Current, Potential and Resistance - a Fluid Model

Apparatus

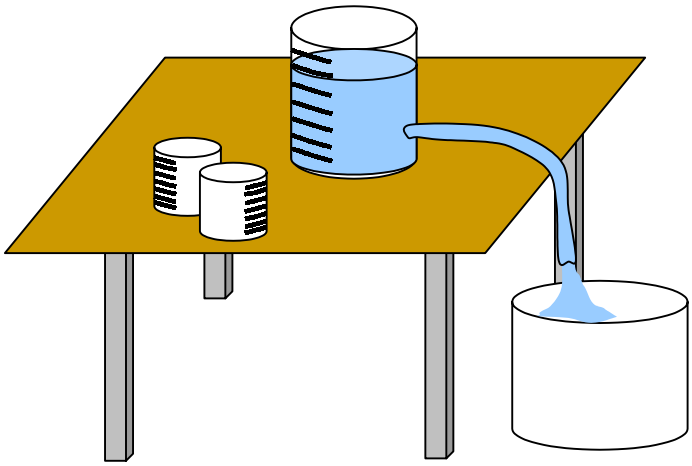
large container with hole at the bottom, beakers, bucket, flexible plastic tubing, paper towels for cleaning up afterwards

Action

The students put water into the large container and allow it to flow out. They should identify the changes in energy of the water as it flows through the system. They can change the resistance, and hence the current, by squeezing the tubing. They can change the gravitational potential energy of the water in the container by raising or lowering the container, and observe the effect this has on the current. The current can be measured by measuring the amount of water that flows out of the tube and into a beaker in a given time, or by using a flow meter if available.

The Physics

The energy of the water is determined by the height of the large container. This gravitational potential energy is converted to kinetic energy of the water when it is allowed to flow. Squeezing the tube is analogous to increasing the resistance in a circuit, which decreases the current. The difference in gravitational potential (proportional to the height) between the water in the container and the end of the pipe is analogous to the potential difference or *emf* provided by a battery, and increasing this height difference will increase the current flow.



Accompanying sheet

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How can you measure the current here?

How does changing the gravitational potential change the current?

How can you change the resistance?
What effect does increasing the resistance have?