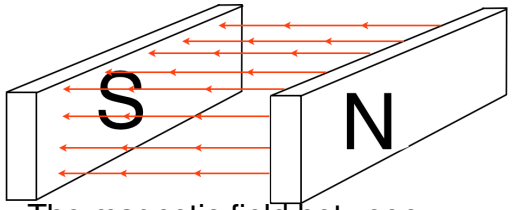
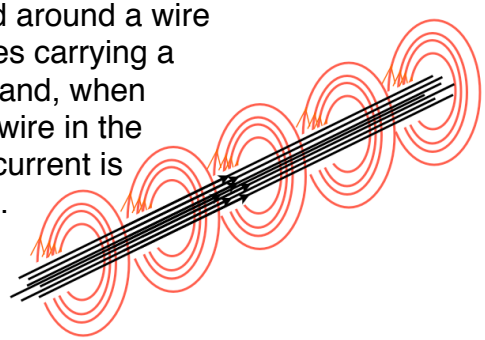
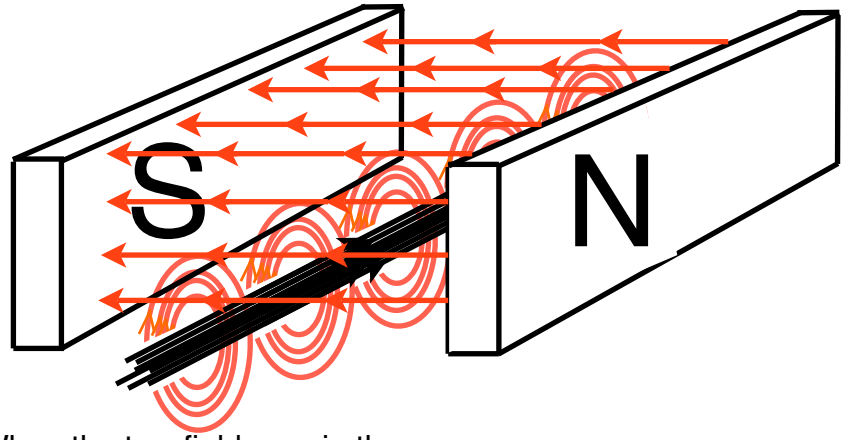


The magnetic field between the two poles of a permanent magnet runs from North to South

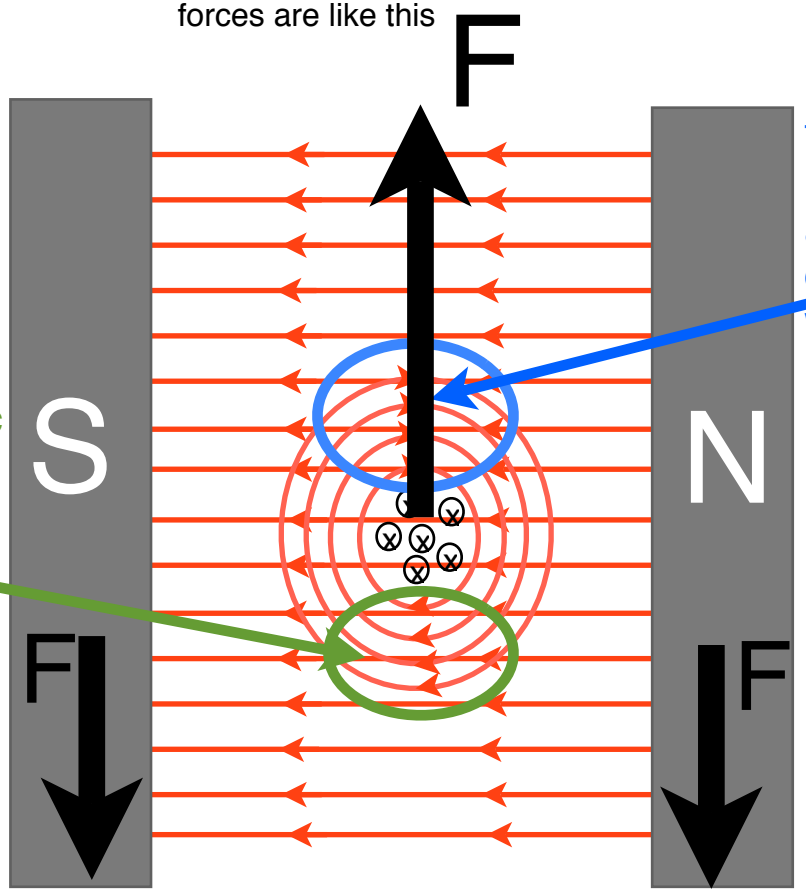
The magnetic field around a wire or a bundle of wires carrying a current is circular and, when looking along the wire in the direction that the current is flowing, clockwise.





When the two fields are in the same space they interact and create forces which push the fields apart.

Looking at the field from one end the forces are like this



The two magnetic fields are in opposite directions and will cancel out

The two magnetic fields are in the same directions and will reinforce

If the current was reversed or if the magnets were swapped around the forces would be in the opposite direction.

1 2 3 4 5

Forces on a current in a magnetic field

The force on the wire upwards will be exactly equal and opposite to the total forces on the magnet downwards. The size of that force can be calculated like this:

Force is proportional to

the current	I
the length of the current carrying wire in the field	L
the number of wires carrying that current	N
the flux density of the permanent magnetic field	B

so Force F = NBIL