LESSON 3: WE GO WAY BACK

Module 1: Space Explorers - An Introduction to Astrobiology

OVERVIEW	During this lesson, inspired by the book <i>We Go Way Back</i> , students will embark on a journey to understand the building blocks of life and explore how elements combine to form everything around us, including living organisms. Students will learn that life begins at a cellular level, understanding that all living things are composed of tiny cells and that these cells have evolved over time. The concept of microorganisms is introduced, emphasizing that these tiny living organisms are everywhere, even on Earth, prompting students to consider the existence of life on other planets. Through discussions and activities, students will contemplate how life adapts to different environments and how scientists search for evidence of life beyond Earth. This lesson aims to spark curiosity about the origins of life and the possibility of its existence elsewhere in the universe, emphasizing that the same building blocks that make up life on Earth could also be the foundation for life elsewhere. Duration: 60 minutes.
SUCCESS CRITERIA	 Representation of Elements and Compounds: Students can draw at least one element and one compound, demonstrating an understanding that they are building blocks of life. Students' drawings show recognizable representations of the concepts. Representation of Organisms: Students can draw a simple organism, showing their understanding of living things. Students can draw a microorganism. Animal Evolution (Past, Present, Future): Students can draw a past or present animal, demonstrating their understanding of animal life. Students can draw a prediction of what that animal might look like in the future, demonstrating creative thinking about evolution or change over time. Connection to "We Go Way Back": Students can explain their drawings. Creative Expression: Students use colors and details to enhance their drawings. Students demonstrate effort and engagement in the activity.

ARIZONA

DLOGY NTER



Module 1: Space Explorers - An Introduction to Astrobiology

K-2 AZ STATE STANDARDS	 Kindergarten Science (K.L2UI.8): Observe, ask questions, and explain the differences between the characteristics of living and non-living things. There is a wide variety of living things, including plants and animals. They are distinguished from non-living things by their ability to move, reproduce, and react to certain stimuli. Science (K.L1UI.6): Obtain, evaluate, and communicate information about how organisms use different body parts for survival. Science (K.L1UI.7): Observe, ask questions, and explain how specialized structures found on a variety of plants and animals (including humans) help them sense and respond to their environment. Social Studies (K.SPI.1): Use a variety of words to reference time in the past, present, and future; identify the beginning, middle, and end of historical stories. Social Studies (K.H2.1): Explain the benefits of cooperation and compromise as ways to solve problems. First Grade Science (1.L4.U3.11): Living things can survive only where their needs are met. If some places are too hot or too cold or have too little water or food, plants and animals may not be able to live there. Science (1.L4.U3.11): There are many different kinds of plants and animals in the world today and many kinds that once lived but are now extinct.
	 Second Grade Science (2.L2U1.9): Obtain, analyze, and communicate evidence that organisms need a source of energy, air, water, and certain temperature conditions to survive. Science (2.L2U1.10): All living things need food as their source of energy as well as air, water, and certain temperature conditions.
MATERIALS	 We Go Way Back - book or YouTube video such as: <u>https://www.youtube.com/watch?v=kaiMDQKELq4</u> Chemical Reactions Video: <u>ttps://www.instagram.com/reel/DHIhXiSC0hY/?</u> <u>igsh=bjh1b3RtbGZrMzZt</u> Past, Present, and Future of Life Worksheet Picture of a Woolly Mammoth Picture of an Elephant "Planet in a Jar" Parent Letter (optional) Microscope Camera (optional)



VOCABULARY	 Elements: The tiny building blocks that make everything in our universe - like how LEGO pieces make a castle! Cells: The tiny parts that make up every living thing, like little puzzle pieces in your body. Organism: A living thing. That could be a person, an animal, a plant, and more. Microorganism: A very tiny living thing that you can't see unless you use a special tool called a microscope. Life: Anything that grows, eats, breathes, or moves on its own-like animals, people, and plants. Change: When something becomes different, like when a caterpillar turns into a butterfly. Extinct: When something alive is all gone and doesn't exist anymore, like dinosaurs.
SET UP	 If you don't have a physical copy of We Go Way Back, you can pull up a read aloud on YouTube such as: <u>https://www.youtube.com/watch?</u> <u>v=kaiMDOKELq4</u> Prepare microscope camera, if applicable Review any previously taught lessons before giving this lesson.
LESSON PROCEDURE	 Introduction (20 minutes) Review the word "astrobiology" with students. Explain that astrobiologists study how life began on Earth, because understanding life on Earth helps us to learn how life might develop on other worlds, too. Read the book <i>We Go Way Back</i> to the class. This book provides a fantastic springboard for exploring elements, cellular life, and microorganisms with young learners! During the reading, pause frequently to highlight and emphasize some of the following concepts and questions: Elements and the Building Blocks of Life: The book talks about how everything is made of tiny pieces. What are those tiny pieces called? (Elements/atoms) Do you think the same elements that make up rocks and water also make up living things? Why or why not? The book mentions the 'soup' where life started. What do you think was in that soup? (Elements to live, like oxygen. Do you think other planets might have different elements that could support different kinds of life? If we were to look at a tiny cell, what elements might we find inside?

ARIZONA

CENTER

OGY



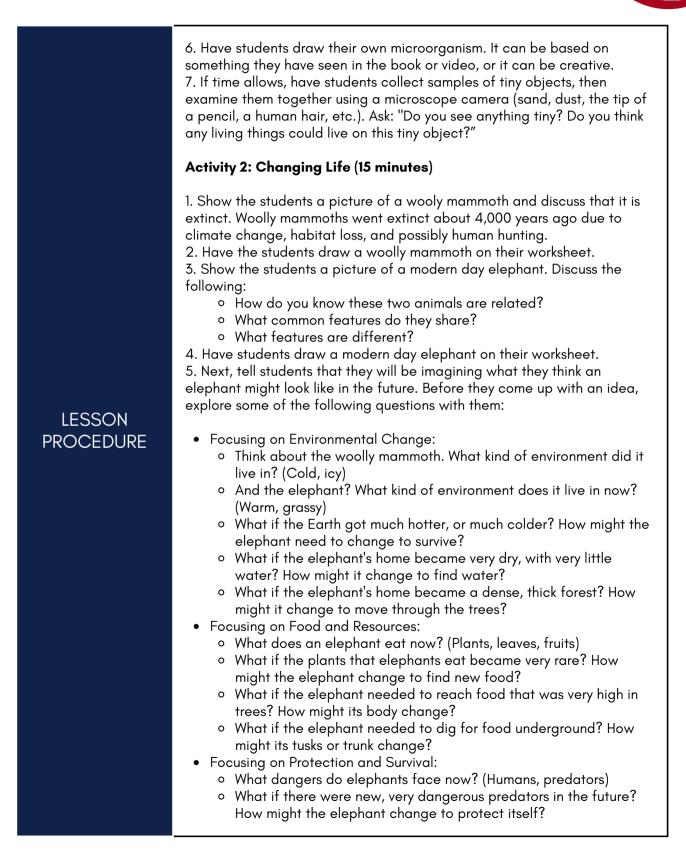
LESSON PROCEDURE	 Life at a Cellular Level: The book shows how life started with tiny, tiny things. What are those tiny things called? (Cells) Do you think all living things are made of cells? Are we made of cells? Are trees made of cells? The book talks about how cells changed over time. Do you think cells are still changing today? What do cells need to survive? (Water, nutrients, etc.) Do you think cells on other planets might need different things? "In the book, some cells started working together. Why do you think they did that?" Microorganisms: The book mentions that the very first living things were very small. What are very small living things called? (Microorganisms) We can't see most microorganisms on other planets? What might they look like? The book talks about how microorganisms on other planets? What might they look like? The book talks about how microorganisms changed the Earth. How do you think they look like? The book shows how life on a some good? How do they help the earth? If we sent a robot to another planet, how could it look for microorganisms? Connecting to the Book's Themes: The book shows how life on Earth took a very long time to develop. Do you think life on other planets might also take a long time to start? The book shows how life changed and adapted to Earth's conditions. Do you think life on other planets would have to adapt to their conditions? The book ends with us. What do you think life will be like in the future? After reading this book, does it make you wonder if life could exist in other places? Activity I: Life on a Tiny Scale (15-25 minutes) 1. Pass out the "Life of the Past, Present, and Future" worksheet. 2. Have students watch this video of elements being added into a drop of water demonstrating the relationship between elements/reactions/changes:
---------------------	--

ARIZONA

LOG\ TER



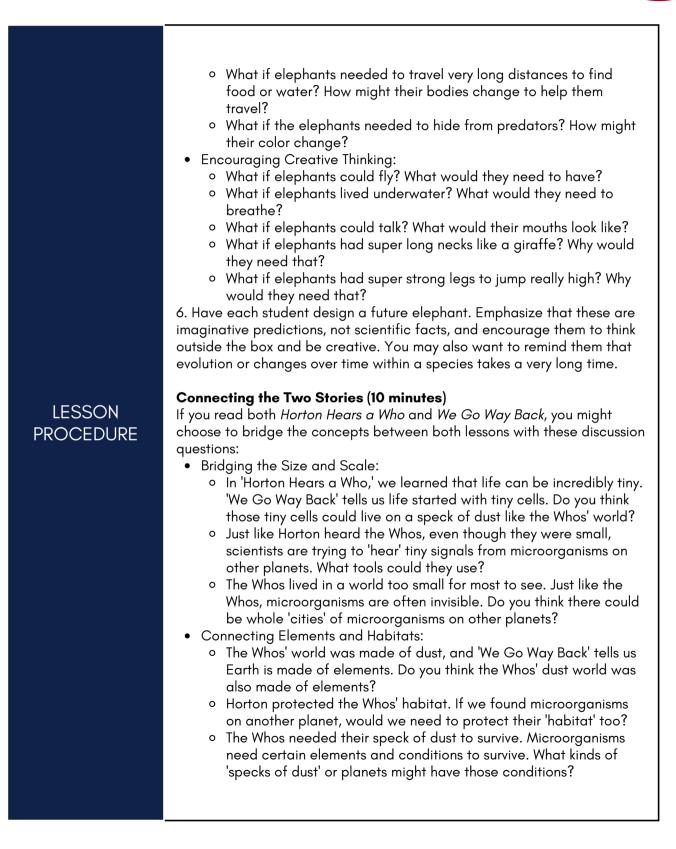
Module 1: Space Explorers - An Introduction to Astrobiology



LESSON 3: WE GO WAY BACK



Module 1: Space Explorers - An Introduction to Astrobiology





Module 1: Space Explorers - An Introduction to Astrobiology

LESSON PROCEDURE	 Relating Communication and Discovery: The Whos had to shout to be heard. Microorganisms might send 'signals' in ways we don't understand. How can we learn to 'listen' to them? Horton believed there was life, even when others didn't. Scientists believe there might be life on other planets, even if we haven't found it yet. Why is it important to keep looking? If the Whos were made of cells, like the cells in We Go Way Back, how would we prove that they were alive? Expanding on the Idea of "Life": Both stories show us that life can be very different from what we expect. Does this make you more curious about what life might be like on other planets? Both stories talk about communities. The Whos had their city, and 'We Go Way Back' talks about cells working together. Do you think alien life might also live in communities?
EXTENSION AND TAKE-HOME ACTIVITIES	 Planet in a Jar At-Home Activity Ask students to create another "animal of the future" using their favorite animal. Ask students to bring some tiny objects from home that they'd like to see in the microscope camera. Explore the concept of cells in more detail with these YouTube videos: What Are Cells? Science for Kids (https://www.youtube.com/watch?v=ex0x-w00Uy4) Cells for Kids Learn about cell structure and function in this engaging and fun intro to cells (https://www.youtube.com/watch?v=kcG1F88KQA0) The Cell For Kids - The Cell and its Parts (Learning Videos For Kids) (https://www.youtube.com/watch?v=YY5ciDx7Y3Q)

This module was created by Terra Bennett, a kindergarten educator at Pueblo Elementary in Tucson, AZ, in collaboration with the Arizona Astrobiology Center. It is supported and distributed by the University of Arizona's Astrobiology Center with funding from the Marshall Foundation, Tucson, AZ. For more information, contact Lauren James at laurenjames@arizona.edu. Lesson kits are available for checkout from the Arizona Astrobiology Center – https://astrobiology.arizona.edu/