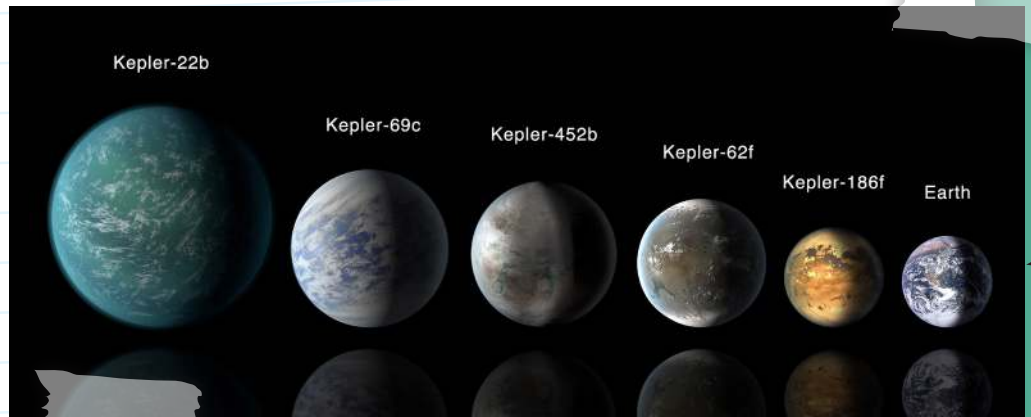




STARDOME OBSERVATORY & PLANETARIUM FACTS, RESOURCES AND ACTIVITIES ON...

HUNT FOR ANOTHER EARTH

Since the early 1990s, astronomers have discovered thousands of planets in orbit around distant stars. Yet, of all the planets that we now know of, the only one which is known to support life is our very own Earth. Life almost certainly does exist elsewhere in the universe, though. The planets we know of today are just a minute fraction of the billions that are expected to exist in the Milky Way alone. While not impossible, it is extremely unlikely that out of the billions and billion planets in the universe only Earth has life.



Relative sizes of Kepler habitable zone planets (artist impression). Image: NASA

Scientists think that the main factor in deciding whether or not a planet can support life, is whether or not liquid water can exist on the planet in significant quantities. If a planet is too close to its star, it will be too hot, and any water will boil away. Likewise, if a planet is too far from its star, then it will be too cold and any water will freeze solid. To have liquid water, a planet must be at just the right distance from its parent star. Orbiting in a narrow band known as the habitable zone or the Goldilocks zone.

The habitable zone in our Solar System starts just beyond the orbit of Venus and extends out to somewhere around the orbit of Mars but Earth is the only planet whose orbit is fully inside the zone. Not all solar systems have their habitable zone in the same place. Many stars are much smaller and cooler than the Sun and have habitable zones much closer. Others are larger and hotter and have habitable zones further out.

Merely being in the habitable zone does not guarantee that life will exist on a planet. Many other factors come into play. Some planets might have a very thick atmosphere, like Venus, and thus, be far hotter than one would expect. Others might have no atmosphere at all and are subjected to wild temperature fluctuations, like Mercury or our Moon. Some might lack a magnetic field to protect them from radiation from their star. Others might orbit a star that is too short lived to give life time to develop. Some might even have conditions that are perfectly suitable for life but through random chance life never developed.

The Kepler mission is on the hunt for terrestrial exoplanets. To date, Kepler has found 1,041 confirmed exoplanets with 4,696 still to be confirmed.

Check out these other resources...

- ➔ Latest exoplanet news: <http://news.discovery.com/space/alien-life-exoplanets>
- ➔ Known exoplanets that may have life: <http://www.space.com/18790-habitable-exoplanets-catalog-photos.html>

DISCUSSION POINTS

SCIENCE CONTENT/ CURRICULUM LINK

APPRECIATE THAT SCIENTISTS ASK QUESTIONS ABOUT OUR WORLD THAT LEAD TO INVESTIGATIONS AND THAT OPEN-MINDEDNESS IS IMPORTANT BECAUSE THERE MAY BE MORE THAN ONE EXPLANATION.

Imagine an alien planet that is covered in water, with no dry land at all. What might life look like on such a planet? Could a technologically advanced civilisation develop on such a world? (Hint: probably not.)

Might there be circumstances where life could exist on a world outside the habitable zone of a star? (Hint: yes!)



ACTIVITY

STARDOME OBSERVATORY & PLANETARIUM

CREATE:

Design an alien world that is capable of supporting life and design the creatures that live on it.

PLANET

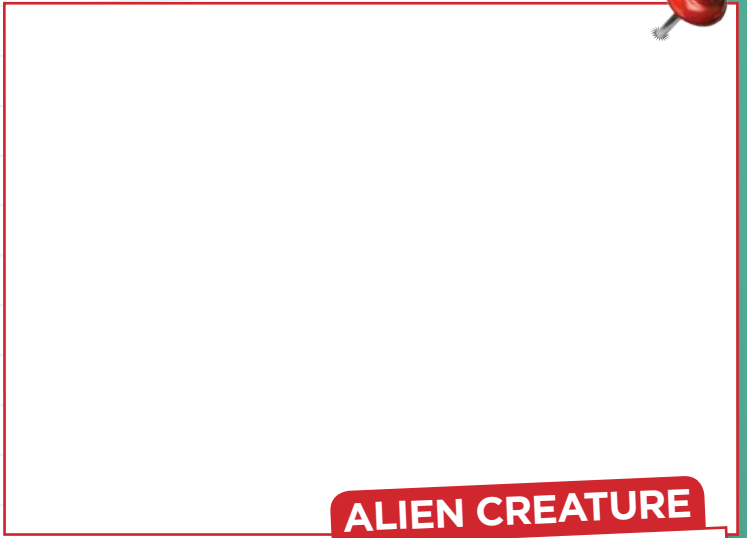
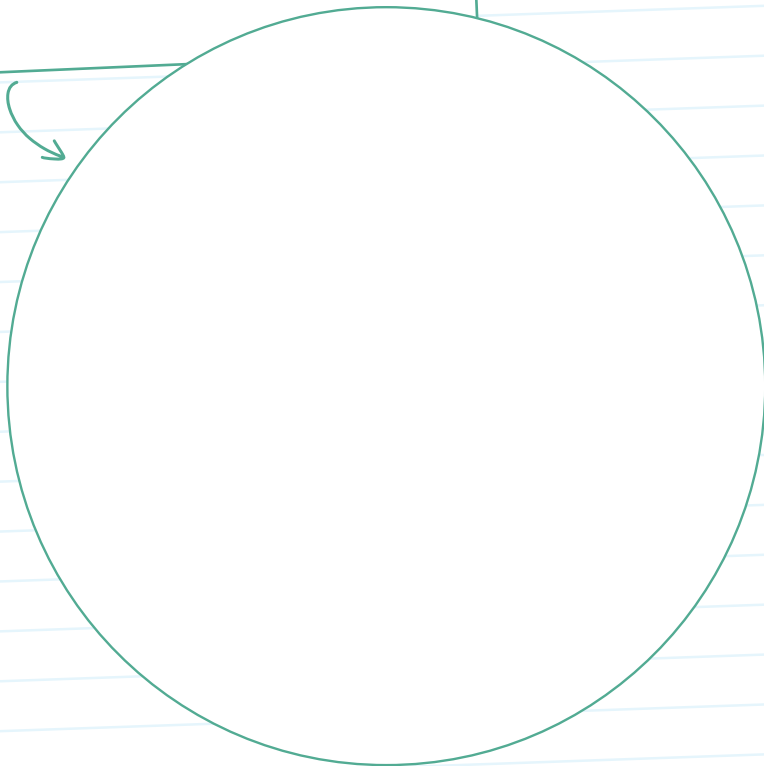
Planet name:

Planet details: *(size, colour, chemicals and other elements)*

ALIEN CREATURE

Alien creature name:

Creature details:



Take a photo of your activity and send it to us.
We'd love to see it! education@stardome.org.nz



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