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SURVIVAL SCIENCE

LESSONS 7B

WHAT IF YOU...

- You were in a dark cave without light? In complete darkness, you can't see the ground beneath your feet or even your own hands.
- How would you find your way around?
- What simple tool would make the most difference?



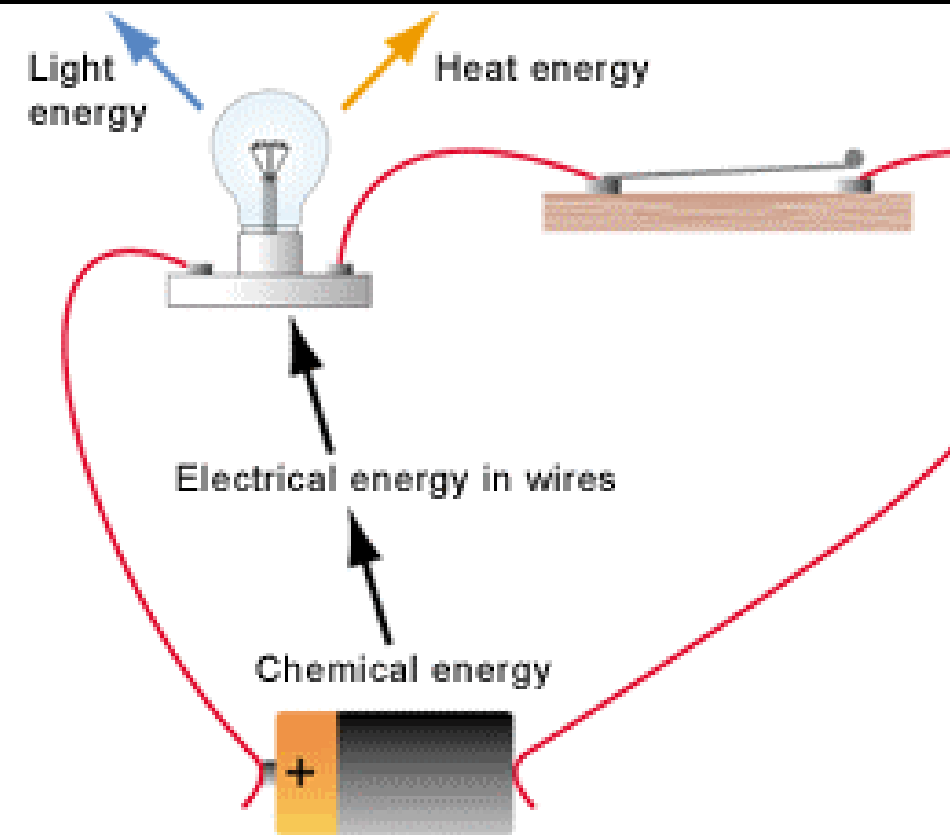


Light with PURPOSE

- By Day and By Night
- Navigation – North Star
- Time – Hands on a Clock
- Seasons

LIGHT AT NIGHT

RADIANT ENERGY IS LIGHT ENERGY...



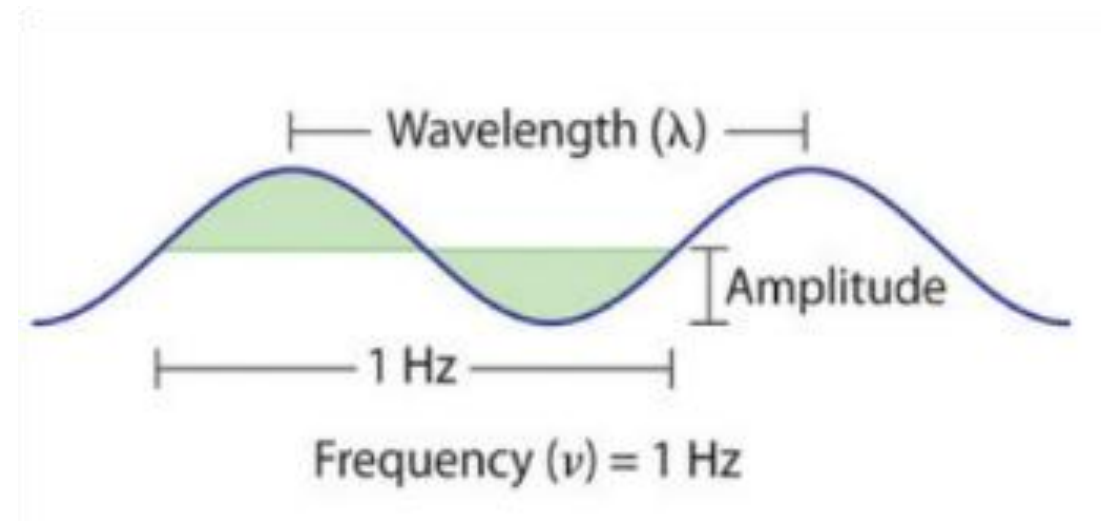
- Radiant Energy is energy from ELECTROMAGNETISM
- SOLAR ENERGY is also Electromagnetic (EM)
 - Radiant Energy
 - Kinetic Energy
 - Light Energy
- Radiant kinetic energy releases light and heat

ENERGY MOVES IN WAVES

WAVELENGTH – a distance measure from crest to crest.

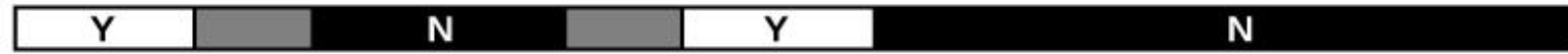
FREQUENCY – the number wave cycles per second (ν) given in Hertz (Hz).

AMPLITUDE – one half the height of a wave (intensity)

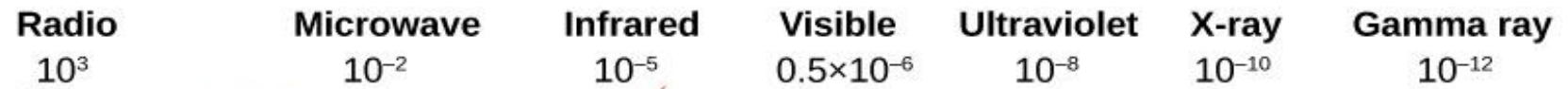


ELECTROMAGNETIC (EM) WAVES - ENERGY

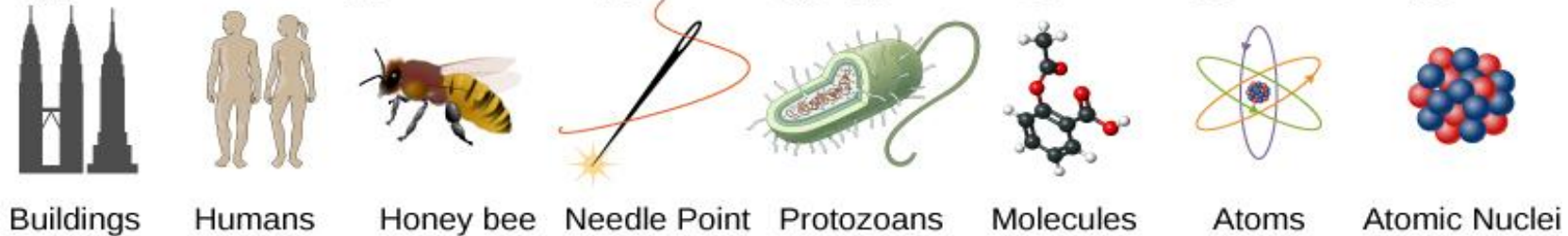
Penetrates Earth's atmosphere?



Radiation type
Wavelength (m)



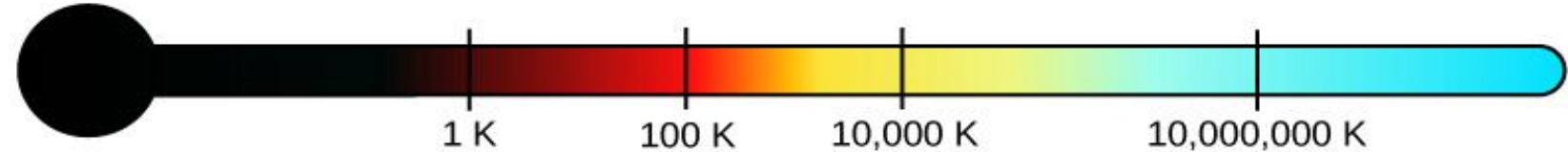
Approximate scale



Frequency (Hz)

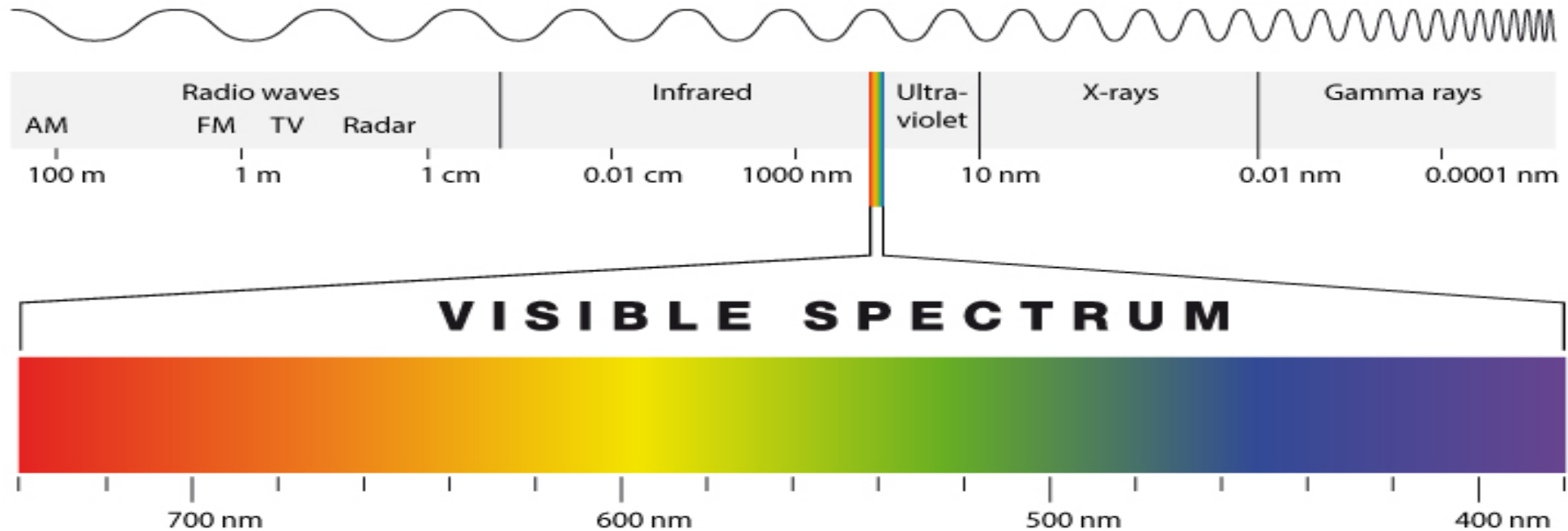


Temperature of bodies emitting the wavelength



LONGER WAVELENGTHS USED FOR COMMUNICATIONS (LOWER ENERGY USE)

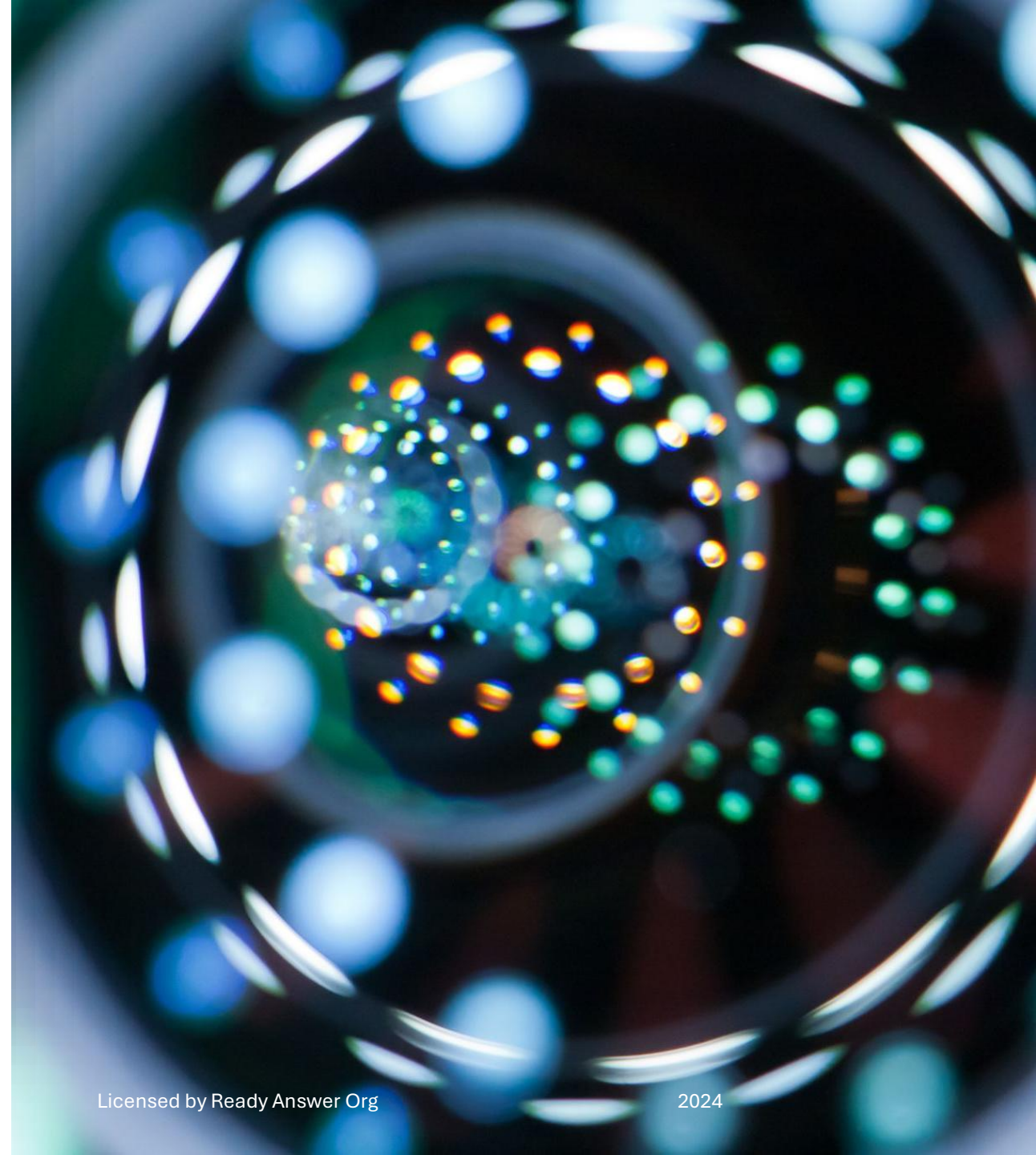
LOWER FREQUENCY = LOWER ENERGY



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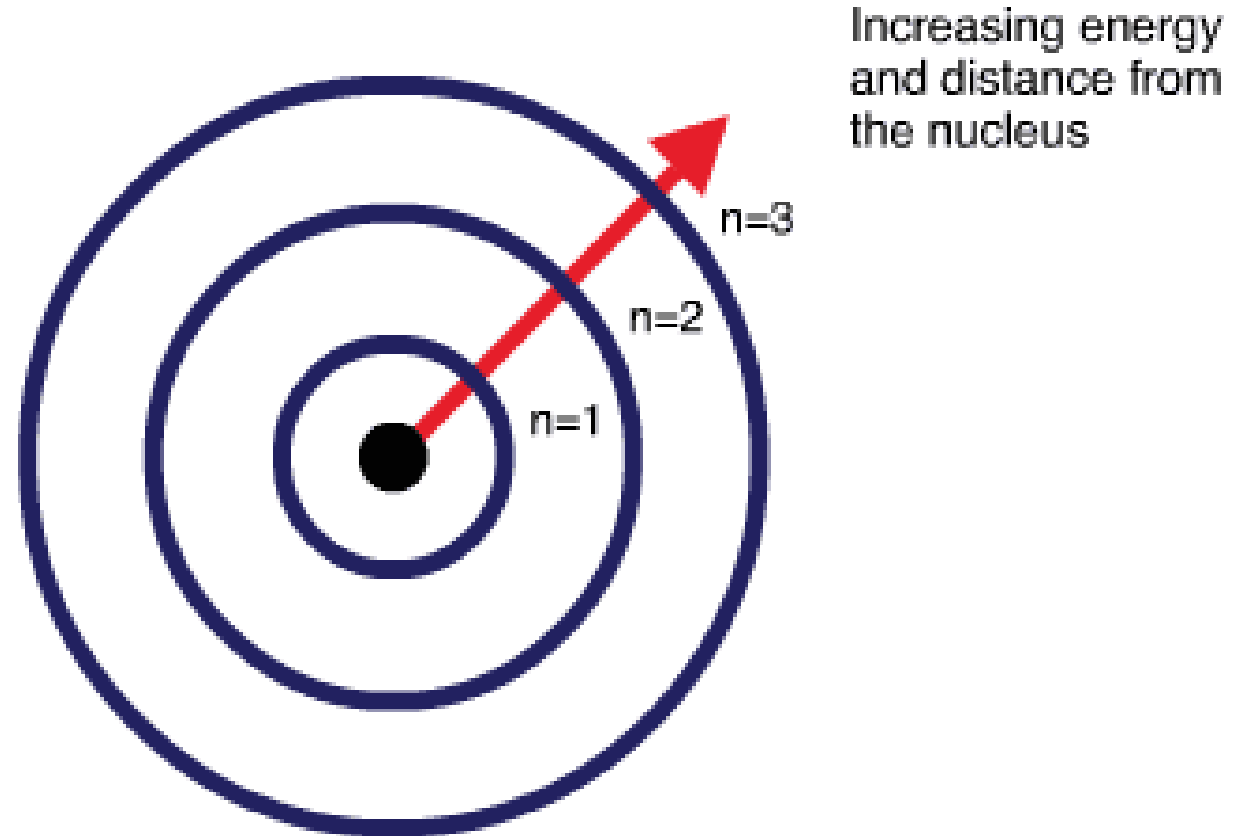
LIGHT CAN BE A PARTICLE or WAVE

- **Photons** are light particles
- Distinct Wavelengths and Frequency
- Unique Energy Signature
- Interacts with Electrons



PHOTON ENERGY

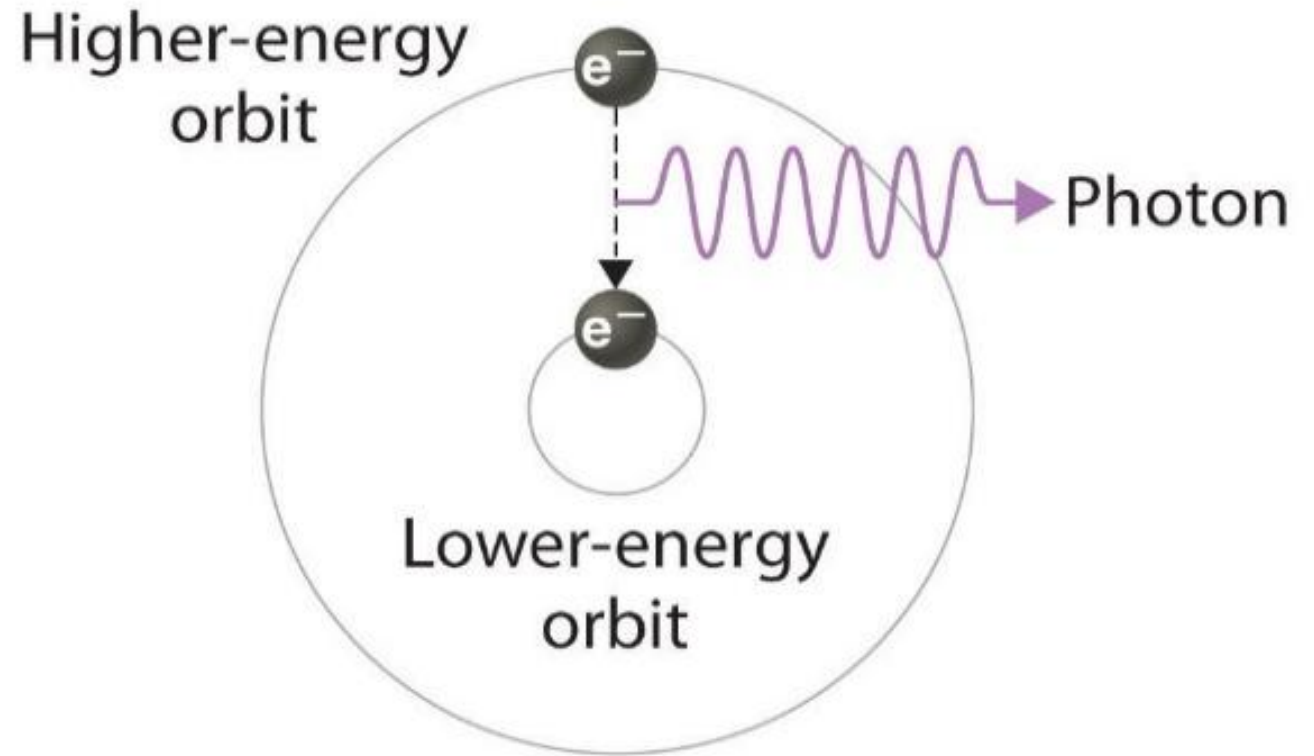
- Particles of Light
- Energizes Electrons
- Electron change orbits around the nucleus
- Creates Moving Electrons (Electron Transitions)
- Creates Electricity



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ELECTRON TRANSITIONS

- As photons interact with electrons, their position is altered
- Absorbed photons energize electrons into higher-energy orbits
- Emitted photons reduce electron energy to a lower-energy orbit



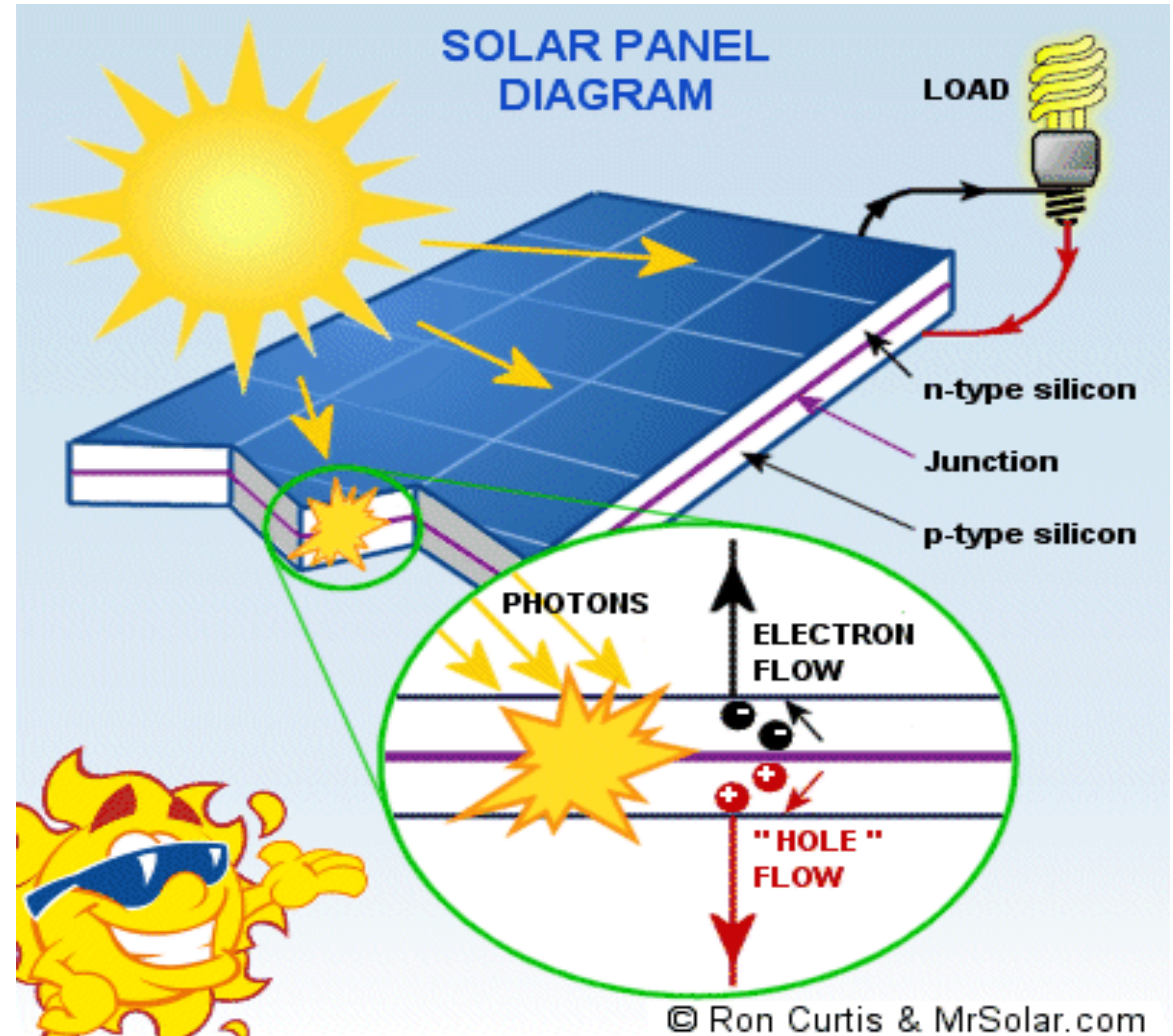
HARNESSING SOLAR ENERGY to do WORK

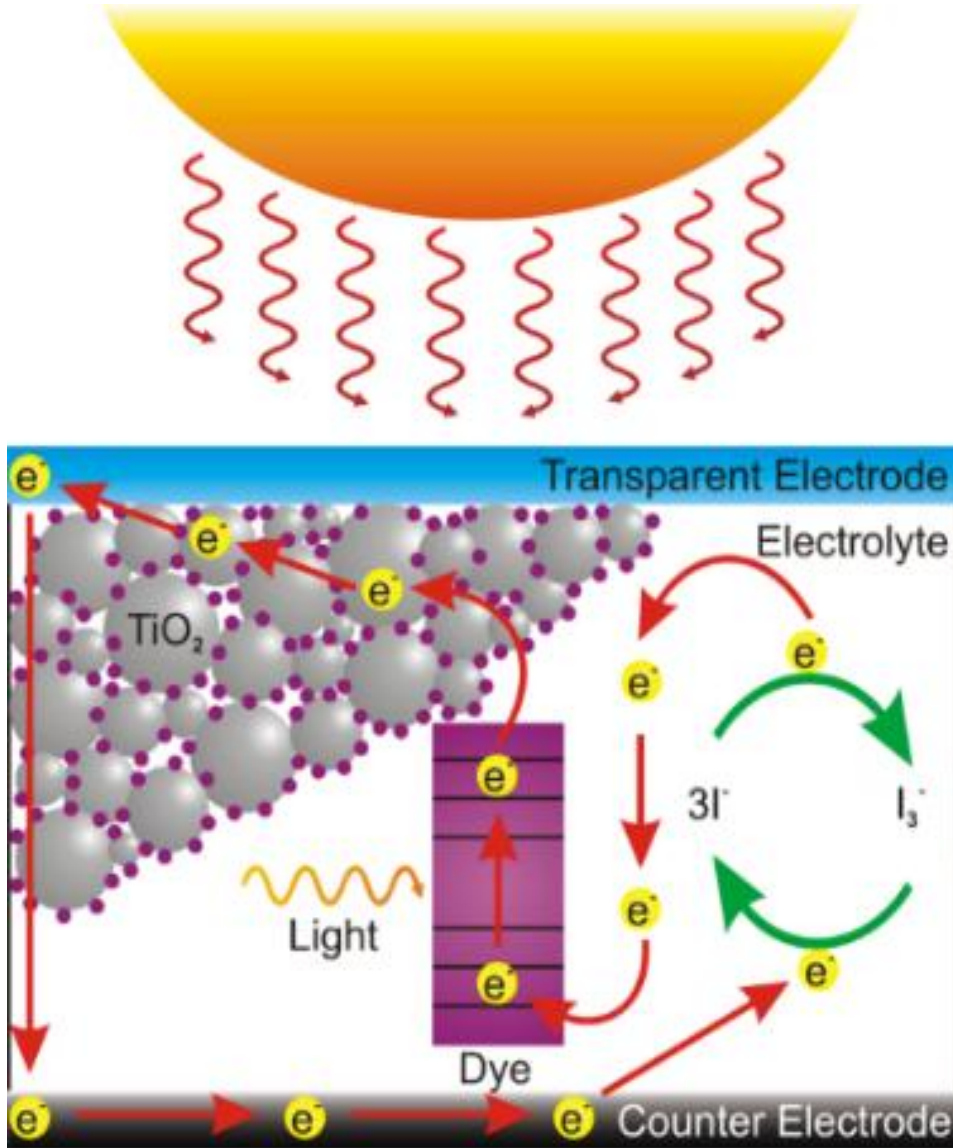
- Solar Panels collect sunlight
- EM Waves and Photons interact with electrons in the solar panels
- Electron energy can be conducted by electrical wires/currents



- Solar Cells collect photons and channel their energy
- Crystalline silicon “holes”
- Channeling electrons with p-type (positive conductors)
- And n-type (negative conductors)

Solar Panels





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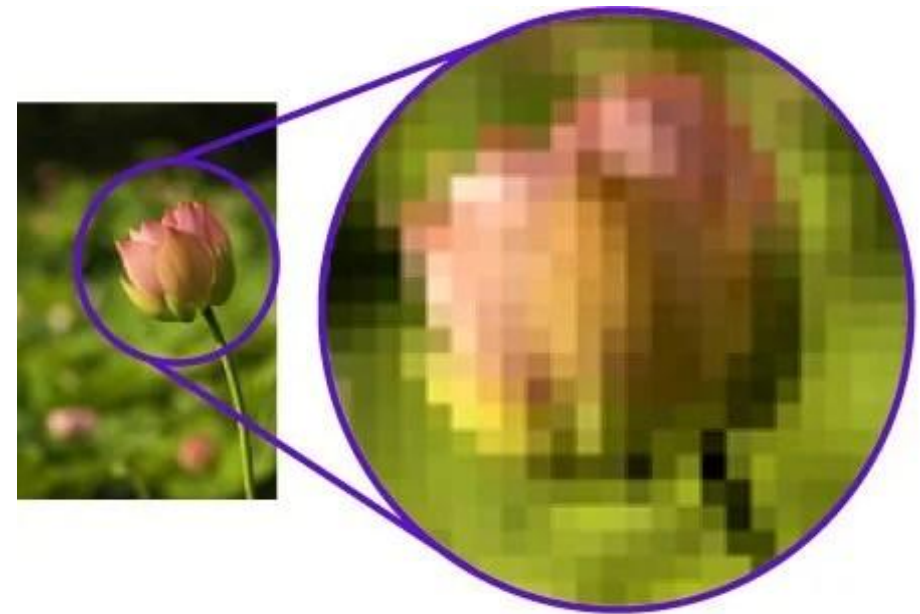
Solar Cells

- Absorb Photons
- Energize Electrons
- Mobilize and Conduct Electrons
- Create Electricity Directly

Other Light Collectors

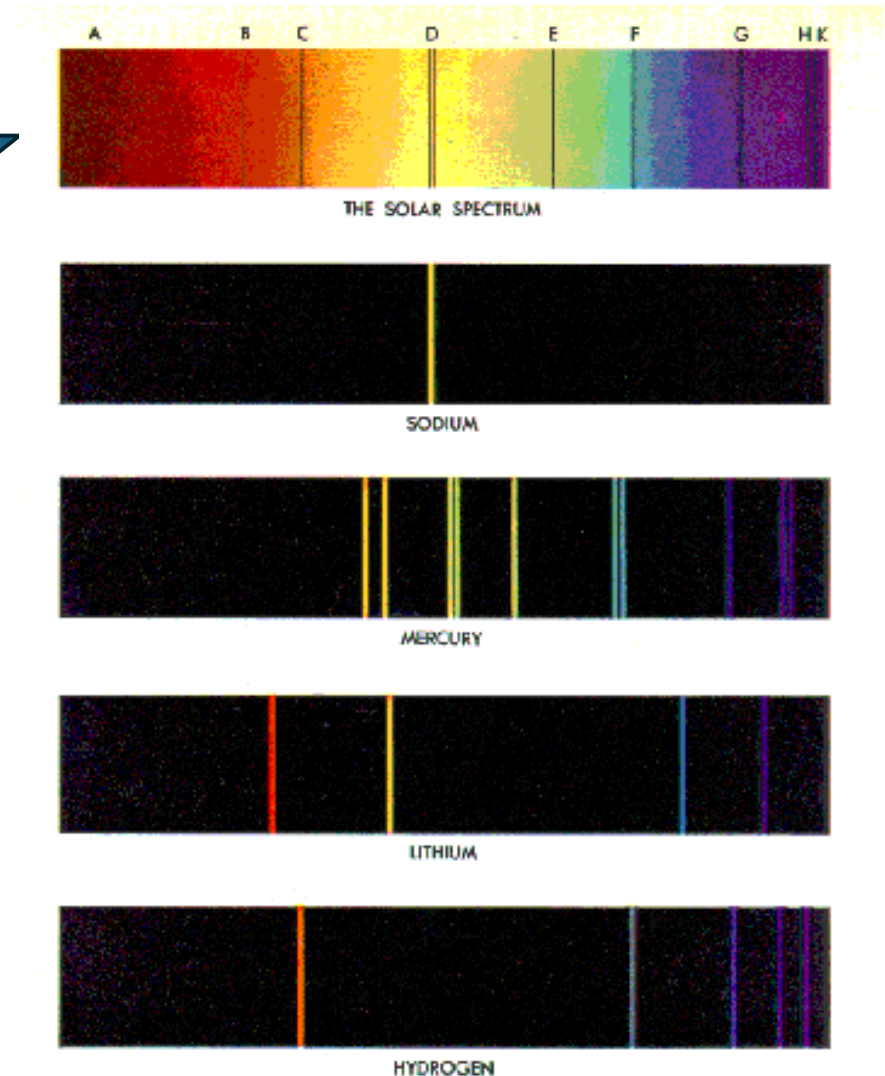
CCD – CHARGE-COUPLED DEVICE

- Light Collection for Digital Cameras/Devices
- A charge-coupled device transfers photon energy to electrons
- Each pixel on the CCD sensor converts the energy into an electrical charge.



SPECTRAL ANALYSIS

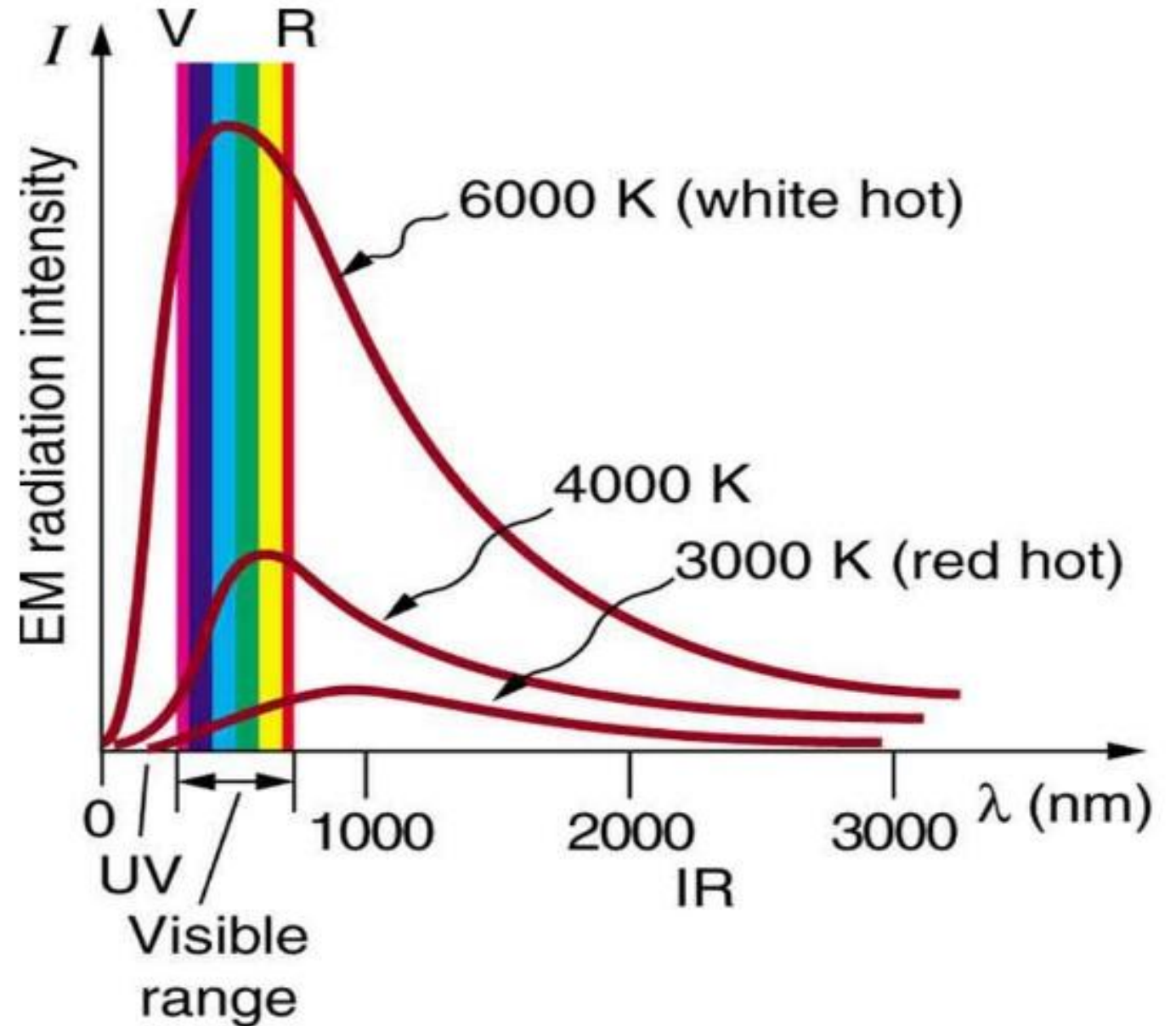
- **ABSORPTION** – each element only absorbs specific wavelengths of photons
- **EMISSION** – each element only emits specific photons →
- **ANALYSES** – in the laboratory, substances can be identified by their spectra (emissions/absorptions)



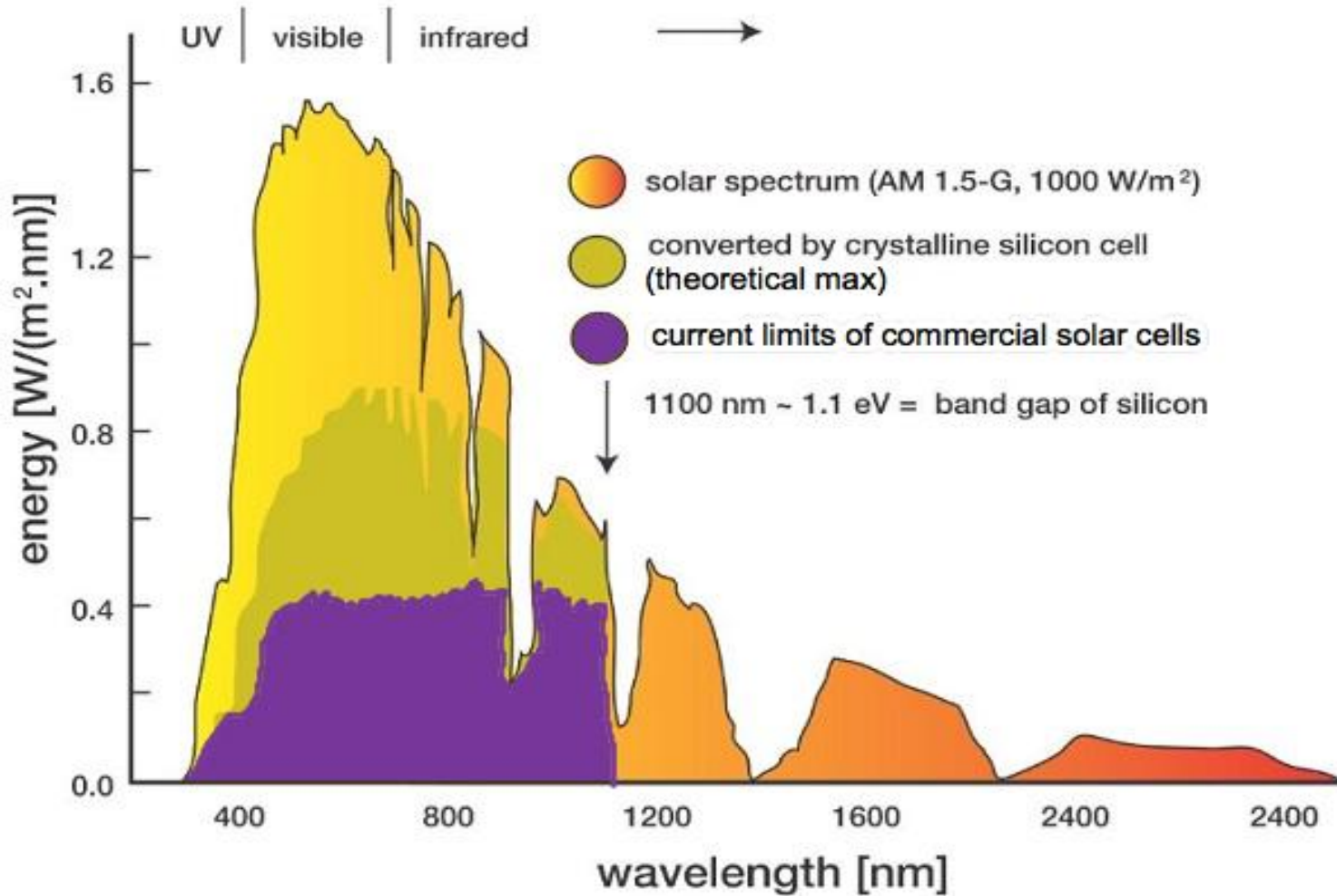
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OUR SUNLIGHT

- Peaks in the Green at 5770 K
- Powers our Food Sources
- Powers our Weather
- Can be used to generate ELECTRICITY



SOLAR POWER



**CAN BE
CAPTURED**

APOLOGETICS

- In **Genesis 1:3**, God said, “*Let there be light*” and there was light.
- Light is foundational to the formation of elements – the building blocks of our universe.
- Biblical writers didn’t understand this when they recorded God’s Word – Moses didn’t know it.
- This simple statement is another assurance that “supernatural intelligence” inspired the Bible.

REMEMBER THESE THINGS

Robots may be made in our likeness, but they're far from human. Humans are made in God's image. We have the breath of life, unlike a robot that runs on batteries and electricity. Their circuit plates, binary code, and computer language may mimic the amazing brain, nervous system, and thought abilities humans possess, but they do not possess a complex soul or spirit. Although Artificial Intelligence can process a greater amount of data faster, it will never have free will, self-awareness, or the ability to tap into a true consciousness that comes from God.



Psalms 18:28 “You, Lord, keep my lamp burning; my God turns my darkness into light.”