LESSON 3: SPACE BUDDIES: CREATING LIFE ON NEW PLANETS!

Module 2: **Life in Space: Imagine, Explore, Discover!**

OVERVIEW	In this lesson, students will apply their knowledge of what life needs by designing an alien that could survive on an imaginary planet. They will explore how organisms might look different based on their planet's environment. **Duration: 45-60 minutes.**
SUCCESS CRITERIA	• Students can describe how living things adapt to survive. • Students can imagine and design a creature that could live on another planet. • Students can explain why a living thing has the parts it does (like, "My alien has wings because it needs to fly").
NGSS STANDARDS	• K-LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive. • K-ESS3-1 Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live. • Crosscutting Concept: *Patterns*. Observed patterns of forms and events guide organization and classification, and they prompt questions about relationships and the factors that influence them. • Crosscutting Concept: *Structure and function*. The way in which an object or living thing is shaped and its substructure determine many of its properties and functions.
AZ STATE STANDARDS	Kindergarten • Science K.E1U1.5 - Observe and discuss patterns related to the needs of living things. • Science K.L1U1.6 - Identify and describe characteristics of living things. First Grade • Science 1.E1U1.5 Living things need water, air, and resources from the land, and they live in places that have the things they need. • 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. 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.

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MATERIALS	• List from Lesson 2 – "What Living Things Need" • "Imagine Another World" slide show (available on AABC website) • Play-dough or clay • Acrylic Paint markers (optional) • Pipe cleaners, googly eyes, beads, feathers, and other craft materials (optional)
VOCABULARY	• **Adaptation**: A special part or behavior a living thing has that helps it survive where it lives. For example, a fish has fins to swim, and a bird has wings to fly. • **Environment**: Where a living thing makes its home. It includes all the things around it, like air, water, food, plants, animals, and weather, that help it live and grow. • **Creature**: Any living thing, like an animal or alien! • **Exoplanet**: A planet that orbits a star outside our solar system. That means it's far, far away from Earth—way past the planets we know, like Mars or Jupiter.
SET UP	• Place clay, markers, and different craft materials at each table. • Bring out the planets the students created in Lesson 2. • Prepare the slide show.

LESSON PROCEDURE	**Warm Up (5 minutes)**
	• Review the list of "What Living Things Need" from Lesson 2.
	• Remind students how special Earth is to have all of these requirements for life!
	• Tell the students that we're going to continue our work as astrobiologists. Remember, astrobiologists like to imagine what life might like on other planets and moons!
	
	Discussion: Planets Beyond Our Solar System (10-15 minutes)
	• Bring up the slide show and pick up where you left off. For each world, discuss the challenges that life might have on that planet, and how life would need to adapt to survive there. For instance, for the planet Kua'kua, you might ask:
	  ◦ What if this planet has all of the requirements for life? With its constant earthquakes, do you think life could survive?
	  ◦ How could life adapt to survive on a world like this?
	• Discuss the rest of the planets as a class, encouraging students to use their imagination to conceive what life might look like on each world. Continually refer back to your list of "What Living Things Need" as you discuss.

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LESSON PROCEDURE

Activity (15 minutes) - Build Your Alien

- In this activity, students use clay to imagine an alien life form that can survive on the planet they created in Lesson 2.
- For students who were absent, or created a planet that is inhospitable to life, you can let them use one of the planet scenarios from the slide show.
- If time, you might have students draw their alien and/or write about their design before creating it out of clay.
- When you feel the students are ready, have them use the clay, markers, and other craft materials to create an extraterrestrial that could survive on their planet.
- Circulate the room, asking guiding questions:
    - "How will your extraterrestrial stay safe on this stormy planet?"
    - "What special eyes or ears does your extraterrestrial need in the dark?"
    - "Does your extraterrestrial need wings, fins, or strong legs?"

Wrap-Up (15 minutes)

- Students can pair up to share their extraterrestrial with a partner, or share with the whole class. They explain what planet their extraterrestrial lives on and why it looks the way it does.
- Check for understanding. Are students making logical choices for their alien's features? Can they explain their choices? Do they match their alien's environment?

Note for Teachers: If you are also teaching Module 4 (where students design a mission to visit another planet), save all of the creatures your students have created. This will enhance imaginative learning in Module 4, as students "explore" that planet and "discover" life on it.

EXTENSION AND TAKE-HOME ACTIVITIES

- Book Suggestion: "Aliens Love Underpants" by Claire Freedman
    - YouTube read-aloud (https://www.youtube.com/watch?v=svSNvzGmLUg)
- Short video to watch with your students - Crash Course Kids: Life on Other Planets (https://www.youtube.com/watch?v=8gHDCOSI5Es)

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