GeoDome Data Sheet for Script 1

Hopefully with Script 1, the Excel Data Sheet and these pages, the students will understand rotation, orbits, the size and place of our Solar System, the different planets – major and dwarf – that make up our system and their moons and rings, a few constellations, and want to learn more.

With that in mind, this sheet will add some trivia.

Zodiac

You cannot see your sign on your birthday as it is a SUN Sign. The constellations of the Zodiac or Ring of Animals were chosen by ancient astrologers because that is where the planets (remember, they only saw 5), the Sun and the Moon appear. Think of the Solar System as a dinner plate. Place a sunny-side-up fried egg in the center of the plate to be the sun. Use 8 lima beans (they are flat and won't roll off the plate) to represent the major planets. If you want the limas to orbit the egg yolk, you would push them around the plate. Use your imagination and put yourself on the third lima from the sun (we aren't above the solar system, we are in it). Where are you going to look for the other limas? They may be on either side of you, behind you, or even on the other side of the egg yolk. Our dinner plate is the plane of our solar system and if we stretch the plate out into the Milky Way to see what stars it would "hit", voila, we find the stars of the Zodiac. Since the egg is also on the plate, it appears in those constellations, too. Our Moon does, too, because it is close to our lima bean.

Landforms

Looking at the east coast, you can point out the nice "flat" piedmont that we sit on that leads up to the nice wrinkly Appalachians. If you want, you can point out Long Island, Cape May, the Great Lakes. If you are fairly close you can point out the skinny Finger Lakes in NY state that were scratched out by the retreating ice sheet in the last ice ages. As you pull away from the surface, you can see the Great Plains and the Rockies, Florida's peninsula, the shallow ocean of the Bahamas and the Keys. If you've time to rotate the Earth, look for the deserts and the green areas of rain forest, and so on. If you are rotating the Earth, have the students look at the lighted and dark areas of the globe and make some guesses as to why there is such a difference. The Appalachian Mountains are the worn down remains of a giant set of early geologic mountains caused by the merger of 2 plates. (Similarly, the Himalayas formed when India crashed into the Asian plate. They are still growing as the Indian plate forces its way under the Asian one.)

Bright Winter Stars

Star	distance from Earth (light years)	constellation	apparent magnitude	temperature (° K)
Sirius	8.8	Canis Major	-1.5	9500
Procyon	11.4	Canis Minor	0.35	6600
Pollux	36	Gemini	1.15	4500
Capella	41	Auriga	0.08	5600
Castor	46	Gemini	1.58	9500
Aldebaran	70	Taurus	0.85	3800
Bellatrix	300	Orion	1.63	23000
Adhara	650	Canis Major*	1.5	23000
Betelgeuse	650	Orion	0.8	3400
Rigel	800	Orion	0.11	10100

*Adhara is the back foot of the Big Dog

Sirius has a white dwarf orbiting it called Sirius B or the Pup.

Castor is in reality 3 binary pairs: Castor A is a pair of blue-white main sequence stars, castor B is a second pair of blue-white mains, and Castor C is a pair of yellow-orange main sequence dwarfs.

Betelgeuse is an enormous dying supergiant. If it were in our solar system it would reach past Jupiter's orbit. Its mass is estimated to be 10-15 times that of our Sun. When it runs out of fuel, it will explode in what is called a supernova. If it is 10X the mass of the sun it will become a neutron star. If it is 15 times the mass of our Sun it could become a black hole. A black hole is not a hole. It is an area where there is so much gravity, not even light can escape. Think a ball of gravity. The remains of a star 15 times the mass of our Sun or greater will collapse down past the molecular level into a point called the singularity. The singularity has all the gravity of the mass of the star. The edge of the gravity's reach is called the event horizon. Black holes were first theorized by Steven Hawking as a mathematical concept for where all the energy of a massive star could go.

A light year is a measure of distance, NOT time. Light travels 186,000 miles per second so in one year it travels approximately 6 trillion miles. Think of it this way, it takes light from the Sun about 8 minutes to travel the 93 million miles to us here on Earth.

Another way to look at this, the closest star to the Sun is a star called Proxima Centuari in the Alpha Centauri system. Stars that don't have their own name are named by their constellation and their position in the order of brightness using the Greek alphabet. Alpha Centauri means the brightest star in the constellation the Centaur. It can be seen from southern Florida. Proxima is named for its closeness. Proxima Centauri is 4.3 light years away. If we could travel the speed of light, 186,000 miles per second, it would take us 4.3 years to get there. BUT we cannot travel the speed of light. At our fastest it would take over 2000 years to get there.

New Horizons is the fastest rocket we've ever launched from Earth. It will reach around 8 miles per second. Voyager 1 is now traveling at 10.5 miles per second and is now beyond the orbit of Neptune (remember it launched back in 1977 and got some gravitational boosts from Jupiter and Saturn).