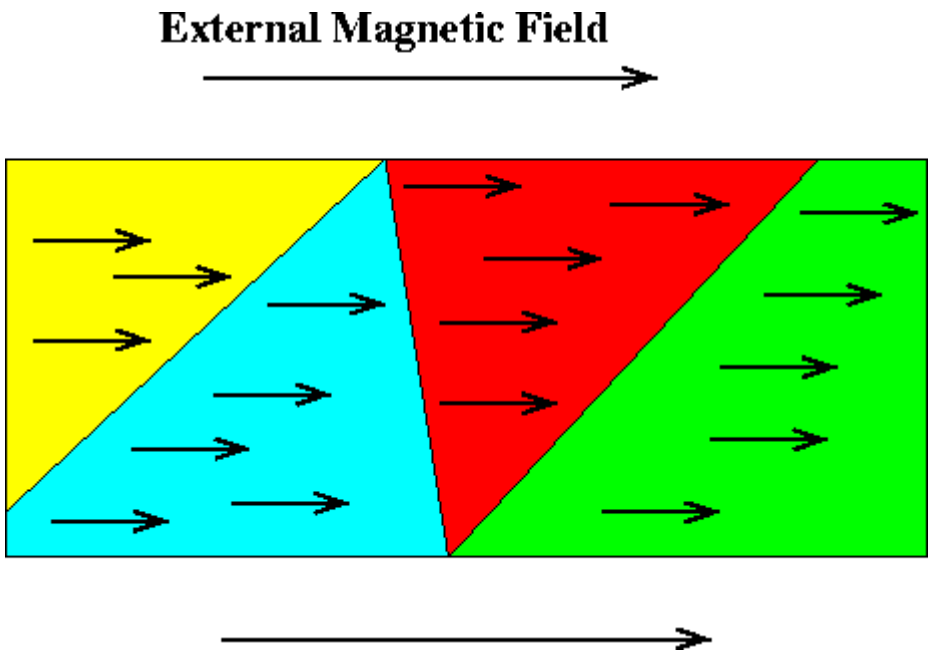
Magnetic field

Created: Tuesday, 30 August 2011 11:27 | Published: Tuesday, 30 August 2011 11:27 | Written by Super User | Print

Introduction to Magnetic Field

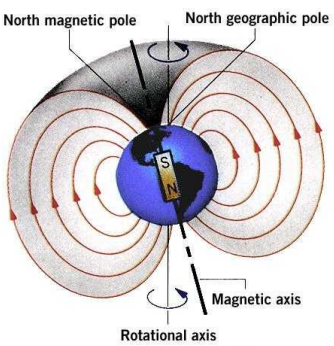


A magnetic field is generated when electric charge carriers such as electrons move through space or within an electrical conductor. The geometric shapes of the magnetic flux lines that moving charge carriers (i.e., electric current) produce are similar to the shapes of the flux lines in an electrostatic field. But there are differences in the ways that electrostatic and magnetic fields interact with the environment.

The force of magnetism causes material to point along the direction that magnetic force points. The term magnetism is derived from Magnesia, the name of a region in Asia Minor where lodestone, a naturally magnetic iron ore, was found in ancient times. Iron is not the only material that is easily magnetized when placed in a magnetic field; others include nickel and cobalt. Magnetism is the force of attraction or repulsion of a magnetic material due to the arrangement of its atoms, particularly its electrons. All magnetic phenomena result from forces between electric charges in motion.

When an unmagnetized substance is placed in a magnetic field, the substance can become magnetized. This happens when the spinning electrons line up in the same direction.

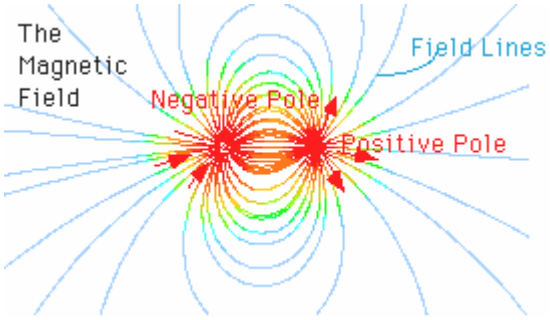
Earth’s Magnetic Field



The Earth's magnetic field appears to come from a giant bar magnet, but with its south pole located up near the Earth's north pole (near Canada).The magnetic field lines come out of the Earth near Antarctica and enter near

Canada. It exerts magnetic force and is surrounded by a magnetic field that is strongest near the North and South magnetic poles. We use the Earth's magnetic field to find direction. The needle of a compass always points toward the magnetic South Pole. We call this direction "north" (remember, opposites attract).

On Earth, the north (positive) pole of the Earth's magnet is in fact at its south geographic pole. Sure enough, a compass needle indicates north, but if you put a compass needle near a bar magnet, it will point AWAY from the north (positive) pole of the bar magnet. The picture below shows where the poles are actually found, and also shows that the poles drift across the surface of the Earth over time.



The force of magnetism coming from the magnet is called the "magnetic field", and is illustrated by lines. The magnetic field is strongest where the lines of force come together (and turn red), and is weakest when the lines of force are far apart (and turn blue).

Compass near a current-carrying wire

The connection between an electric current and a magnetic field was first observed when the presence of a current in a wire near a magnetic compass affected the direction of the compass needle. We now know that current gives rise to magnetic fields, just as electric charges give rise to electric fields. When a charged particle enters a magnetic field, an electric force is exerted on it. If a charged particle moves at an angle to a magnetic field, the magnetic force acting on it will cause it to move in a spiral around the magnetic field lines.

Want to know more about magnetic fields?Click here to schedule a live session with an eAge eTutor!

About eAge Tutoring

eAgeTutor.com is the premium online tutoring provider. Using materials developed by highly qualified educators and leading content developers, a team of top-notch software experts, and a group of passionate educators, eAgeTutor works to ensure the success and satisfaction of all of its students.

Contact us today to learn more about our guaranteed results and discuss how we can help make the dreams of the student in your life come true!

Reference links

1. http://www.windows2universe.org/physical_science/magnetism/magnetism.html
2. http://www.physics.sjsu.edu/becker/physics51/mag_field.htm
3. http://www.windows2universe.org/physical_science/magnetism/magnetism.html

Category:ROOT