Children’s Misconceptions about Space

Explorify Teacher Support

Learning about Space creates a real sense of awe and wonder, but some concepts are difficult to grasp, and it might be easier for children to stick to their own explanations which are based on their experiences. Using the BEST Evidence in Science Teaching resources, the common misconceptions identified from educational research have been added in the ‘Watch out for’ sections of some of our Space activities. We hope that having this at your fingertips on Explorify will help you.

We have also mapped out the Explorify activities with the connected misconceptions below:

Watch out for	**Explorify Activity**
Misconceptions about the Sun and stars	
Any object visible in space that generates its own heat and light is called a star. Many children do not realise that our Sun is a star. This is because they think that stars have a pointy shape. The Sun looks different to other stars because it is only 150,000,000 km away. Other stars that we can see in the sky are much further away than the Sun. The next nearest star is more than 250,000 times further away from Earth than the Sun is. It is because most stars are so far away that they appear as tiny, faint points of light.	ZIZO Far, far away
Some children may believe that the stars are only present in the sky during the night because that is when they can be seen. In the daytime, even on a dull day, the brightness of the Sun will stop all of the other stars in the sky from being seen.	TBQ How many stars can we see?

Misconceptions about the shapes, relative sizes and distances between celestial objects	
Some children will suggest that the Earth is flat because it appears flat them. This is because the world is so enormous compared to our tiny bodies. Some might think the Earth is round and flat, like a plate, or that it's a sphere inside which everyone lives Some even believe that there is one flat Earth that we live on and another spherical one in space.	TBQ Can you see the sunrise in space?
Children can think that the Earth is the biggest object within our Solar System because the Sun, Moon and other planets appear to be small from Earth. This is because we are looking at them from a distance. Many children are also surprised to learn that the Sun is a star. They may also believe that Mars is a hot planet because of its colour.	OOO Celestial objects OOO Goldilocks planets
Some children may think the Moon is about the same size as the Earth and the Sun because the Moon and Sun seem similar sizes in the sky. The Sun is, however, much further away and its diameter is about 100 times larger than Earth. Children may also think the Moon makes its own light because it shines, not realising that the Moon is reflecting the Sun's light.	ZIZO Black hole
Some children may think that the images we show in the classroom, representing the Solar System, show it as it really is. Point out these are only models.	OOO Maps of the solar system
Misconceptions about the movements of the Earth	
Children regularly get confused about the ways that space objects move so it is important to give lots of opportunities to practise the language. Avoid using the words 'moving round' or 'turning'. If 'spinning' or 'orbiting' is used, the meaning is clearer. They can think, understandably, that the Sun travels across the sky each day and the Earth is stationary – that the Sun orbits the Earth. By saying the Sun appears to move across the sky you are acknowledging their observations and experiences. Children can also think that it is dark at night because the Sun is blocked by the Moon.	WGO Earth WI The sun rotated and the Earth didn't
A common misconception some children have is that the Sun is actually travelling across the sky. This can lead them to conclude that the Sun orbits the Earth. Other children may think that during a day, the Sun rises straight up in the sky and falls straight down in the same place. However, it is the Earth's rotation that changes the position in which we see the Sun at different times.	WGO Light and time
Some children may believe the reason it is dark at night is because the Sun's light is blocked by the Moon. This only happens in specific locations when there is a total solar eclipse. It is dark at night because half of Earth is turned away from the Sun.	OOO It's a shady business

Misconceptions about the movement of the Moon	
Some children may believe that the Moon appears to change shape because clouds move in front of it, rather than as a result of light from the Sun falling on different regions of it. Some can also think that its shape changes several times in one night. Children can believe that the Moon is moving across the night sky, rather than understanding that the Earth is spinning which affects where we see the Moon. Children often don't think you can see the Moon in the sky during the day – it only comes out at night. It is bright enough to be seen during the day, but only just, and it is so faint that many people do not notice it.	OOO Space objects
Children often think the Moon is about the same size as the Earth and the Sun, and that the Moon makes its own light which is why we are able to see it. Some children also assume you can only see the Moon at night – it is easier because of the contrast against a dark sky but, depending on the position of the Sun, it can be visible during the day. You can also sometimes make out the shape of the whole Moon even when we aren't seeing a full Moon. Children might also think that the Moon changes shape quickly during the course of one night rather than slowly over a month.	HYE Have you ever looked at the Moon and noticed how it appears to be different shapes at different times?
Misconceptions about the seasons	
Children can think that the same season is experienced everywhere in the world at the same time. They can also think it is warmer in the summer because the Earth is closer to the Sun. Primary school children do not need a detailed understanding of why we experience seasons - they simply need to know that the Earth is tilted on its axis as it travels around the Sun, so some parts of the Earth receive more sunlight each day than others.	WI The Earth wasn't on an axis