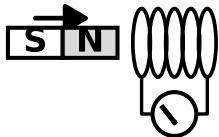
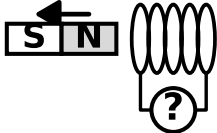
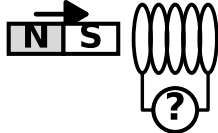


Part A: When Is Current Induced?

1. When Ava pushes the N pole of a magnet into a coil, the meter swings to the **left** (Start). For each case a through d, predict whether the meter swings left, swings right, or stays at zero. Explain each answer.

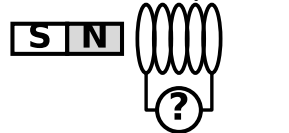
Start

 N pole pushed in:
 meter swings left

a.

 N pole pulled
 out of the coil

b.

 S pole pushed
 into the coil

c.

 magnet resting
 in the coil

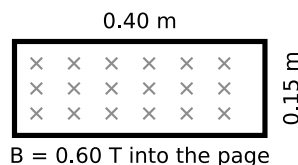
d.

 magnet still,
 coil moved to N

2. Name three changes that would make the induced current in a coil bigger. Then explain why Ava has to push harder to move a magnet into a coil when the coil is connected to a light bulb, and describe the energy changes.

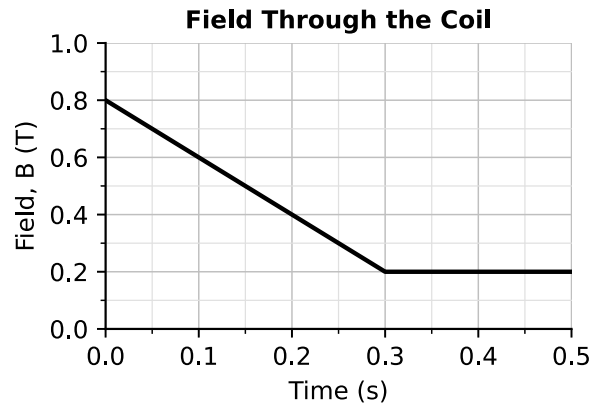
Part B: Flux and Faraday's Law

 Use $\Phi = BA$, $\varepsilon = N \Delta\Phi / \Delta t$, and $I = \varepsilon / R$.

3. A rectangular loop of wire sits in a magnetic field that points straight into the page, as shown. What is the magnetic flux through the loop?



4. A coil with 200 turns, each with an area of 0.010 m^2 , sits in a magnetic field that changes as shown in the graph. The coil is connected to a circuit with a total resistance of $8.0 \, \Omega$.



- Find the induced voltage from 0 s to 0.30 s.
- Find the induced current from 0 s to 0.30 s.
- What is the induced voltage from 0.30 s to 0.50 s? Explain.

-
5. A bike light's generator coil has 300 turns. To light the bulb, the coil needs an induced voltage of 12 V. If the flux through the coil changes by 0.020 Wb each time the magnet passes, how much time can each change take?