

Lesson Plan

Assessment
Cross-curricular

Rubric – drawing eval.
Biodiversity, arts

Big Ideas

- Earth is a part of a large interrelated system.

Learning Goals

- Life forms adapt to local conditions
- The Earth is an amazing and unique planet, being hospitable for life.
- Other planets similar to Earth may exist and life there would be adapted to those conditions.
- To learn about the diversity of extra-solar planets we have discovered to date.

Specific Expectations:

- 2.3** use scientific inquiry/research skills to investigate scientific and technological advances that allow humans to adapt to life in space
- 3.1** identify components of the solar system, including the sun, the earth, and other planets, natural satellites, comets, asteroids, and meteoroids, and describe their physical characteristics in qualitative terms
- 3.5** describe the effects of the relative positions and motions of the earth, moon, and sun (e.g., use models or simulations to show solar and lunar eclipses, phases of the moon, tides)

Description:

This is **lesson 4** of a five-lesson unit in which the students plan and execute an interstellar mission. This lesson will focus on alien life, a topic that inspires almost everyone. It is also really a way to appreciate how the diversity of life on Earth has developed to adapt to the conditions it lives in.

Materials/Resources:

Planet cards (15 individual cards, to be copied as many times as needed to supply one card of a HABITABLE planet per student)
 -10 habitable planets and 5 non-habitable planets
 (3 copies of the 15 cards should provide cards of habitable planets for 30 students)

Safety Concerns:

Introduction

Getting Started

We start the lesson by learning about extra-solar planets and the environments that may exist on them. Students will familiarize themselves with several planets. They will then decide which one of these would be hospitable to life as we know it, and then imagine an alien that lives on such a planet.

Watch the Science North video on Space. Start at the section called “Faraway Worlds”. Your task today is to envision what life on this planet might look like.

- Introduction to extra-solar planets
 - “Have you heard that we have discovered many planets beyond the solar system? These planets orbit around other stars, stars that are in our night sky!
 - They are very hard to detect, as they are very small compared to stars.
 - Today we know of over 2000 planets orbiting around other stars
 - We can’t take an image of what they look like, but we can learn how far away from their star they are, how big they are, and if we are lucky what kind of material they might be made up of.
 - What we’re most interested in is whether these planets are in the habitable zone.
 - Not too close – where water would evaporate due to heat from star
 - Not too far – where everything would be frozen
 - In the solar system the only planets in the habitable zone are Earth and possibly Mars.
 - All of these planets are light years away from us – meaning even travelling at the speed of light it would take us years to get there. Even the most advanced rockets travel much slower than the speed of light, so for now we have no plans to visit these planets. Maybe one day someone will go on this journey!

Action

Extra-solar planet “hockey cards”

- Students will randomly pick planet cards and spend a few minutes learning about that planet. You can shuffle the cards and hand them out. Then collect them, shuffle again and hand out again (trade cards with any students who got the same planet again).
- They do this for several rounds so they learn about a few planets and also learn how planets vary from each other.
- If they think the planet could support life, WRITE DOWN ITS NAME.
- After a few rounds, lay out all the cards. Students can now go pick one of the planets that they wrote down as supporting life. If their card is already taken, have a look at remaining cards and pick a different planet that could support life.

Imagine a life form

- Now that you have a planet, carefully think about what kind of environment life would exist in there. Is the environment dark or bright? Is it generally hotter or colder than Earth? Do life forms there have to contend with a lot of gravity? Take each piece of information on your planet card and write down one or two things of what that might mean for a life

form (e.g. if the average temperature is only 5 degrees, your life form would have to shield itself from the cold with a lot of hair or something like blubber).

- Now draw an alien from this world. Have fun, but also remember that you want your alien to be adapted to the world it lives on as best as possible!
 - Draw inspiration from life forms you know exist on Earth.
 - See Alien Assessment Rubric for evaluation.
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Consolidation/Extension

Students could present their work, explaining why their alien looks the way it does. This could be a quick oral presentation by each student or a presentation in a small group to a few peers.