National Center for Earth and Space Science Education

Universities Space Research Association



Introduction to the Journey through the Universe Program and the Are There Other Neighborhoods Like Our Own? Module's Grade K-4 Lessons



1. The Program

Journey through the Universe (http://journeythroughtheuniverse.org) is a national science education initiative that engages *entire* communities—students, teachers, families, and the public—using education programs in space exploration and the space sciences to inspire and captivate. The initiative embraces the notion that—*it takes a community to educate a child*.

Journey through the Universe programming is tailored to a community's strategic needs in science, technology, engineering, and mathematics (STEM) education, and is a framework for partnership between school districts, museums and science centers, colleges and universities, civic and business organizations, and the public. The cornerstone philosophy for all programming is—*inspire... then educate*.

2. The Grade K-12 Are There Other Neighborhoods Like Our Own? Education Module

Are There Other Neighborhoods Like Our Own? Searching for Abodes of Life in the Universe is one of several Education Modules developed for the *Journey through the Universe* program. The Module contains activities at three grade levels (K-4, 5-8, 9-12). Each grade level package is called an **Education Unit.** The Module also includes one Family and Home activity, and one activity on the Process of Science, both of which are suitable for use at all grade levels. Note that the Module currently uses an old lesson format.

The Module focuses on the search for abodes of life in the universe. Considering that life is found in just about every environment on Earth—from frozen Antarctica to sun-deprived hydrothermal vents at the bottom of the ocean to the interior of nuclear reactors—life flourishes over a wide range of environs. If it is conceivable for species to adapt to living conditions that are unthinkable for human survival, then similar adaptations might be possible for life on another world. Mars, with frozen water beneath its surface, and Jupiter's icy moon Europa, may seem like harsh environments to us, yet they may be abodes of life.

The storyline approach adopted for this Module is to address three questions at each grade level:

- *What* makes our neighborhood an abode of life, and might these conditions be present in other neighborhoods beyond our own?
- Why do we want to search for other neighborhoods like our own?
- *How* will we explore other neighborhoods beyond our own?

Each grade-level Education Unit has a lesson addressing each of these questions.

At the elementary level 'our neighborhood', a case study of a familiar life-bearing environment, is one's hometown and 'other neighborhoods' are other possible abodes of life within the Earth-Moon system. At the middle school level 'our neighborhood' is the Earth-Moon system and 'other neighborhoods' encompass those found across the Solar System. At high school 'our neighborhood' is the Solar System as an abode of life, and the search for 'other neighborhoods' spans the entire galaxy. The nature of a neighborhood at each grade level is based on the National Science Education Standards and Benchmarks for Science Literacy.

3. The Are There Other Neighborhoods Like Our Own? Grade K-4 Lessons

This document provides a description of each lesson for the *Are There Other Neighborhoods Like Our Own?* elementary school (grade K-4) Education Unit. Also provided are connections to grades K-4 National Science Education Standards.

ARE THERE OTHER NEIGHBORHOODS LIKE OUR OWN? THE K-4 EDUCATION UNIT PROGRESSION								
Lesson Title	Lesson Description							
Lesson 1: My Hometown	Storyline question addressed: What makes our neighborhood an abode of life, and might these conditions be present in other neighborhoods beyond our own?							
	In this lesson, students critically think about what resources are needed for survival, and where these resources can be found. First, students define the essential resources needed for survival by considering themselves on an isolated island, far from the comfort and familiarity of their own neighborhood. Through discussion, they distinguish the non-essential needs—TV, refrigerator, car, etc.— from the essential—water, food, shelter (a reasonably comfortable environment), and air, and recognize tools that can be used to secure essential needs—sharp stick, fishing line, etc. They then build a three-dimensional model of their own neighborhood—their home and extended community—and identify where the essential resources are found.							
Lesson 2: Explore Bigger Neighborhoods	Storyline question addressed: Why do we want to search for other neighborhoods like our own?							
	As an extension to the first lesson, students explore whether the essential resources found in their neighborhood are created locally, or brought in from the outside—from neighborhoods beyond their own. They research the sources of the food they eat, the water they drink, and other resources, and recognize that the well-being of people in their neighborhood depends critically on resources found elsewhere—which is one of many motivations for humans to explore neighborhoods beyond their own.							
Lesson 3: How Do We Explore Strange Environments?	Storyline question addressed: How will we explore other neighborhoods beyond our own?							
	Robotic exploration is one means by which we can study other neighborhoods that otherwise might pose serious risks for direct human exploration. Robots can also offer acceptable low cost alternatives to sending humans. This is the case for study of the deep ocean, or the surface of the Moon and planets.							
	In this lesson, student teams will design, draw, and build a model of a robot to explore a new place. Their robot will have a specific mission, and their design must reflect the needs of the mission.							

CONNECTION TO STANDARDS

This Education Unit has been mapped to the National Science Education Standards (National Research Council, National Academy Press, Washington, DC, 1996). A complete explanation of the Standards can be found at: http://www.nap.edu/html/nses/html/. Core standards for each lesson are indicated by a " \checkmark ."

	EDUCATION STANDARDS IN ARE THERE OTHER NEIGHBORHOODS LIKE OUR OWN? K-4 EDUCATION UNIT									
	National Science Education Standards									
	Standard A: Science as Inquiry		Standard B: Physical Science	Standard D: Earth and Space Science	Standard E: Science and Technology		Standard F: Science in Personal and Social Perspectives	Standard G: History and Nature of Science		
	A1: Abilities necessary to do scientífic inquiry	A2: Understanding about scientific inquiry	B1: Properties of objects and materials	D1: Properties of Earth materials	E1: Abilities of technological design	E3: Abilities to distinguish between natural objects and objects made by humans	F3: Types of resources	G1: Science as a human endeavor		
Lesson 1: My Hometown										
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