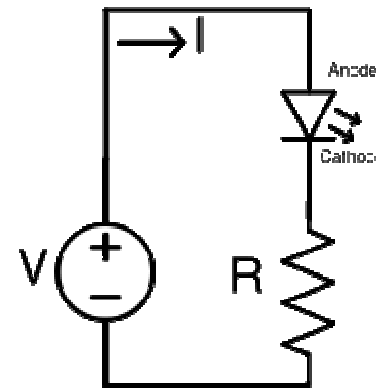
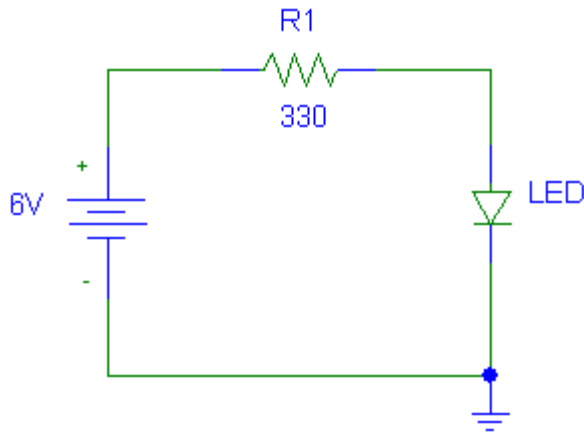


# Garfield Exploring CS

Electronic components

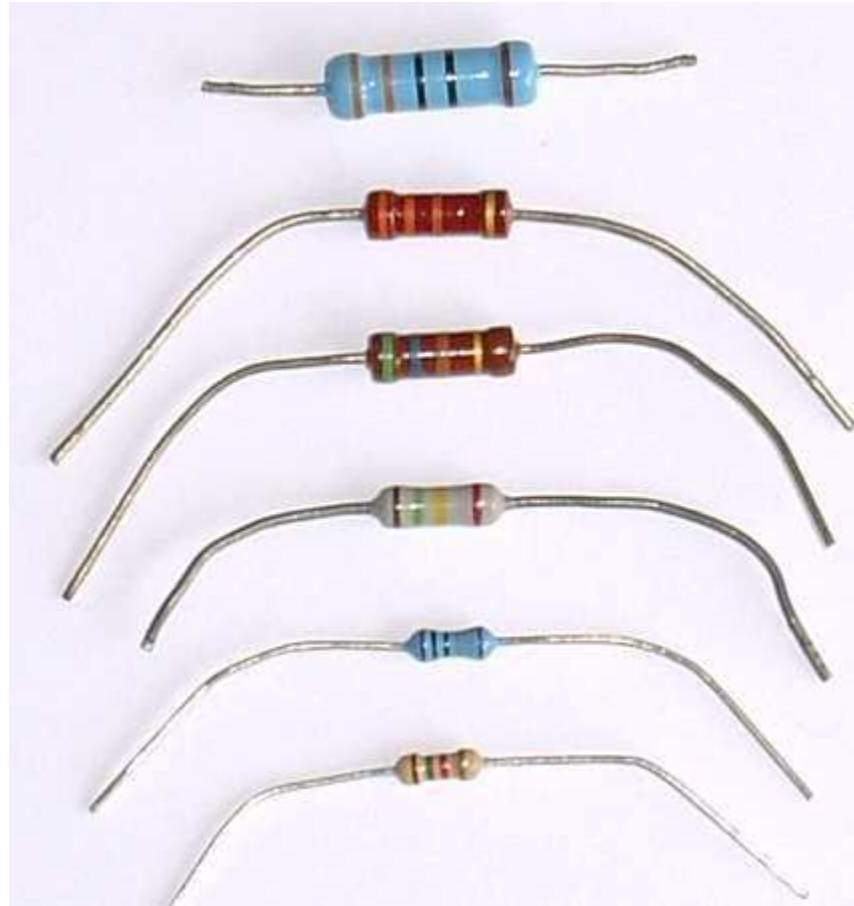
# Lighting LEDs

- We need a resistor not to fry the LED
- We'll try different resistor values and see how they affect brightness

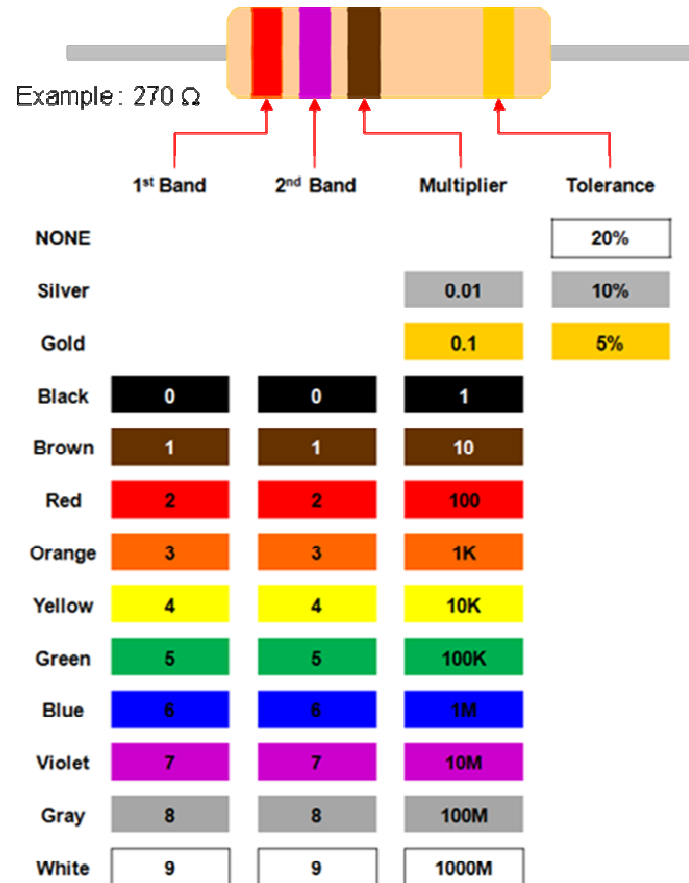




# Resistors

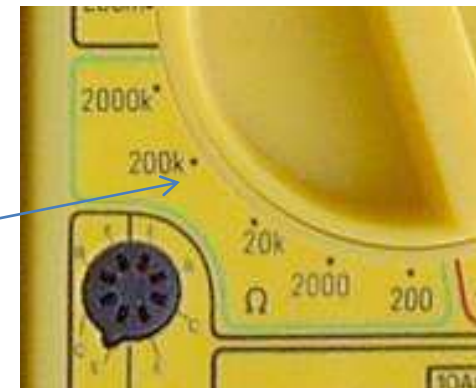


# Reading resistance



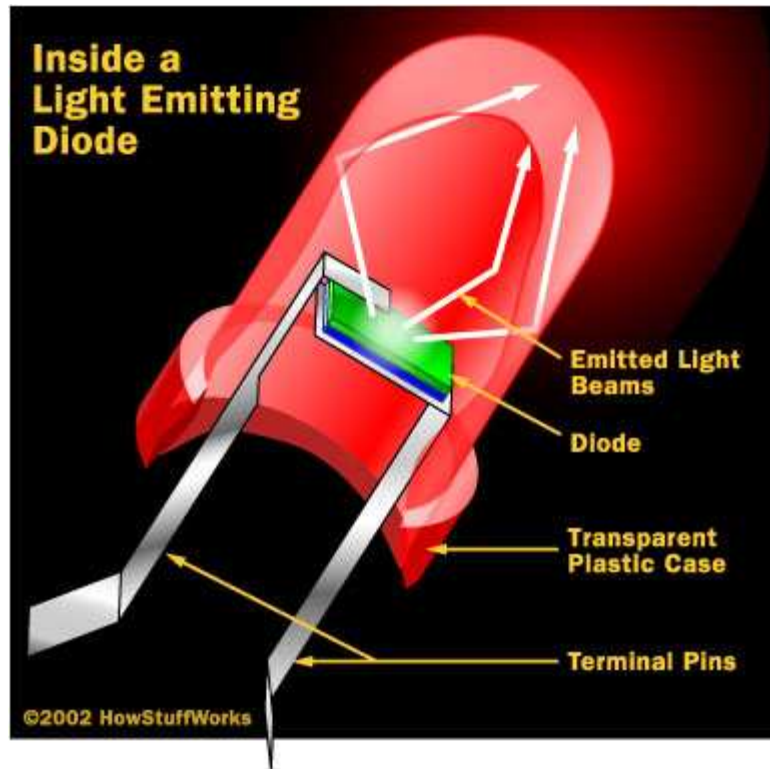
**B**ig **b**rown rabbits **o**ften **y**ield **g**reat **b**ig **v**ocal **g**roans **w**hen **g**ingerly slapped

# Measuring resistance



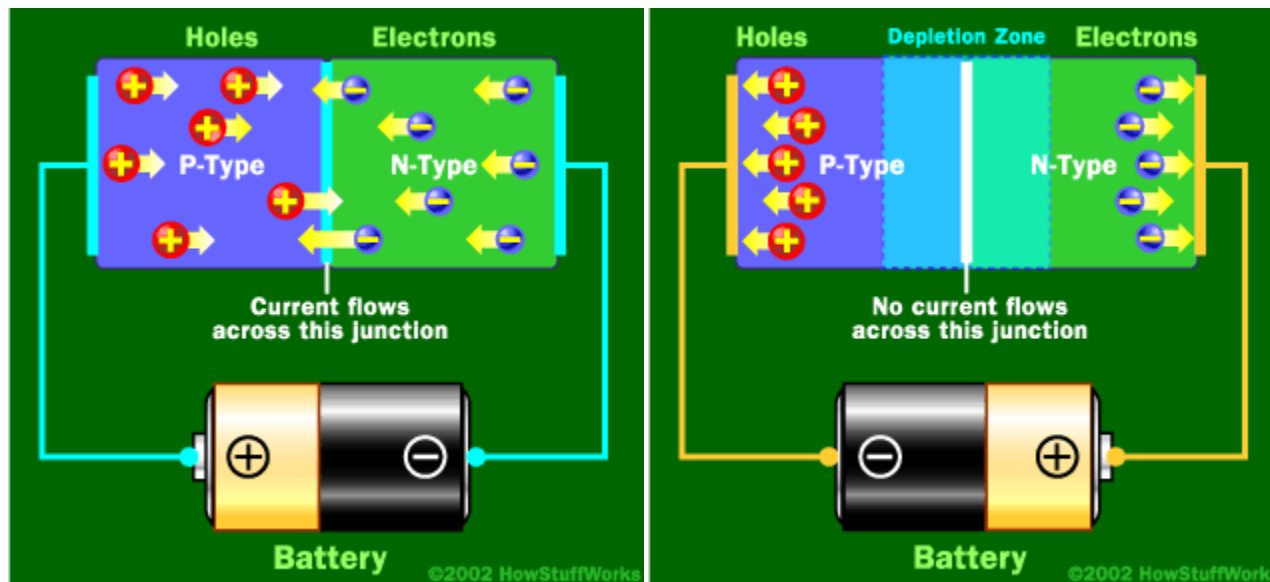
# LED

- Where have you seen these?



# How LEDs work

- Semiconducting material
- Current can only flow in one direction
- Electrons jump to lower state, release photon



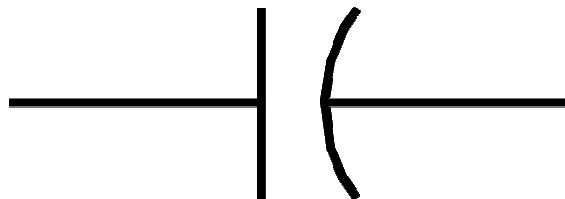
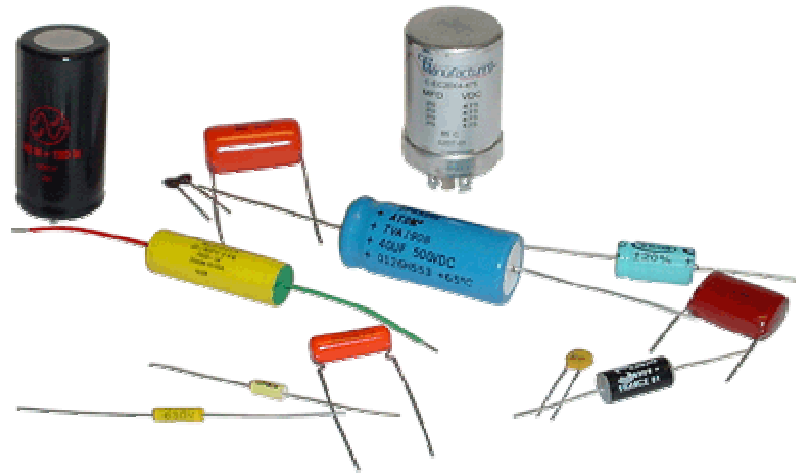


# LED uses

- Remotes
- Car alarms
- Indicators on computers
- Large scrolling displays
- Flashlights
- Street lights
- Ornamental lights

# Capacitors

- Store electrical energy for burst use
- Two conductors separated by a dielectric



# Capacitor uses

- Flashes
- Power supplies
- Defibrillators
- Lasers
- Rail guns
- Noise filters



# Dangerous!

- Capacitors are why lots of electronics have hazard warnings
- A disposable camera flash can be charged to over 300V
- Beware of TVs, power supplies

