Relativity and Electromagnetism

Apparatus

coil connected to ammeter, bar magnet

Action

The students experiment with moving the magnet in and out of the coil in different directions. They should then investigate the effect of moving the coil rather than the magnet.

The Physics

The direction of the current depends on the motion of the magnet relative to the loop and changes when the magnet is reversed. It doesn't matter whether the coil or the magnet is moved, only the relative motion of the two is important. It was this observation that led Einstein to his theory of relativity.

Whether you consider a reference frame attached to the magnet or the coil makes no difference, the physical result, a current, is the same.

Student at the University of Sydney experimenting with a magnet and a coil.

Accompanying sheet

Relativity and Electromagnetism

Move the magnet in and out of the loop of wire with the ammeter.

What happens if the loop is moved and the magnet is stationary?

What does this tell you about the frame of reference of the magnet and the coil?