# NEWTON'S NOTIONS

## STUDENT WORKBOOK



# SURPRISING SPIN

What will happen when you spin steel balls and corks in a water-filled tube? You might be surprised!



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# SPIN IT AROUND

#### WHAT YOU NEED: FROM THE KIT:

OTHER ITEMS: Water

- Plastic tube with two caps
- Two small steel balls
- Two corks



### WHAT TO DO:

- **1.** Fit a cap over one end of the plastic tube.
- **2.** Push the cap down until it makes a tight seal with the tube.



- **3.** Gently place the two corks and the two steel balls into the tube and let them hit the bottom (where the cap is).
- **4.** Fill the tube almost to the top with water, leaving about ½ inch of space at the top.
- **5.** Place the second cap over the open end of the tube.
- **6.** Push the cap down until it makes a tight seal (you may want to do this over a sink in case some water gets pushed out).
- **7.** Place the tube horizontally on a flat surface like a table.





In the spinning water tube, each ball has a certain amount of inertia based on its mass. The greater the mass, the greater the inertia.

I. In the spinning water tube, which object (cork or steel ball) has a greater inertia? Explain.

2. If the cap suddenly popped off when you spun the water tube, which object(s) would get out of the tube first? Why?

# SHOW WHAT YOU KNOW

 ? 1. Restate Newton's First Law in your own words (you may also use drawings/diagrams if you like).

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#### **SITUATION 1**

How much momentum does the boulder have before it's stopped?

p = m • v p = (500 kg) (2 m/s) p = 1000 kg • m/s

How much momentum will the boulder have after it's stopped?

p = m • v

p = (500 kg) (0 m/s)

p = 0 kg • m/s

How much force will it take to stop the boulder in one second?





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Kit	SU-NEWTON
Instructions	IN-NEWTONS
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