→ Activity 1: Exploring exoplanets

This activity introduces the students to the topic of exoplanets. Following the activity, the students should be able to describe what an exoplanet is, give an estimate of the possible number of exoplanets in our galaxy, and give reasons as to why exoplanets are difficult to detect.

Equipment

- Student worksheet
- Construction guide, Annex 1 (optional)

Exercise

Provide the students with the student worksheets and additional exoplanets background information. This activity can be presented as a classroom discussion, a group discussion or as an independent investigation.

Introduce the students to the concept of exoplanets and discuss the proposed questions with them.

1. Stars are celestial bodies composed primarly of hydrogen and helium, held together by their own gravity. They produce their own light and energy from nuclear fusion that take place within them.
    - Stars are formed from clouds of molecular gas that collapse under the influence of gravity
    - Planets form when the dust and gas that is present in the disc surrounding a star start to condense.

2. When searching for life beyond Earth, scientists have to make assumptions about what is considered finding life (or signature hints of it). One assumption is to focus on finding life forms such as microorganisms, or evidence of their past existence. It is believed that primitive organisms are more likely to exist and persist than advanced species. Another assumption is to focus on water dependent life, as liquid water is considered a fundamental requirement for life as we know it. This condition narrows down the list of possible places that might harbour life to the so called "Habitable Zone" around a star, where water can be present in liquid state (where it is not too hot and not too cold for life as we know it to exist). These are just two examples but there are more criteria that could indicate life such as certain chemical signatures and energy sources.

→ EXOPLANET IN A BOX

Modelling exoplanet transits

→ Activity 1: Exploring exoplanets

Just as the planets in our Solar System orbit the Sun, there are other celestial objects that orbit around other stars. We call some of these celestial objects exoplanets. Scientists study exoplanets to understand if and how life could have formed outside Earth.

Exercise

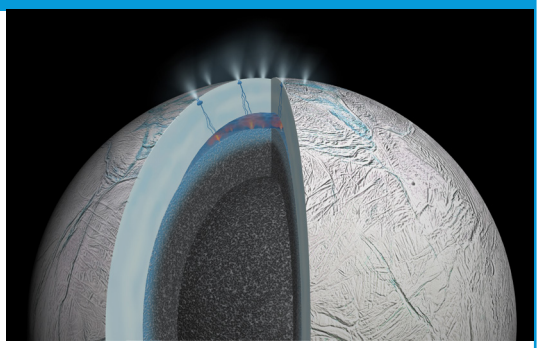
1. What are the differences between stars and planets?

2. Whilst life outside Earth has not been discovered yet, scientists are searching for it in our Solar System and beyond. What conditions do you think life would need to develop?

Did you know?

The Milky Way is estimated to contain a few hundred billion stars. Observations indicate that many stars host exoplanets, so it is likely that there are a few hundreds of billions of planets within our galaxy. Some of these might be located in the star's habitable zone.

Within our Solar System scientists are investigating some of the moons of Saturn and Jupiter as good candidates for finding signs of life, such as Enceladus and Europa.



↑ Enceladus