

11. Exploring the Solar System

Edexcel GCSE Astronomy Course

11.1 Be able to use data about the names and relative locations of bodies in the Solar System, including:
a planets b dwarf planets c Small Solar System Objects (SSSOs): asteroids, meteoroids and comets

Use this website to look at the real time positions of the planets right now

https://www.theplanetstoday.com/the_planets.html

(NB Take a look at the view relative to the zodiacal band and positions of some dwarf planets shown e.g. Makemake, Ceres, Haumea and centaur Chiron etc)

What are the definitions of the bodies listed above? Make a list:

<https://www.jpl.nasa.gov/infographics/infographic.view.php?id=11268>

<https://nineplanets.org/small-solar-system-bodies/>

<https://www.universetoday.com/60072/what-is-a-moon/>

<https://www.space.com/51-asteroids-formation-discovery-and-exploration.html>

continued....

https://solarsystem.nasa.gov/asteroids-comets-and-meteors/meteors-and-meteorites/overview/?page=0&per_page=40&order=id+asc&search=&condition_1=meteor_shower%3Abody_type

https://solarsystem.nasa.gov/asteroids-comets-and-meteors/comets/overview/?page=0&per_page=40&order=name+asc&search=&condition_1=102%3Aparent_id&condition_2=comet%3Abody_type%3Alike

Now let's make a chart of the contents of the solar system...

Distances to some solar system objects in AU

Mars/ all inner planets 1.5AU

Asteroid belt 2.2-3.2

Jupiter 5.2 Saturn 9.5 Uranus 19 Neptune 30

Kuiper belt 30-50

Pluto 30-50, av 40AU

Halley's comet at perihelion 0.586AU; aphelion 35AU

Oort Cloud 2000 - 20000 AU

[C/2012 S4](#) (PANSTARRS) AP 504,443 AU (8.0 ly) peri 4AU

Heliopause 150 AU?

11.3 Understand the orbits of short-period comets and their likely origin in the Kuiper Belt

11.4 Understand the orbits of long-period comets and their likely origin in the Oort Cloud

11.5 Understand the location and nature of the Kuiper Belt, Oort Cloud and the heliosphere

<https://solarsystem.nasa.gov/solar-system/kuiper-belt/overview/>

<https://solarsystem.nasa.gov/solar-system/oort-cloud/overview/>

<https://science.nasa.gov/heliophysics/focus-areas/heliosphere>

Summary diagram:

<https://en.wikipedia.org/wiki/Heliosphere#/media/File:Solarmap.gif>

Exploring Interstellar space <https://www.space.com/nasa-voyager-2-interstellar-space-mysteries.html>

Comets - Extra Extension Resources

Play this animation - is it a long period or short period comet? What is your evidence?

<https://vimeo.com/127735680>

Play this animation - is it a long period or short period comet? What is your evidence?

https://www.youtube.com/watch?v=jYvl2ltGnlc&ab_channel=VideoFromSpace

Favourite Comets

Shoemaker Levy

<https://www.space.com/19855-shoemaker-levy-9.html>

Hale Bopp

<https://www2.jpl.nasa.gov/comet/stewart1.html>

Comet Holmes

https://spaceweather.com/comets/gallery_holmes_page20.htm

And....

Comet NEOWISE - the Lockdown Comet of 2020?



The Story of Rosetta and Philae

What was meant to happen:

<https://www.theguardian.com/science/video/2014/sep/15/landing-comet-animation-rosettas-mission-space-video>

What actually happened:

The ESA cartoons tell the story, here's a clip:

https://www.youtube.com/watch?v=s35Jlwobcqk&ab_channel=EuropeanSpaceAgency%2CESA

https://www.youtube.com/watch?v=dNNsh9SzbAI&ab_channel=CNN

What we found out (a singing comet!):

<https://mashable.com/2016/09/29/rosetta-orbiter-mission-ending/?europe=true>

And finally - how to make a model comet:

https://www.youtube.com/watch?v=2lk874N7AjQ&feature=emb_logo&ab_channel=NASAVideo

SAFETY - this must be done by a trained teacher or scientist in a lab with appropriate PPE. Dry ice is VERY cold and will cause severe skin damage and pain. Some of the ingredients are hazardous.

Self Study Project (Page 1)

Make a fact file about the eight, major planets which includes the following information about each of them:

11.6 Understand the following principal characteristics of the planets:

a relative size

b relative mass

c surface temperature

d atmospheric composition

e presence of satellites

f presence of ring systems

Research using websites (e.g. <https://theplanets.org/planets/>); books you may have; You Tube videos e.g. https://www.youtube.com/watch?v=pCoPykw8xug&ab_channel=BRIGHTSIDE and make a presentation, a video, a booklet or a poster with all the information listed above for each planet.

Self Study Project (Page 2)

You could extend your project by including information about space missions to each planet - every planet has been visited by at least one:

<https://www.sciencealert.com/this-glorious-map-helps-you-keep-track-of-every-space-mission-in-the-solar-system>

And remember - you can be as artistic as you like! Here's great example of art being used to explain science:

<http://tabletopwhale.com/2019/06/10/the-solar-system.html>

And you might enjoy building a scale model of the solar system at home - here's an example to get you started:

<https://sizemattersscience.wordpress.com/2015/06/17/build-your-own-solar-system/>