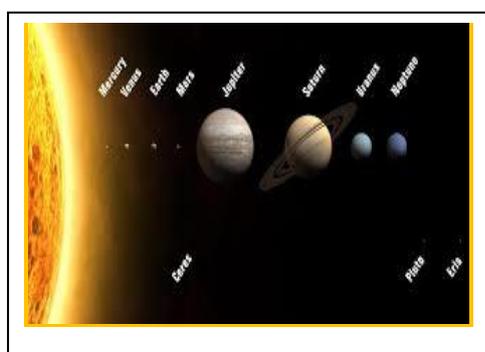


West Dartmoor U3A

Meeting Report: September 2020	Prepared by: David Jowett
Speaker: Jo Richardson	Subject: Our Place in Space

Jo Richardson is an astronomer who is involved in space education for children and has appeared on “Sky at Night”.

She began by defining the Solar System as the Sun, the planets with their satellites and all other objects, such as asteroids and comets, which orbit the Sun, and explained that the Solar System lies close to the edge of our own galaxy, the Milky Way, which is but one of trillions of galaxies in the Universe as a whole.



We were given a brief history of astronomy from the geocentric system of Ptolemy, which lasted for centuries, to the heliocentric system of Copernicus. Only in the 19th century did the Herschel family discover that the Sun may be the centre of our Solar System, but not of the Universe as a whole.

Stars are born as a result of the collapse under gravity of clouds of gas, mostly hydrogen. Depending on the size of the gas cloud, the stars vary in size and temperature, our own Sun being medium in this respect with a temperature of 6,000°K at the top of the chromosphere (the Sun’s atmosphere), 4,500°K at the surface and about 15 million degrees K at the centre. Stars of this size have a life-span of about 10 billion years and are regarded as the ones most likely to have planets with at least the potential for life to evolve. Smaller ones are too short-lived and larger ones too hot. Our Sun is about 4.6 billion years old.

Planets are formed from the coagulation under gravity of the residual material of the original gas cloud. Our own system seems to be unique in having rocky planets like Earth, Mars and Venus near the star and gas planets like Jupiter and Saturn further out.

Distances are mind-boggling; at the speed of light (186,000 miles per second) it would take 190,000 years to cross the Milky Way, 2.5 million years to reach the Andromeda Galaxy, our nearest neighbour in the Local Group, which is itself infinitesimally small compared with the whole Universe.

Jo gave us a brief tour of our own Solar System; Mercury, nearest to the Sun, is a small, rocky and heavily cratered world. It has no moon, no atmosphere, rotates once in 58 Earth days and has a highly eccentric orbit. Because of its slow rotation its surface temperature ranges from 400°C during the day and -400°C at night.

West Dartmoor U3A

Venus is also rocky and of similar size to the Earth. It has an acidic atmosphere, no moon and rotates once in 243 Earth days in the opposite direction from all the other planets. It is the hottest planet, over 400°C on the surface, having suffered the greenhouse effect of its thick atmosphere. Recently the gas phosphene has been found in its upper atmosphere, which theoretically could indicate the presence of microbial life.

Earth is the fifth largest of the planets, has an orbital speed of 67,000 mph and an axial tilt of 23½°, which produces the seasons as the altitude of the Sun varies throughout the year.

Mars is the last of the rocky planets, about half the size of the Earth, with a thin atmosphere and two small moons, Phobos and Deimos (Fear and Terror). The familiar red colour is due to the presence of large quantities of iron oxide. A large volcano, Olympus Mons, in the past produced enough lava to cover almost half the planet's surface.

Jupiter is the largest planet, the first of the gas giants, and consists mainly of hydrogen, so may be a failed star. It rotates every 9 hours and shows a long-lasting storm in its cloud bands, the Red Spot. It is 583 million miles from the Sun, has four large moons discovered by Galileo and over 70 much smaller satellites, probably captured asteroids.

Saturn has a very low density, consists of hydrogen and methane, and has 62 moons and a magnificent set of rings formed of rock particles, possibly a fragmented moon. It takes 28 years to orbit the Sun.

Uranus is formed of ice and methane, has 27 moons and also a set of faint rings. It takes 84 years to orbit the Sun and is unusual in being tipped on its side, perhaps as a result of impact with a large body.

Neptune and Pluto are beyond the range of naked-eye visibility, Pluto taking 248 years to orbit the Sun.

36 members thoroughly enjoyed this fascinating talk which Jo really brought to life using the zoom platform.