



**Subject:** Biomimicry

**Grade Level:** 5-8

**Topic:** Animal Habitats

**Time:** 60 minutes

## Learning Objectives

Students will:

- demonstrate knowledge that animals' needs remain the same whether in a human-made or natural habitat.
- explore how habitat designers create habitats for animals outside of their natural range.
- use brainstorming skills to mimic natural habitats in a closed- system habitat on Mars.

## Materials

iPads, 3 giant sticky note pages, Lego, pencil, paper, *Needs Assessment Worksheet*, toy animals and fact sheets.

## Procedure

**Engage:** To promote student curiosity, as a full group, talk through designing zoo habitats for two very different animals (i.e., snow leopard and Dumeril's ground boa). Write student ideas on a sticky note. Remind them that all animals need food, water, air, and shelter to survive.

**Explore:** Help students build understanding by noting that needs do not change in different

settings but may be harder to fulfill in harsh environments. *Ask: What is the environment like on Mars?* Referencing their Needs Assessment Worksheet, brainstorm some challenges to designing habitats that support life on Mars. Write their ideas on a large sticky note.

**Explain:** Have students begin to show what they have learned by introducing students to an animal ambassador (if you are able to coordinate with a local zoo or wildlife center). Otherwise, select an animal and have a photo of the animal. Discuss their natural history, and have the students consider how they would design a habitat for the animal.

*Ask: How can we ensure that animals have enough space and can use their natural instincts and tendencies (climbing, hunting, hibernating, running, playing, breeding)? How can food and water be provided in their habitat? How can they be kept safe from other animals, people, weather, etc.? How will the habitat be kept clean? How can staff access the animals to provide medical care? How can visitors view the animal in a comfortable and naturalistic way?*

**Elaborate:** Have students use their new knowledge by having students work in groups to pick a toy animal to design a *closed-system habitat* for on Mars. The habitat must be self-sustaining, produce minimal waste, and should be able to recycle its water, air, and nutrients. Provide each group with a fact sheet about the animal they chose. Groups will fill out a *Needs Assessment worksheet*. Advise them to take inspiration from the animal's native habitat. Give each group a tablet or laptop and allow them to illustrate their ideas using Procreate, Tinkercad or build with Legos or recycled material.

## Assessment

**Evaluate:** Evaluate student learning by asking students to evaluate whether they included a way to get the animal the food, water, air, and shelter that it requires to live. Have them identify the sources they used from Mars to provide all of those.

## Extension Activities

- Take a trip to a local zoo or watch live webcams to view a variety of zoo habitats.
- Ask a local animal shelter to speak to students about how they ensure their animals have a suitable habitat.

# NGSS Alignment

## Middle School

MS-LS2.A - Animals depend on living and nonliving factors (food, water, air, shelter) in their environment to survive.

MS-LS2.C - Ecosystems are dynamic and must recycle materials and manage energy to remain sustainable.

MS-LS1.B - Different animals have specialized needs and behaviors tied to their structures and life processes.

MS-ETS1.A - A design problem can be solved by specifying criteria and constraints.

MS-ETS1.B - Multiple solutions can be generated and evaluated based on how well they meet criteria.



Created by the Akron Zoo