



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.

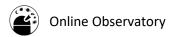
Again, explaining and justifying their decisions to the rest of the class.

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.





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).

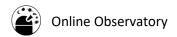
Point out the diverse range of planets, mentioning different weather conditions, surface geography and day and night cycles. Take time to look at some of the most unique exoplanets discovered ('extreme planets - weirdest').

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:

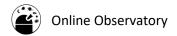
• Have the groups switch posters/exoplanets

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.