Curiosity Guide #707
Fluid Power
Accompanies Curious Crew, Season 7, Episode 7 (#707)

Liquid Power
Investigation #5

Description
We’ve got the power in this fun activity with water!

Materials
• 10-milliliter syringe
• 35-milliliter syringe
• Plastic tubing, six inches in length
• Scissors
• Ruler
• Water
• Food coloring

Procedure
1) Measure and cut a length of tubing and set aside.
2) Add 15 milliliters of water to the large syringe.
3) Turn the syringe over and press the air bubbles out through the top, then connect the syringe to one end of the tubing.
4) Press the plunger of the 10-milliliter syringe all the way in, and connect this syringe to the other end of the tubing.
5) Try pushing and pulling on the 10-milliliter plunger, and then try the 35-milliliter plunger.
6) What do you notice?
7) Try adding food coloring to make the liquid easier to see.
Results

Explanation
You may have noticed that pushing the 10-milliliter plunger is easier, compared to pushing the 35-milliliter plunger. This relates to the diameter of the syringe itself. Total force is calculated by the pressure multiplied by the area. The pressure of the water is the same throughout the system, so the only difference is the area of the syringes. This means that the force in the larger syringe is multiplied. Pushing on the 10-milliliter plunger is easier because the area is smaller. There is a mechanical advantage going from a small cylinder to a larger one, but the tradeoff is that the larger cylinder won’t move as much.

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