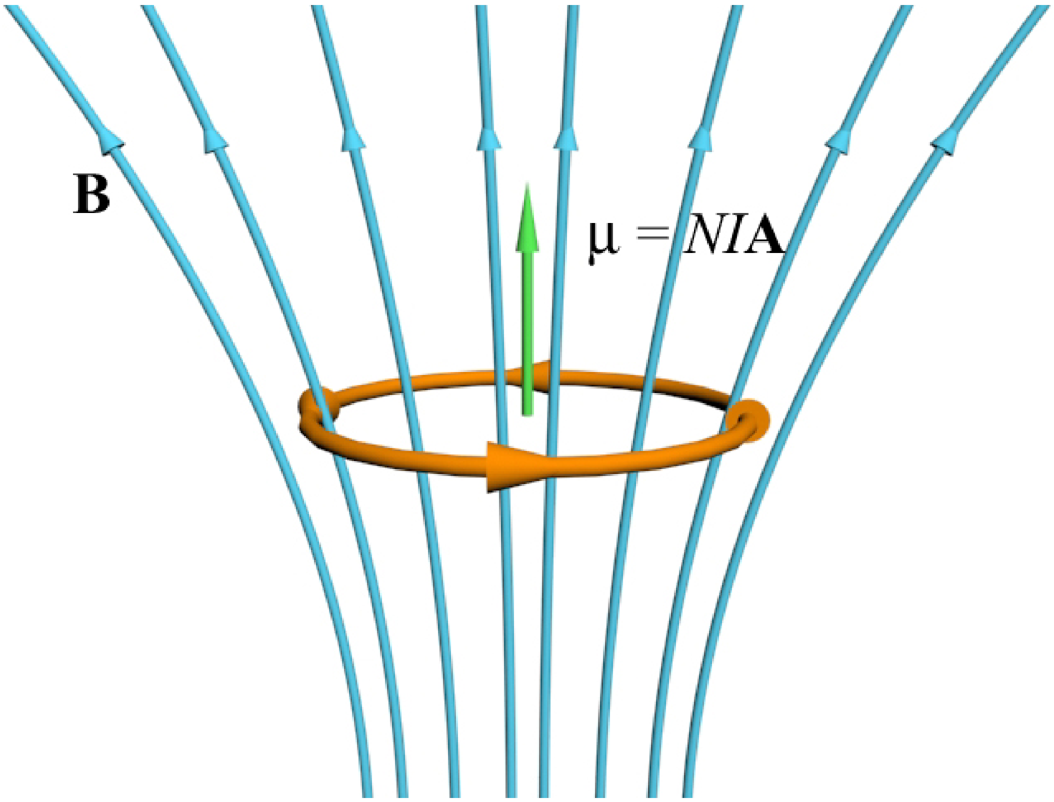
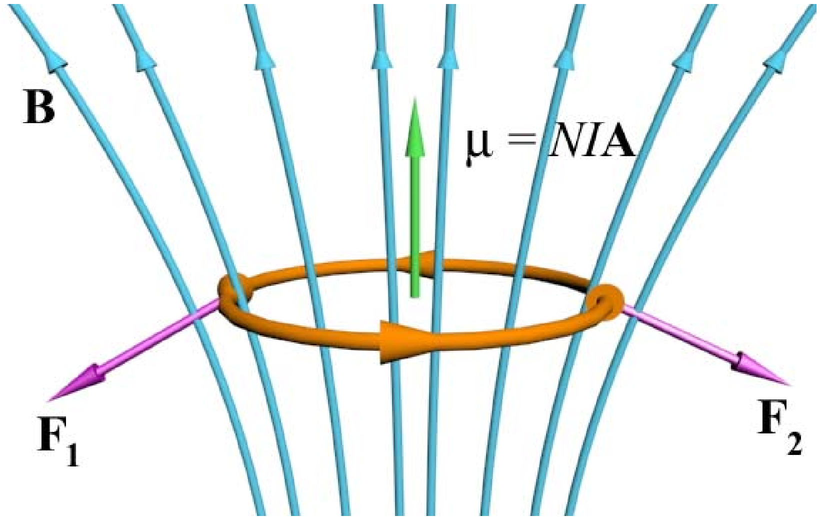
Dipole in Field

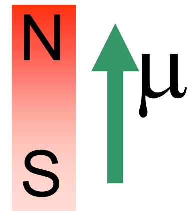


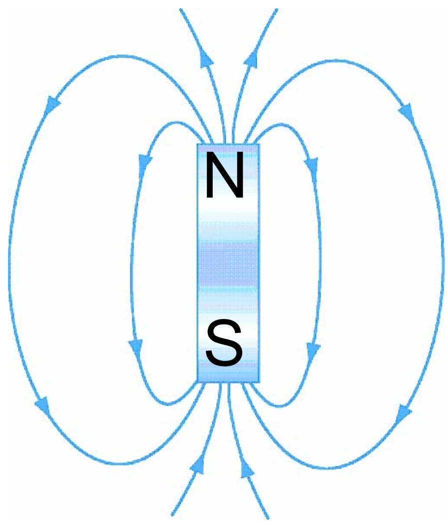
The current carrying coil above will move

1. upwards
2. downwards
3. stay where it is because the total force is zero

Dipole in Field





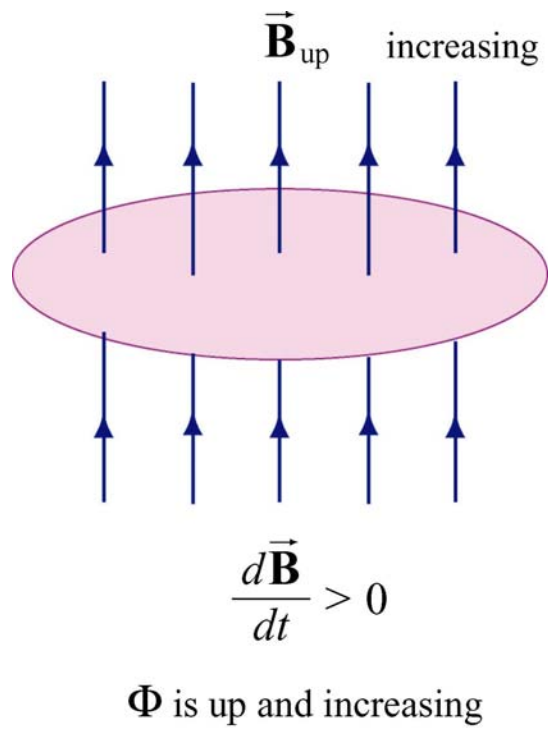


(2) Coil will move down

EITHER: The ***I ds x B*** forces shown produce a net downward force

OR: Think about magnets…

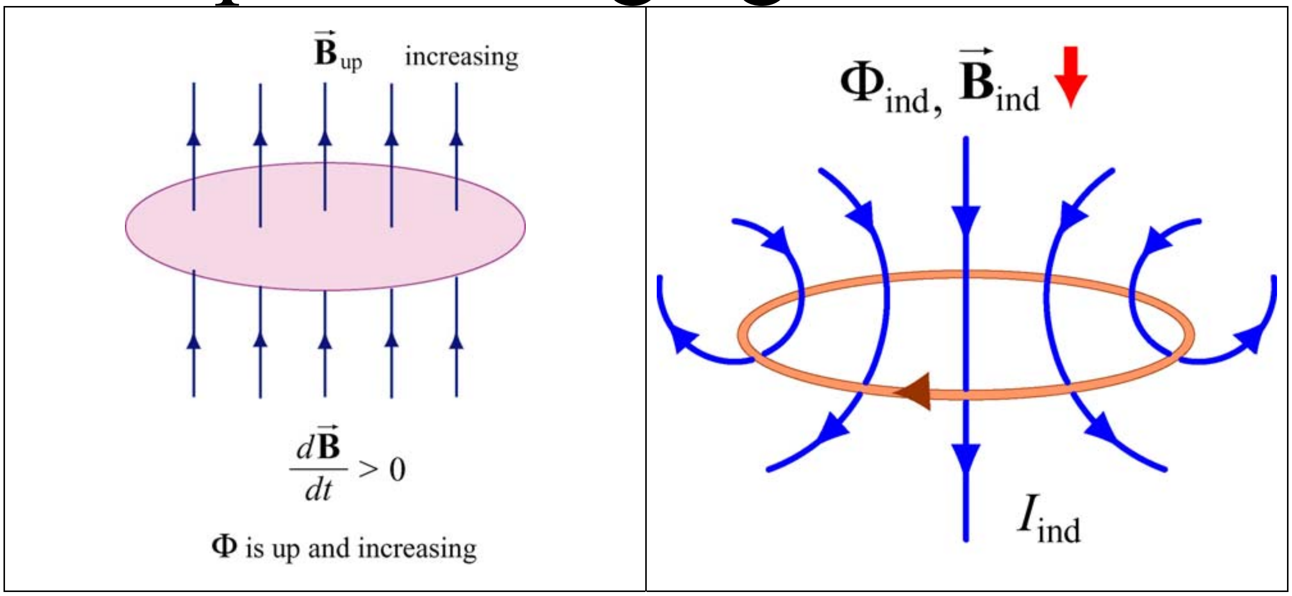
Loop in Changing Field



The magnetic field through a wire loop is pointed upwards and *increasing* with time. The induced current in the coil is

1. **Clockwise as seen from the top**
2. **Counterclockwise**

Loop in Changing Field

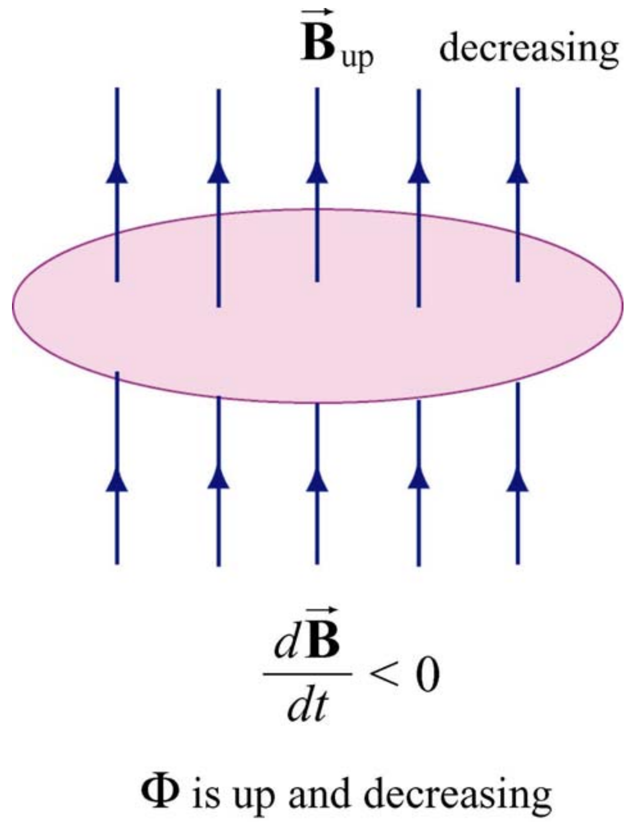


(1) Current is clockwise.

This produces an "induced" B field pointing down over the area of the loop.

The "induced" B field opposes the increasing flux through the loop – Lenz's Law

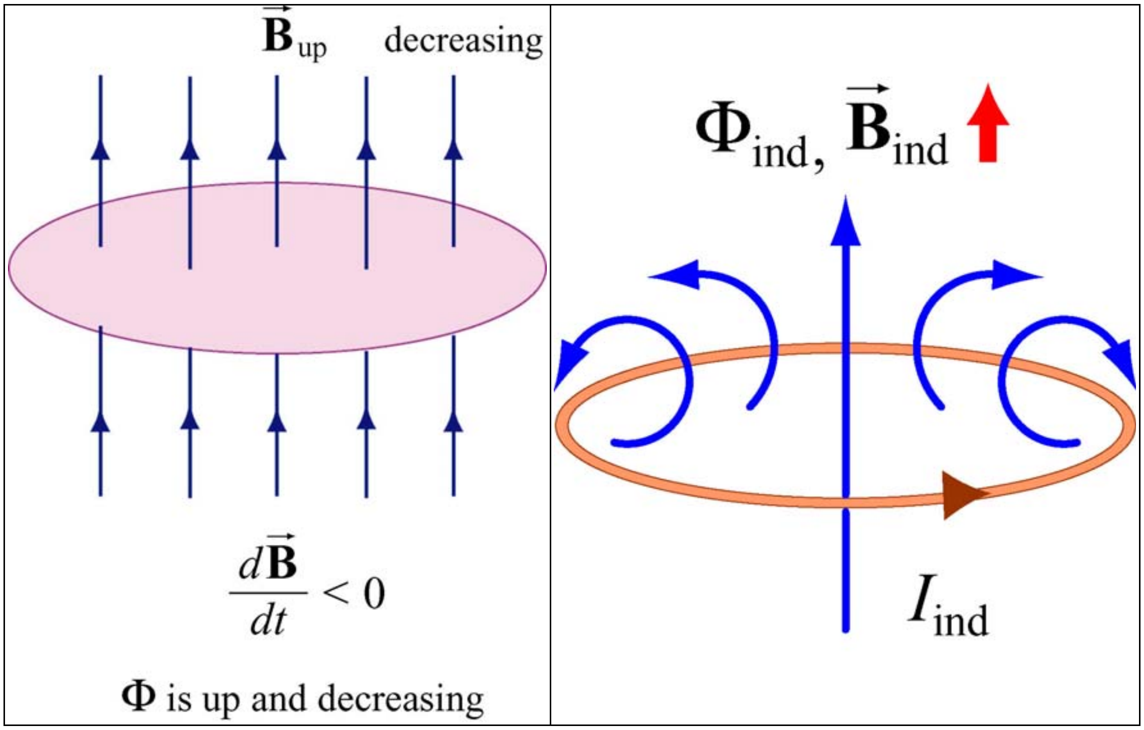
Loop in Changing Field



The magnetic field through a circular wire loop is pointed upwards and *decreasing* with time. The induced current in the coil is

1. **Clockwise as seen from the top**
2. **Counterclockwise**

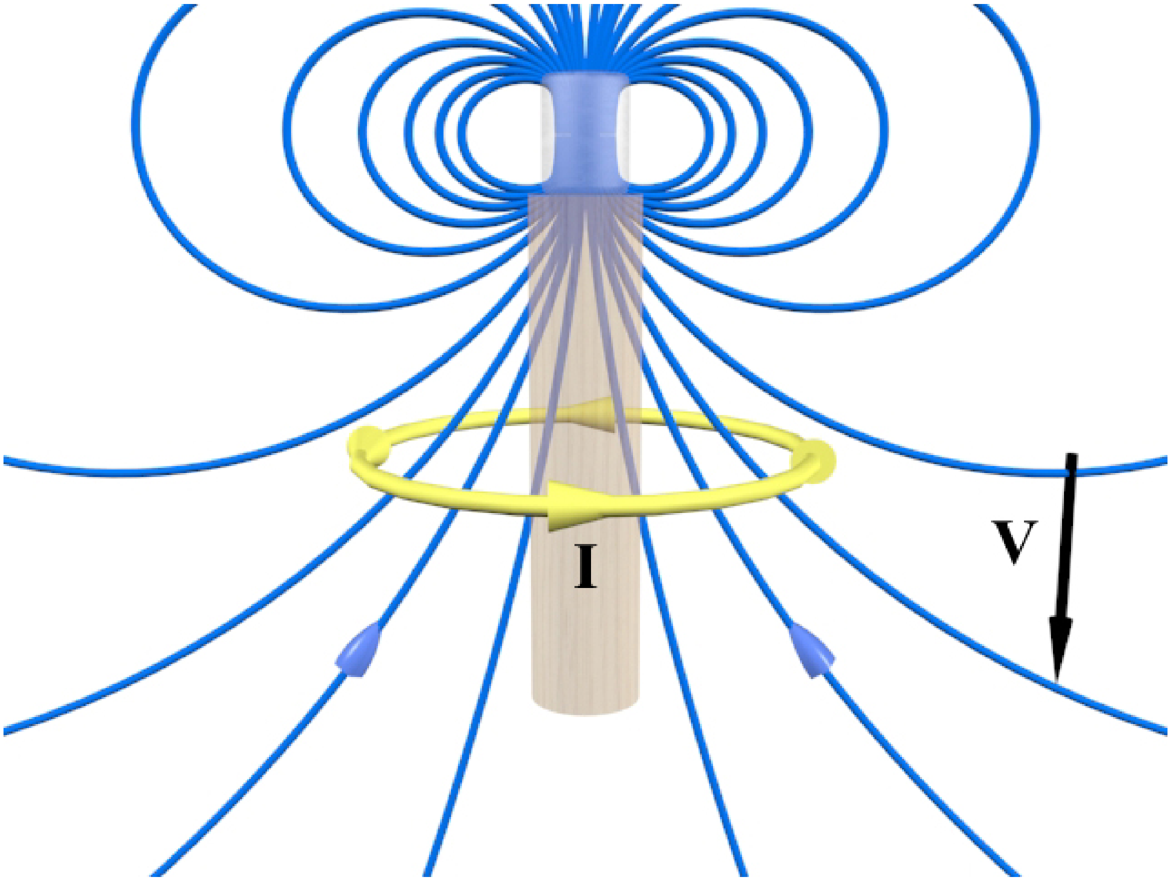
Loop in Changing Field



(2) Current is counter-clockwise.

This produces an "induced" B field pointing up over the area of the loop.

The "induced" B field opposes the decreasing flux through the loop – Lenz's Law

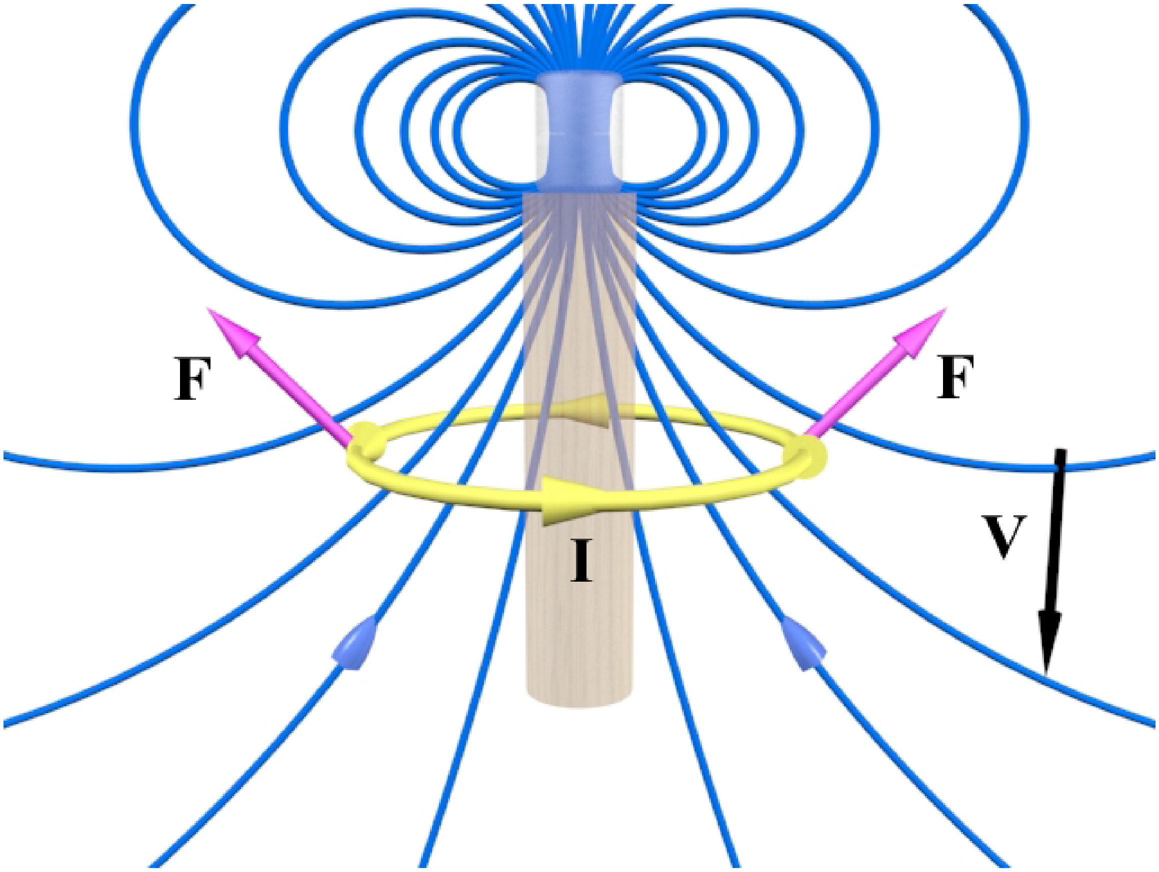


When the coil is below the magnet and moving downwards. This induces a current as pictured. The *I ds x B* force on the coil is

1. Upwards

2. Downwards

3. Zero



(1) Upwards

<u>Lenz' Law:</u>

Must oppose motion – force is up

<u>More detail:</u>

Induced current is counter-clockwise to oppose drop in upward flux. This looks like a dipole facing upward, so it is attracted to the other dipole