

Driving unit question: How can we sustainably and inclusively travel to and colonize another planet?

KNOWS:

(5-10 min.)

1. There are 8 planets (9=pluto)
2. Neptune, Jupiter, Mars, Earth, Saturn, Mercury, Venus, Uranus (Pluto)
3. Neptune = Posidon
4. Jupiter = Zeus
5. Pluto = Hades
6. Venus = Aphrodite
7. Mars = Ares
8. Niel Armstrong: "One small step for man, one giant leap for mankind"
9. N.A. boot are still there

NEED TO KNOWS:

(10-20 min.) What do you already know about this topic and what skills do you have that would help you complete it?

Think about things like technology, ethical considerations of space exploration, the role of international cooperation, the constraints of space travel, conditions of other planets, and more!

1. How will we breathe
 - Could plant some plants. There is a relationship between humans and plants. The planet will become self-sustaining.
 - Make an air filter: MOXIE. Seperates the oxygen from the CO2.
 - <https://mars.nasa.gov/mars2020/spacecraft/instruments/moxie/>
2. How will we get there? How long will it take? How many ships? How big should they be?
 - We will get there by using spaceships. It would take about 500 ships.
 - There will be about 16 million people on each ship.
 - We'll stagger sending them every 2-3 days. Ships will launch from all over the world.
 - Ships would land in different parts of the planet.
 - It takes 7 months to get there.
3. What's the temperature?
 - 63 Degrees in summer
 - About -260 degrees in winter
4. How/ what will we eat?



- leafy greens, vegetables, fruits and specialty crops such as herbs, coffee and chocolate.
- <https://www.astronomy.com/science/learning-to-grow-food-on-mars-could-transform-food->

when it comes to feeding Martian colonists, such as wheat, corn, soybeans, peanuts and sweet potatoes.

- <https://www.space.com/how-feed-one-million-mars-colonists.html#:~:text=Previous%20research%20suggested%20a%20number,soybeans%2C%20peanuts%20and%20sweet%20potatoes.>

5. How will we get water?

- Dark, narrow streaks on Martian slopes such as these at Hale Crater are inferred to be formed by seasonal flow of water on contemporary Mars. The streaks are roughly the length of a football field. <https://www.nasa.gov/image-feature/jpl/pia19916/recurring-lineae-on-slopes>
- There is water in polar ice caps on the planet. It is frozen and mixed with frozen CO₂ (carbon dioxide) <https://www.cam.ac.uk/stories/liquid-water-mars#:~:text=Like%20Earth%2C%20Mars%20has%20thick,to%20the%20Greenland%20Ice%20Sheet.>
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- The water vapor and any air from the ice go through a number of cold traps to separate them. According to Dyonisius, sublimation “is arguably the cleanest” method for extracting gas from ice cores, “especially for trace gases that are highly reactive, like CO₂ (carbon dioxide) and methane, the two most important greenhouse gases.”
<https://eos.org/articles/the-catcher-in-the-ice#:~:text=The%20water%20vapor%20and%20any,two%20most%20important%20greenhouse%20gases.>”



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- (Above) polar ice cap on mars (from an artist’s perspective).

6.

ABSTRACT

Radiation shielding materials are an essential component of long-term space travel and habitation. The mission to Mars will require a radiation shielding material that can be produced on Mars through energy and cost-efficient means. In this study, Martian regolith simulant and hydrogen-rich polymers are used to create a radiation shielding material in the form of bricks. The bricks are capable of shielding against galactic cosmic radiation on Mars. There are three methods in which the bricks were formed: 1) a heated press, 2) a microwave oven in a CO₂ atmosphere, and 3) a vacuum oven with a low CO₂ pressure. Each brick varies by the type of polymer, percent of polymer, and the method in which it was made. Flexural tests were conducted on the bricks to determine the flexural strength, flexural strain, and modulus of elasticity. OLTARIS was used to estimate the effectiveness of these bricks to shield against GCR on the Martian surface.

7.

What kind of shelters would we live in?

- Radiation shielding bricks for mars using martian regolith simulant hydrogen rich- polymers.
- Radiation blocking materials are an essential part of homes on mars and for long term space travel so we could use hydrogen and regolith which are thick fabric so we could use those materials to colonize mars and, hydrogen and Martian regolith could take the form of bricks or just a home made of the hydrogen and regolith as shown in a NASA clip the fabric home is shown below and if we used regolith and hydrogen in thick enough layers we could make a rough draft of a home on mars. So the houses could be based off of pace ships with certain chambers. Like a bathroom a kitchen and sleeping chambers.

What
how
we
Mars

and
could
things
houses



- kinds of resources and many of them will need? has iron, titanium, nickel, aluminum, chlorine, sulfur, calcium which we do some good with like build and such.

<https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwiUt9i8xLSBAxUjkYkEHfdRBvYQFnoECCkQAQ&url=https%3A%2F%2Fsolarsystem.nasa.gov%2Fplanets%2Fmars%2Foverview%2F&usg=AOvVawOBsmCt7YIR2FzcsWiF24iA&opi=89978449> Mars is also confirmed to have some liquid water and polar ice caps that we could possibly drink if it had enough for us.

<https://www.nasa.gov/press-release/nasa-confirms-evidence-that-liquid-water-flows-on-today-s-mars>

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8. What planet will we choose?

- Mars!



9. What about the animals?
 - We would have to be careful about what aquatic animals we bring.
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NEXT STEPS:

(5-10 min.) What do you need to know/do in order to answer this question?

Don't just list "research." What kind? How?

10. Internal thoughts
11. The internet (.edu, .gov)
12. Books (encyclopedias, atlas)
13. Newspapers/ the news
14. Experts: former astronauts, physicists, NASA employees, engineers, robotisits

Play/ Stop Motion Animation Project Rubric

	Research	Design (visual/ tangible)	Content (not tangible)
Excellent	<ul style="list-style-type: none"> • I got most of my information from reliable websites (.gov and .edu) At least 4 of my sources are reliable. • I have 5 or more sources 	<ul style="list-style-type: none"> • I took enough photos to make our characters and scenes move smoothly (at least 70 photos) • I exported the video to iMovie and added music and credits. The sound effects and audio make sense with the story. • It is obvious that I put time and effort into my characters and sets. My work is very neat. 	<ul style="list-style-type: none"> • I address all 3 aspects of the prompt • In my artist statement, I used full sentences and good punctuation (3 or less errors) • I can explain why I chose my answers and give evidence from my sources (2 or more)

		<ul style="list-style-type: none"> I storyboarded my animation with at least 6 boxes and descriptions. 	<p>references to my sources)</p>
Good (but)	<ul style="list-style-type: none"> I got some of my information from reliable websites (.gov and .edu) At least 2-3 of my sources are reliable. I have 5 or more sources 	<ul style="list-style-type: none"> I took somewhat enough photos to make the characters and scenes move smoothly (at 50-69 photos) I exported the video to iMovie and added music and credits. The sound effects and audio make sense with the story, but are a little off with timing. I put some time and effort into my characters and sets. My work is somewhat neat, but looks a little rushed. I storyboarded my animation with at least 4-5 boxes and descriptions. 	<ul style="list-style-type: none"> I address 2 aspects of the prompt In my artist statement, I used some full sentences and good punctuation (4-5 errors) I can explain why I chose my answers and give evidence from my sources (3 or more references to my sources)
Needs Improvement (not)	<ul style="list-style-type: none"> I got very little of my information from reliable websites (.gov and .edu) At least 0-1 of my sources are reliable. I have less than 5 sources. 	<ul style="list-style-type: none"> I didn't take enough photos to make the characters and scenes move smoothly (49 or less photos) I didn't export the video to iMovie to add music and credits. I put very little time and effort into my characters and sets. I either did not storyboard at all or I storyboarded my animation, but only used 3 or less pictures and description boxes. 	<ul style="list-style-type: none"> I address 0-1 aspects of the prompt In my artist statement, I used little to no full sentences and good punctuation (6 or more errors) I have trouble explaining why I chose my answers and give little to no evidence from my sources (0-1

		My story doesn't make much sense.	references to my sources)
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Student-Created Calendar

<p>DAY 1</p> <p>Reviewed unit question</p> <p>Asked <i>Need to know</i> questions</p> <p>Decided a planet to travel to: (Mars)</p> <p>Made calendar</p> <p>Made Rubric</p> <p>Made Contract</p>	<p>DAY 2</p> <p>Research for 1st half and decide on a solution: internet based</p> <p>Assign roles</p> <p>Storyboard (at least 6 cells)</p> <p>Write script</p>	<p>DAY 3</p> <p>Making characters</p> <p>Making sets</p> <p>Making props</p> <p>Start stop motion!</p>	<p>DAY 4</p> <p>Finish filming</p> <p>Edit, add sound, and effects</p>
<p>DAY 5</p> <p>Create our personal websites (portfolios)</p>	<p>DAY 6</p>	<p>DAY 7</p>	<p>DAY 8</p>