

U3A-GROUP ASTRONOMY (25-11-2005)

THE SOLAR SYSTEM

SS consists of 1 star (Sun) and 9 (10?) planets + billions of smaller objects orbiting around it. Diameter: 30 billion km. Sun formed c. 4.6 bln years ago out of a cloud of stellar gas and dust. In its centre nuclear fusion forms Helium (He) out of Hydrogen (H); enormous amounts of energy are produced, resulting in temperatures of c. 15 mln °C. The heat reaches the surface after 100s of 1000s of years and has then been reduced to 'only' 5,500 °C. In the Sun's atmosphere, however, temperatures rise again to over 2 mln °C.

This whole process has been going on now for c. 4.6 bln years, and it will take about the same time before all the available H has been converted into He. Then the Sun will 'die'.

Sun / Planets	Distance from Sun (average, mln km)	Diameter (km)	Diameter (Earth = 1)	Mass (Earth = 1)	"Year"	"Day"
SUN	-	1,392,000	108.8	300,000	-	-
Mercury	58	4,880	0.4	0.06	88 d	59 d
Venus	108	12,100	0.9	0.82	225 d	243 d
<i>Earth</i>	150	<i>12,800</i>	<i>1</i>	<i>1</i>	<i>365 d</i>	<i>1 d</i>
Mars	228	6,780	0.5	0.11	687 d	1 d
<i>Asteroid Belt</i>						-
Jupiter	778	143,000	11.2	318	12 yrs	10 hrs
Saturn	1,430	120,000	9.4	95	29 yrs	10 hrs
Uranus	2,870	52,400	4.1	15	84 yrs	16 hrs
Neptune	4,400	48,600	3.8	17	165 yrs	17 hrs
Pluto	5,800	2,300	0.2	0.002	248 yrs	6 d
<i>Kuiper Belt</i>						
<i>Oort Cloud</i>						

The planets + asteroids + comets etc. are debris from the time when the Sun formed (less than 1% of the Sun's mass). All of it orbits around the Sun, everything in the same direction and in one plane: the ecliptic.

The planets (*ancient Greek word: 'Planetai' = wanderers*) are very different from each other in size, mass (weight), composition, length of 'years' and 'days' (see Table). The four 'inner' planets are rocky, the 'outer' planets are gas-giants (except Pluto). Between these two groups lies the Asteroid Belt: material that never made it to form a planet. All the planets have moons (total over 150), except Mercury and Venus. Saturn and Uranus also have rings consisting of lumps of ice.

Beyond Pluto lies the Kuiper Belt, an enormous flattish belt of Asteroids, and around the whole SS lies the spherical Oort Belt, home of the Comets (extends to half-way the nearest star).

Discussion whether Pluto and the recently discovered 'Tenth Planet' are real planets, or objects from the Kuiper Belt.

All the planets – except Pluto - and some of their moons have been visited: fly-by's, probes in orbit, spacecraft landing (manned so far only on the Moon).