$Q_1 = \lim_{\epsilon \rightarrow 0} \frac{1}{\epsilon}$$

Teacher's
Resource Guide

Created by Youth Media International
for Sony Pictures Classics

THE SCIENCE OF FUN THRILL RIDE

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student activities

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teaching strategies

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Synopsis

THRILL RIDE: The Science of Fun truly is learning at the edge of your seat!

As the film opens, we creep forward on rickety tracks into an abandoned mining compound. We quickly realize that the grinning old miner leaning against a track switch is about to catapult us into the ride of our lives.

He begins by tracing the history of the roller coaster, from its French roots in 1804, to today's High Roller, coiled around the top of the Stratosphere Hotel in Las Vegas. As we watch a family clutching one another for dear life as their boat hangs on the edge of a waterfall at Busch Gardens' White River Rapid Ride, we wonder why sensible people spend money to be scared silly.

We explore the physics behind roller coasters, and we see how gravity and momentum are used to perform breathtaking feats. We learn how the designers of these rides cleverly play with our senses to heighten the illusion of speed and danger.

We learn that, in the past decade, the technology of the motion simulator, the thrill of the roller coaster, and the excitement of the large-screen film have been blended into an all-new medium—the motion simulation ride film. Where the roller coaster is limited by what is

physically possible, this new medium can take us into the realm of the impossible: We can even meet some dinosaurs up close and personal.

We see how the movie image grew from its pint-sized origin to today's giant format. And, we learn how motion pictures work—how our eye and mind are tricked into seeing moving figures when no images are moving at all.

Another wild ride across canyons and skyscrapers brings us to the heart of the supercomputer—the CPU. We meet the ride's animators and follow the steps they use to construct an image. We see what it takes to create a ride—from selecting the setting and story line, to designing the twists and turns, to adding textures, lighting and detail, and digitizing live actors' images into the scene. Even the theater, we learn, is a marvel of careful planning and engineering.

The film ends with a visit to the "Virtual Museum of History." We experience the first steps on the Moon and witness the "Big Bang." Just like an old-fashioned thrill ride, students are sure to want to try it again!

Summary of Student Activities

Activity Sheet	Student Objective	Curriculum Focus/ Processes	Ride-On Activity
1. Thrills, Fears and Fun	To determine what gives us thrills; the "fight or flight" response	Science Social Studies	Consider meeting and overcoming various challenges
2. Movies – An Optical Illusion	To understand how movies create the illusion of motion	Science: Experimenting Comparing Communicating Observing	Experiment with afterimages
3. Sense and Nonsense	To understand the senses and how they can be tricked	Science: Comparing Classifying Applying Observing	Explore motion-vision connection
4. Now Hear This!	To understand how sound affects perceptions and emotions	Science: Predicting Observing Comparing Language Arts	Consider relationship between vision and hearing
5. Science All-Stars	To connect individuals with their discoveries or inventions	Science: Ordering Hypothesizing Communicating	Identify additional scientific role models and consider impact of their achievements
6. Roller Coasters— A High-Energy Idea	To understand potential and kinetic energy and the effect of height	Science: Measuring Experimenting Applying Observing Math	Experiment with potential and kinetic energy and loss of energy due to friction
7. The Great Energy Machine	To identify energy transformations and the effect of friction	Science: Relating Applying Communicating Synthesizing	Identify energy forms in everyday objects
8. An Incredible Journey	To describe the mechanics of motion simulator rides	Science: Synthesizing Applying Communicating	Consider scientific principles and factors in creating motion simulation ride films

Pre-viewing teaching strategies

Review these ideas and choose those activities that best serve your students' needs:

1. Write the following words and phrases on the chalkboard and ask students to suggest definitions. (These words are in boldface where their definitions appear in the activity sheets and Teaching Strategies.)

perspective	"fight or flight"
optical illusion	afterimage
frequency	inertia
friction	mass
semi-circular canal	gravity
kinetic energy	acceleration
persistence of vision	

Explain to your students that these are just some of the things they will learn more about during the film and from the activities they will do after viewing the film.

2. Use the synopsis of *THRILL RIDE: The Science of Fun* to give students a brief summary of the film.
3. Ask students who have been on roller coasters or have seen motion simulation ride films to share their experiences with the class. What did they like or not like about the rides? Had they ever thought about how much science is involved in creating them?



4. Ask students to name someone whose work involves science. Encourage answers that go beyond research in a laboratory. Explain that science affects their everyday lives in many different ways, and that science—just like a thrill ride—can be fun.
5. Reproduce and distribute the Letter to Parent/Guardian on page 8 for students to take home.

post-viewing teaching strategies



1. Lead students in a discussion of the film, encouraging them to share their impressions: Which part did they find the most thrilling, most scary, most informative, most surprising, most interesting, etc., and would they go again to see the film?
2. Ask them to think about how the sound effects, sound system and the size of the screen affected their impressions.
3. The narrator in *THRILL RIDE* says: "Where the roller coaster is limited by what is physically possible, the ride film can enter the realm of the impossible." Ask your students what they think this means.
4. Ask your students if they can identify the illusions in *THRILL RIDE*. Can they guess why those illusions worked?
5. From pages 9 through 16, choose activities that are appropriate for your students. Refer to the Teaching Strategies on pages 4 through 7 for materials, answers and teaching tips.
6. Refer to Related Resources on the inside back cover for additional information, ideas and activities.
7. Share your thoughts about the film and how you used it with your students at DWhelan@columbia2.msmail.spe.sony.com