

Exoplanet Project (Version B)

Due:

Purpose of this project:

This unit we have developed our background knowledge related to the different types of stars and planets that exist in the Universe and their characteristics. We now know based on current scientific evidence the characteristics of exoplanets and their host stars that would make them more or less likely to be potentially habitable. For this project, imagine that you belong to a committee of scientists that has been asked to explore the universe for an Earth-like exoplanet that may be habitable by humans. Your task is to convince the scientific community that the exoplanet you've identified is worth the funding necessary to investigate it further.

Mastery Assessment:

Based on current scientific evidence, which exoplanet in the NASA Exoplanet Catalog has a high probability of being habitable by humans and should be investigated further? Consider your knowledge of relevant scientific concepts including the characteristics of habitable exoplanets, their host stars, and orbits that help to prove your claim.

Mastery Skills & Rubrics:

- **Visual Interpretation:** I can identify, interpret, apply and synthesize relevant information presented visually.
- **Claim & Evidence:** I can state a detailed claim to answer a scientific question and provide relevant and sufficient scientific evidence to support that claim.
- **Scientific Communication:** I can clearly, accurately, and completely communicate scientific ideas using scientific language.
- **Habits for Success** - I can meet deadlines and assignment expectations.

Checklist	Project Section
	<u>Part 1. Exoplanet Data</u> - Choose the exoplanet for your project and collect important information about your exoplanet
	<u>Part 2. Exoplanet Claim & Evidence</u> - Answer the project's scientific question with a scientific claim & evidence writing assessment
	<u>Part 3. Exoplanet Slide Presentation</u> - Create an informative slide to share why your chosen exoplanet is likely to be habitable using information from NASA

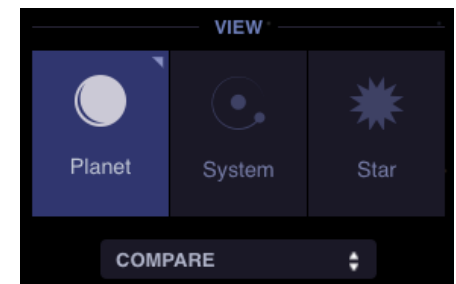
Part 1. Exoplanet Data

Guiding Questions:

- *What methods does NASA use to identify exoplanets in other solar systems?*
- *Which type(s) of star(s) would be the best candidates for having habitable, Earth-like planets orbiting them?*
- *How does orbit shape and location affect if an exoplanet can be habitable?*
- *Which characteristics of exoplanets make them more or less suitable to life?*

Directions:

1. **First** you will need to explore the [NASA Exoplanet Catalog](#) to identify potential candidates.
2. Use the '**Planet Type**' filter option to search only for types of exoplanets that could potentially be habitable.
3. Examine the search results to identify exoplanets that have similar characteristics to Earth.
4. Click on possible candidates to open up the catalog record on them.
5. Use the **VIEW menu** and the '**COMPARE**' options to compare the characteristics of the exoplanet to Earth's characteristics, to compare the host star to our Sun, and to determine if the exoplanet is in it's host star's habitable zone (the light green region).



6. Review as many exoplanet candidates as needed until you've found an exoplanet that you believe is likely to be habitable by humans to use for your project.
7. Use the table below to organize the important information for your chosen exoplanet to use in your project.
8. On NASA's Exoplanet Catalog you should be able to find the data for: *Planet Type, Planet Mass, Star type, Star color, Orbital Shape (Eccentricity), Habitable Zone, and Light Years from Earth*.
 - a. '*Light Years (distance) from Earth*' tells us how far away the exoplanet is from Earth. It doesn't affect whether the exoplanet is habitable or not, but could be something interesting to consider. For reference, 1 [light year](#) is equal to approximately 6 trillion miles (or 9 trillion kilometers).
9. To find *Star temperature* and *Star luminosity* you can do a basic [Google search](#) by searching for the characteristics and the name of the star. For example, search for: "Luminosity of STAR NAME" or "Temperature of STAR NAME"
10. If you can't find a specific piece of information that you need for your exoplanet, send Ms. P-G an email and she can help.

Exoplanet Data Table

Your Chosen Exoplanet's Name	Planet type	Planet mass	Star name	Star type	Star color	Star temperature	Star luminosity	Orbital shape <i>Eccentricity</i>	In host star's habitable zone?	Light Years <i>(distance)</i> from Earth

Part 2. Exoplanet Claim & Evidence & Reasoning

Directions:

1. Review the scientific question that you are answering for your project.
2. Use your knowledge of the characteristics of habitable exoplanets and your [Exoplanet Data Table](#) to answer the scientific question with a detailed claim, then support your claim with evidence and connect your evidence to your claim using scientific reasoning.

3. Scientific Reasoning: You should explain important scientific concepts in your writing to help connect your evidence to your claim. For example, you should explain the concept of a habitable zone and why it is important if one of your pieces of evidence is that the exoplanet you've chosen is located in its host star's habitable zone.
4. ALL of your writing must be in your own words, you should not use any direct quotations of sentences or statements. Cite the sources for ALL of your scientific information that doesn't come from your own brain. You can cite your sources by either using sentence starters such as *"According to the Edpuzzle video 'Types of Stars', ..."* or *"Based on the Newsela article 'Article Title,' ..."* or by including the name of the source in parentheses after the summarized information such as *(Edpuzzle Video 'Types of Stars')*. Sources that you should use for your project include:
 - a. Assigned Edpuzzle videos
 - b. Assigned Newsela articles
 - c. Class slides/discussions
 - d. Exoplanet Data Table
 - e. Other outside sources, as necessary, but not encouraged
5. BEFORE CLICKING "TURN IN" on this assignment, go to the menu above and click:
 - a. **Tools → Spelling and grammar → Spelling and grammar check**
 - b. After checking the spelling and grammar, re-read your sentences for punctuation, capitalization and to make sure your ideas are clear and free of errors.

Checklist of important scientific evidence and reasoning to include:

- ☐ Name of your chosen exoplanet
- ☐ Exoplanet's characteristics compared to Earth's characteristics
- ☐ Characteristics of the exoplanet's host star compared to the Sun
- ☐ Exoplanet's orbit around its host star (shape & habitable zone)
- ☐ Why you believe this exoplanet has a high probability of being habitable

Scientific Question: Based on current scientific evidence, which exoplanet in the NASA Exoplanet Catalog has a high probability of being habitable by humans and should be investigated further? Consider your knowledge of relevant scientific concepts including the characteristics of habitable exoplanets, their host stars, and orbits that help to prove your claim.

Your response:

Resources:

[Class Website \(Class Recordings, Slides, and Resources\)](#)

[NASA's Exoplanet Glossary](#)

[NASA's Frequently Asked Questions about Exoplanets](#)

Your recent assignments in your [Google Classroom](#)

Part 3. Exoplanet Slide Presentation

Directions:

1. Open the **Exoplanet Project_Slide** attached to this assignment in Google Classroom.
2. Create an informative & visually appealing slide to share why your chosen exoplanet is likely to be habitable and what you know about it.
3. You should summarize the most important information from your [Exoplanet Data Table](#) and [Claim & Evidence paragraphs](#) in bullet points.
4. You can find illustrations of your exoplanet by searching for it in the [NASA Exoplanet Catalog](#) or by doing a [Google search](#).

Mastery Skill Rubrics

Visual Interpretation

I can identify, interpret, apply and synthesize relevant information presented visually.			
<i>Professional (4)</i>	<i>Practitioner (3)</i>	<i>Apprentice (2)</i>	<i>Novice (1)</i>
I can synthesize the relevant information with outside knowledge to address a question or solve a problem.	I can accurately identify, interpret and apply relevant information presented visually (in a chart, graph, diagram, image, etc.)	I can identify relevant information and make basic interpretations of the relevant information presented visually (in a chart, graph, diagram, image, etc.)	I can identify relevant information related to a question or problem.

Claim & Evidence I can state a detailed claim to answer a scientific question and provide relevant and sufficient scientific evidence to support that claim.			
<i>Professional (4)</i>	<i>Practitioner (3)</i>	<i>Apprentice (2)</i>	<i>Novice (1)</i>
States specific, detailed claim regarding complex relationships that accurately and completely answers the scientific question. AND Supports claim with extensive relevant and varied scientific evidence.	States detailed claim that accurately and completely answers the scientific question. AND Supports claim with sufficient relevant scientific evidence.	States basic claim that answers the scientific question. AND Supports claim with some appropriate, but insufficient scientific evidence; may include some inappropriate evidence.	States basic claim that answers part of the scientific question; may provide non-scientific or unrelated evidence.

Scientific Communication I can clearly, accurately, and completely communicate scientific ideas using scientific language.			
<i>Professional (4)</i>	<i>Practitioner (3)</i>	<i>Apprentice (2)</i>	<i>Novice (1)</i>
Fluently and accurately communicates complex scientific information or ideas in a professional manner with consistent scientific language.	Clearly and accurately communicates detailed scientific information or ideas with consistent scientific language.	Communicates mostly accurate scientific information or ideas with some minor errors in scientific language.	Communicates general scientific ideas that are mostly accurate.

Habits for Success - I can meet deadlines and assignment expectations.			
<i>Professional (4)</i>	<i>Practitioner (3)</i>	<i>Apprentice (2)</i>	<i>Novice (1)</i>
I can submit my work by the	I can submit my work by the	I can submit my work by the	I can submit my work after the

assignment deadline according to the assignment directions. My submitted work is detailed and free of spelling errors (use spell check!). My work is complete and meets the assignment's expectations.	assignment deadline according to the assignment directions. My submitted work is detailed and mostly free of spelling errors (use spell check!). My work is complete and mostly meets the assignment's expectations.	assignment deadline according to the assignment directions. My submitted work is somewhat detailed and free of spelling errors (use spell check!). My work is complete and somewhat meets the assignment's expectations.	assignment deadline according to the assignment directions. My submitted work is somewhat detailed and free of spelling errors (use spell check!). My work is mostly complete and somewhat meets the assignment's expectations.
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