

CAN EXTREMOPHILES “LIVE” ON

PLANETS?

AP BIOLOGY 5E Lesson plan for Juniors and seniors

2 DAYS

My students will access various websites to determine if Extremophiles can live on Planets. I will choose 5 Planets - the ice giants, Uranus and Neptune; and the inner rocky planets, Mercury, Venus, Mars. The first question to explore is what is an Extremophile, what does it look like, what characteristics make an Extremophile a living organism, and what are some conditions where it lives?

Questions that the students will answer before they begin exploring the NASA sights:

1. What is an Extermophile?
2. What type of cell is an Extremophile? How are Extremophiles classified?
3. How large are they?
4. What type of environment can an Extrmophile tolerate?

Engage: For the engagement part of my lesson I will introduce how the material from a planet is obtained and brought safely back to earth for analysis.

<https://www.youtube.com/watch?v=DGTPPy2fNyc&t=1s> This is a great warmup video which explains how life began. Students will be able to conceptualize

1. the formation of molecules, building blocks of proteins, and finally how these molecules aggregate to form cells. A cartoon video that actually focuses on a simple explanation.

2. <https://www.youtube.com/watch?v=rehxGbYuwIU> This video link will engage the students by explaining how material from a planet is safely brought back to Earth for study. The students will realize how important the Engineering aspect is for the design and implementation of the technology used in NASA missions. There are students in my class that are Interested in Engineering. Their knowledge of Biology paired with Engineering is an asset.

Explore: For the exploration section students will use a NASA website to explore 5 planets: Mercury, Venus, Mars, Uranus, Neptune

The following website will be used to gather information and data to determine if life is possible on a planet

<https://solarsystem.nasa.gov/planets/overview/> Excellent website that gives information on the planets.

The attached worksheet will be used to explore information and answer questions. Each student will have one planet to explore.

There will be a worksheet with questions the students will answer as they search information about their planet.

https://docs.google.com/document/d/13r-NxCEknKlxCc_TptDBmQtXjDla_J8YFxp6ztj7RF4/edit?usp=drive_link

Explain: Students will take this knowledge and discuss with their peers if life is possible on any of the planets. They will begin with a discussion of

Extremophiles and the types of extreme environments they exist in.. By drawing a picture of one and the conditions it exists in, they will discuss

Possibility of life on one of the planets, and the reasons why or why not extremophiles would be found.

Elaborate: Make a poster that details which Planet Extremophiles would be most likely to live on and why? Use Canva to complete your poster and report your

findings. Included in this poster: information about your planet, conditions that make life possible, conditions on your planet that make life possible, is

There an extremophil that could possibly live there? Why? Why NOT?

Evaluate: Construct a justification using evidence for a plausible Planet location in the search for life, either past or present. Justify your reasons why life might exist

On a particular planet, or why life will not exist on the Planet. Give examples of how the organism could potentially exist in that particular environment - how

These organisms obtain matter and energy and reproduce. This will be one or two paragraphs.

Standards:

HS-ESS1-6 Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history.

MS-LS1-1 Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.

Cross Cutting Concepts: 1. **Patterns.** Observed patterns of forms and events guide organization and classification, and they prompt questions about relationships and the factors that influence them.