

The Solar System

The Sun

- 99% of Solar System by mass
- Everything else orbits it
- Thought to be third generation star
- Big Bang created hydrogen helium and a little lithium
- Gravity caused clumping gradually collecting regions of compressed gas
- First generation stars formed, gravity versus pressure from nuclear reaction
- Nuclear reaction converts hydrogen to helium + release of energy causing pressure
- Some stars can create other elements by nuclear fusion notably oxygen, carbon and nitrogen which with hydrogen can produce molecules needed for life.
- Water H₂O contains elements which are easy to make and relatively common.
- Some larger stars burn faster, run out of fuel and collapse producing a supernova
- Supernovae generate enough pressure to make heavier elements e.g. iron necessary for complex life of the kind we know.
- Stars from this generation seed the universe with more elements than just hydrogen and helium although they remain the most common elements by far.
- Second generation stars are formed from the residue of the first generation and third generation from the residue of these.
- The Sun is mostly hydrogen which it converts to helium producing the energy we need for life.
- Most matter in the Solar System other than hydrogen and some helium have been created by the nuclear burning of first and second generation stars.

Zones

Rocky Planets

The inner Solar System has 4 small rocky planets.

Mercury and **Venus** are called “inferior planets” because they orbit inside ours. Because of this they show phases like our Moon.

Mercury

A little larger than our Moon
Orbits Sun in 88 Earth days
Large core - probably iron
Has a detectable magnetic field
Surface is cratered - similar to our Moon

Venus

Similar size to Earth
Orbits Sun in 224 days
Rotates backwards (Sun rises in the west and sets in the east) and one Venus day is 243 Earth days long.
When Venus shows a thin crescent, sometimes light (called the Ashen Light) can be seen on the disc. This is thought to be an atmospheric phenomenon
Total cloud cover
Surface hot enough to melt lead. Rains sulphuric acid.

Mars

Little more than half the diameter of Earth
Orbits Sun in approx 687 Earth days
We catch it up approx every 780 days therefore we do not get an opposition (closest approach) every year.
Rotational period just over 24 hours therefore its aspect does not change much from one night to the next.
Has a thin atmosphere and polar caps of water ice coated with CO₂ (dry) ice.

Richard Young. 17.06.2016