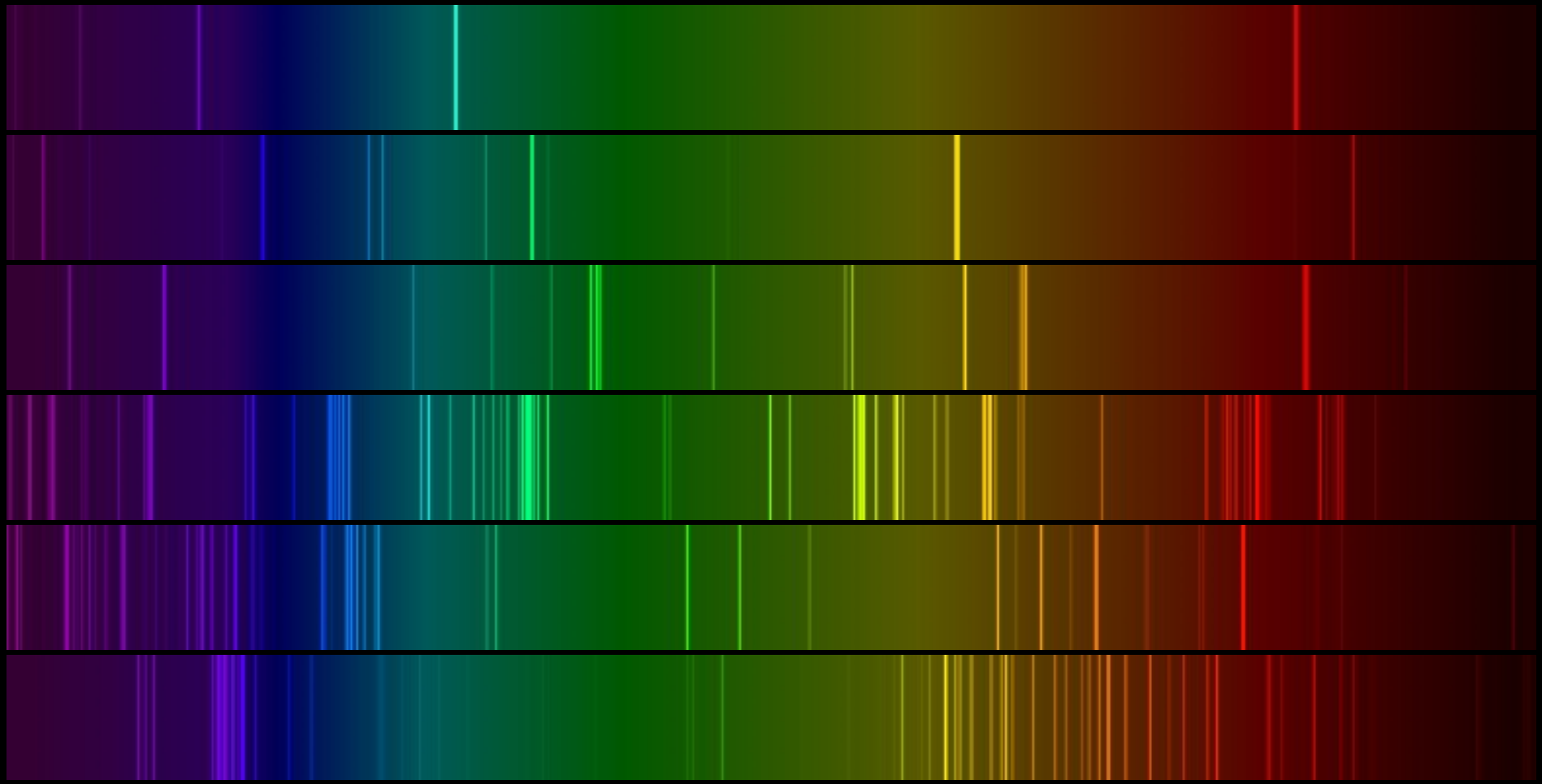
ELECTRONS & LIGHT

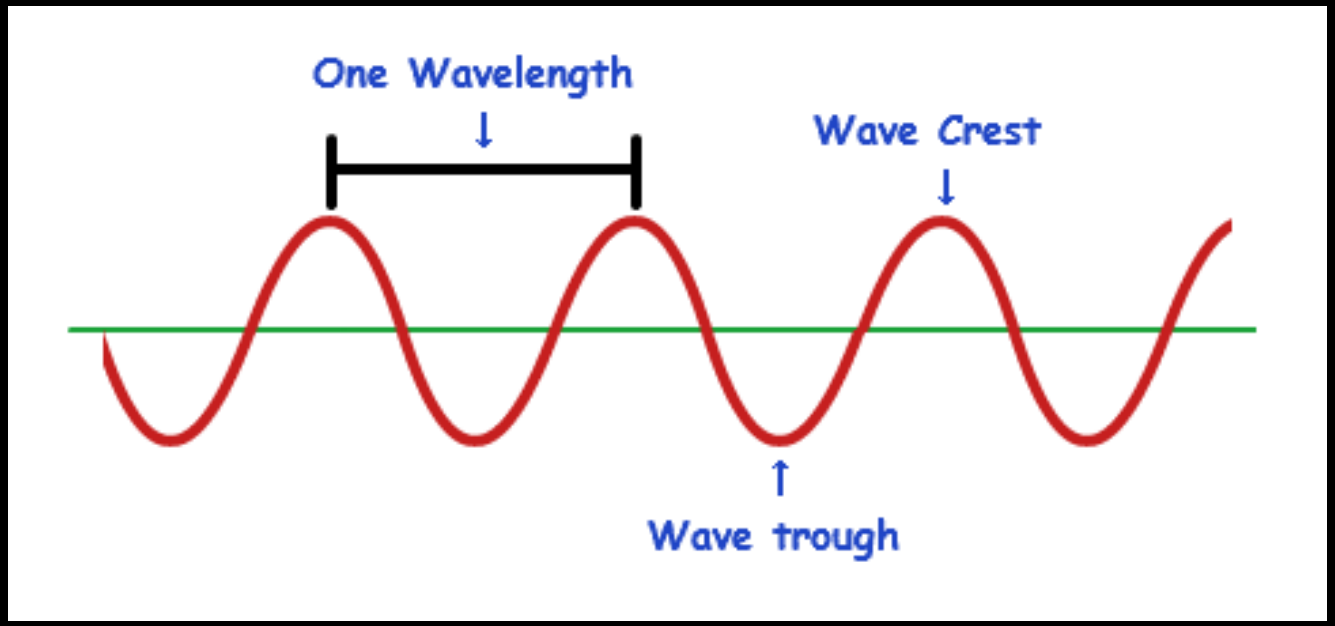


THE BIG QUESTIONS

- What is light?
- How is light emitted?
- What do electrons have to do with light?
- How do flame tests help identify metals?
- What are emission spectra?

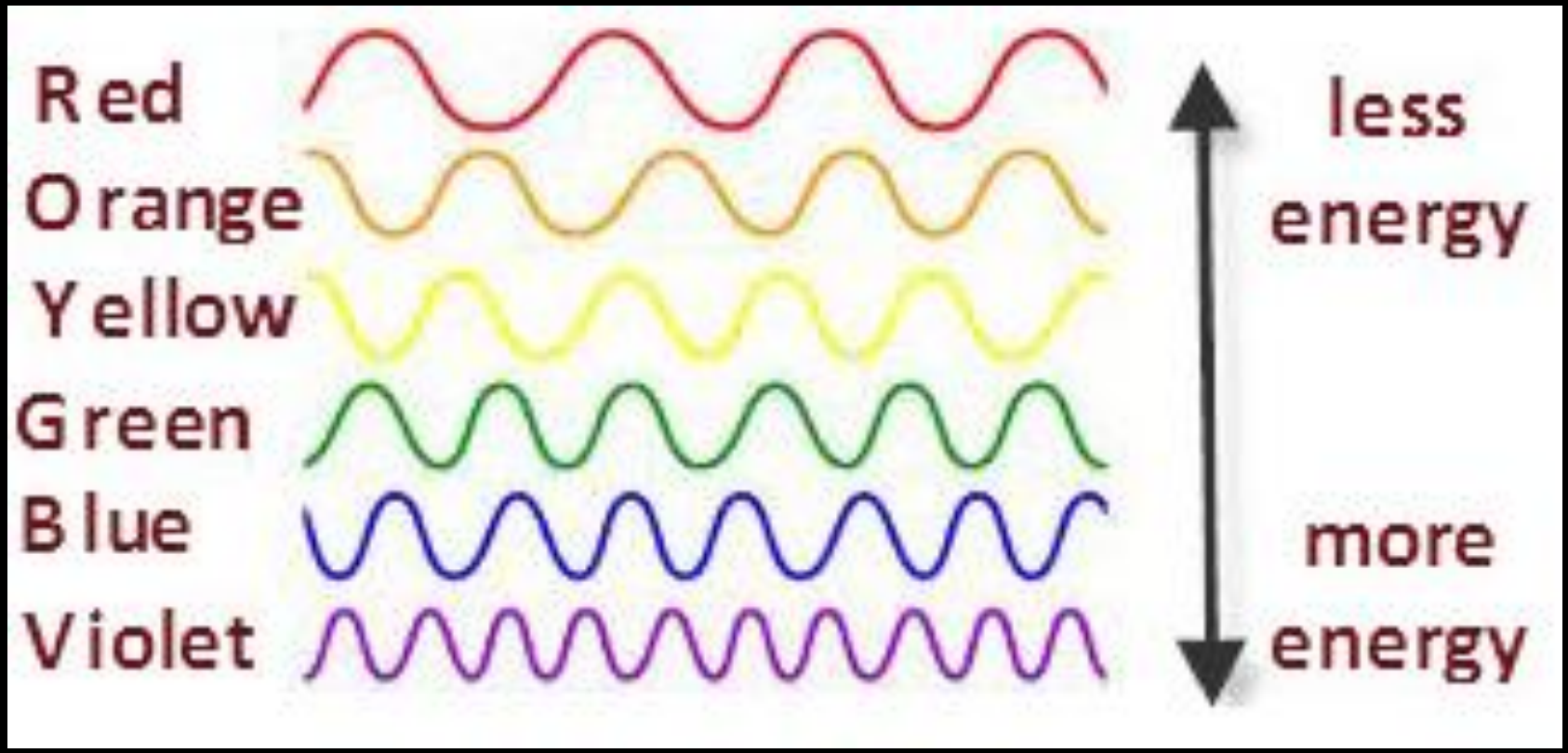
THE ELECTROMAGNETIC SPECTRUM

- All light is part of the EM spectrum.
  - Most is **invisible**:
    - radio waves, microwaves, **IR**, **UV**, X-rays, gamma,
  - **Visible** light: **wavelength** from 400 to 700 nm.

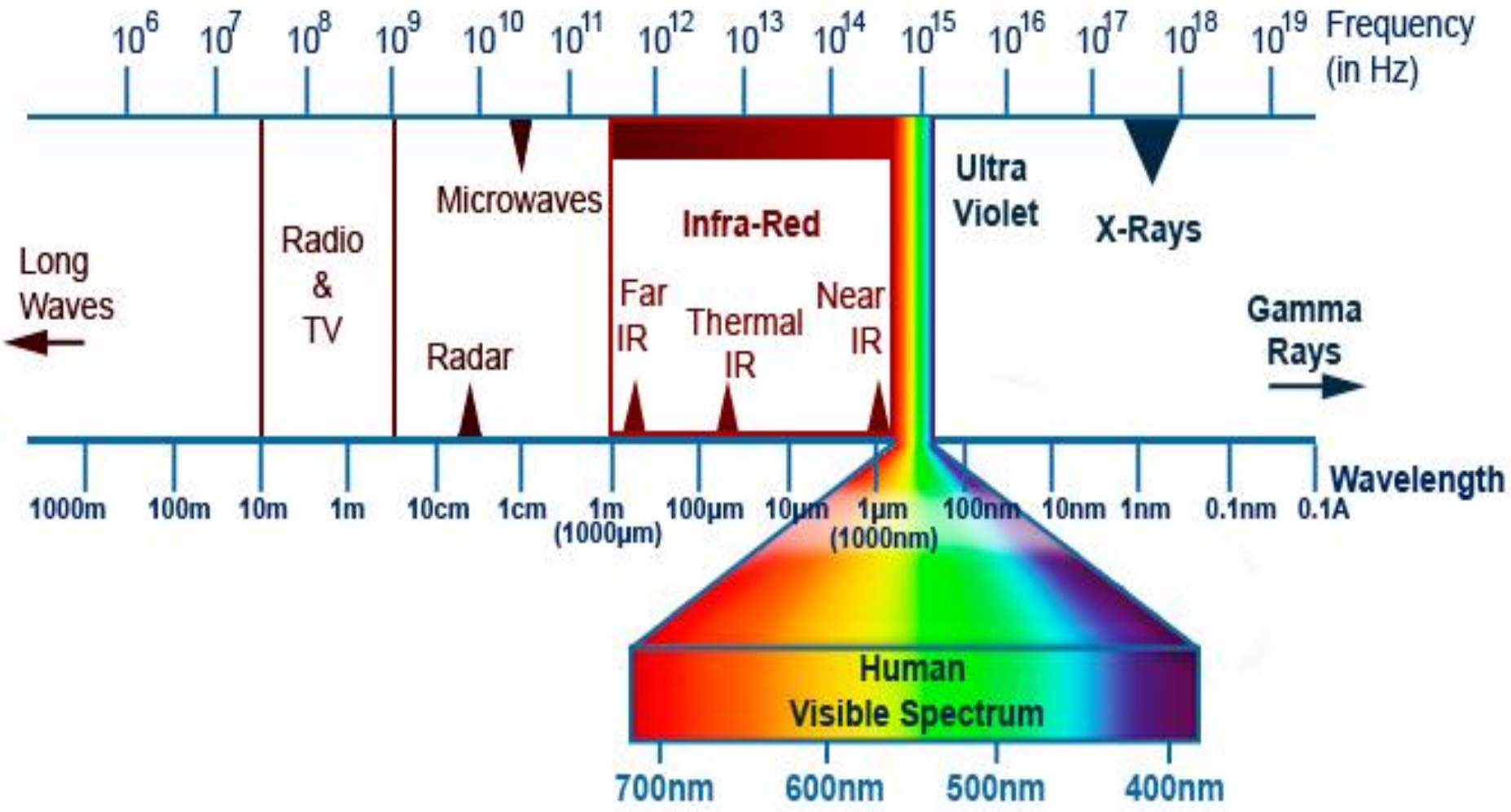


LIGHT

- **Light** is a carrier of **energy**.
  - Energy is proportional to **frequency**.
  - **Frequency** is inversely proportional to **wavelength**.

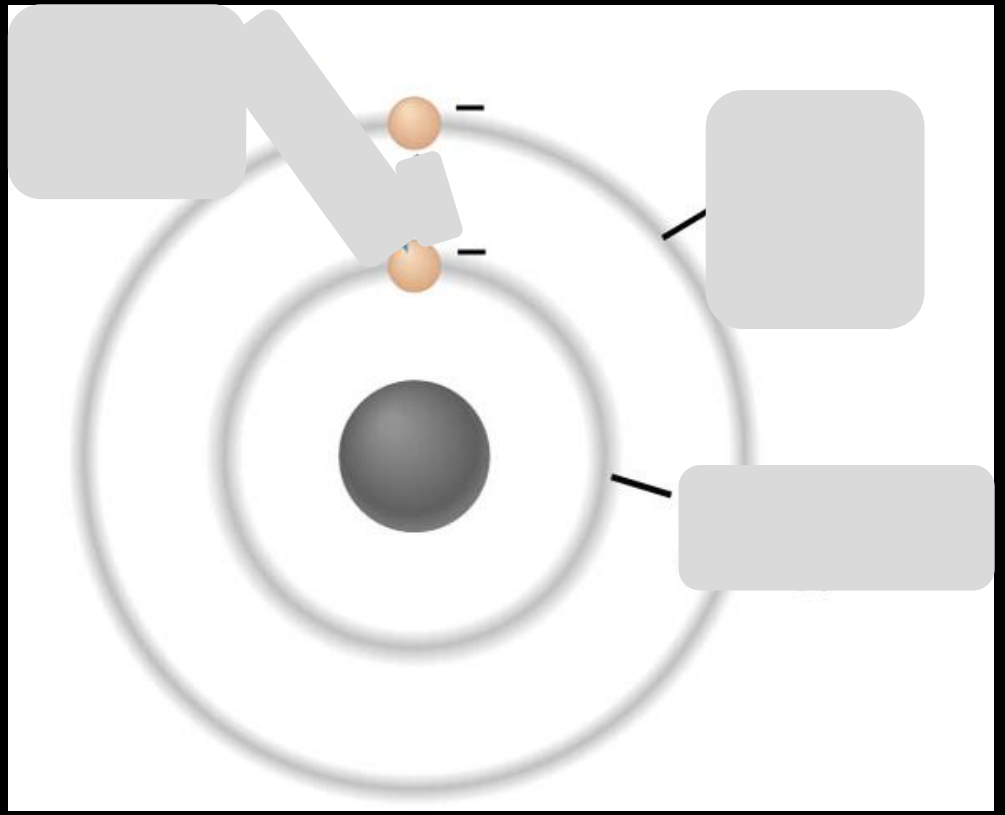


The Electromagnetic Spectrum

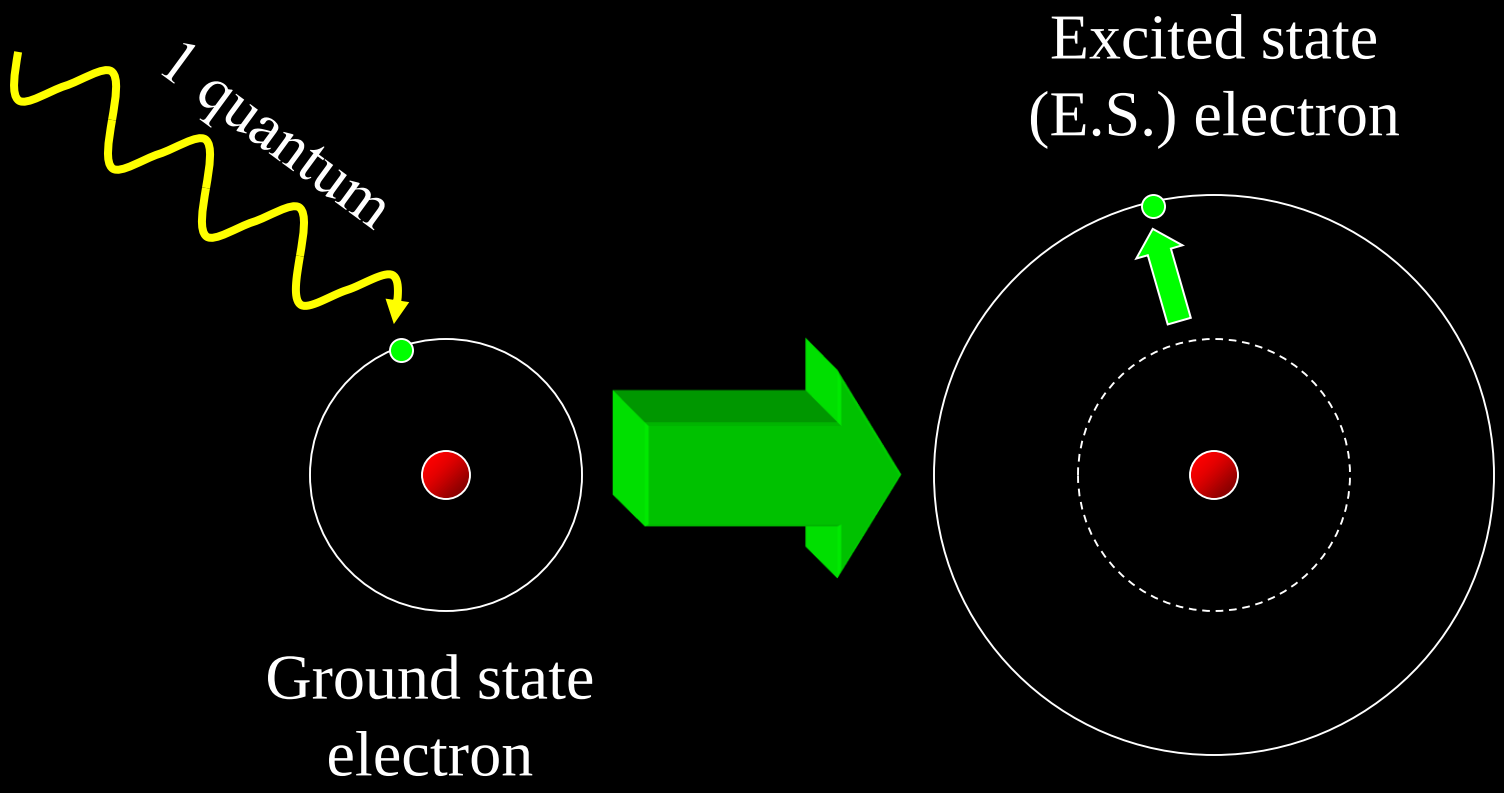


ELECTRONS AND ENERGY

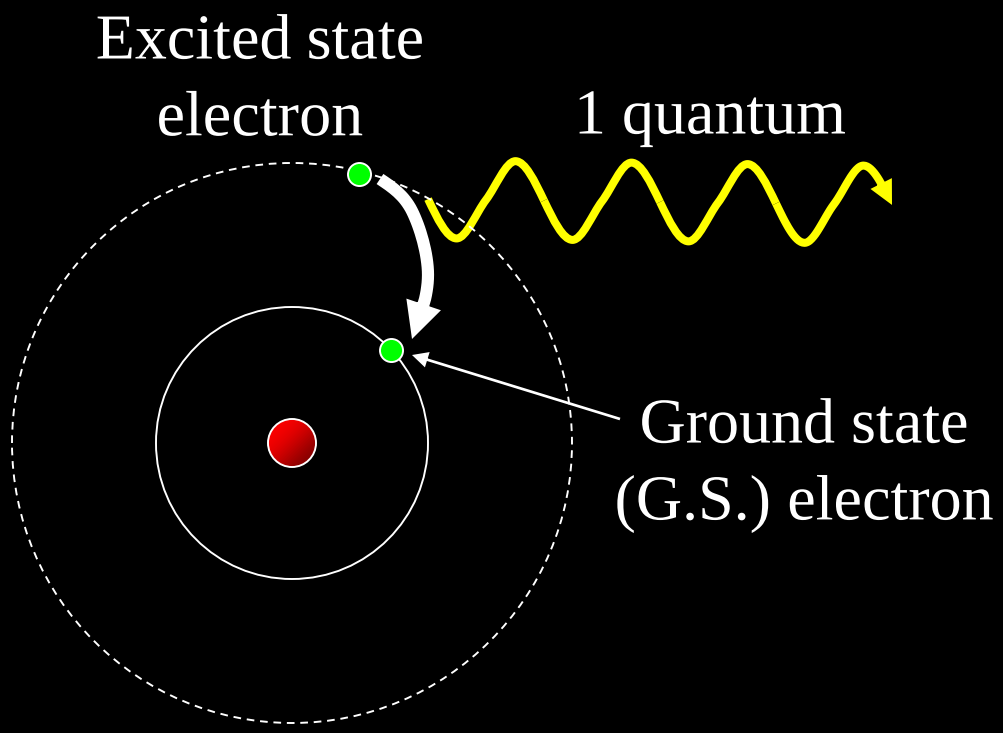
- Ground state:
  - lowest energy an e^- can occupy.
- Excited state:
  - high-energy position.
- Quantum *(pl. quanta)*:
  - amount of energy needed to move an e^- to a higher energy level.



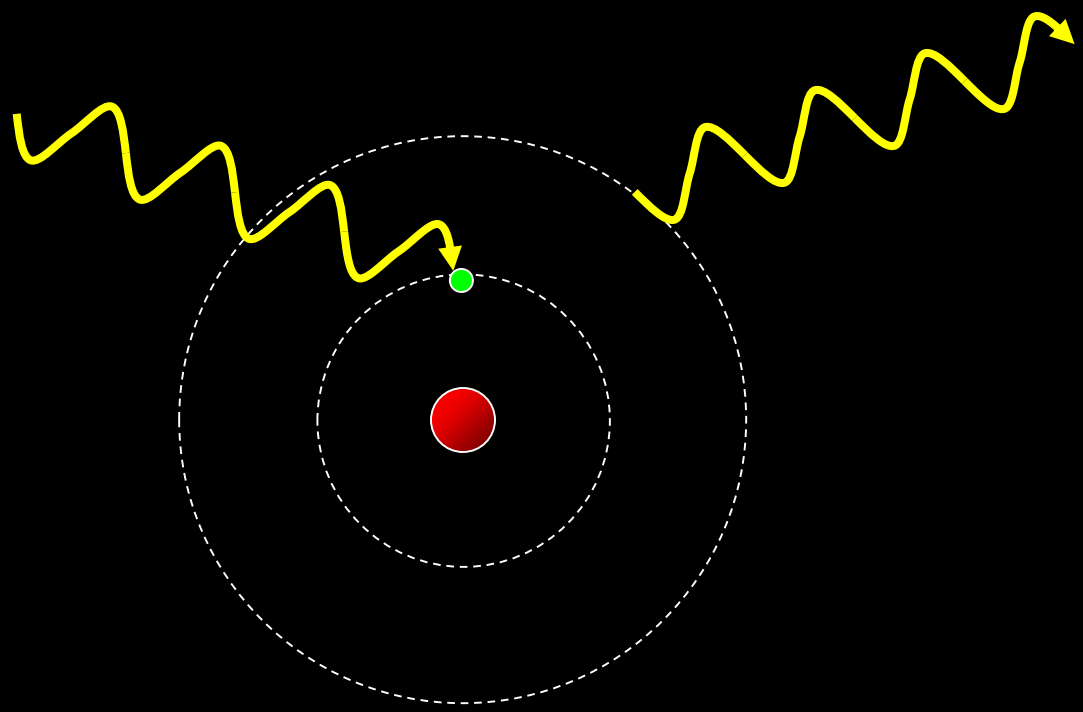
LIGHT AND ELECTRONS



LIGHT AND ELECTRONS



LIGHT AND ELECTRONS



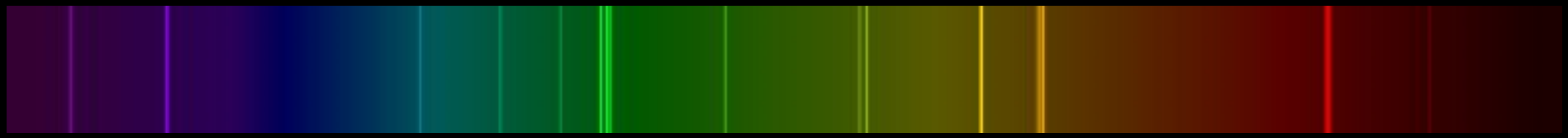
EMISSION SPECTRUM

- **Emission spectrum** – wavelengths of light given off by an element when it is excited (usu. by heat).
  - Every element has unique emission spectrum.

EMISSION SPECTRA

Hydrogen

Helium



Carbon

FLAME TESTS

- **Flame test** – used to ID some metals in compounds.
  - Each metal gives a flame a characteristic color.
  - Can identify metals based on flame colors.