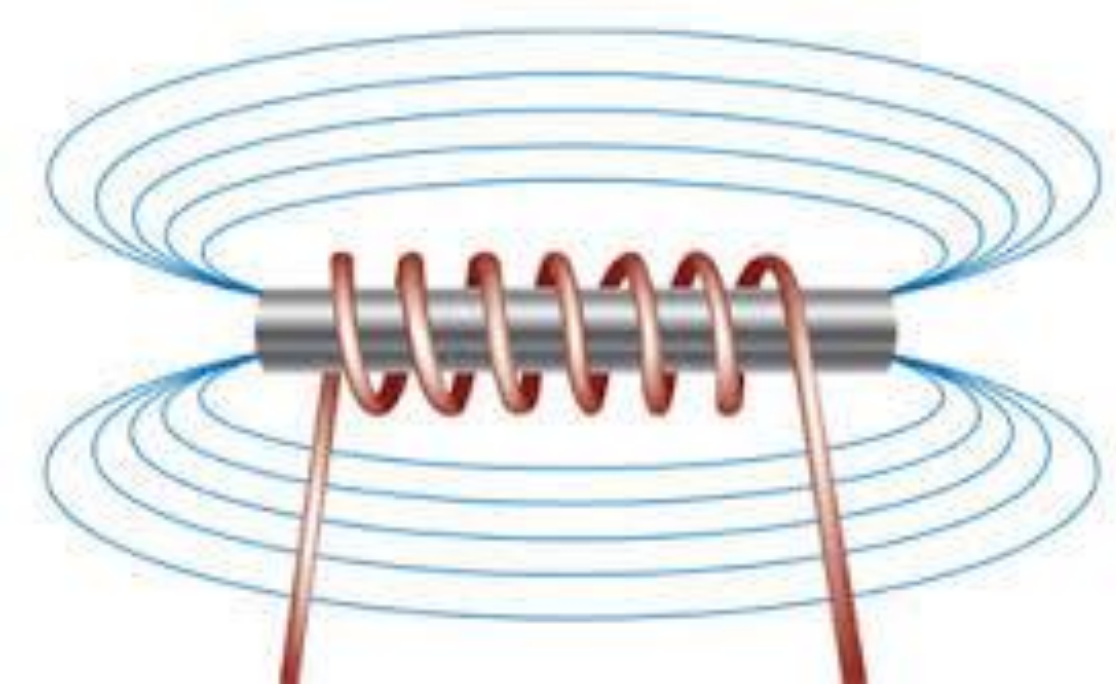
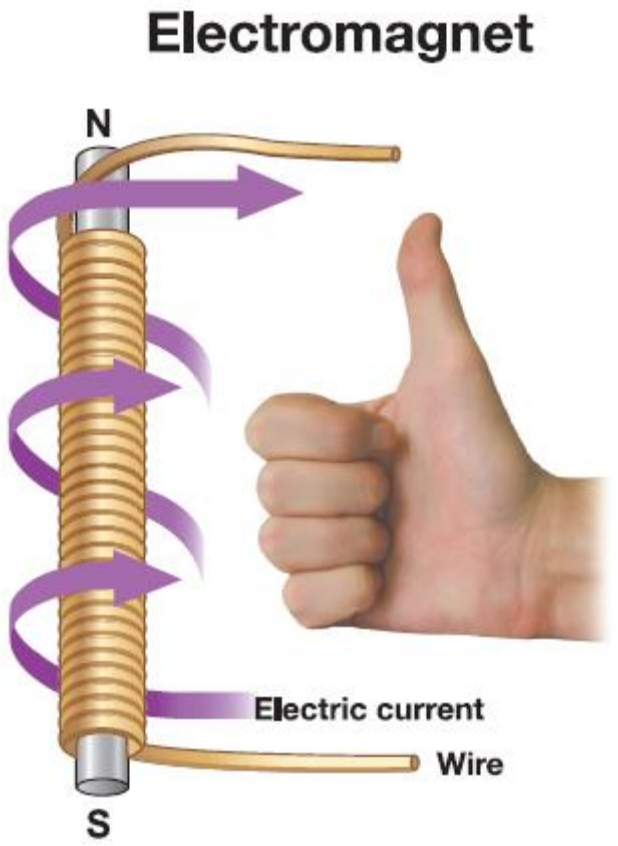
22.2 Electromagnets



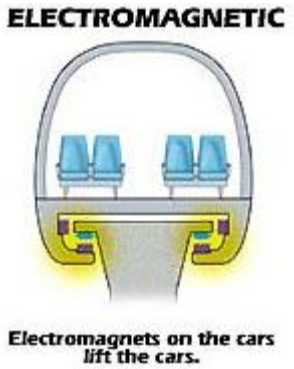
Electromagnet

- Electromagnet: a magnet created by a wire carrying electric current
- All moving charges create magnetic field
- RIGHT hand rule: thumb points in direction of current, fingers curl in direction of magnetic spin



Applications of Electromagnets

- A magnet can be made stronger with electric current
- Magnetically levitated (maglev) trains: fasted train (343 mph) in the world in Japan “floats” with no friction
- Lots of things! (toasters, cars, CDs, etc.)



https://www.youtube.com/watch?v=iaElPV0FWJ0

Building an Electromagnet

- Wrap coil around an iron nail
- To increase strength of electromagnet:
  - Apply more voltage
  - Add more turns in the coil (more total current flowing around nail)
  - Amount of iron in core

https://www.youtube.com/watch?v=txmKr69jGBk

Permanent Magnets vs. Electromagnets

- Electrons move, creating small loops of current
- These small loops are like little electromagnets
- Most atoms “loops” cancel each other out
- If not, a magnetic field occurs