
Synopsis: Kinesthetic Current I... Flow

In this activity we will use macroscopic kinesthetic model to gain a hands-on understanding of current. Understanding current (the flow of charge) is key to beginning DC circuits, conductivity and electromagnets.

Standards

4th Grade

1a. Students know how to design and build simple series and parallel circuits by using components such as wires, batteries, and bulbs.

1c. Students know electric currents produce magnetic fields and know how to build a simple electromagnet.

9-12th Grade

4a. *Students know* waves carry energy from one place to another.

5f. *Students know* ~~magnetic materials and~~ electric currents (moving electric charges) ~~are sources of magnetic fields and are subject to forces arising from the magnetic fields of other sources.~~

Driving Questions

1.) What is current?

Learning Objectives

Students will learn that:

- Current is a flow of charge (typically electrons)
- Current flows from high potential to low potential
- Current is conserved in a loop

Kinesthetic Current I... Flow

Procedure

This is a whole class activity. You may need to go outside to have enough room.

Part A: Hand current

Form a circle and link hands. A leader will raise their left hand (and their neighbors right hand in the process). When the leader lowers their left hand, their neighbor will immediately raise their left hand to start to propagate a wave. Each member of the circle will propagate the wave, raise and lower their arms, when the wave gets to them. This raising and lowering will continue around the circle until it returns to the leader. Once the group has a good idea of how the activity works, try sending the wave around a few times.

Quick follow up questions:

1. What moved around the circle?
2. Did any one hand go all the way around the circle?
3. Approximately how long did it take to raise the leaders right hand?

Possible Alternatives:

1. Open the loop. Model a short circuit. Show that the wave never gets back to the leader.
2. Add a "Power Ball". What happens when the loop is open? What happens when it is closed?

Part B: Pass the ball current

Single ball

Form a circle. A leader will pass a small ball to their neighbor who will pass the ball to their neighbor and so on until it returns to the leader.

Multi ball

Form a circle. Every other person should have a ball. Pass balls to neighbors as before. This will require a bit of timing.

Quick follow up questions:

1. Approximately how long did it take to return a ball to the leader with a single ball? With multiple balls?
2. Sketch a picture that describes the flow of charge around a closed loop.
3. Develop a physical analogy to describe the flow of charge around a closed loop.

Instructor Notes: Kinesthetic Current I... Flow

This activity requires some space and mobility. You may want to do it outside. In addition, you may want to come back to this activity to include models for batteries and resistors.

Safety

This activity no risk associated with it.

Materials

- ~15 Balloons

Notes
