L 27 Electricity & Magnetism [5]

Magnetism

- Magnets
 - -permanent magnets
 - -electromagnets
 - -the Earth's magnetic field
- magnetic forces
- applications

Magnetism

- two sources of magnetism
 - permanent magnets
 - electromagnets
- the earth's magnetic field
 - how does a compass work
 - the north pole is really a south pole!

2

Van Allen radiation belts

Permanent magnetism

- certain minerals (magnetite, Fe₃O₄) are naturally magnetic
- These minerals will attract bits of iron
- a magnet produces a magnetic field in the space around it, just like the Sun has a gravitational field that holds the planets in their orbits
- the magnetic field can be visualized with iron filings



Permanent magnets

- Are made from alloys of some of the rare earth elements like neodymium, samarium, and cobalt.
- Always have a north and a south pole
- like poles repel and unlike poles attract
- if you break a magnet in half you get 2 magnets → cannot have just a north or just a south pole



3





needle to move.















Sun – Earth Connection: space weather





Charges stay on magnetic field lines



- Electrons spiral around magnetic field lines – they are trapped
- Electrons and protons that originate at the sun flow to earth as the solar wind
- The particles get trapped by the earth's magnetic field
- Very energetic particles can damage satellites

















