Mars Habitat

Prep Time: 15 minutes	**Grades:** 5-8	**Lesson Time:** 65 minutes

Essential Questions:

- Could humans live on Mars?

Objectives:

- Students will be able to create a Mars habitat in augmented reality.

Standards:

- MS-ESS1-2 - Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.
- MS-ESS1-3 - Analyze and interpret data to determine scale properties of objects in the solar system.

Teacher Prep:

- **Download and familiarize yourself with the Mars Community Builder App.** Search for Mars Community Builder in your app store (Google Play or Apple App Store). All mobile devices being used should be loaded with the app to save time.

- **Print AR Triggers.** The cards need to be printed ahead of time. Cardstock works best because it is more stable, but any type of paper will work.

Teacher Notes/Background:

- The AR cards can work on any mobile device, but tablets work best.

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Engage (5 minutes)	**3-2-1 Warmup:** Students complete a Do Now/warm up in their notebook or on a separate sheet of paper. "3 things you learned, 2 things you want to learn more about, 1 question you still have" Have students share out their questions.	**Materials:** Do Now/Paper/Notebook
Explore (5 minutes)	**Review:** Based on the video, what are some of the things to consider when building a Mars habitat? What are some of the rooms and spaces that a crew might need? • Living quarters (habitat lander), greenhouse, exercise module, communication center, water tanks, fuel tanks, and Earth return pad. Students will learn more about the different aspects of a Mars habitat at each station. They will be completing graphic organizer with their group.	**Materials:** N/A
Explain (35 minutes)	**Research Stations:** There will be 7 stations around the room: one for each of the modules listed above. Place 1-2 tablets at each station and set them to the respective module. The trigger card should be placed with the tablet as well. Have students spend 3-5 minutes at each station, taking notes on the graphic organizer. Students should rotate through all seven stations.	**Materials:** • 7-14 Mobile devices • AR cards • Graphic organizer
Elaborate (15 minutes)	**Build a Habitat:** Once they have completed this, students should get into as small of groups as the number of devices permits. They will now build a Mars Habitat using the AR section of the app. The app will either guide them through the process using the Guided Build or they can create their own layout in the Freeform Build. If doing the latter, the AR app will give them feedback on the sustainability based on their layout. Once they complete the design, they can take a screenshot and save it to the tablet.	**Materials:** • AR cards • Graphic organizer • Mobile device • Printer (optional)

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Evaluate (5 minutes)	**Evaluation:** The screenshot of the layout can be the evaluation for the day. Students can also be graded on their ability to work together and the completeness of their graphic organizer.	**Materials:** N/A

Extensions and Enrichment:

- If you do not have the technology to use to AR cards, you can have students design their habitats on paper. They could also use the AR cards at home, if students or families have smart phones that cannot be used in school.
- For an extension, have students write a rationale for the layout they chose.

Additional Resources:

- **Launchpad: Food for a Mars Mission**
  NASA must find a way to provide food for astronauts that fits into very limited space. The food must be safe, nutritious and provide a variety for astronauts. Learn about new techniques in food processing.
  https://nasaeclips.arc.nasa.gov/video/launchpad/launchpad-food-for-a-mars-mission

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At each station, there is information about a different component of a Mars Habitat. Take notes at each station on the importance of each component and how it might look on Mars.

RESEARCH STATION #1 – HABITAT LANDER

RESEARCH STATION #2 – WATER TANKS

RESEARCH STATION #3 – FUEL TANKS

RESEARCH STATION #4 – COMM CENTER

RESEARCH STATION #5 – GREENHOUSE

RESEARCH STATION #6 – MODULES

RESEARCH STATION #7 – EARTH RETURN PAD