

**Introduction to Earth Science** ▪ *Enrich*

## What Is Science?

### A Famous Experiment

One of the most famous experiments in the history of science may never have taken place! Before the time of the Italian scientist Galileo, scientists thought that a heavier object would fall faster than a lighter one. Around 1590, Galileo developed a hypothesis of his own: Objects with different masses fall at the same rate.

According to legend, Galileo tested this hypothesis by dropping two cannonballs, one large and one small, from the top of the Leaning Tower of Pisa. He reasoned that gravity would cause both cannonballs to fall at the same rate. Galileo predicted that both would hit the ground at almost the same instant. He thought any slight difference would be due to air resistance. Modern scientists don't think Galileo ever really performed this experiment. But the reasoning behind the experiment was correct. Later scientists showed that gravity causes all objects to fall at the same rate. For example, a coin and a feather fall at the same rate through a glass tube from which the air has been removed.

*With a partner, you can perform a version of Galileo's experiment:*

### Materials

two marbles, one larger than the other  
spring scale  
piece of paper towel, folded in quarters  
ruler

### Procedure

1. Determine the mass of each marble using the spring scale.
2. Place both marbles on the edge of a desk and position the folded paper towel on the floor below.
3. As your partner watches to see which marble hits the floor first, use the ruler to push both marbles off the desk at the same time.
4. Repeat the procedure several times.

*Answer the questions on a separate piece of paper.*

1. Which marble hit the floor first? Does this result support or disprove Galileo's hypothesis?
2. What is the manipulated variable in this experiment? What is the responding variable?
3. What variables are controlled?