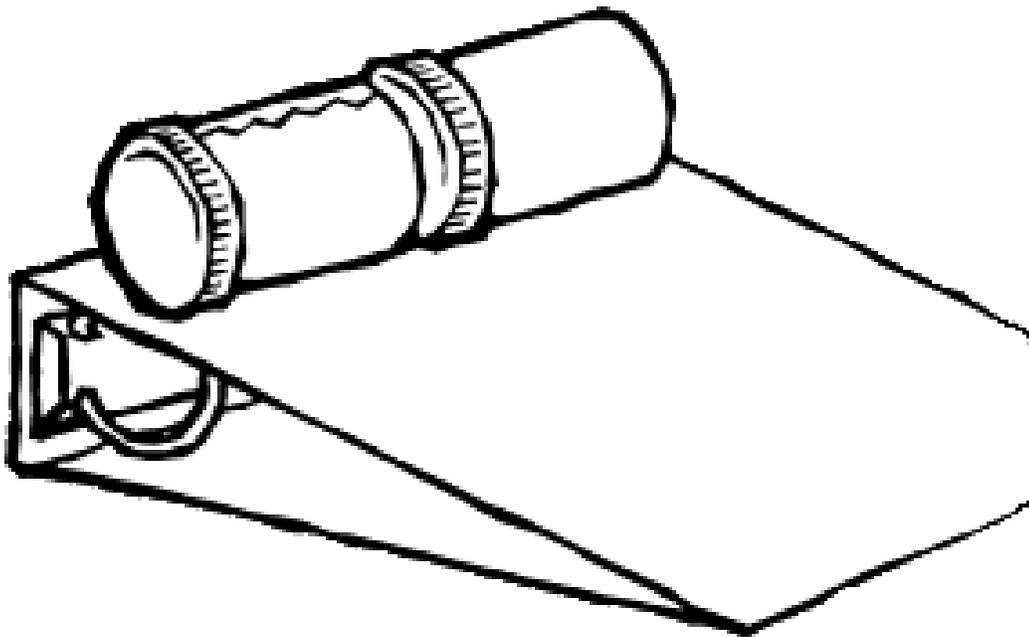


## PRIMARY Activity: Racing Jars

Take two identical clear jars (6 oz baby food jars), leave one empty, and fill one with water. Put the lids on both jars and tighten. Place a large, three-ring binder on a level floor (carpet works well), and start the jars from the top of the "ramp" the binder forms.

Which one will get to the bottom of the ramp first? Which one will roll the farthest? Release both jars at the same time and observe.



At first, the water-filled jar moves down the ramp faster than the empty one. This happens because a solid object will pick up more rotational speed than an empty, or hollow, object—even if both have the same mass. The water-filled jar is more like a solid object and begins to rotate more quickly. The empty jar is left behind.

But as the jars begin rolling along the carpet, the greater mass of the full jar causes more friction between the jar and the carpet than with the empty jar. The full jar slows down, allowing the lighter, empty jar to take the lead!