Earth and Space

Learning Objective:
To discover how theories about our solar system have changed.

Next

Sun

asteroid

planet

Can you explain what a solar system is?
Use some of these words to help you.

orbit

dwarf planet

moon

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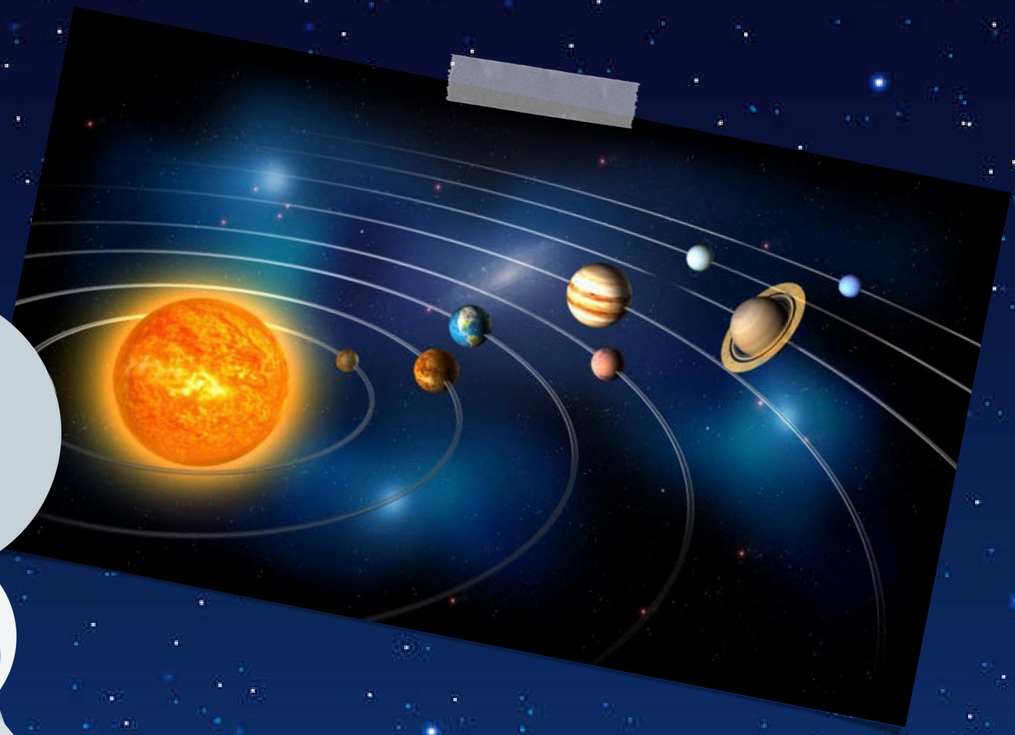
The solar system is a group of objects which orbit the Sun.

The Latin name for the Sun was Sol. Sol was also the Roman god of the Sun. The word solar means to be related to or determined by the Sun. Solar-powered objects are powered by the Sun's light.



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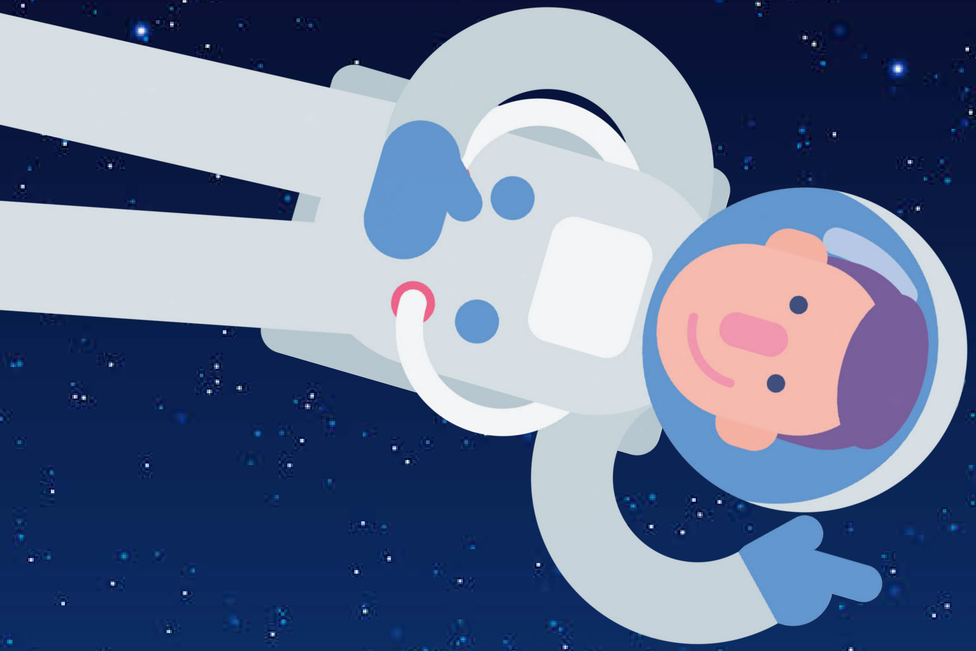
There have been many theories about the structure of our solar system.



Over thousands of years, many great astronomers have observed the night sky and come up with their own ideas about how the solar system works. Let's travel back in time to discuss some of their ideas.

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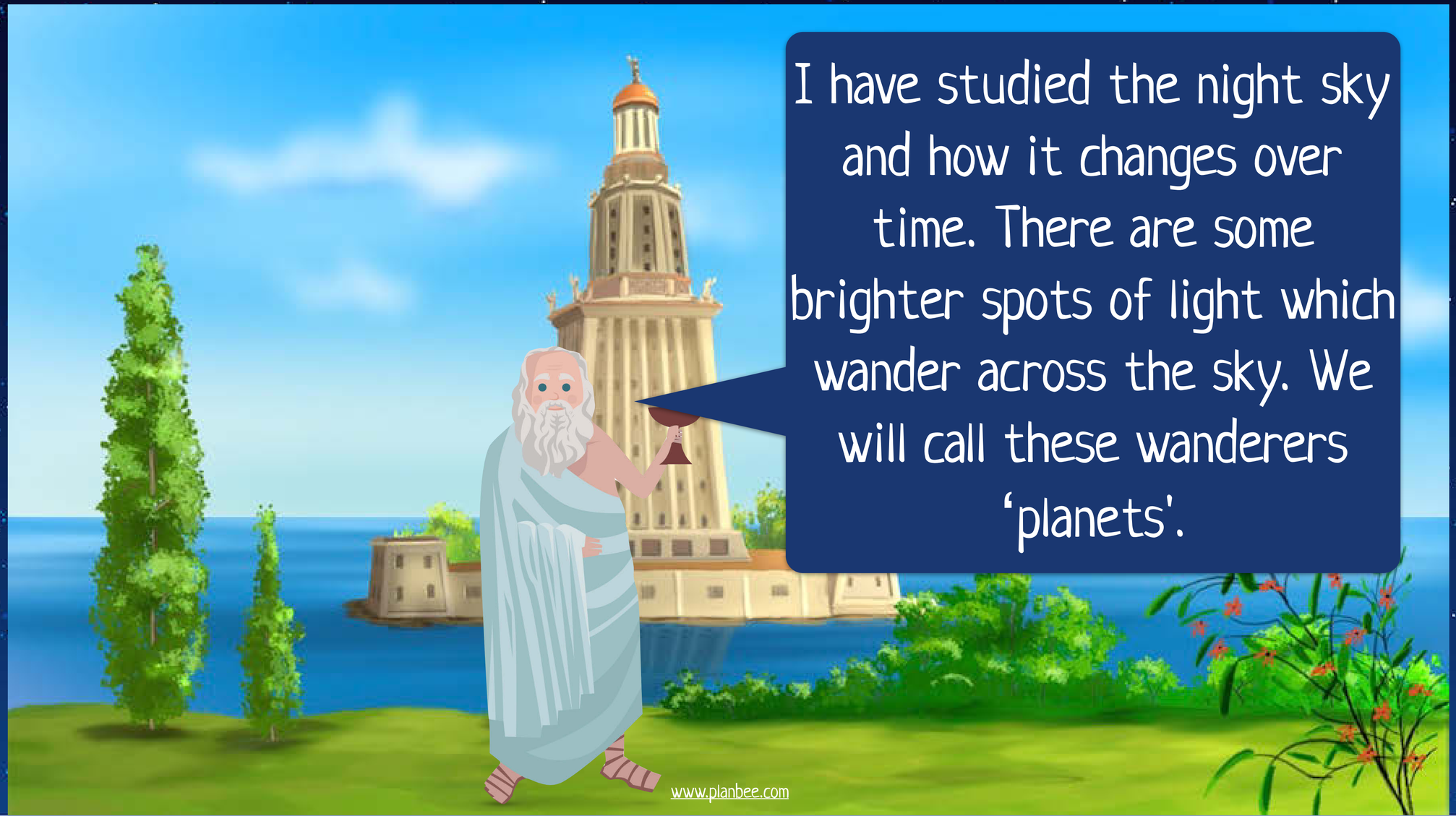
Astronomers in ancient Greece, such as Ptolemy, began making theories about what they had observed.



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The ancient Greeks identified these wandering points of light (planets): Mercury, Venus, Mars, Jupiter and Saturn.

By G.Hüdepohl (atacamaphoto.com/ESO - http://www.eso.org/public/images/potw1118a/, CC BY 4.0, https://commons.wikimedia.org/w/index.php?curid=15093443

These planets are visible with the naked eye.
The ancient Greeks didn't know that they were planets like we do now, but they knew they were different to the stars because they moved differently.

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Originally the planets were given descriptive names such as ‘the light-bearing one’ or ‘the fiery one’, until they were named after the Greek gods by the Greek philosopher Aristotle.

Jupiter

Mars

Venus

They were then translated to the equivalent Roman gods and these are the names we use today.

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Theories turned to figuring out what the solar system might look like, and how everything moves around each other.

At this point in time, it was believed that the solar system was <u>geocentric.</u>

'Geo-' means Earth. What do you think geocentric means?

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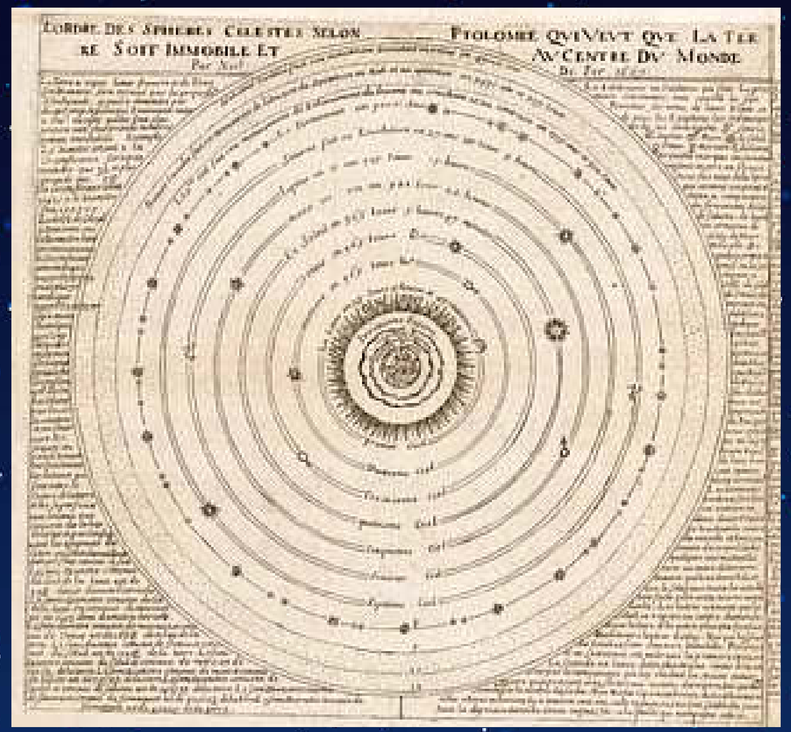

Geocentric means to have Earth at the centre. Aristotle developed a theory that the heavens were composed of concentric circles which the planets, Sun and Moon followed, orbiting the Earth at the centre.

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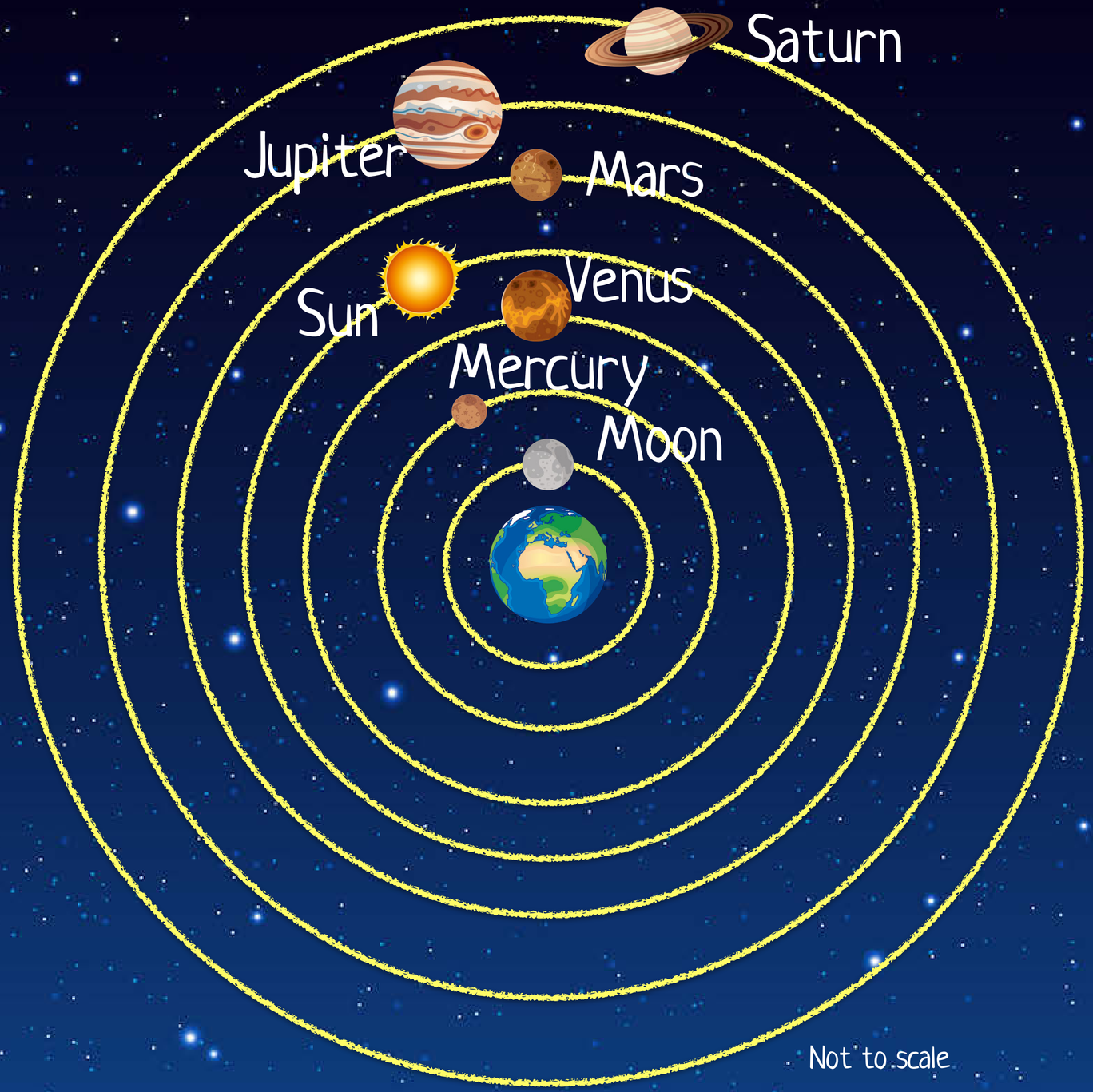
This is a basic model of the geocentric solar system Ptolemy and Aristotle theorised.



Not to scale

Think, pair, share... What do you notice?

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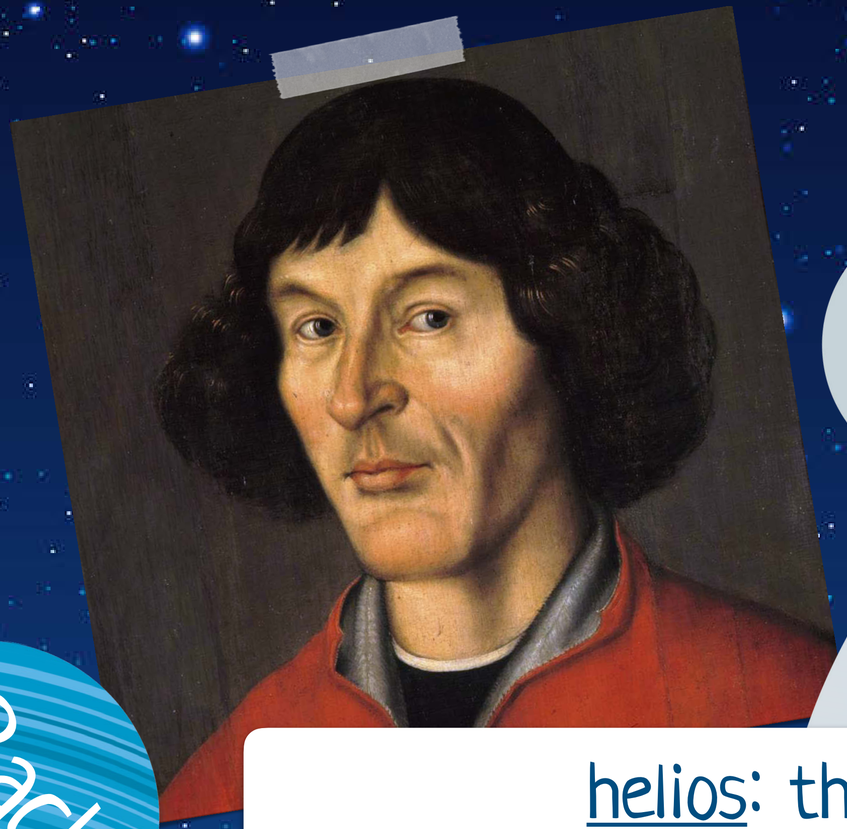
Fast forward to the 16th century: Nicolaus Copernicus, a Polish astronomer, began to create his own model of the universe based on the work of a few other astronomers.



He proposed a heliocentric model, rather than the geocentric model that had been used up until then.
What do you think is different between the two models?

helios: the ancient Greek god of the Sun

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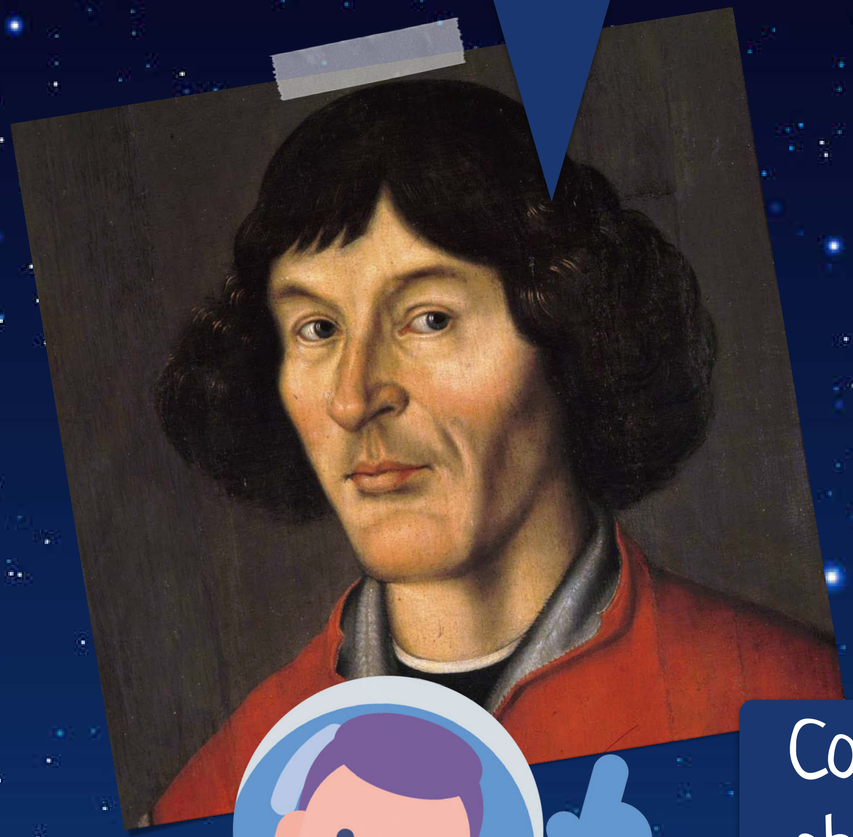
"Finally we shall place the Sun himself at the centre of the universe."



The heliocentric model of the solar system places the Sun at the centre, with the planets orbiting it.

Copernicus was still only aware of the planets observable to the naked eye. He did, however, make a more accurate model of the distance and order of the planets orbiting the Sun.

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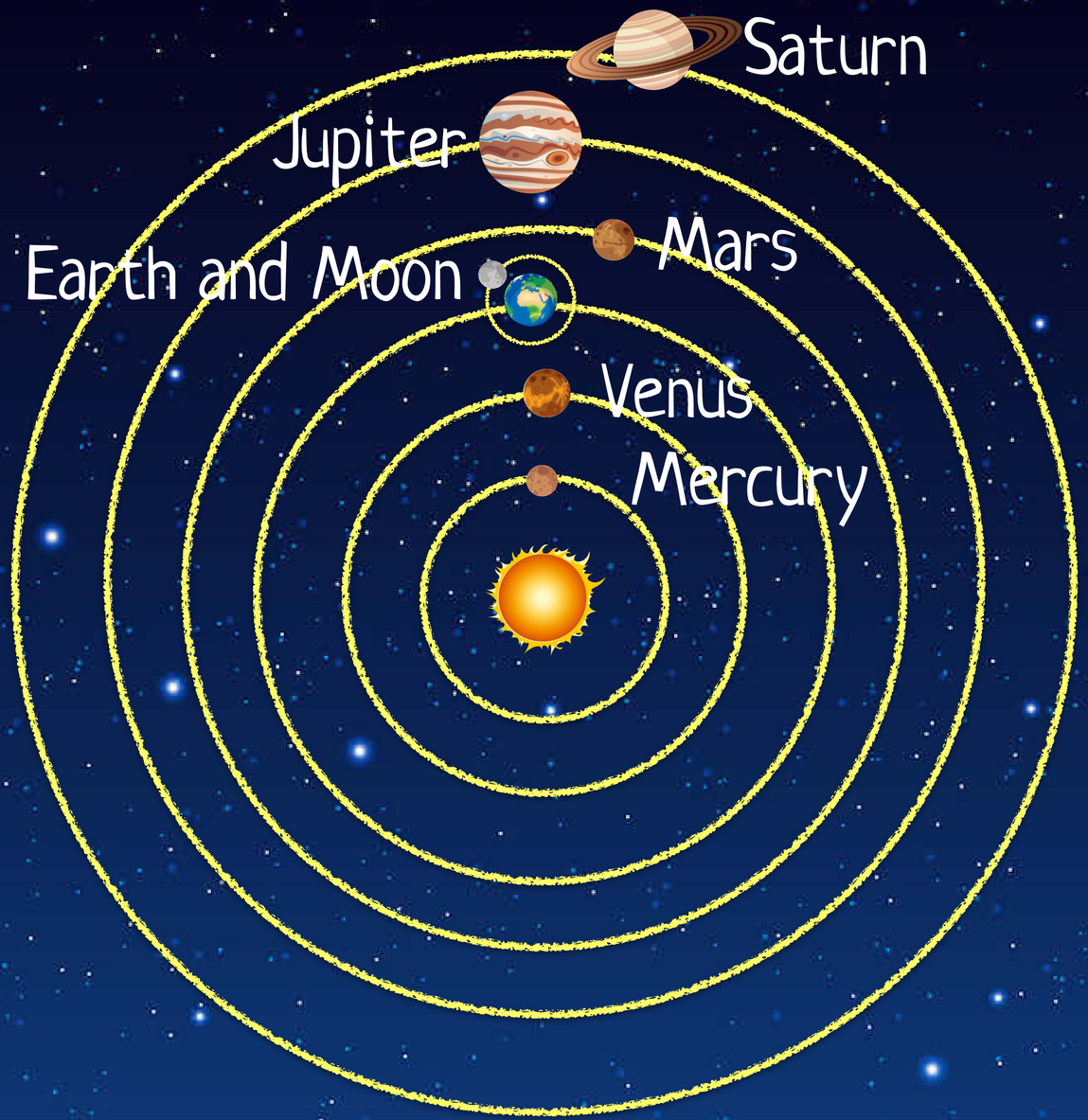
This is a basic model of the heliocentric solar system Copernicus theorised.



Not to scale

Think, pair, share... What do you notice?

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Copernicus also theorised that the Earth has three motions:

A daily rotation

An annual revolution

An annual tilting of the axis

He also said that the distance between the Sun and Earth is <u>much</u> smaller than the distance between the Sun and other stars.

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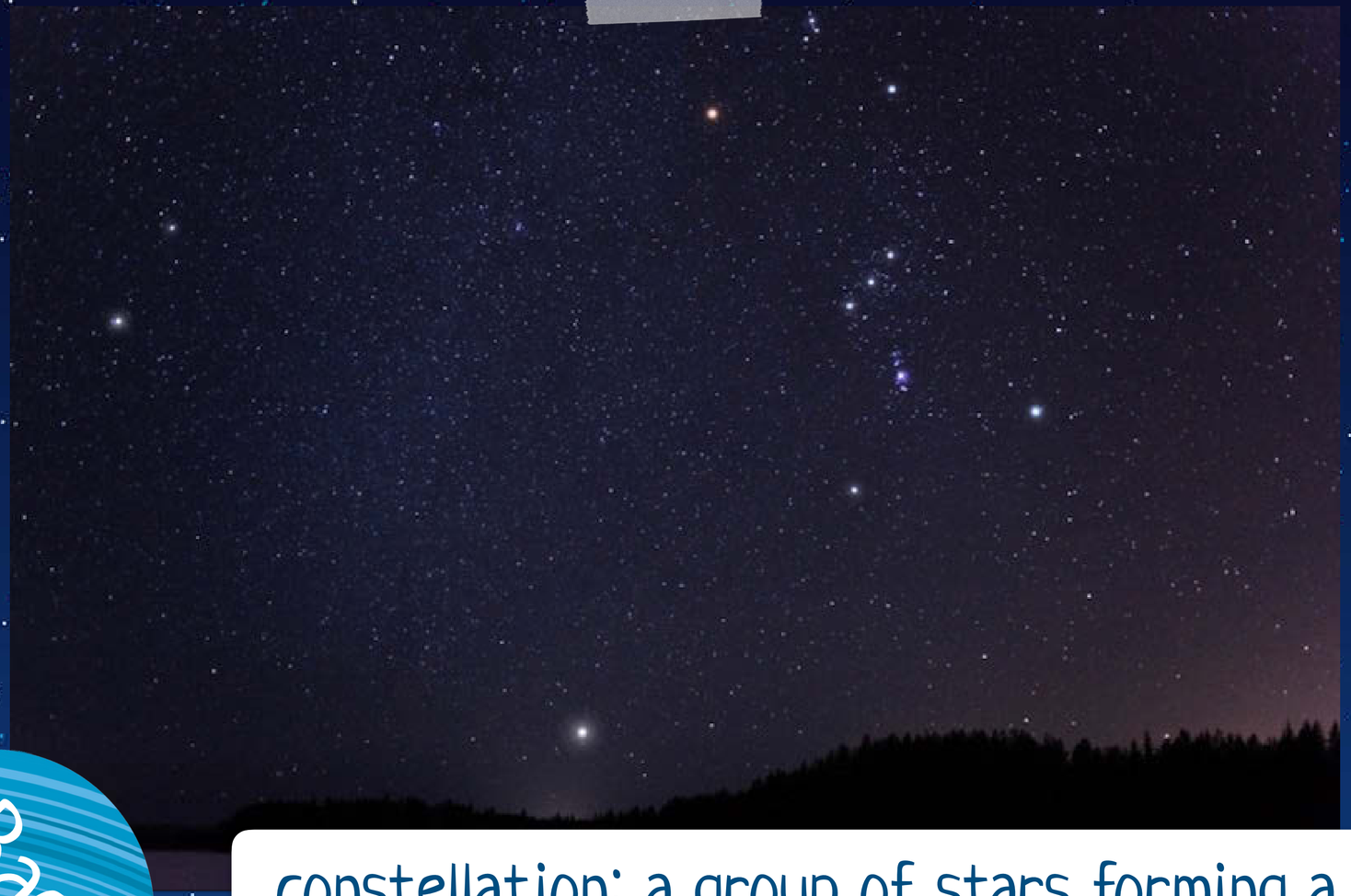
FSD? Slides

Do you know of any constellations?



Can you spot any groups of stars in this photograph which make a constellation?

constellation: a group of stars forming a recognisable pattern

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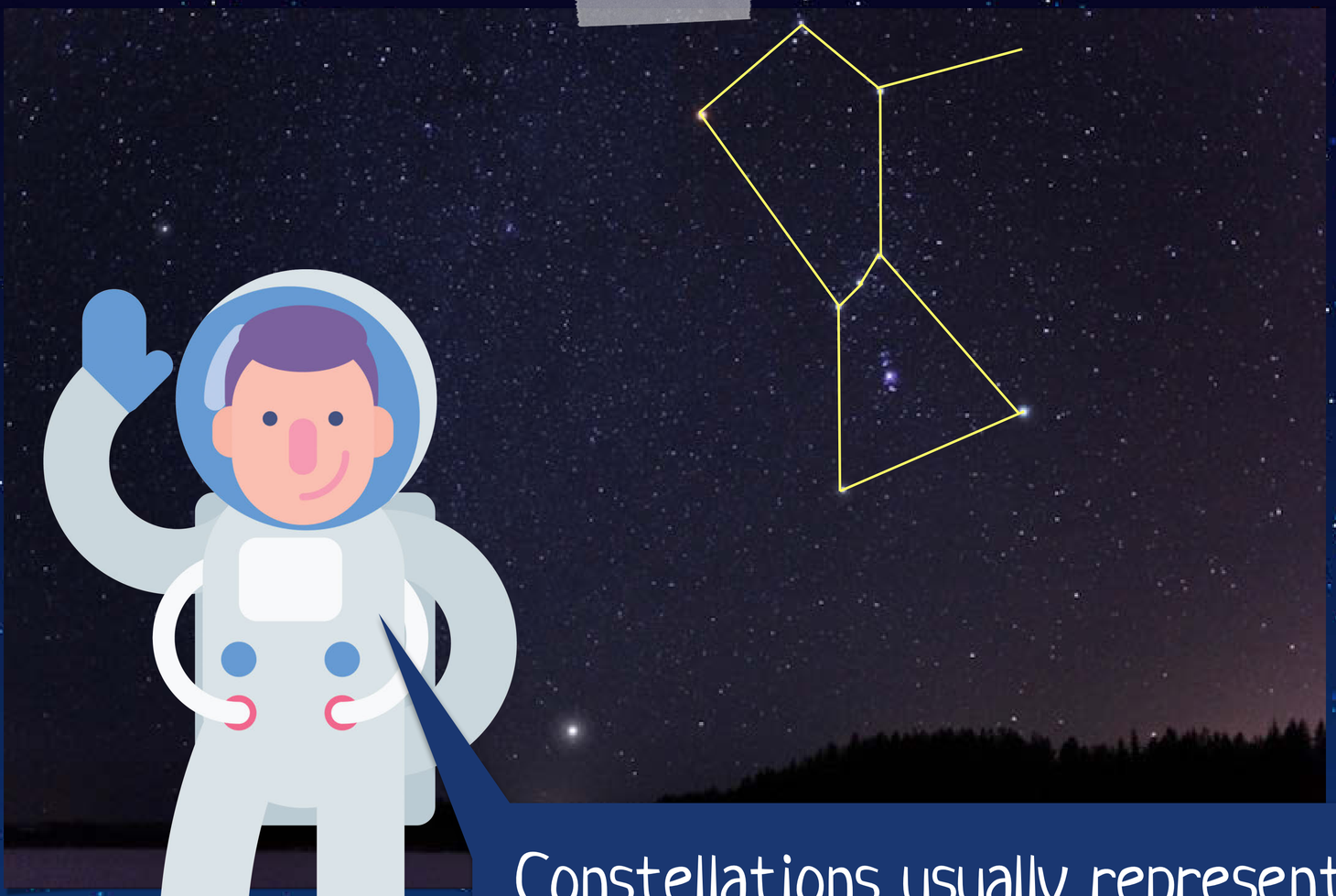
FSD? Slides



This group of stars create the Orion constellation. You can usually spot the three bright stars which create Orion's belt.

Constellations usually represent a story or myth. This one can be linked to many stories, including Orion the Hunter from Greek mythology who was supernaturally strong.

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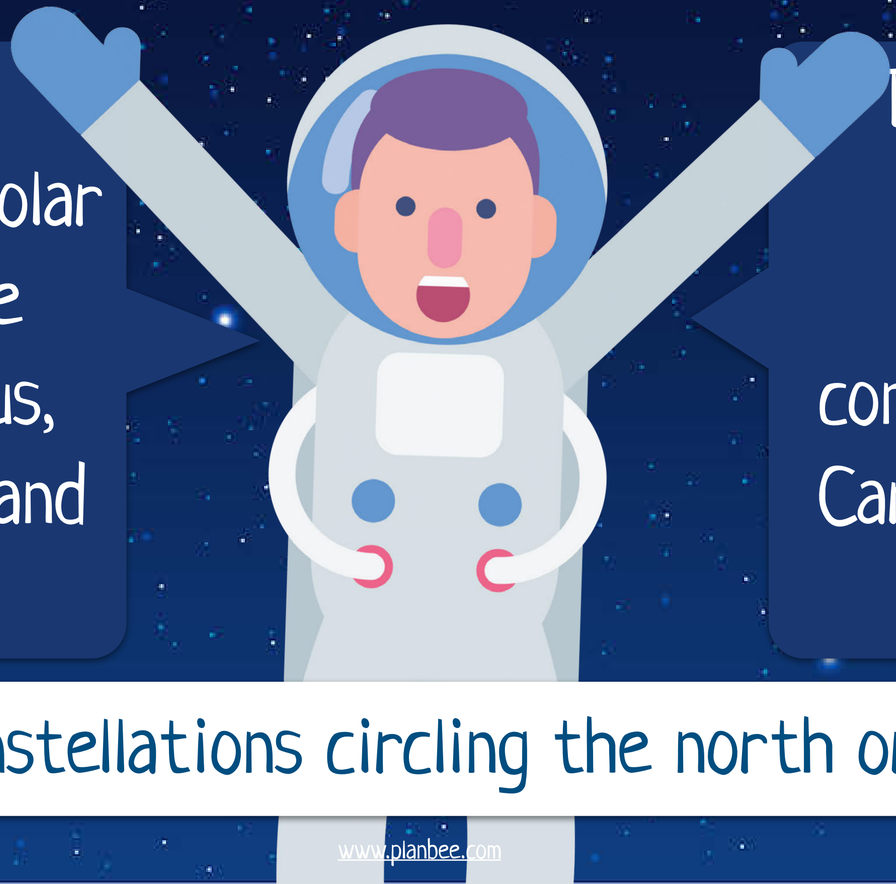
FSD? Slides

There are constellations which you can only see if you are in the Northern Hemisphere, and some that are only visible from the Southern Hemisphere.

The Northern Hemisphere circumpolar constellations are Cassiopeia, Cepheus, Draco, Ursa Major and Ursa Minor.



The Southern Hemisphere circumpolar constellations are Carina, Centaurus and Crux.

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circumpolar: constellations circling the north or south poles.

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Plenary

Since Copernicus, the invention of the telescope and advancements in space travel have allowed us to explore our solar system in much more detail.

We can now see Uranus and Neptune, which also orbit our Sun. These are too far away to see with the naked eye.

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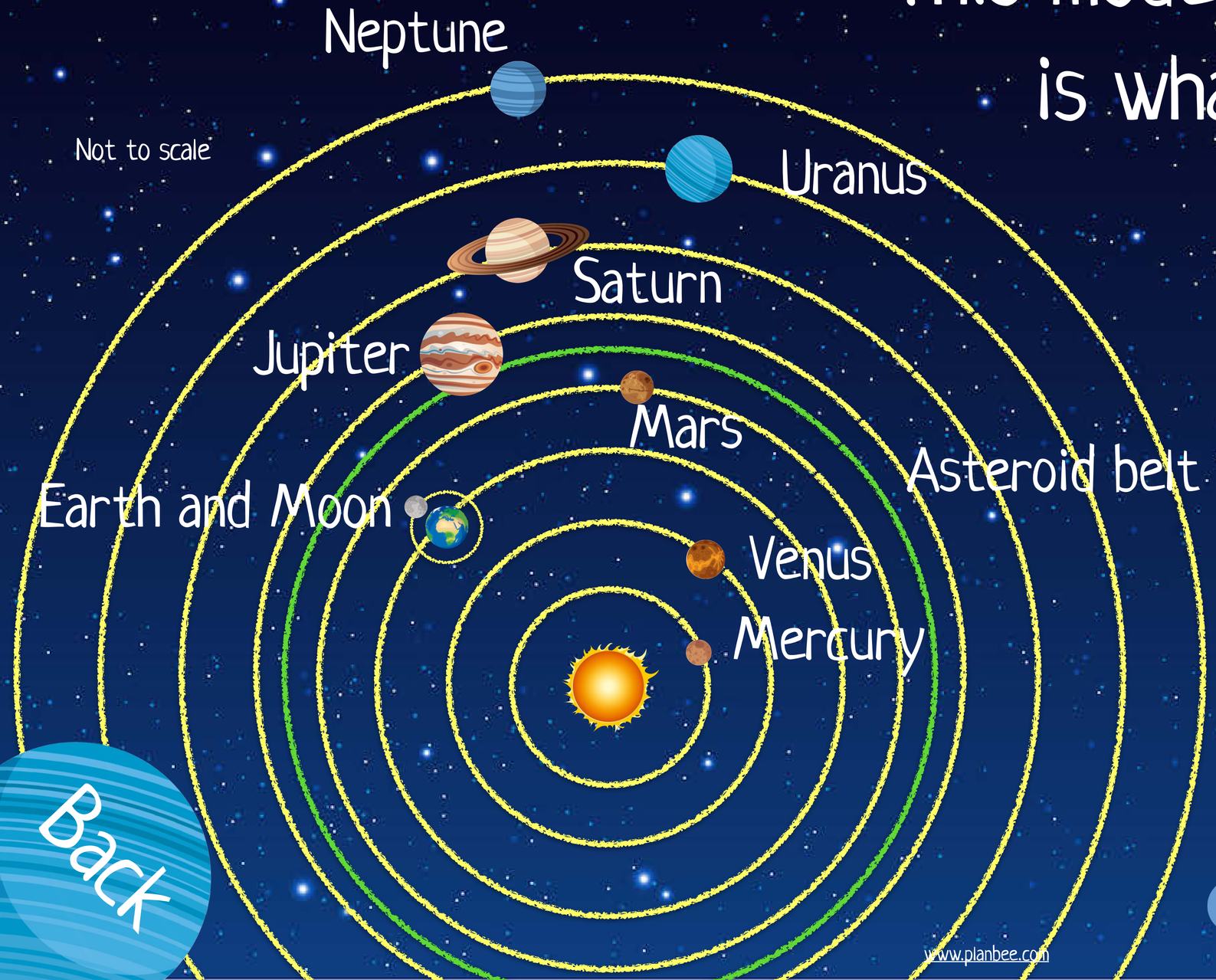
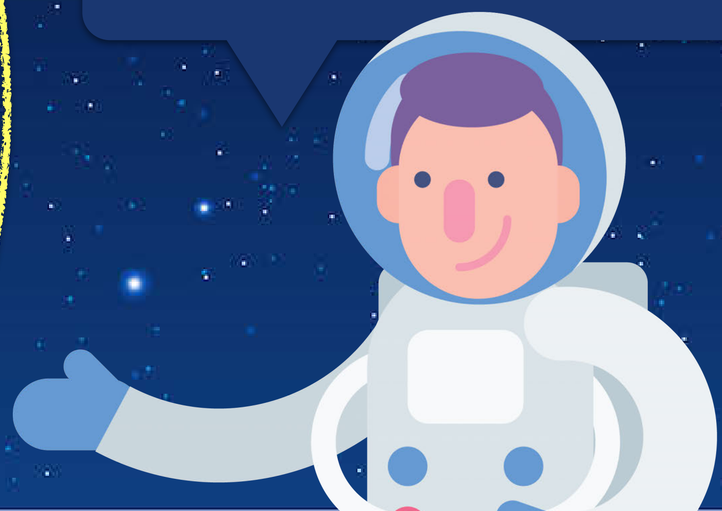
Plenary

This model of the solar system is what we use today.



How is it the same/ different to the geocentric and heliocentric models we have studied?



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Plenary

Powerful telescopes have allowed us to see further than our solar system. We now know that we are within a galaxy called the Milky Way, which has been estimated to contain 100-400 billion stars and more than 100 billion planets!

I don't know about you, but I feel pretty small now!

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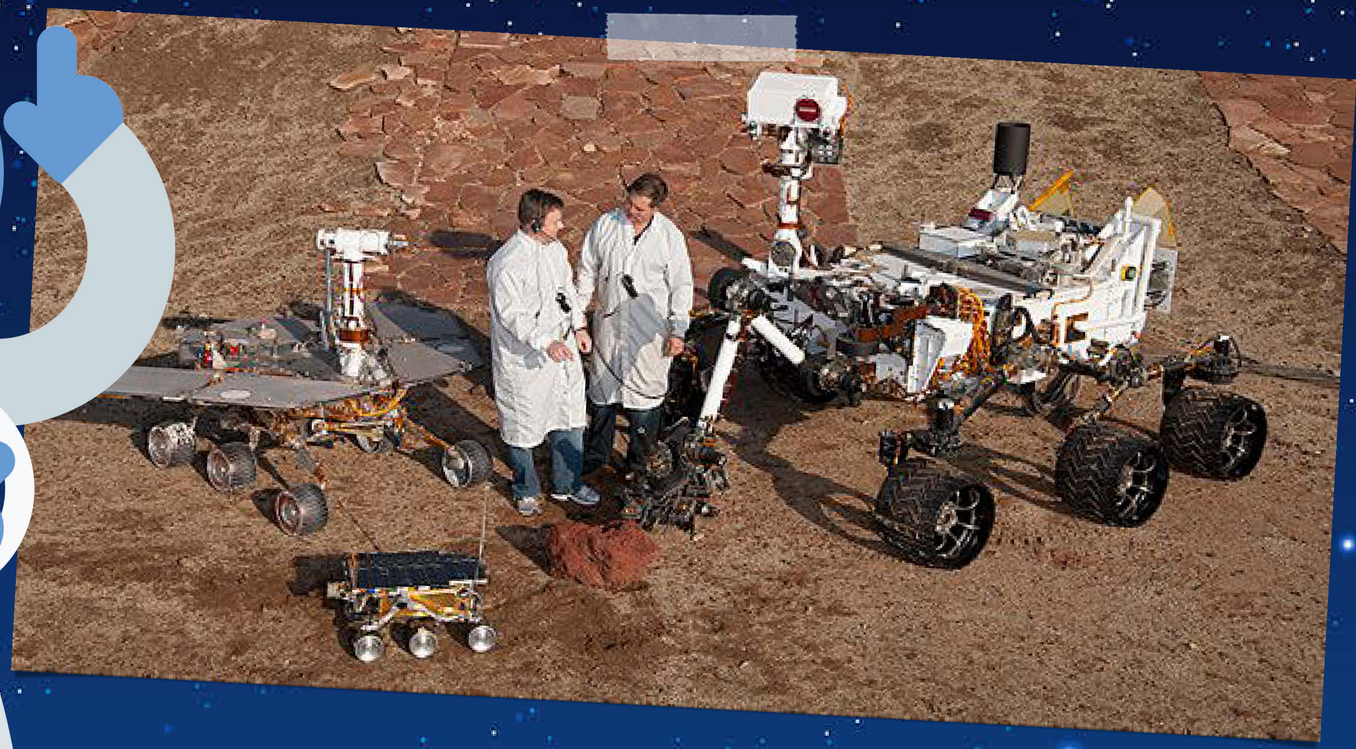
Scientists are currently exploring the surface of Mars using rovers as they believe that there could have once been life on the red planet.

They are investigating ways to send the first human to Mars for further investigations.



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