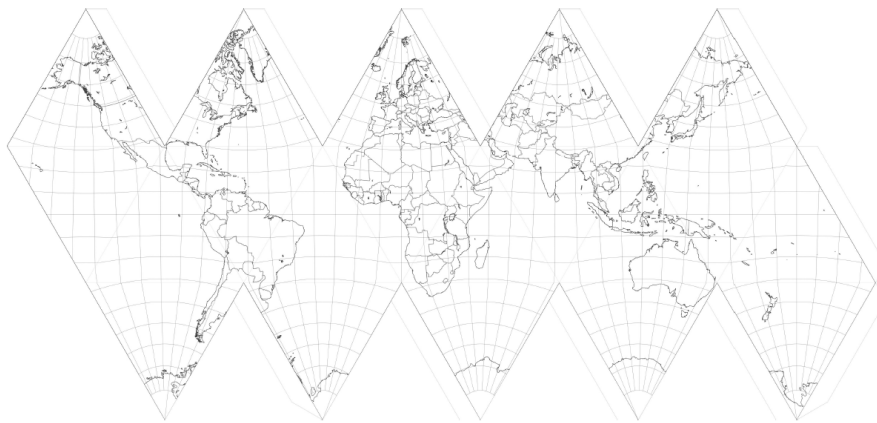




DIY SOLAR SYSTEM

In this imaginative craft activity, children make the planets of our Solar System using a template of an icosahedron (a polyhedron with 20 triangular faces, 30 edges and 12 vertices). They then decorate their planets with sand, glue, cotton wool, paint, glitter... the sky is the limit!



LEARNING OBJECTIVES

In this activity, students will learn about the the movement of the Moon relative to the Earth, the lunar cycle and the phases of the Moon.

YOU WILL NEED

- White cardboard
- Scissors
- Tape
- Paint
- A needle
- Thread
- Image of an icosahedron to print
- Craft supplies (plastic, foil, construction paper, different kinds of sand, plasticine, mud, string, fuzzy yarn, cloth, foam, stickers, glitter glue, cotton wool, bubble wrap, etc.)

BACKGROUND INFORMATION

Minimal knowledge about the Solar System:

The Solar System consists of the Sun and eight planets, their moons, and other non-stellar objects, such as asteroids. The four smaller, inner planets—Mercury, Venus, Earth and Mars, also called the ‘terrestrial planets’—are primarily composed of rock and metal. The four outer planets, called the ‘gas giants’, are substantially more massive than the terrestrials. The two largest gas giants, Jupiter and Saturn, are composed mainly of hydrogen and helium; the two outermost planets, Uranus and Neptune, are composed largely of substances called ‘ices’, such as water, ammonia and methane. They are often referred to as ‘ice giants’.

The Solar System also contains the asteroid belt, which lies between Mars and Jupiter and is similar to the terrestrial planets as it mostly contains objects composed of rock and metal. Beyond Neptune’s orbit lies the Kuiper belt, which contains objects composed mostly of ices. Some of these objects are referred to as dwarf planets and include Pluto, Eris, Haumea, Makemake and Ceres. There are also small-body populations including comets and interplanetary dust.

Conditions in our Solar System



Mercury: Conditions on Mercury, the closest planet to the Sun, are some of the harshest in the Solar System, the surface displays some amazing extremes with temperatures that vary by an astounding 590 kelvin.

Although Mercury is the closest planet to the Sun, there are places on the surface that are cold and dark enough to contain water ice. The surface of Mercury is a broken and distorted landscape; it has ridges, mountains, plains, escarpments and valleys, but above all, it is marred by an impressive number of craters. Mercury’s craters vary widely in diameter, some are tiny bowl-shaped cavities, while others are multi-ringed basins hundreds of kilometres in diameter. The largest known crater is called Caloris Basin at 1550 kilometres in diameter. On the opposite side of the planet from the gigantic crater is a large hilly area known as the “Weird Terrain” that might have been pushed out by the shock wave created by the impact on the other side of the planet. The cratering is deeper than on most terrestrial planets because Mercury its lack of a substantial atmosphere.

The planet’s thin, tenuous atmosphere is the reason temperatures on the surface can drop to -279°C at night, despite it being the closest planet to our Sun’s light and heat. There are places on Mercury cold enough that they contain water ice.

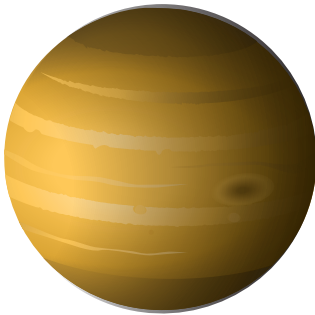




Venus: Venus is shrouded in a thick atmosphere that rises 400 kilometres above its surface, making the planet's ground very difficult to study. However we do know that Venus has a solid, rocky surface like all the Solar System's terrestrial planets (Mercury, Venus, Earth, Mars). The surface is a desolate and barren place, comprised mainly of low, rolling plains that appear to have been created by volcanic activity. Unlike most other terrestrial planets, there is a lack of small impact craters due to the cushioning effect of the planets dense atmosphere which prevents all but the largest meteors from reaching the Venusian surface.

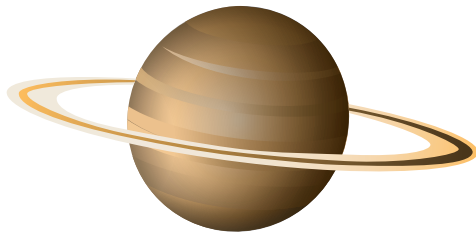


Mars: Mars is commonly referred to as the "Red Planet", due to its striking reddish appearance caused by the iron oxide (otherwise known as "rust") prevalent on its surface. It is a dry, barren wasteland that is marked by some remarkable geological characteristics; mountains, craters, valleys and canyon systems. It is home to the largest volcanic mountain in the entire Solar System, Olympus Mons. In fact, the northern half of the planet contains volcanoes so huge that they deform the planet's roundness. Mars also hosts a gigantic equatorial rift valley called Valles Marineris. This canyon system is one of the largest in the Solar System; Earth's Grand Canyon could easily fit into one of the many canyons of this great chasm. The Martian surface has been changed dramatically over time by volcanism, impacts from other bodies, movements of its crust, and atmospheric effects such as dust storms. Great dust storms regularly engulf the entire planet, with dramatic after-effect such as giant dunes, wind streaks and other wind-carved features.



Jupiter: Jupiter is what we call a 'gas giant', and the name is very apt, the planet is the largest in our Solar System and made up almost entirely of hydrogen and helium. In its large, gassy atmosphere some intense weather is taking place. Storms that grow to cover thousands of kilometres within hours, winds whipping the clouds at 360 kph, and storms that last for hundreds of years are common. The famous brown, white and yellow stripes that can be seen wrapping around the planet are clouds of ammonia crystals that are around 50 kilometres deep. These stripes are known as 'tropical regions', and they are created by air flowing in different directions at different latitudes. The Great Red Spot on Jupiter is one of the best known features in the Solar System. The storm is larger in diameter than Earth, and has been known to shrink and grow. It has been as large as 40,000 km in diameter. During its recorded history it has travelled several times around the planet relative to any fixed position below it. Storms like the Great Red Spot are common on gas giants.

Jupiter also has white ovals and brown ovals, which are lesser, unnamed storms. White ovals tend to consist of relatively cool clouds within the upper atmosphere. Brown ovals are warmer. Such storms can last as little as a few hours or stretch on for centuries.



Saturn: Saturn is the second largest planet in our Solar System, big enough to fit the Earth inside around 760 times! Like Jupiter, it is a gas giant made up of mostly hydrogen and helium. Saturn is most famous for its beautiful rings. Actually, the planet has several rings which are made of billions of particles of ice and rock that range in size from a grain of sugar to the size of a house. Saturn is the farthest planet from Earth visible to the naked human eye. Yellow and gold bands can be seen in the planet's atmosphere which are the result of super-fast winds reaching up to 1800 kilometres per hour! Recently a giant hexagonal storm has been spotted circling the planet's north pole, each of its sides nearly 25000 kilometres across and reaching at least 100 kilometres down. It remains uncertain what causes this.



Uranus: Upon first glance Uranus is striking – most of the planets within our Solar System appear dull and colourless, but Uranus is a blue-green colour due to methane in its atmosphere. Like its neighbour, Saturn, Uranus also has rings although they are much less apparent. Unlike Saturn's rings which are made of bright ice, the rings of Uranus are very dark, made up of less reflective dust particles. They're also narrow, only measuring a few kilometres wide. Perhaps the planet's most interesting feature is that it is axially tilted. Uranus' north and south pole lay where all the other planets have their equators. This means that while the rings lie around Uranus' equator, to us they appear to lie around its poles.



Neptune: Neptune is the furthest planet from the Sun in our Solar System. Like Uranus, Neptune appears blue, but a more vivid, brighter blue than the blue-green colour of Uranus. Like all the other outer planets of our Solar System, Neptune is a gas giant with intense storms raging upon it – Neptune's winds rage three times stronger than Jupiter's. In 1989 a spacecraft called Voyager 2 spotted a large, dark oval storm in the planet's southern hemisphere, large enough to contain the entire planet Earth. However more recent images by the Hubble Space Telescope show no sign of this storm! The planet has six rings, although unlike Saturn's rings they are very hard to see because they are dark and vary in density and size.

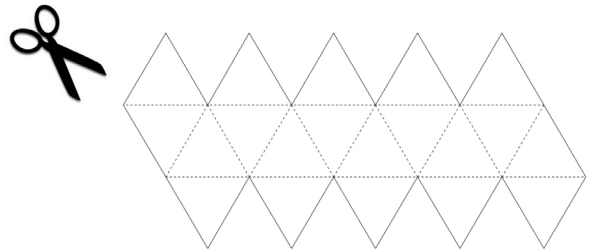
FULL ACTIVITY DESCRIPTION

Step 1

Having taught the children about some of the extraordinary conditions that exist on the planets of the Solar System (see 'background information'), ask each child to choose a planet they want to make).

Step 2

Print out the icosahedron. For best results, it should be at least A3 size.



Step 3

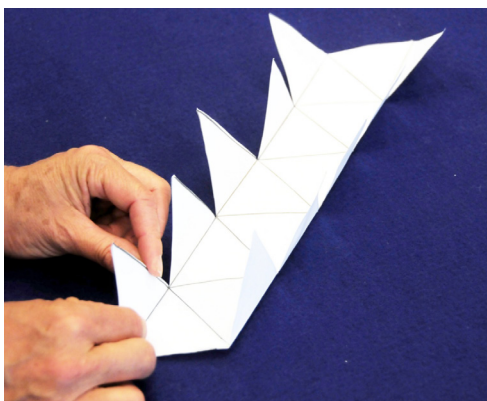
Cut out the icosahedron along the solid lines only.

Step 4

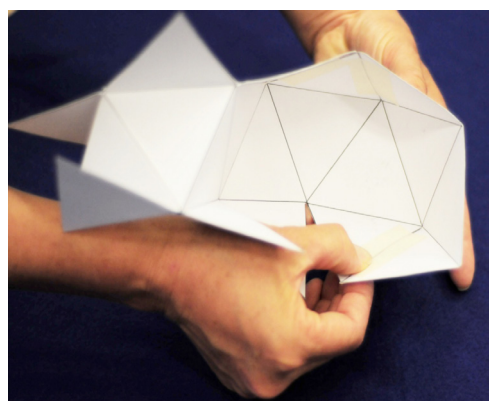
Fold along the dotted lines. (Image 2)

Step 5

Tape together the adjacent faces. (Image 3)



Folding along the dotted line



Taping together the adjacent faces

Step 6

Ask the children to decorate their plain planet according to the facts they have heard. Make available a range of craft materials or encourage the kids to find what they need.

Step 7

If you are low on resources, try to find industrial discards, off-cuts and over-runs. Not only are they unusual and useful for creative purposes, you are helping reduce the amount of waste going to the landfill!

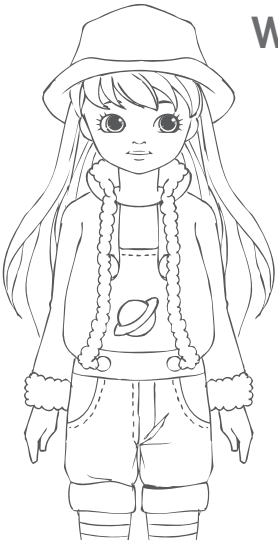


Step 8

Hang the planets in the classroom and invite the children to guess which planet is which. 'My planet is dusty and red, and sometimes huge dust storms cover the surface for days. What am I?'

Step 9

You can also make the Earth as an icosahedron!



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