Today: Oscilloscope and Faraday’s Law
Oscilloscope

A device for **displaying** electronic signals. Something else must generate the signal.

Think of it as electronic graph paper.
Oscilloscope Display

The vertical axis shows the voltage for the signal (measured in V).

The horizontal axis shows time (measured in s, ms, µs, ns).

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Using an Oscilloscope

- You can measure the amplitude of a signal as well as the period and frequency.
- You can also change the way the signal is displayed by switching the vertical (amplitude) or horizontal (time) scales.
Last week we put a voltage on a coil of wire. The resulting current in the coil made it act like a magnet. In other words a current can produce an magnetic field – evidence that electricity and magnetism are connected.

Q. Can a magnetic field produce a current?

A. Yes… but it is not as easy. A constant magnetic field cannot produce a current (or voltage). A changing magnetic field will do the trick.

Faraday’s law determines that the induced current flows in a way to oppose the change in magnetic field.
Faraday’s Law

I push the magnet into the coil – it pushes back on me.

I pull the magnet out of the coil – it pulls back on me.
Eddy currents

Suppose I have a pendulum with a copper plate on the end that swings through a magnetic field. Do I expect anything to happen?

→ There’s a change in the amount of magnetic field through the copper as it swings into the magnetic field, so an current will be induced.

→ Eddy currents

You’ll do your own eddy current demo with a copper tube.