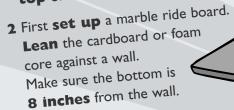# Marble Ride

ZOOMsci™

What You Need

- large piece of cardboard or foam core (about 20 x 30 inches)
- ruler
- masking tape
- building materials (things like construction paper, paper towel tubes, sandpaper, yarn, cloth, cotton balls, sponge, clay)
- marble

Engineering Scoop

To slow the speed of the marble, you need to think about two things: the **angle** of the ramps and **friction**. The **steeper** the ramps, the **more** the marble will speed up. The **less steep** the ramps, the **less** the marble will speed up. As the marble moves down a ramp, there is **friction** between the marble and the ramp. Friction is a **dragging force** that happens when objects **roll or slide** against each other. **Rough** surfaces produce more friction than **smooth** surfaces. So if you roll a marble across a **rough** surface, like a ramp covered in sandpaper, there will be **more friction** to slow it down. How did **you** design your marble ride so it was as **slow** as possible?

1 Design a **roller coaster ride** for a marble. The goal is to have your marble go **slow**, so it takes as long as possible to go from the **top** of the board to the **bottom**.

2 First **set up** a marble ride board. **Lean** the cardboard or foam core against a wall. Make sure the bottom is **8 inches** from the wall.

3 **Plan** your design. What can you do to **slow** down the marble?

4 Start **building**!

5 Each time you **add** a new part to your Marble Ride, **test** it with your marble.

6 When you're ready, **time** how long it takes your marble to go from start to finish. Then **record** your result in the table on the back of this sheet.

Redesign It!

Make **changes** to your Marble Ride so it lasts longer. What other materials can you add to **slow** down the marble? What changes can you make to **increase friction**? Choose **one thing** to change (that's the variable) and make a **prediction**. Then **test it** and **send** your results to ZOOM.

Sent in by Jenny, Anna, Erin, Becky, Jessica, and Jackie of Page, AZ

pbskids.org/zoom

Marble Ride

Here's my marble ride.

(Draw your design and label the parts.)

Send It to ZOOM™!
Tell us about your design at
pbskids.org/zoom

Test your Marble Ride three times and **record** the times below. Then figure out your average time.

	Trial 1	Trial 2	Trial 3	Average Time
Time (in seconds)				

········➤ (Add each time together. Then divide the sum by 3.)