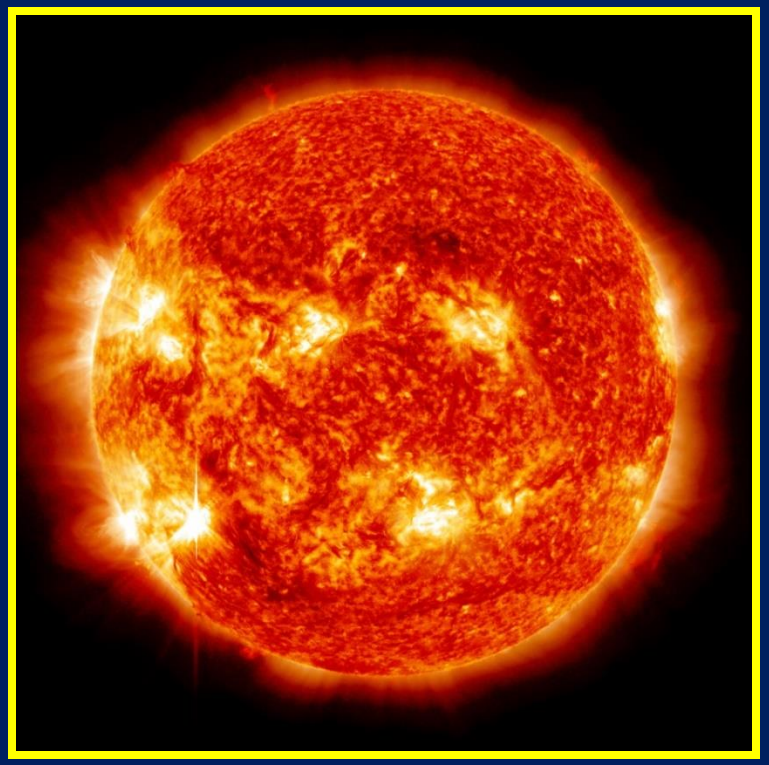
Energy from the Sun



Essential Standard 1.1: Explain Earth's role as a body in space.

Objective 1.1.3: Explain how the Sun produces energy which is transferred to the Earth by radiation.

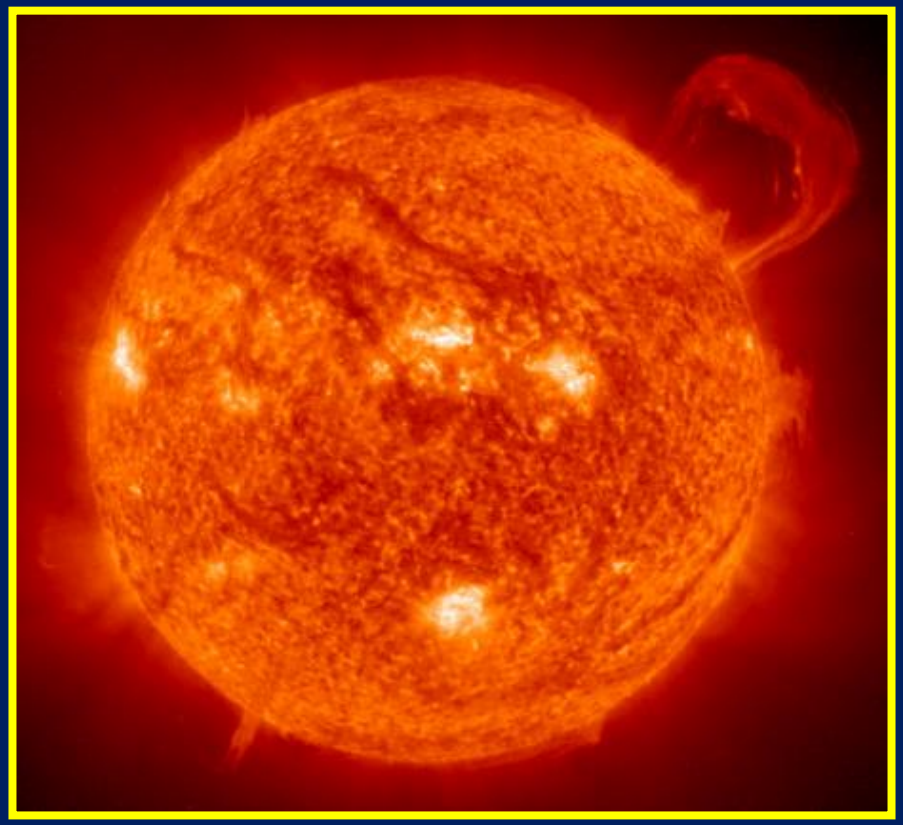
I Can Statements

At the end of this lesson, you should be able to say, with confidence:

- I can explain what happens during fusion reactions in the Sun.
- I can explain the difference between fusion and fission reactions.
- I can explain how Energy from the Sun travels to Earth as radiant energy in the form of electromagnetic waves.
- I can explain how infrared waves are responsible for heating Earth's atmosphere.
- I can explain how plants use light energy to produce chemical energy in the form of food during photosynthesis.

Our Sun - Star

The Sun contains 99.8 % of the total mass of our Solar System is 864,000 miles in diameter and yet is just an ordinary star.



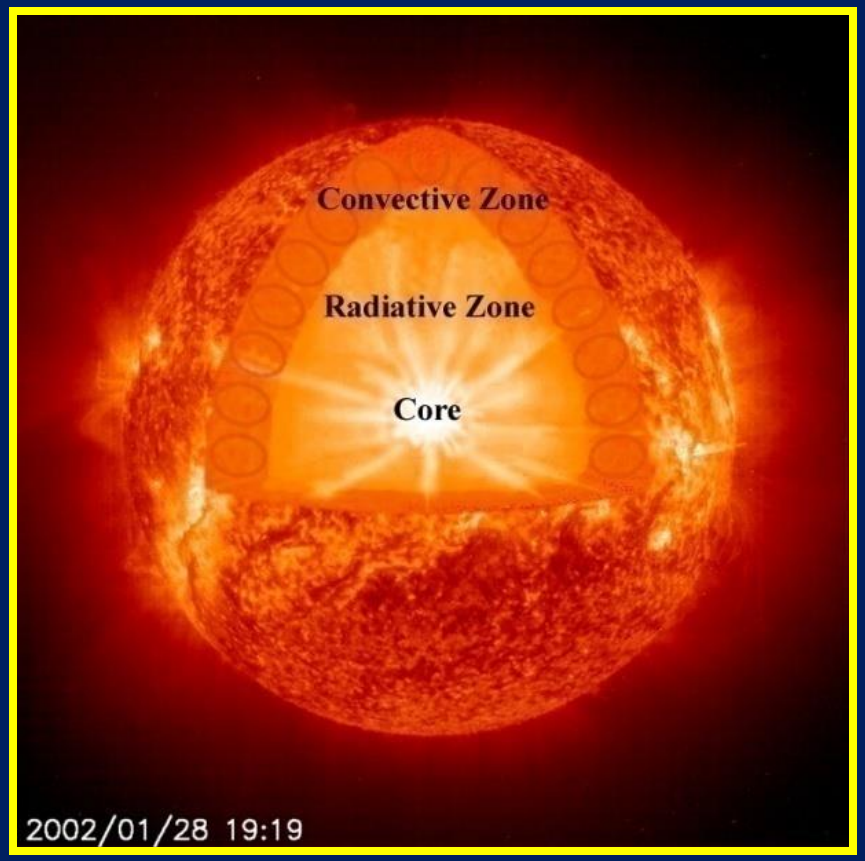
Responsible for Life

Every fraction of a second, our Sun releases more energy than all humans consume within an entire year.

Without the Sun, we would have no light, warmth, or life on Earth.

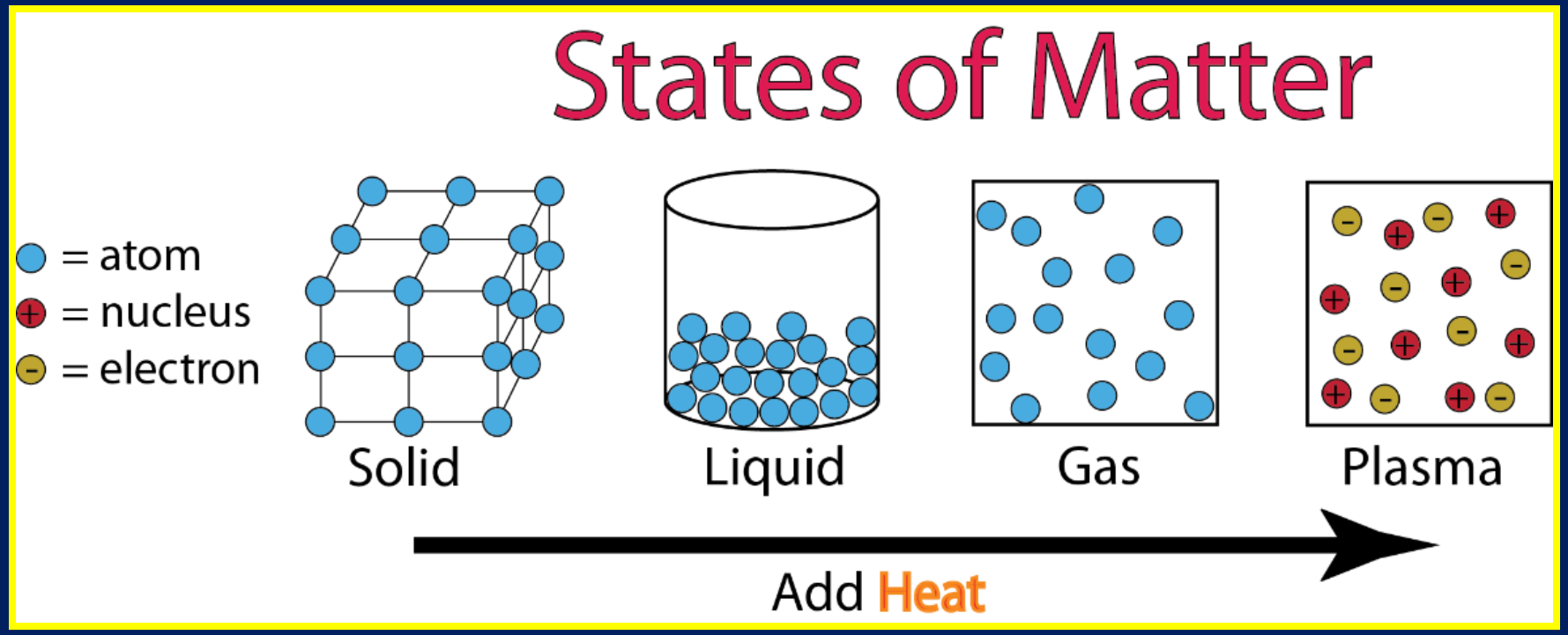
Plasma

The temperatures at the core of the Sun reach 27 million degrees Fahrenheit.



Plasma

At extremely high temperatures, much of the matter exists as plasma, not as fully formed atoms.

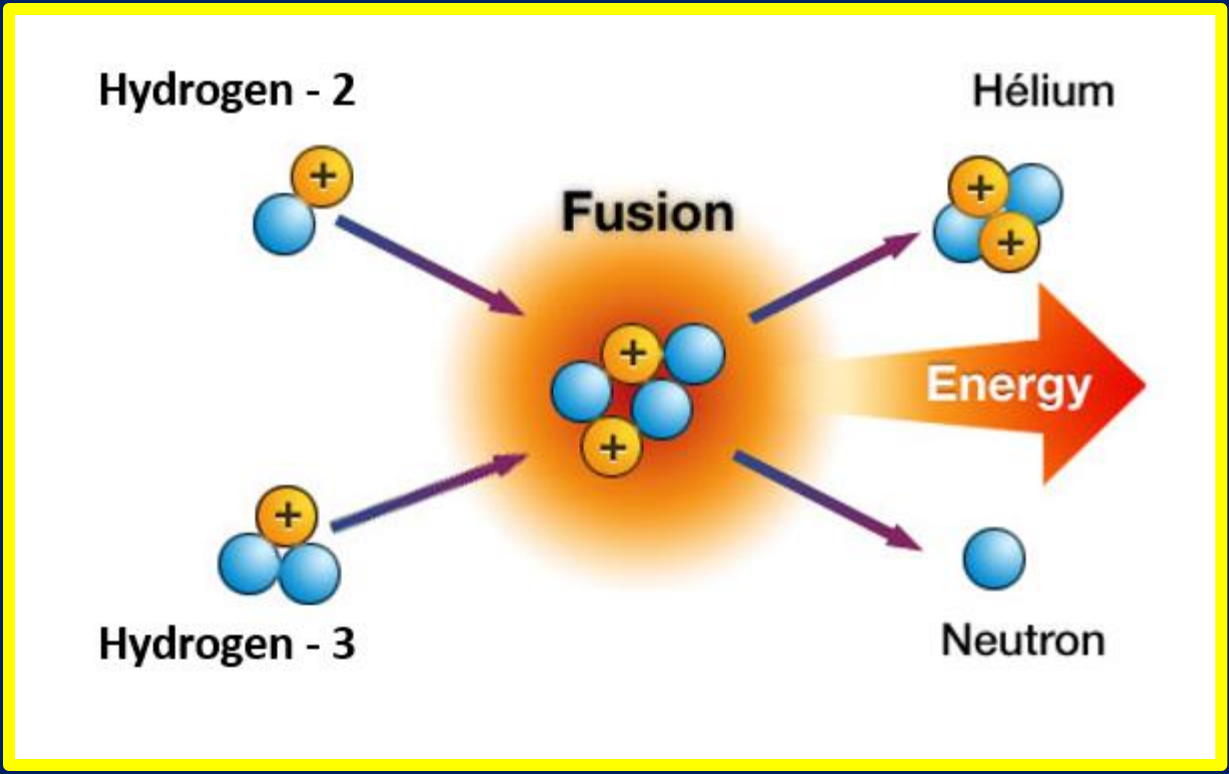


Fusion Reactions

The high temperatures, inside the core, transfer thermal energy to the particles, setting them in motion at extreme speeds.

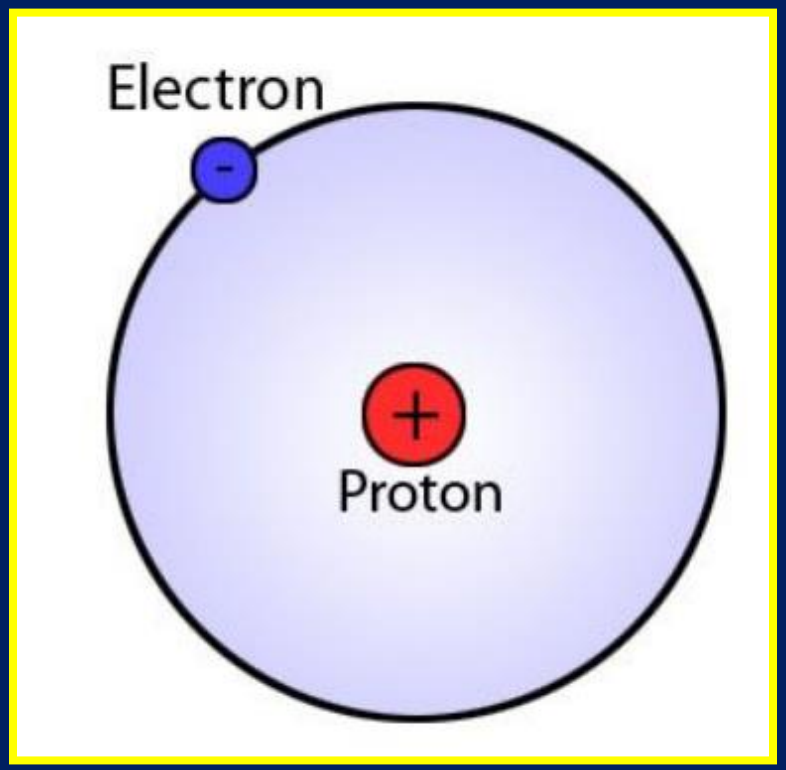
Fusion Reactions

As the extremely fast-moving particles move, they collide and fuse together, forming atoms, in a process called fusion.



Fusion Reactions

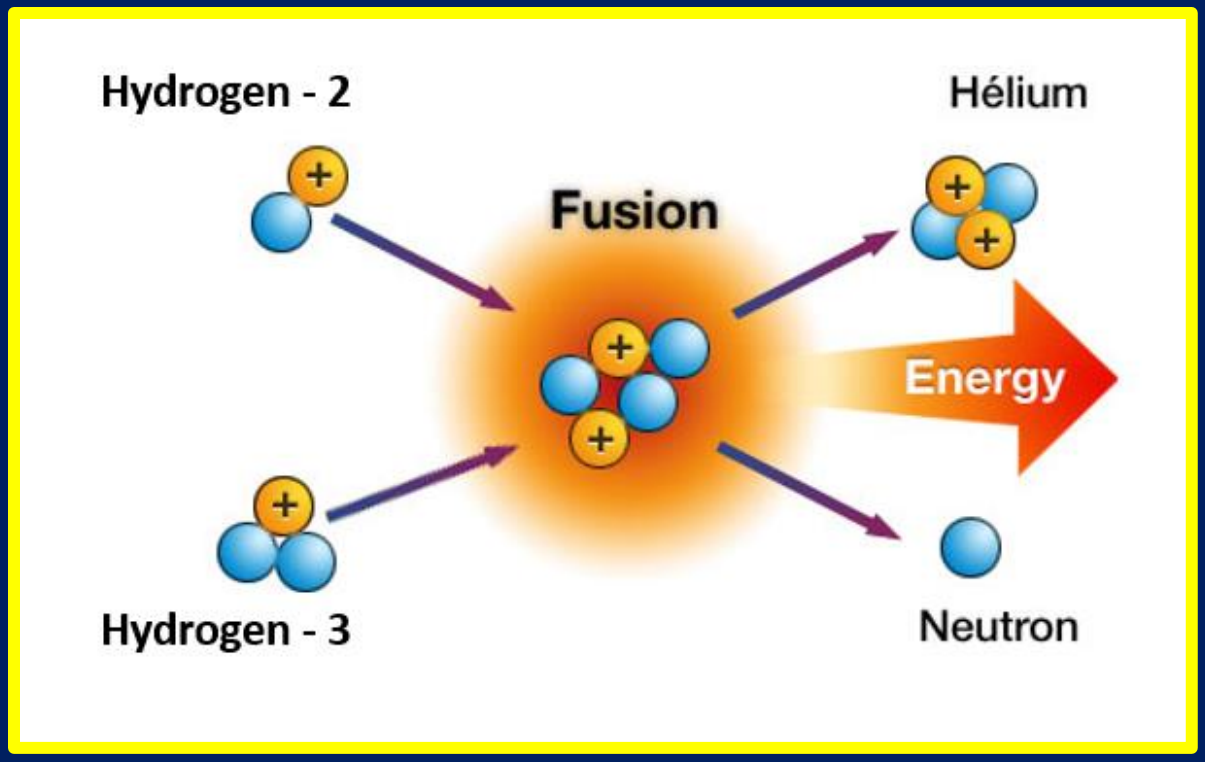
Hydrogen atoms are the smallest atoms and the first atoms formed during fusion reactions.



Hydrogen atoms consist of one proton, one electron, and no neutrons.

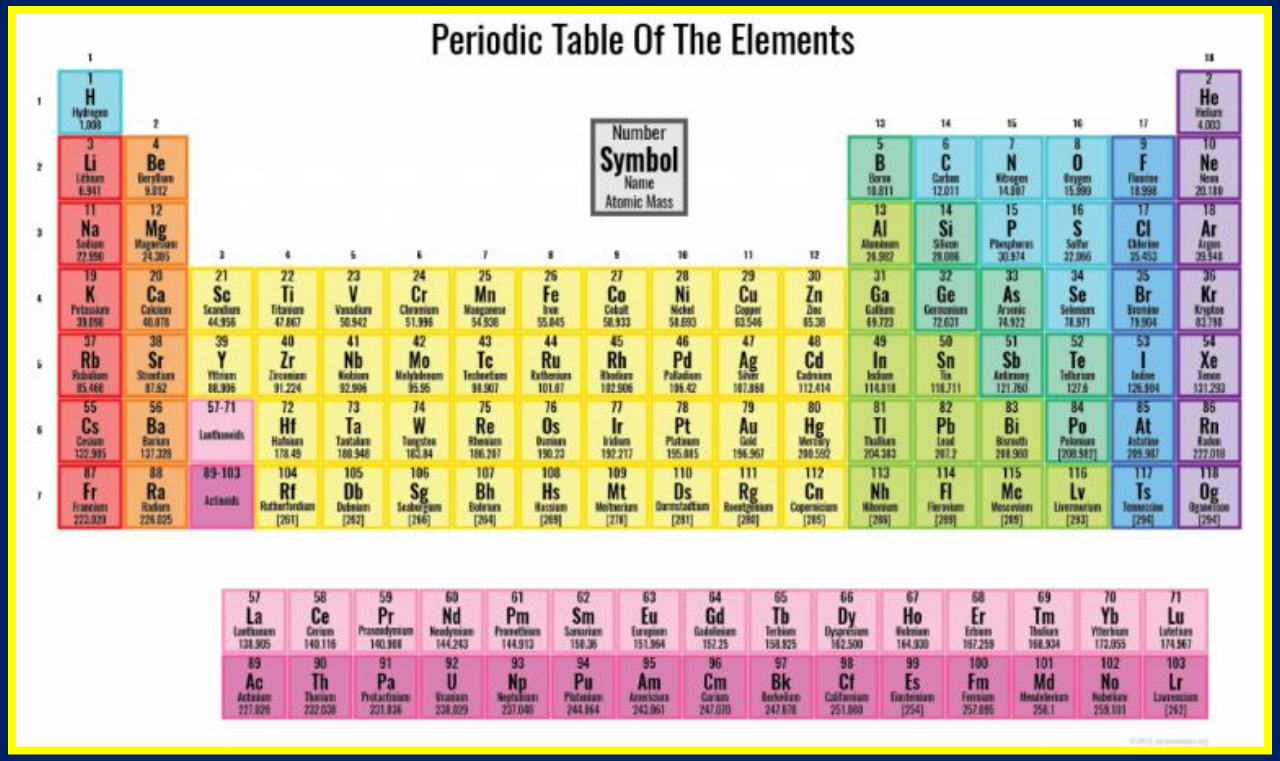
Fusion Reactions

Further fusion reactions result in hydrogen atoms colliding to form Helium atoms.



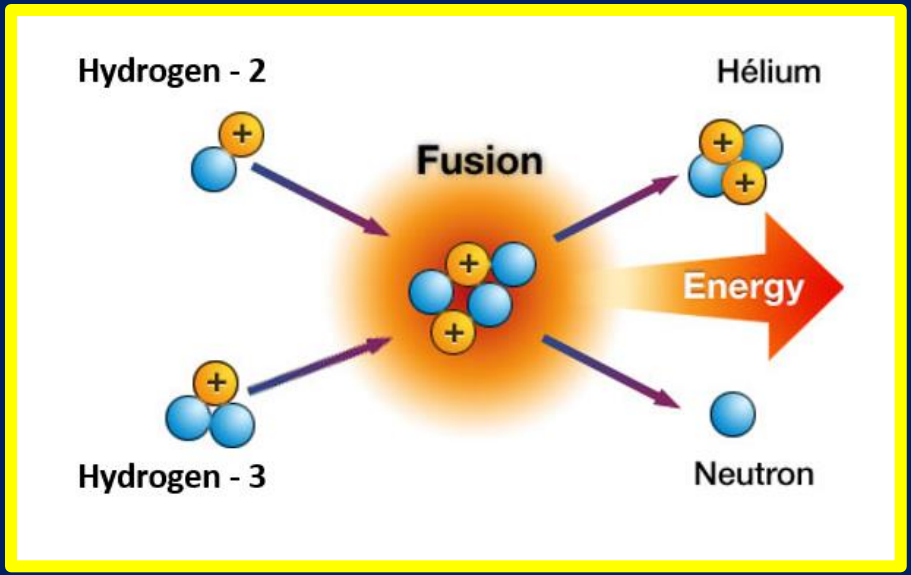
Fusion Reactions

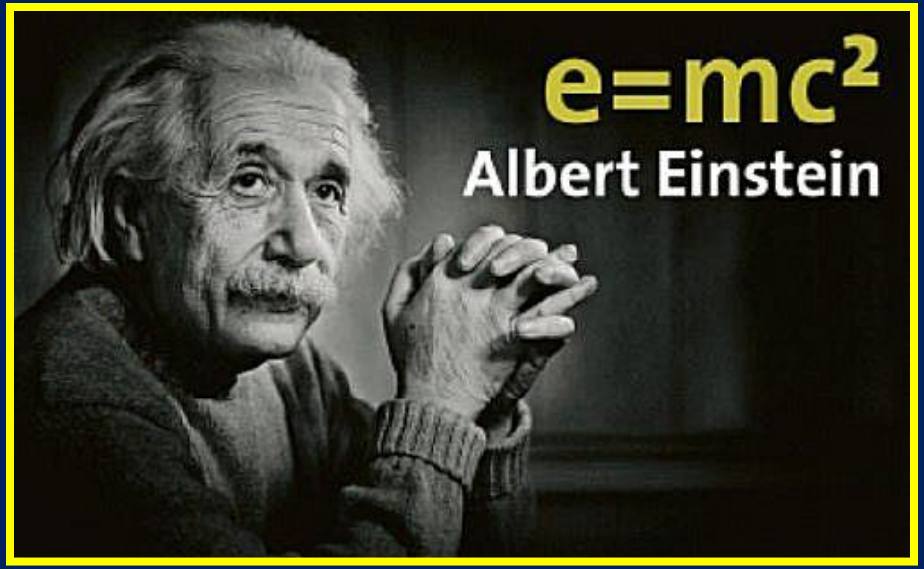
Most of the atoms or elements, found on the periodic table, are formed through fusion reactions inside of stars like our Sun.



Fusion Reactions

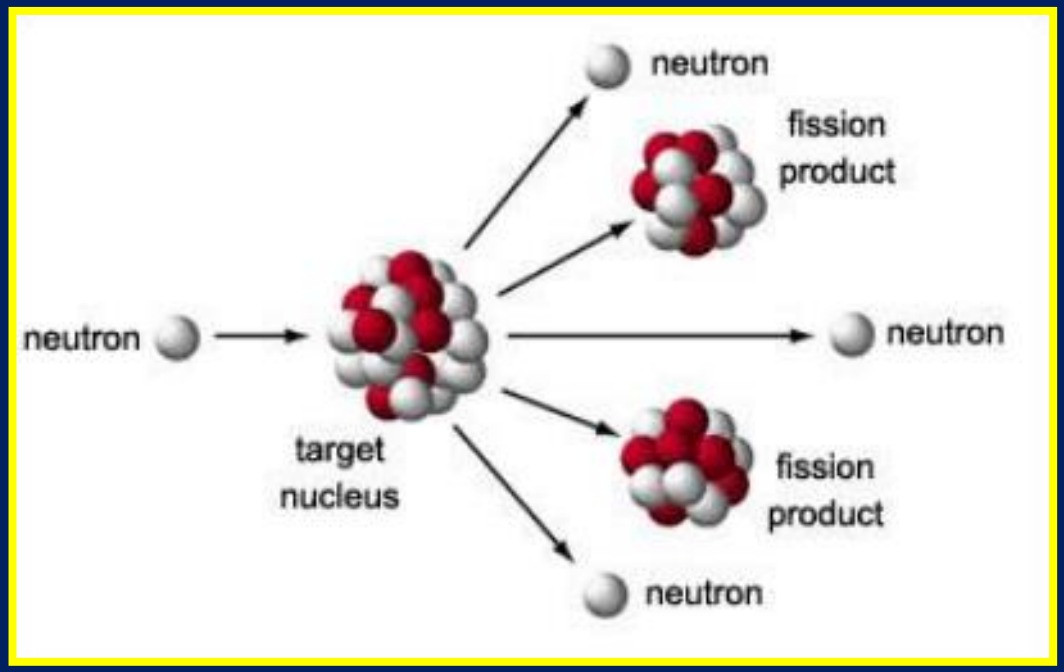
Besides the formation of atoms, fusion reactions also release massive amounts of energy.





Fission Reactions

Related to fusion reactions are fission reactions but instead of forming atoms, larger atoms are split into smaller atoms.



Fission reactions also release massive amounts of energy.

Fission Reactions

Fission reactions are responsible for radioactive decay and can take place naturally or be caused by humans.

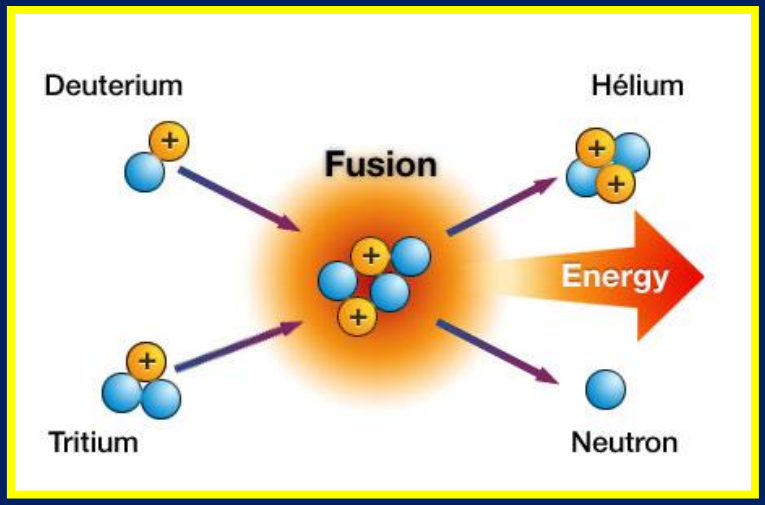
Fission reactions are used in nuclear bombs.

Fission Reactions

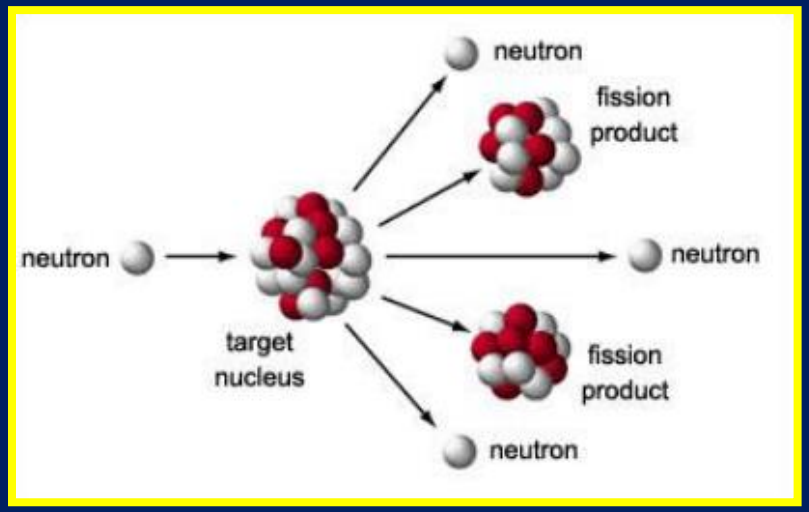
Fission reactions are also used in nuclear power plants.

Fusion or Fission Reactions

Fusion reactions occur in the Sun and involve smaller atoms colliding to produce larger atoms, while releasing energy.



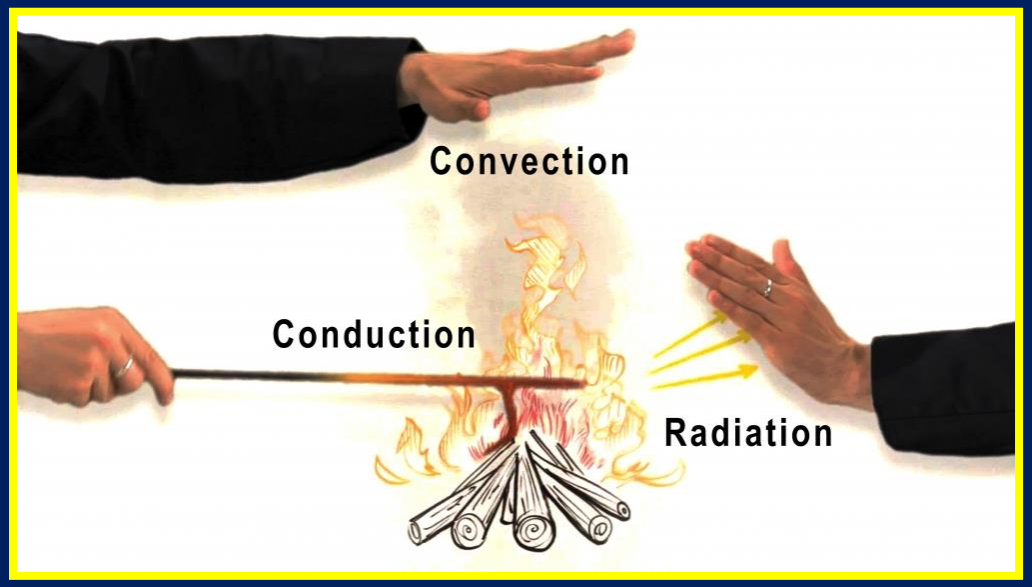
Fusion contains the letters for Sun.



Fission reactions involve splitting apart large atoms to form smaller atoms, while releasing energy.

Radiant Energy

The energy produced in the Sun, during fusion reactions travel to the Earth in the form of radiant energy or radiation.



Radiant energy, or radiation, is transferred without the use of atoms.

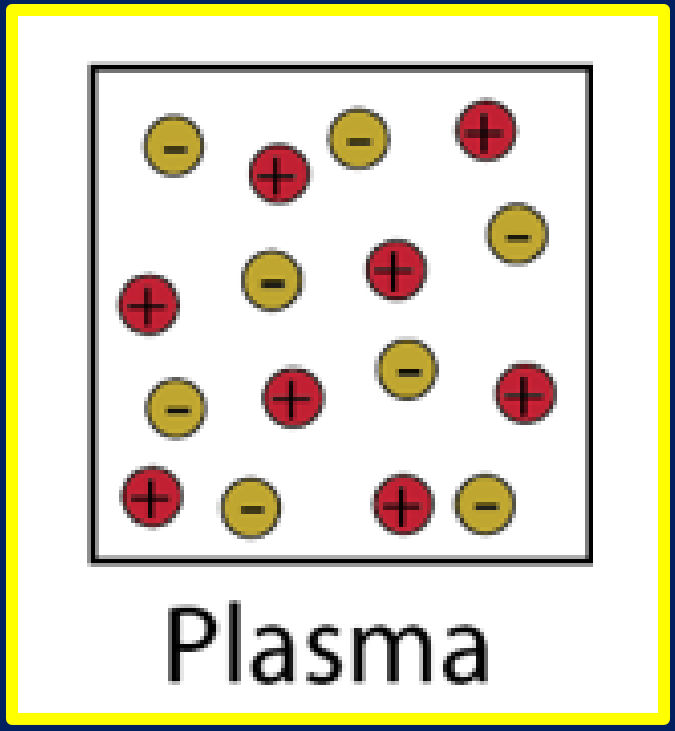
Radiant Energy

Most of space is a vacuum, which means that there are not any atoms present.

Since radiant energy doesn't require atoms, it can travel through space to Earth, making life possible on Earth.

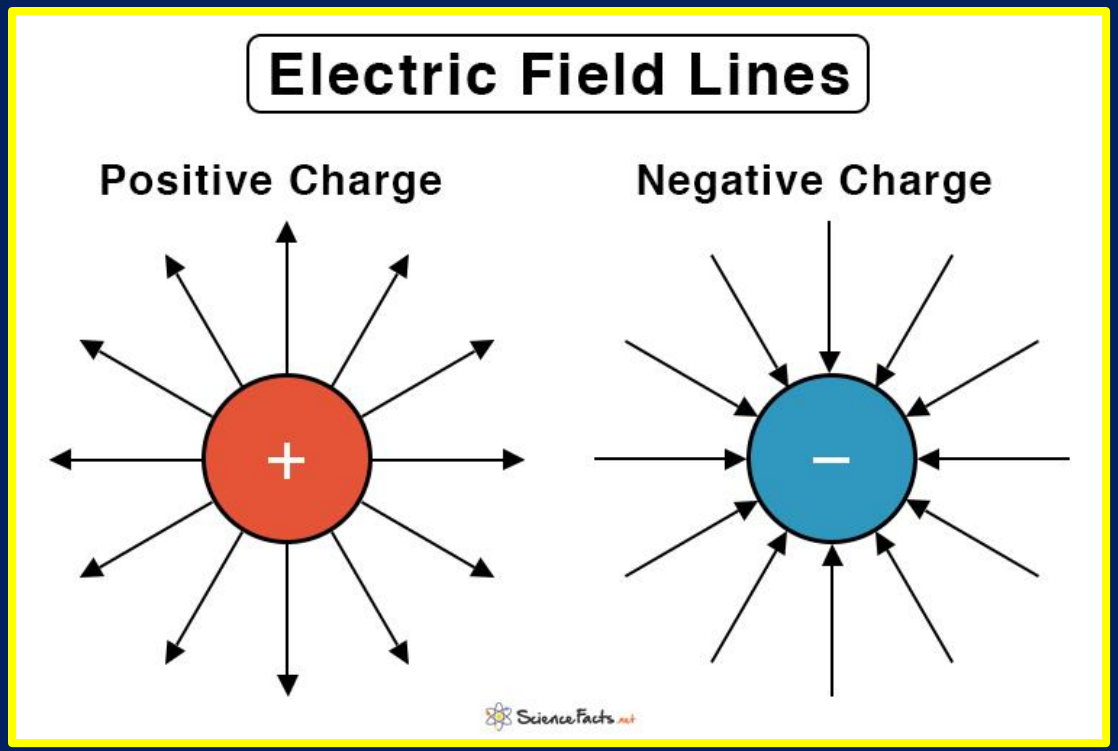
How Radiant Energy Works

Inside the Sun are a lot of charged particles, consisting of lone electrons and lone protons in the plasma state.



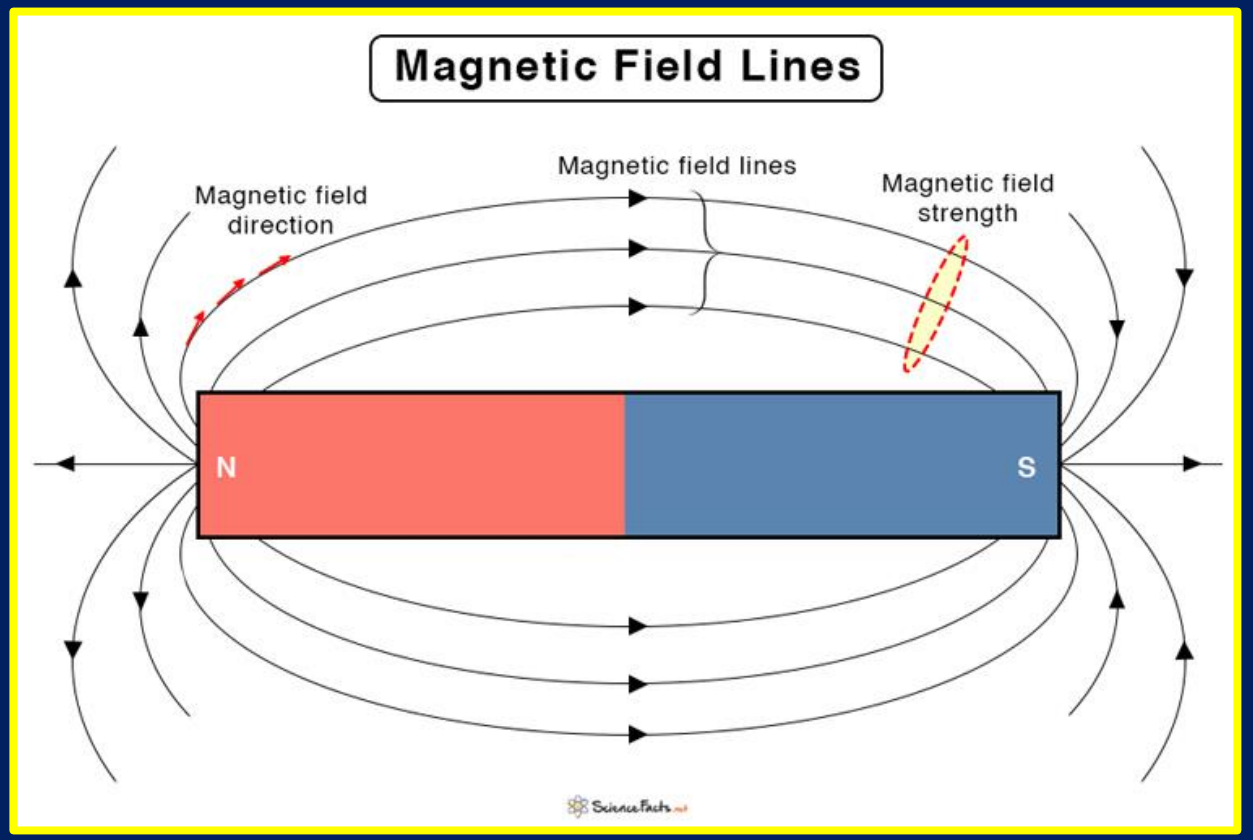
How Radiant Energy Works

Surrounding any charged particle is an electrical field that extends out into the space, surrounding the charged particle.



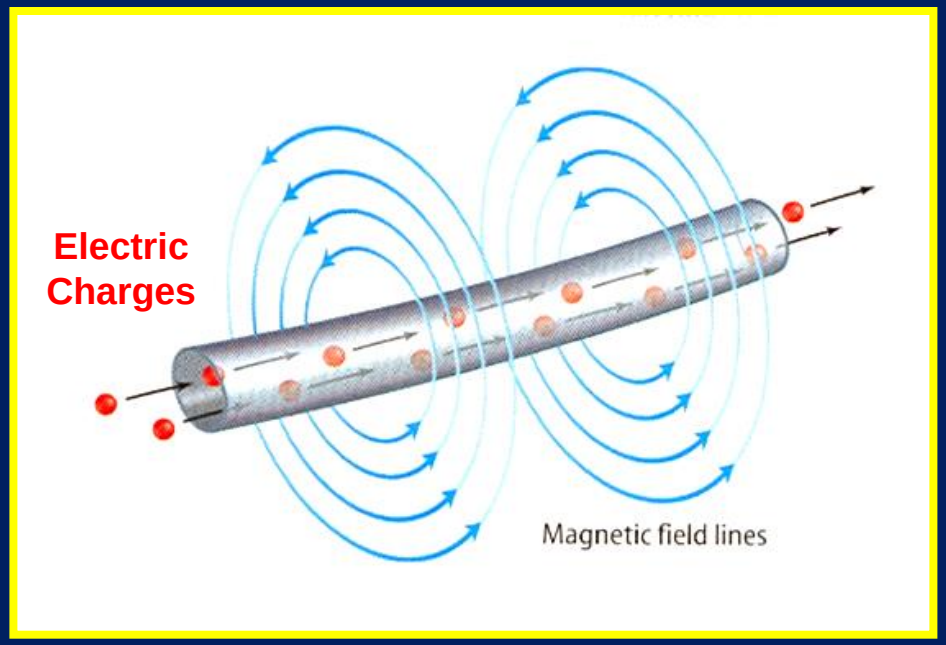
How Radiant Energy Works

Also surrounding any charged particle is a magnetic field.



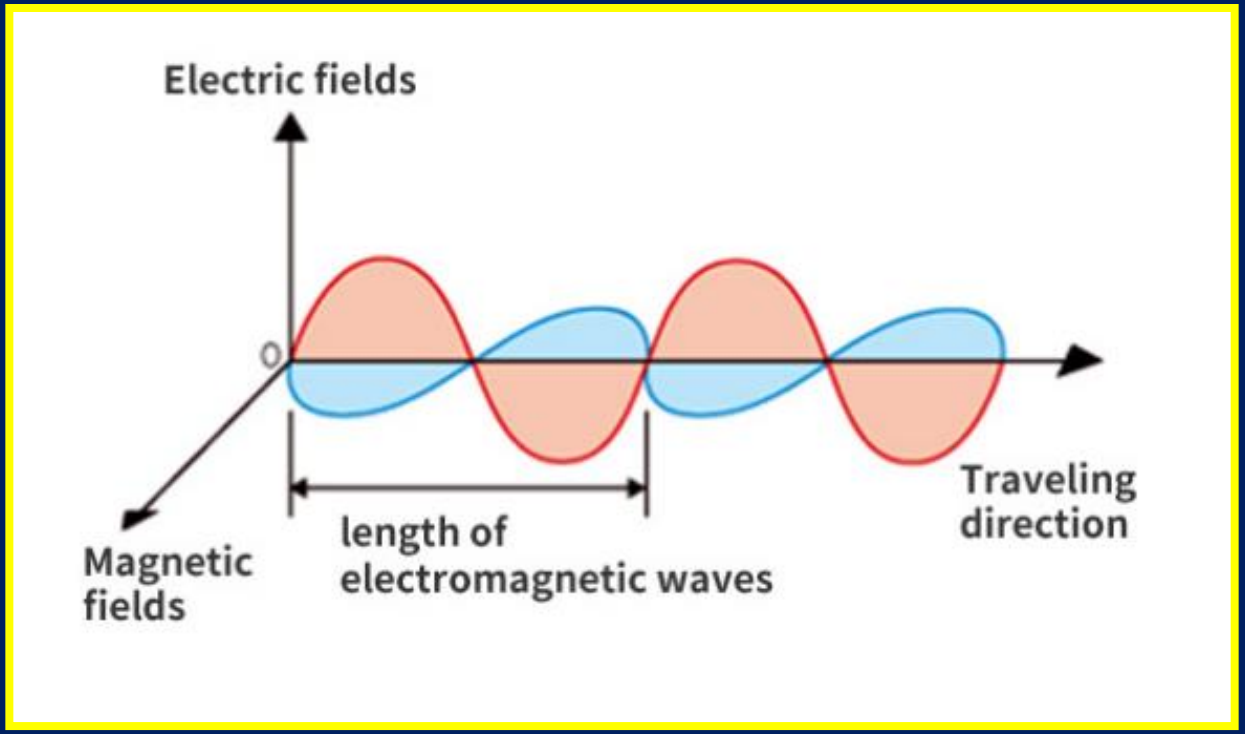
How Radiant Energy Works

Electrical fields and magnetic fields interact so that a vibrating electrical field will produce a vibrating magnetic field and visa versa.



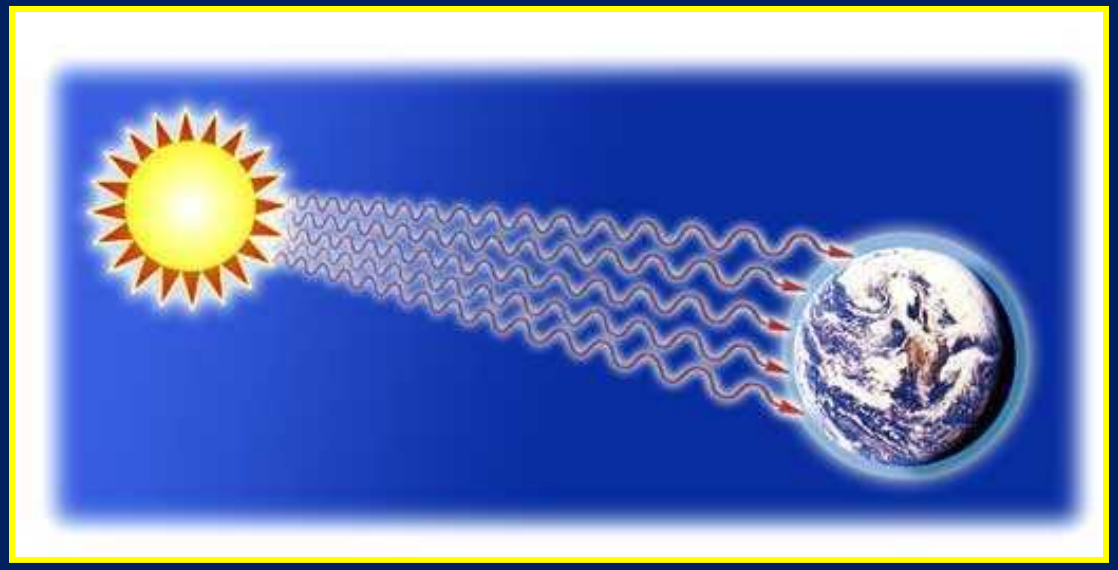
How Radiant Energy Works

The process of electrical fields producing magnetic fields and visa versa results in the formation of an electromagnetic wave.



How Radiant Energy Works

Since electromagnetic waves rely only upon alternating electrical and magnetic fields, they can travel from the Sun to Earth thru the vacuum of space.



The End