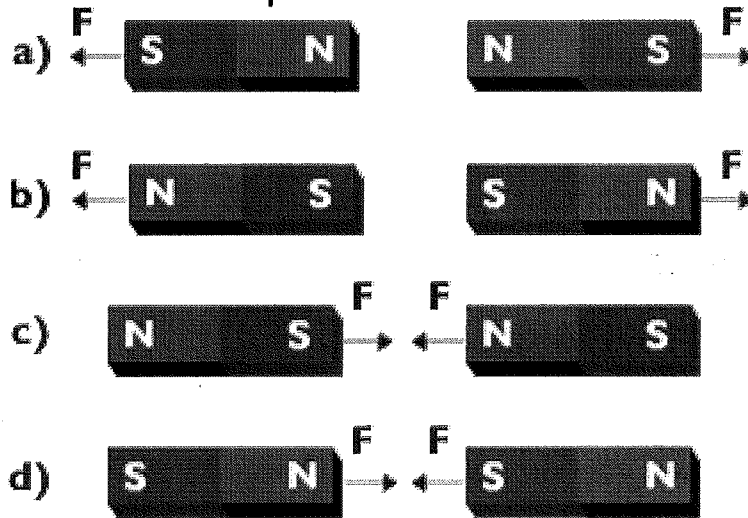


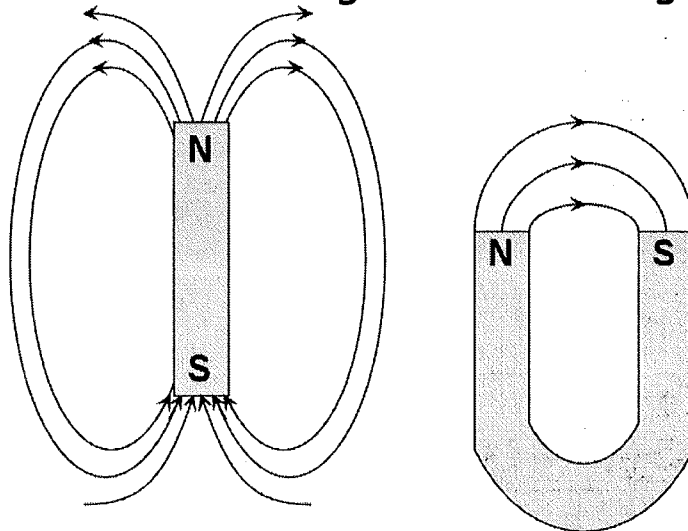
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Section 20.1 Magnets and Magnetic Fields

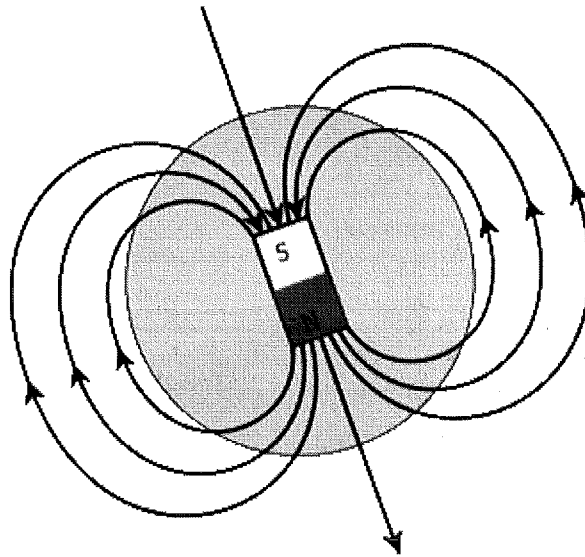
1. Magnetic force has been paired with electric force to form one of the four fundamental forces in the universe -electromagnetic force.
2. Like poles repel and unlike poles attract.



3. There are only four elements that have a strong magnetic effect (ferromagnetic): Iron, Cobalt, Nickel, and Gadolinium.
4. A magnet always has two poles -North and South; it also has an area of influence around the magnet called a magnetic field.



5. Magnetic field lines are always drawn so that they never cross and originate at the North Pole and go to the South Pole.
6. A magnetic field at a specific point has both magnitude and direction and is therefore a vector. The symbol for magnetic field is B and it has the unit of measure T (Tesla).
7. The Earth has a B field produced by the movement of charge in the core.

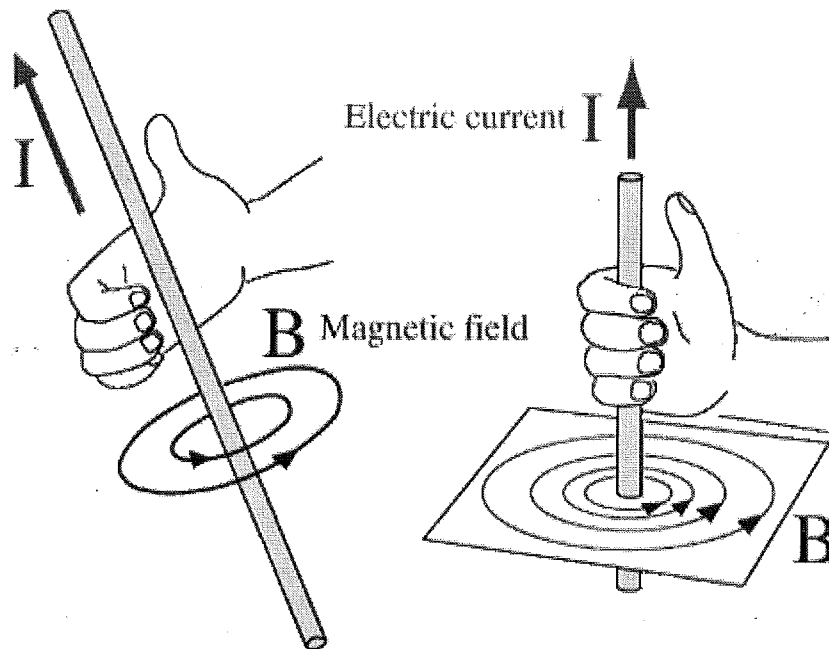


8. The Earth's magnetic field deflects the Solar wind (charged particles) around the Earth. Also some of the charged particles are funnelled to the poles creating the Northern and Southern lights.

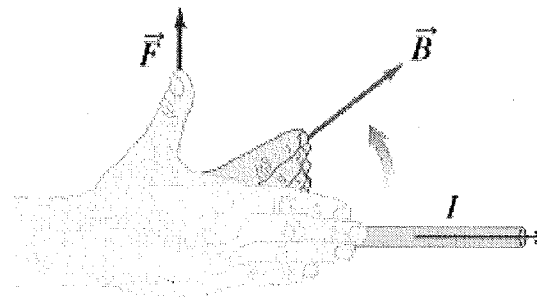
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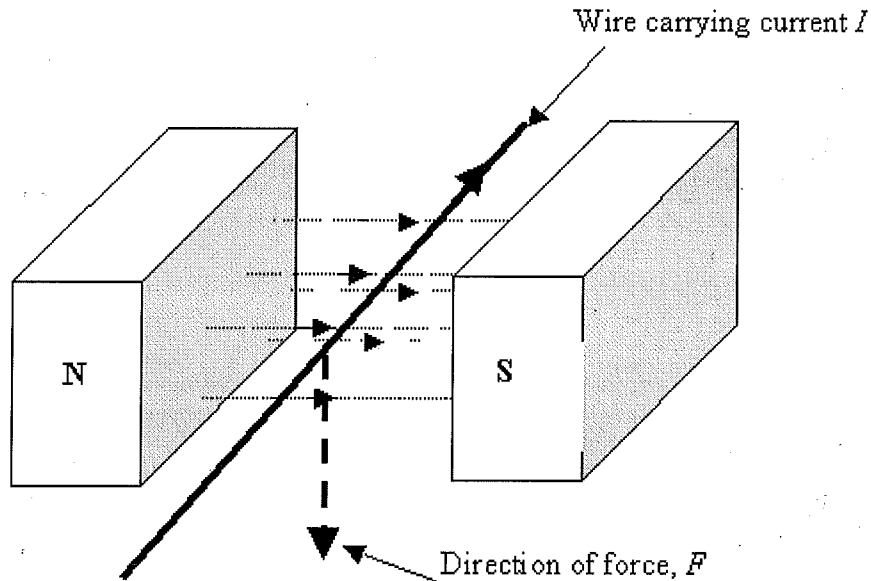
Section 20.2 and 20.3 Electric Current Produce Magnetism

1. In 1820 Hans Christian Oersted demonstrated the production of a magnetic field around a current carrying conductor.
2. The right hand rule allows us to predict magnetic field direction knowing the conventional current direction or the conventional current direction knowing the field direction.

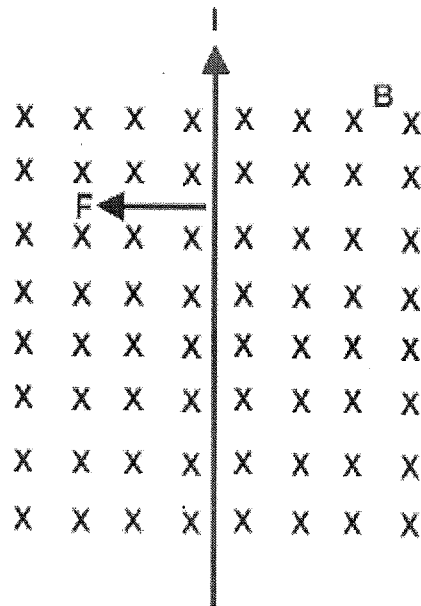


3. A second right hand rule allows you to determine the direction of force on a current carrying wire.





4. The Magnitude of the Force can be found by $F = BIl\sin\theta$, where B is the magnetic field strength (T), I is the current (A), l is the length of the wire (m) in the magnetic field, and θ is the angle between the B field and the wire.



Example: A wire carrying a 30A current has a length of 12cm between the pole faces of a magnet at an angle of 60° . The magnetic field is 0.90T. What is the force on the wire?