Magnetism & Right Hand Rule

IB PHYSICS | FORCE FIELDS

Rules of Interaction

Cutting Magnets in Half

Poles cannot be isolated – a magnet cannot be broken to get a separate north and south pole. Instead, it creates two magnets, each with a north and south pole

Magnetic Domains

Domains Before Magnetization

Domains After Magnetization

In order for a material with domains to become magnetic, the domains have to be aligned by an external magnetic field.

If enough of a materials domains become aligned, the material forms a magnetic dipole and becomes a permanent magnet

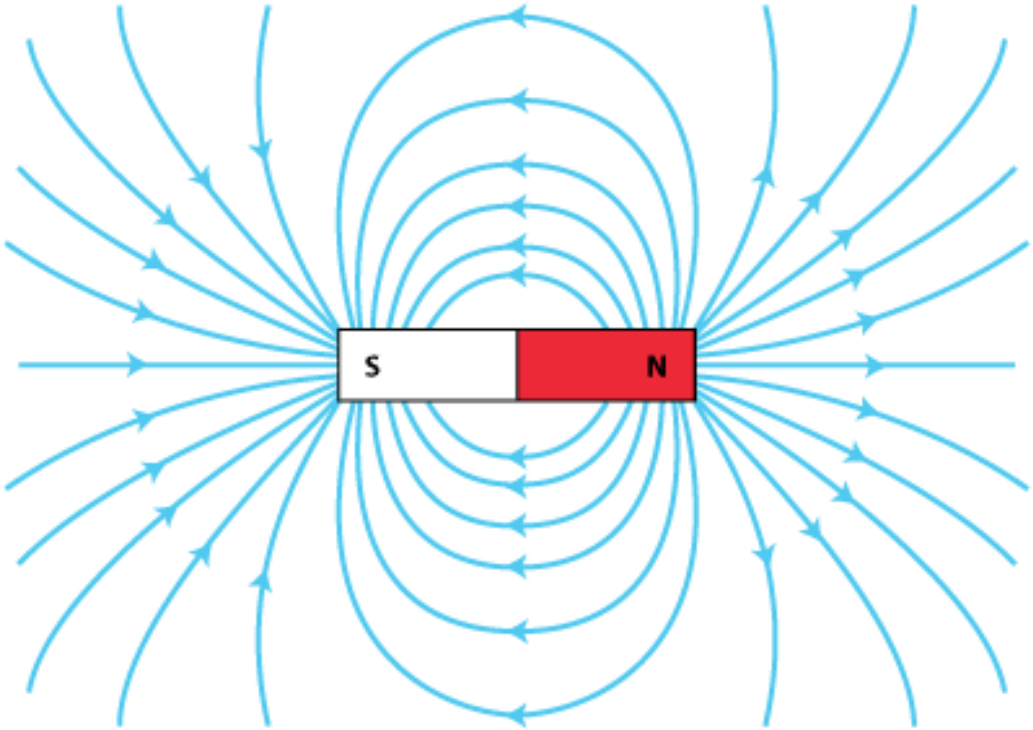
Magnetic Fields

Magnetic field lines point from _____ to _____

A compass would align with these field lines

B-Field

$\vec{B}$

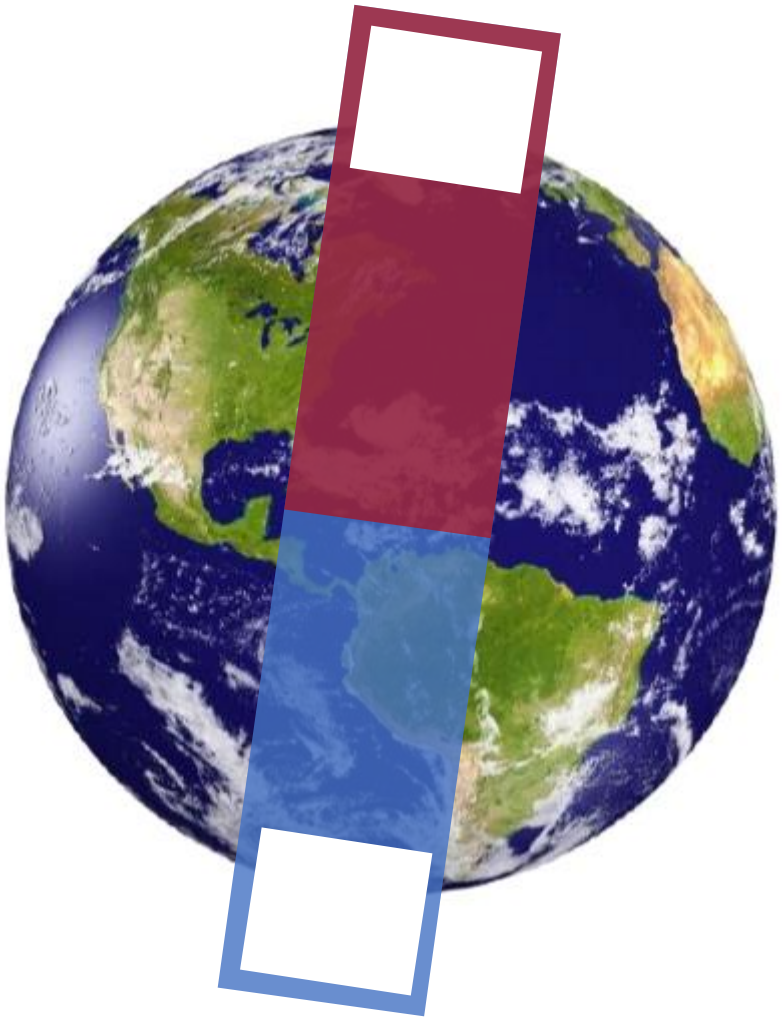


Units

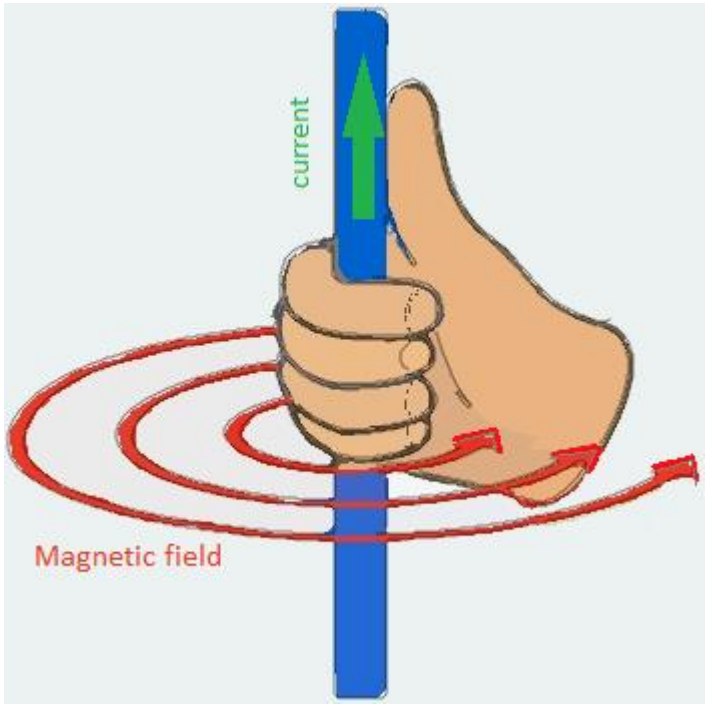
Magnetic Fields

A horseshoe magnet is just a bent bar magnet. The rules for magnetic fields still apply.

The Earth is a Magnet



Right Hand Rule #1

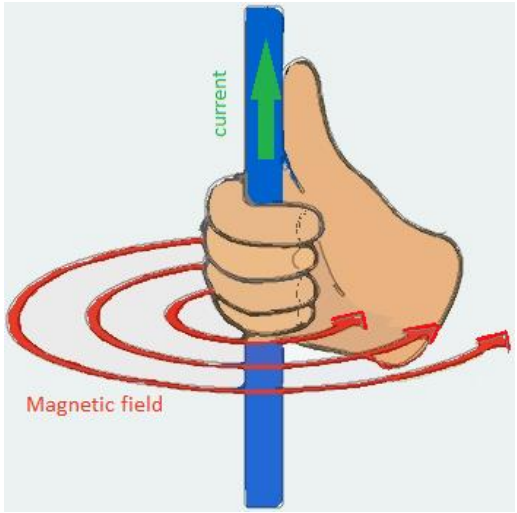


If you make a “thumbs up” sign and point your thumb down a wire in the direction of the current, your other four fingers will point in the direction of the magnetic field.

Thumb points in direction of the current

Fingers point in direction of the field lines

Drawing in 3D



It can be hard to translate a 3rd dimension into a 2-dimensional diagram so there some conventions to help us out

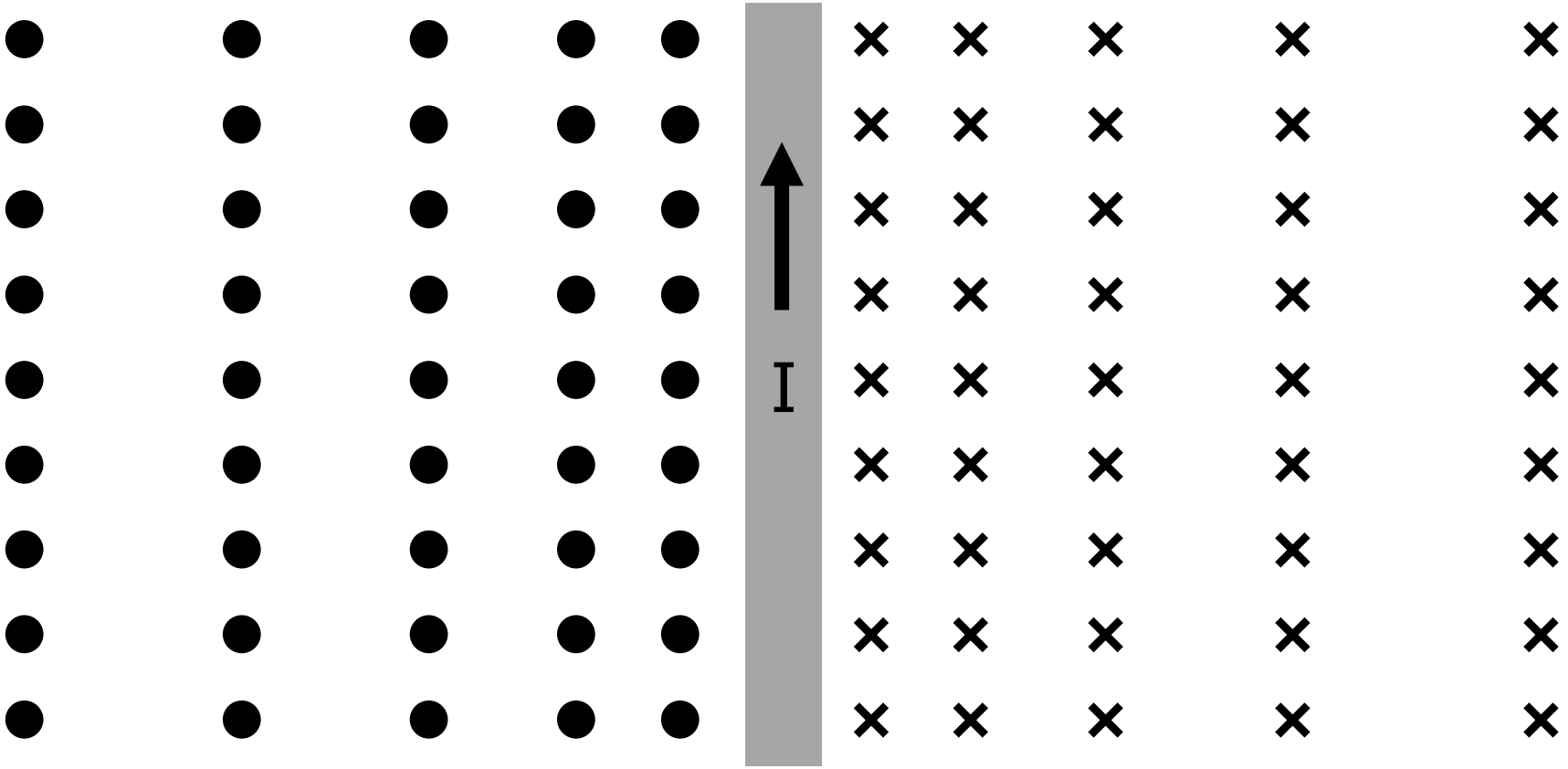
How do you represent a direction that's perpendicular to the paper?

Into the paper	

Out of the paper	

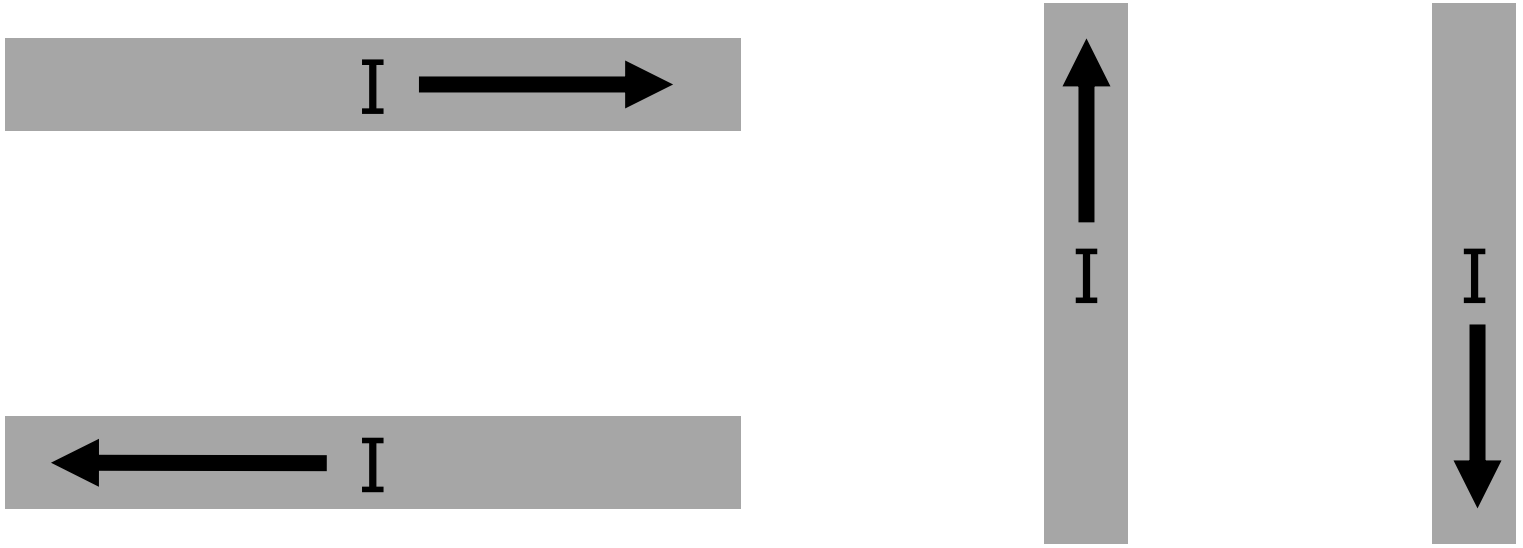
Drawing in 3D

Where is Magnetic Flux Density the highest?



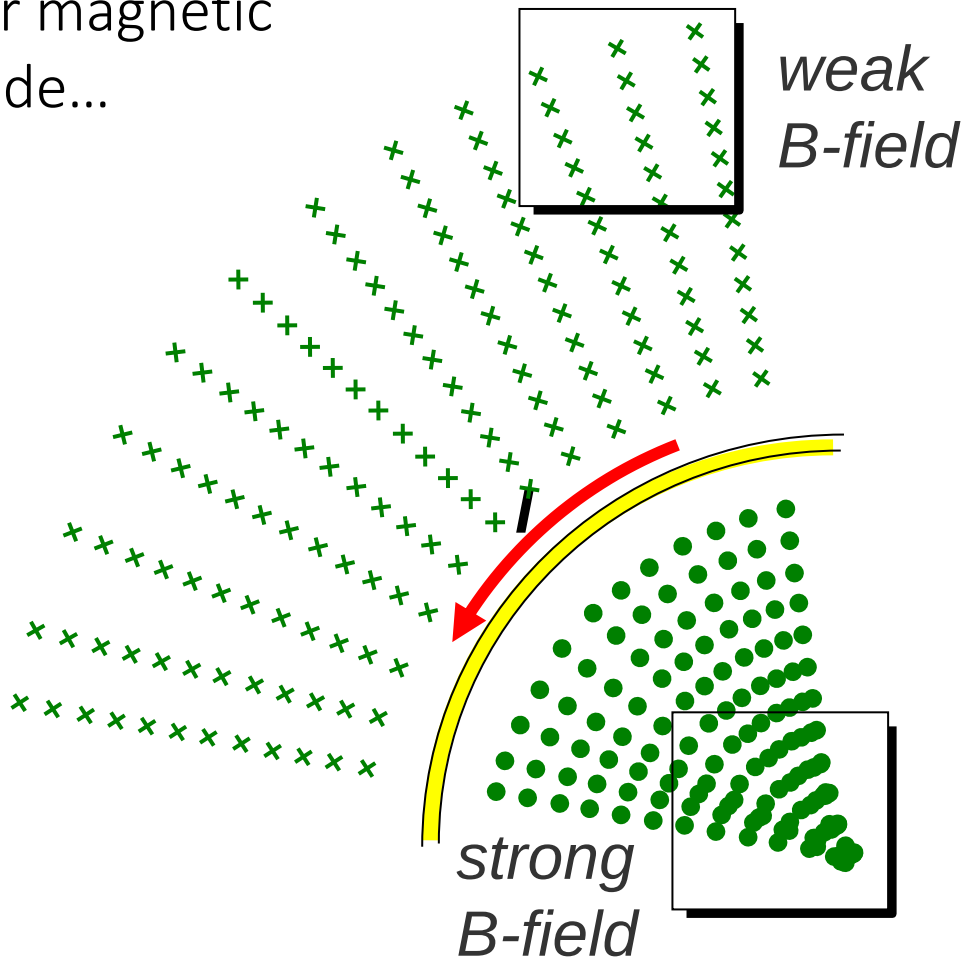
Right Hand Rule #1

Draw in the magnetic field lines around these current carrying wires

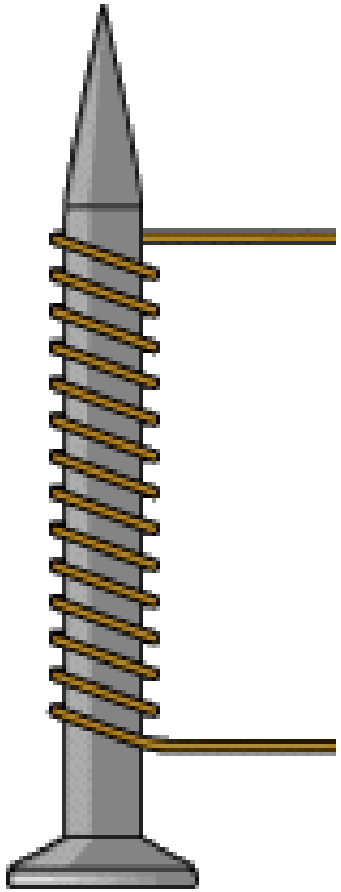


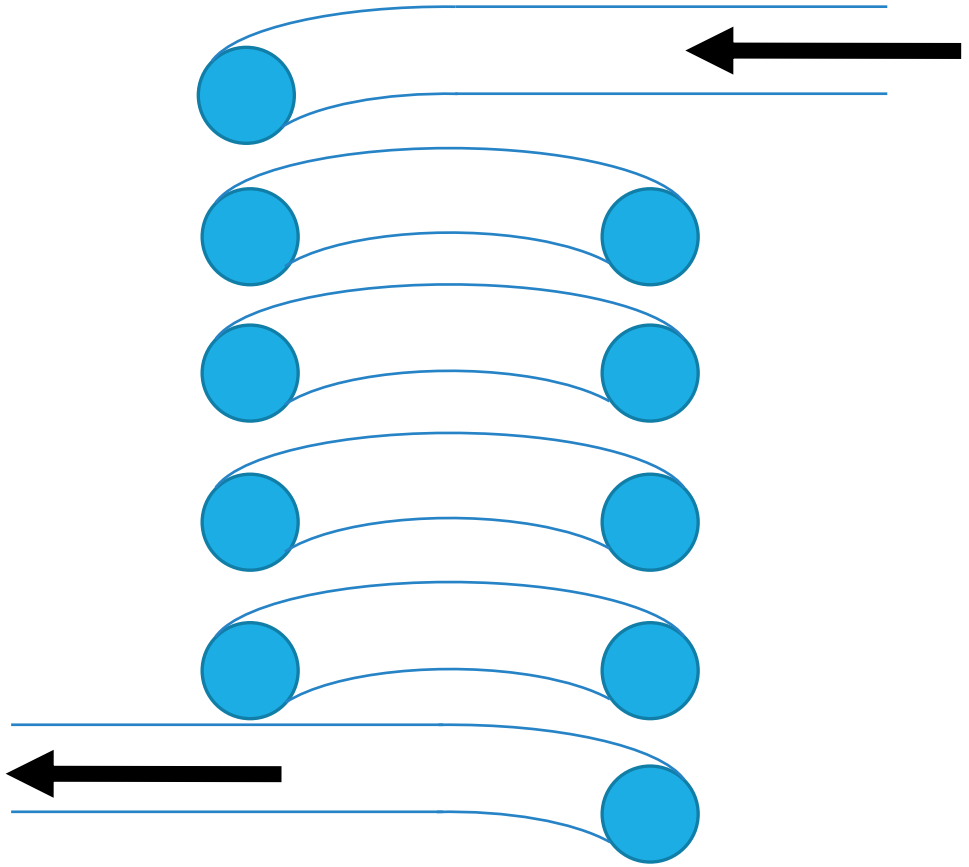
Looped Wire

A wire in a loop has as stronger magnetic field inside the loop than outside…

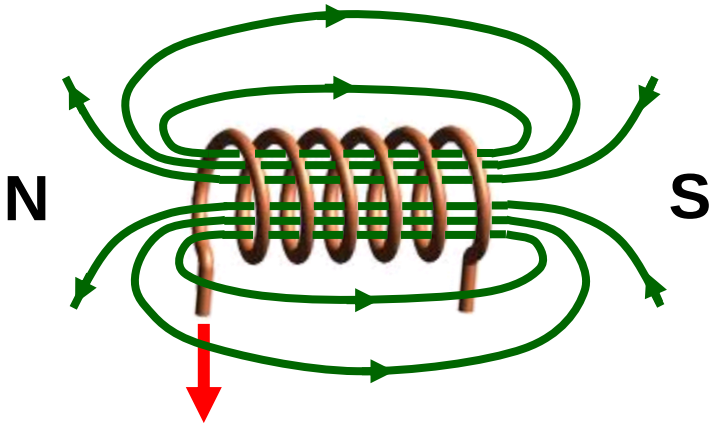


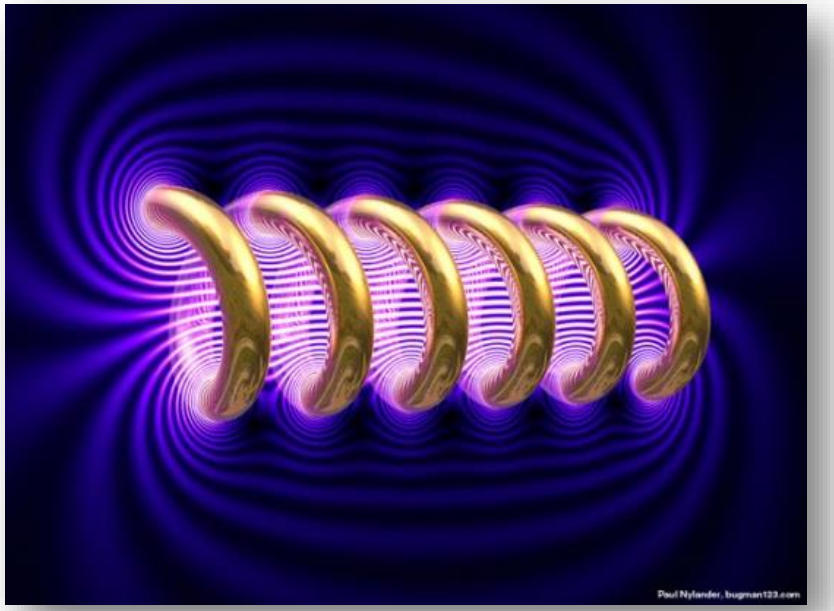
Creating an electromagnet





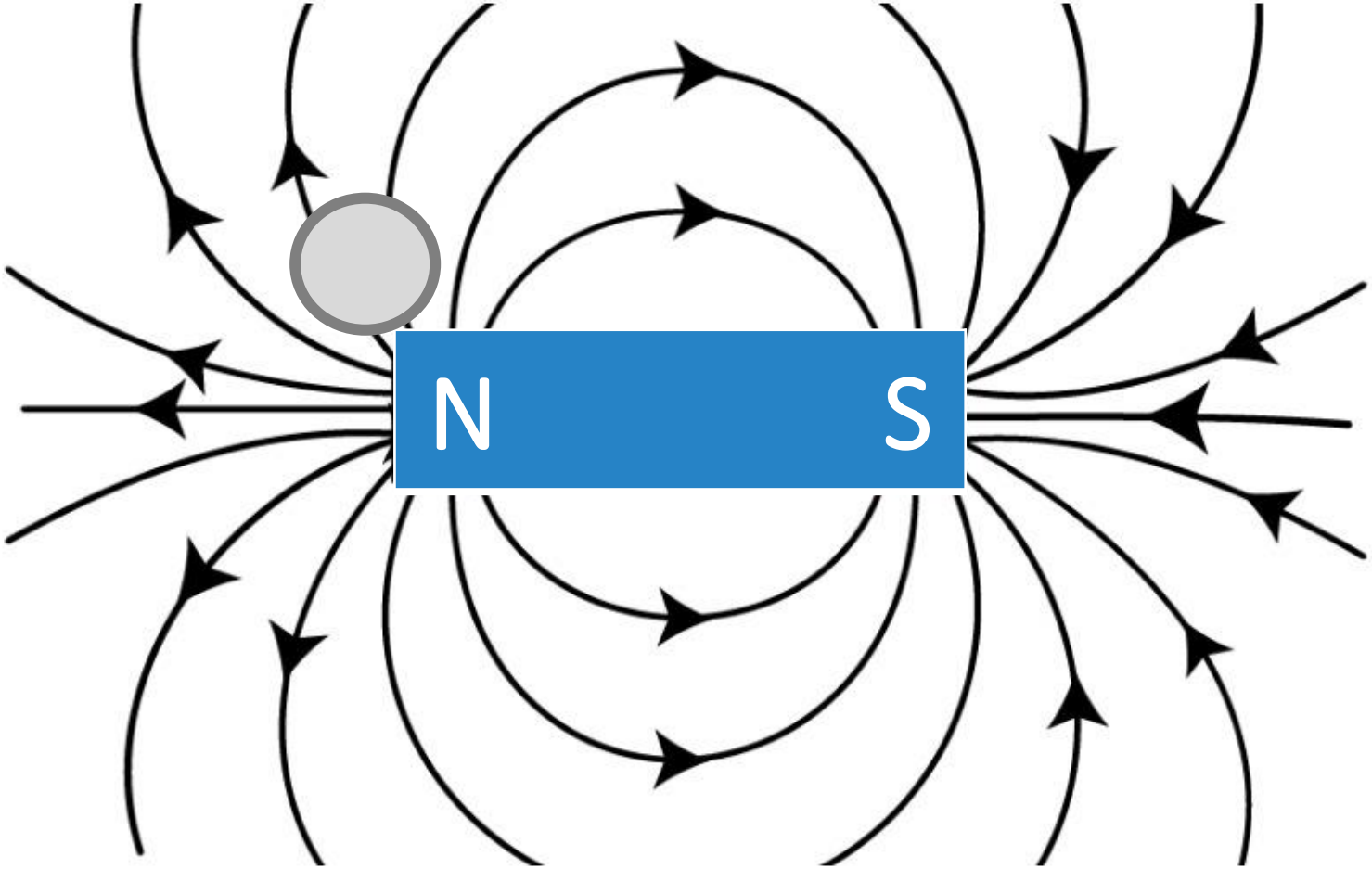
Magnetic Field





Electromagnet Applications

Draw in the Field Lines



Build and Study Electromagnets

Explore what factors can be changed to increase the strength of an electromagnet