## PHYS 2212

Look over Chapter 30 Sections 1-4, 6, 7 Section 9 for lab examples 1, 2, 3

## PHYS 1112

Look over Chapter 21 sections 1-4 Section 11 for lab examples 2, 5

#### Good Things to Know

1)What is Faradays Law.

2)What Magnetic Flux is.

3)How to use Lenz's law to find the direction of a current.

4)How to use Faraday's law to find induced current.

# Two Experiments

Experiment 1: We get an induced current (and an induced emf) only when the current in the right hand loop is changing.

Experiment Experiment 2: A current only appears if there is a relative motion between the magnet and the loop.

### Faradays Law

Faraday realized that an emf and a current can be induced in the loop by changing the amount of magnetic field passing through the loop.

<u>Faraday's law of Induction</u>: An emf is induced in a loop when the number of magnetic field lines that pass through the loop is changing.











## Lenz's Law

Soon after Faraday proposed his law of induction, Heinrich Friedrich Lenz devised a rule —now know as Lenz's Law— for determining the direction of an induced current in a loop:

An induced current has a direction such that the magnetic field due to the current opposes the change in the magnetic field that induces the current.





#### Reformulation of Faraday's Law

If we place a copper ring in a uniform external magnetic field and then steadily increase the strength of the magnetic field what will happen?

According to Faradays law an induced emf and current will appear in the ring.



## Inductors

We found that we could store energy in the field of a capacitor.

We will now do the same with the magnetic field.

An <u>Inductor</u> (which is basically a solenoid) can be used to store energy in the magnetic field produced by the changing current flowing through the coils of the inductor.







