Think Like A Scientist

In the Classroom/Before you go:

1. Perform "Exploring Momentum Lesson" with the students. Rolling balls of similar size but different masses leads to talking about how many people should/could ride in an amusement park car. Changing the incline of the ramp leads to talking about distance an amusement park car can travel. For fun, try adding a second "up" hill at the bottom of the ramp and discuss what is necessary for the ball to go up and over the additional hill.

2. Discuss the results of the lab and draw conclusions about roller coaster design from the activity. The ramp and ball experiment (rolling different size and type of balls down an inclined ramp) showed the students the higher the ramp, the farther the ball rolled. Ask the students a few questions to stimulate responses.

a. What do roller coasters look like?
b. Why do you think roller coasters are built that way?
c. How are roller coasters like the ramp in our experiment?

3. Tell the students that they are going to look at roller coaster design like Scientists or Engineers. The students are going to explore a question of their own about roller coaster design and/or construction.

4. Brainstorm questions with the students. Ask them to write down anything they have ever wondered about roller coasters. Then create a class master-list of intriguing thoughts. For example:

a. Is the first hill always the tallest? Why?
b. How often can a car start on the roller coaster? How many times can I ride in an hour?
c. Do the loops make the car go faster or slower?

5. Choose one or two ideas from the brainstorm session for the students to test at the park. (or you could help each student or smaller group of students to fine tune their own question)

6. Now the students will begin to "Think Like A Scientist" to devise an activity to help them explore their roller coaster question. Distribute an activity sheet to the students. You may choose either a three-section worksheet (Guess – Test – Tell) or a five-section worksheet (Question – Hypothesis – Test – Record – Conclude).

7. Guide the students though writing down a question they'd like to answer and what they think the answer might be. Use class discussion time to remind students that a good question can be tested objectively. For example, a student could ask, "Does it take longer for a car to travel up the first hill or down the first hill?" or "How long does it take a car to travel the entire route?" instead of "What is the best roller coaster?"

8. Then help them create a way to try to find an answer. The experiments or tests can be as simple as making visual observations, or more complex with measurements of time. The value of this activity is in the planning as much as in the testing. Students will need to think about what kind of information would be helpful to answer their question. If a student is interested in speeds, they will need to find distances and times. If students are comparing loop and non-loop roller coasters, they will need to find at least one of each kind to watch. Students should be encouraged to consider the equipment they will need to use and how they will use the items for their tests. Have the students write down a short series of steps they will take to gather their required information.

At the Park:

9. Students conduct their experiments & make notes.

In the Classroom/After you return:

10. Help the students draw pictures or create tables to share their results.

11. Have each group and/or student share what they found out.

12. As a wrap-up activity, have the students draw a picture of a rollercoaster they think would work, based on what they learned at the park and from each other.