# Exoplanet Design

## Create a Unique World

Classroom Activity

## Overview

**Age Range:**

7-11

**Prep. Time:**

15 minutes

**Lesson Time:**

2 hours 15 minutes

**Cost per activity:**

Medium

**Includes the use of:**

Arts and crafts supplies, computer or tablets with internet access, books

## Outline

Students will learn about exoplanets. Working together in groups to design their own planets, using their imagination to decide on what sort of conditions would be present.

They will then practise their presentation skills, explaining what they have created to the rest of the class.

Finally, they will learn about adaptation and evolution, creating their own unique life form to survive the conditions on one of the planets.

Again, explaining and justifying their decisions to the rest of the class.

## Pupils will Learn:

- Exoplanets have a diverse range of conditions, based on a range of factors
- Living things (plants and animals) adapt and evolve over time to survive the environmental conditions (adaptation and evolution)

## Lesson Plan:

Overview of the time required to complete lesson.



The online observatory collaboration consists of the following partners:
Baldone Observatory, Brorfelde Observatory, Cardiff University, Harestua Solar Observatory, Helsinki Observatory

| Description | Time | Notes |
|---|---|---|
| Introduction to the subject | 15 min | Use Eyes on Exoplanets application https://eyes.jpl.nasa.gov/eyes-on-exoplanets.html |
| Activity 1 | 45 min | Students will use https://exoplanets.nasa.gov/alien-worlds/exoplanet-travel-bureau/ |
| Break | 15 min | |
| Introduction to Activity 2 | 15 min | Videos to explain adaptation: https://www.bbc.com/bitesize/clips/z3hxpv4 https://www.bbc.com/bitesize/articles/zxg7y4j |
| Activity 2 | 45 min | Any relevant resources, such as books, to help students understand adaptation and evolution https://www.bbc.com/bitesize/topics/zvhhvcw |

## Introduction to the subject:

If not previously covered, explain to students that exoplanets are planets that orbit stars other then our Sun, creating different solar systems. Scientist have found several of these exoplanets that have suitable conditions to support life.

Show students some examples of exoplanets orbiting other stars using the Nasa app: https://eyes.jpl.nasa.gov/eyes-on-exoplanets.html (download the app prior to the lesson).

Point out the diverse range of planets, mentioning different weather conditions, surface geography and day and night cycles. Take time to look at some of the most unique exoplanets discovered ('extreme planets - weirdest').

## Activity 1:

- Divide into groups of 3-6 students

The teacher will provide each group with the materials required to make a poster. Telling the groups to design their own exoplanet and make a poster for it.

1. Students will use https://exoplanets.nasa.gov/alien-worlds/exoplanet-travel-bureau/ to have a look at example travel posters for real exoplanets, some even have interactive designs of the imagined planet surface to explore.
2. The groups should create their own exoplanets, making decisions on the temperature, weather conditions, orbit from its star, size, gravity, surface formation

etc. and write a description for their new exoplanet. Encourage them to only think of the planet, no life forms/inhabitants yet.

3. Now the groups should design a travel poster for their exoplanet, to advertise it to the rest of the class (if more time and resources are available you may consider having students also make models and other display material).
4. Have the groups take turns to present their planet to the rest of the class, allowing the students to ask questions about each planet. You might want to class to vote on whether or not they would like to visit the exoplanets.

- Alternatively, if time is an issue, have the groups pair up and just present to each other.

## Introduction to Activity 2:

Explain that to survive all life forms require water, but they can adapt to a range of extreme conditions, from extremely hot too extremely cold, or really dry or really wet environments. Show the class some videos, with specific examples, to help them understand:

https://www.bbc.com/bitesize/clips/z3hxpv4

https://www.bbc.com/bitesize/articles/zxg7y4j

## Activity 2:

- Have the groups switch posters/exoplanets

Make sure the students understand the exoplanet that they have been given, then ask them to design a lifeform to survive its unique conditions.

1. Groups should research further into how creatures on earth have adapted and evolved to survive extreme conditions, especially those conditions relevant to their exoplanet.
2. Next they should begin designing an inhabitant (alien) to live on the planet on a new poster. Considering how it has adapted for survival and labelling key features.
3. Have the groups present their 'alien' life, explaining how it survives to the rest of the class.

## Assessment:

Have the groups provide feedback and suggestions after presentation, allowing for peer assessment.

## Background Material/Knowledge:

Exoplanets are planets that orbit other stars, and scientists have been interested in finding out more about them to discover if they may be capable of supporting life. To support life planets must orbits within the 'goldilocks zone' of a star, where conditions are not too hot or cold and water could be present.