

National Aeronautics and Space Administration



Living and Working in Space: Habitat Sample Assessment Rubric: Final Project

**Assessment Rubric
Final Project
for
Living and Working in Space: Habitat**

Essential Question: What kinds of habitats can be designed to support extended human activity in space or on the moon or Mars?

Task to be assessed: Design a research habitat that will allow six researchers to live on the moon or Mars for an extended period of time. Researchers must be able to maintain physical health and a good quality of life.

Knowledge Areas

	Exemplary	Proficient	Developing	Novice
Understands characteristics of successful ecosystems on Earth	Ecosystem has all the elements necessary to provide a flow of energy and recycling of materials. Each organism is able to meet its needs. Presentation clearly and accurately describes energy pyramid, food pyramid, recycling of materials, food webs, and interactions of biotic and abiotic factors in the ecosystem. Attempt is made to quantitatively determine and describe characteristics.	Organisms are chosen and abiotic factors provided so that organisms can meet requirements for life and material is recycled. Presentation describes interactions of biotic and abiotic factors. Presentation describes why organisms should survive for extended period of time.	Organisms are chosen because one organism eats another. Abiotic factors are provided based on students' experience providing care for plants and animals. Presentation describes what is in the system.	Organisms for ecosystem are chosen because the student likes or needs them. The system would require additions of materials.
Understands characteristics of a healthy diet and exercise plan on Earth	Plan includes accurate information about the requirements for proper nutrition and exercise. Plan is very detailed and quantitative and reflects the needs of a variety of people. Presentation adds information and insight into the plan.	Diet plan requires proper amounts of different kinds of food that are appropriate for good nutrition. Exercise plan is appropriate to maintain health. Presentation includes accurate information on how to use nutrition and exercise guides.	Diet plan includes eating a variety of foods and eating less sugar and fat. Exercise plan focuses on the importance of exercise or a specific approach.	Diet and exercise plan are based on personal likes and experiences.

Living and Working in Space: Habitat

Assessment Rubric Final Project for Living and Working in Space: Habitat (continued)

Knowledge Areas (continued)				
	Exemplary	Proficient	Developing	Novice
Understands how clean air and water are maintained naturally within Earth's ecosystems	Design includes accurate information of how ecosystems recycle water and air on Earth. Presentation describes differences and similarities between designed system and Earth. Presentation includes explanation of carbon cycle and water cycle.	Design includes accurate information of how air and water are recycled on Earth. Presentation describes how design is similar to Earth system.	Design focuses on technological methods for cleaning water and air, such as sewage treatment plants.	Student believes that clean air and water are always available on Earth. OR Student believes that once air or water is used it disappears or is discarded.
Understands how matter is recycled on Earth	Design includes recycling of all biological and manufactured matter modeled on Earth ecosystems. Attempt is made to present recycling quantitatively. Presentation describes how matter is recycled within Earth ecosystems and how the student design is different.	Design includes recycling of biological and manufactured matter modeled on Earth ecosystems. Presentation describes recycling within Earth ecosystems.	Design includes biological recycling of some materials. Other materials, especially manufactured items, are separated by material type and reprocessed using industrial recycling techniques. Presentation explains methods.	Design involves using and discarding materials by separating materials by type (e.g., aluminum, plastic, etc).
Understands current technology	Current technology appropriately supplements ecosystem and is appropriate for the moon or Mars. Presentation clearly and accurately describes the technology used and its role in supporting the ecosystem. Attempt is made to quantitatively determine and describe characteristics. New materials are proposed for manufactured items to make them more easily recycled.	Technology supplements ecosystem and is appropriate for the moon or Mars. How technology supports the ecosystem is described.	Student uses technology described for the International Space Station. Presentation describes what technology is used.	Student uses technology familiar in the home or school.

Living and Working in Space: Habitat

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	Exemplary	Proficient	Developing	Novice
Understands resources and challenges on the moon or Mars	Design includes accurate information about the resources and challenges for a successful habitat on the moon or Mars. Choice of location is explained. Attempt is made to quantify resources and challenges in comparison with Earth.	Design uses local resources and technology to solve the challenges to maintaining a successful habitat on the moon or Mars. Presentation describes how challenges are met.	Design focuses on several of the challenges of a successful habitat on the moon or Mars. Presentation describes the challenges.	Design is based on the assumption that Mars is very similar to Earth, but hotter (or colder), and the resources will be the same. OR Design includes constant re-supply of materials.
Integration of knowledge	Design takes into account the elements for a healthy ecosystem on Earth, current technology, and modifications necessary for the moon or Mars. Presentation describes the inter-relatedness of all knowledge areas clearly and accurately.	Design takes into account the way Earth ecosystems purify air and water, current technology, and modifications necessary for the moon or Mars.	Design takes into account more than one knowledge area, and one dominates.	Design tends to focus on one knowledge area, assuming the moon or Mars will not be different from Earth.
Construction of Design Model	The model represents all of the elements of the design clearly and accurately. Functionally appropriate materials are chosen and used creatively. The model is attractive and informative.	The model represents all of the elements of the design. The materials are functionally appropriate and add to the understanding of the design.	The model represents the functionally critical elements of the design. Functionally appropriate materials are used.	The model focuses on the aspects that stand out or are of interest to the builder. Materials are chosen for attractiveness or availability.
Effectiveness of Presentation	Presentation was clear, accurate, well organized, and interesting. Visual aids were accurate, attractive and important to the presentation. A focus of the presentation was the audience understanding the plan and the reasons to expect success at chosen location.	Student presentation organized ideas in a logical or creative way. Visual aids were used to highlight the ideas. A focus of the presentation was the audience understanding of the diet and exercise plan.	Student presentation was clear and organized. Visual aids were used.	Student presented ideas as they came to mind.

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