



# Young Scientist Lab



## WHELMERS

### Water Jug Race

First one to empty the jug wins! And it's not as easy as it sounds...



#### WHAT YOU NEED

- two or more 1-gallon or larger glass jugs (plastic will not work)

#### WHAT YOU DO

1. Make sure the glass jugs are identical in size and shape. Remember, plastic jugs will not work. Their flexibility tends to affect the outcome of the race.
2. Fill all jugs with the same amount of water.
3. Race to empty the water out of the jugs as fast as possible. First one to empty his or her jug wins!

## WHAT HAPPENS

You'll notice that just holding the jug upside down with no additional movements doesn't work. That's because the flow of more dense water *exiting* the bottle is slowed as the water collides with the less dense air *entering* the bottle. In most cases, players who swirl their jug, creating a vortex, win the race. The vortex creates a large inner pathway for air to enter the bottle as water escapes. Also, just shaking the bottle causes the water to travel up and down many times. This increases the distance it must travel before leaving the bottle, which takes longer. For the same reason, swirling the bottle too much will also slow the exit of the water out of the bottle.