Lesson Plan: Nature's Architect - Build a Biome

Subject: Science (Ecology, Biology), Art, Research Skills
Grade Level: 5th-6th Grade (Ages 10-12)
Time Allotment: Two 60-90 minute sessions per week

Materials Needed:

- **Session 1 (Research & Design):**
  - Computer or tablet with internet access
  - Pencil and paper or a science journal
  - Colored pencils or markers
  - Access to library books or online encyclopedias about ecosystems (e.g., National Geographic Kids, DK Find Out!)
  - "Biome Research Guide" worksheet (template provided below)
- **Session 2 (Creation & Presentation):**
  - A shoebox or similar-sized cardboard box
  - Craft supplies: construction paper, glue, scissors, tape, paint, cotton balls, modeling clay
  - Natural materials (collected from a walk): small twigs, leaves, sand, pebbles, moss, grass
  - Small plastic animal figures (optional)
  - Index card or small piece of paper

Overall Goal

This project-based lesson encourages the student to become an expert on a specific ecological biome. Instead of memorizing facts, the student will apply their research to creatively design and construct a 3D diorama, demonstrating a deep understanding of how living and non-living things interact within that environment.

Session 1: The Ecologist's Field Study

Learning Objectives:

- The student will be able to define "biome" and identify at least four major world biomes.
- The student will select one biome and conduct guided research to identify its key characteristics, including climate, at least three plants (flora), and three animals (fauna).
- The student will sketch a detailed plan for a diorama representing their chosen biome.

Activities & Procedure:

1. **Introduction (10 mins): The "Where in the World?" Hook**
   - Show the student a fascinating picture of an unusual animal, like an Axolotl or a Fennec Fox.

Ask: "Based on what you see, what kind of world do you think this animal lives in? Is it hot or cold? Wet or dry? What clues tell you that?"
    - Explain that today, they will become an ecologistâ€”a scientist who studies how living things survive in their homes, or "biomes."
2. **Instruction & Exploration (25 mins): Journey Through Biomes**
    - Briefly define a **biome**: "A large community of plants and animals that occupies a distinct region. Think of it like a giant natural neighborhood."
    - Explore 4-5 major biomes together using a visually engaging resource, like a short BBC Earth or National Geographic video on YouTube. Discuss the key features of each:
        - **Forest:** Lots of trees, rain, diverse animals.
        - **Desert:** Very dry, hot days, cold nights, specially adapted plants and animals.
        - **Tundra:** Cold, treeless, frozen ground (permafrost).
        - **Grassland:** Open fields of grass, few trees, grazing animals.
        - **Aquatic (Ocean):** Saltwater, huge variety of life from coral reefs to the deep sea.
    - Allow the student to choose the one biome that excites them the most to be their focus for the project. This choice is key for motivation!
3. **Guided Research (30 mins): Becoming an Expert**
    - Provide the "Biome Research Guide" worksheet (see template below) and help the student use safe, age-appropriate websites or books to find the information.
    - Encourage them to look for cool facts and visual details that will make their project unique.
4. **Design & Sketch (15 mins): Blueprint for a Biome**
    - Using their research, the student will now sketch a design for their shoebox diorama.
    - Ask guiding questions: "How will you make the sky? What will you use for the ground? Where will your animals live? Are you showing day or night?" The sketch should label where different plants, animals, and features will go.

Formative Assessment:

Review the completed research guide and the diorama sketch together. Ask clarifying questions like, "Why is that animal a good fit for the desert you researched?" or "What challenges might an animal face living here?" to check for comprehension beyond simple fact-finding.

Session 2: The Architect's Workshop

Learning Objectives:

- The student will construct a 3D diorama that accurately represents their chosen biome, using a mix of natural and craft materials.
- The student will create a simple food chain diagram featuring at least three organisms from their biome.
- The student will verbally present their diorama, explaining how the plants, animals, and non-living elements are connected.

Activities & Procedure:

1. **Warm-up & Material Gathering (15 mins): The Nature Walk**
    - Begin with a short walk outside to gather natural materials. This is a great way to get moving and connect with the local environment.
    - Challenge the student to find items that could be "repurposed" for their biome. For example:

a twig could become a fallen log in a forest, sand could become a desert floor, and a small pebble could be a rock in the tundra.

2. **Construction (45 mins): Building the World**
    - Using the sketch from Session 1 as a blueprint, the student begins building their diorama.
    - **Background:** Paint or cover the inside of the box to create the sky and horizon.
    - **Ground:** Glue sand, soil, cotton ball "snow," or green paper "grass" to the bottom.
    - **Flora (Plants):** Use twigs for trees, small green sponge pieces for bushes, or sculpt cacti from clay.
    - **Fauna (Animals):** Use small plastic figures, sculpt them from clay, or draw them on paper, cut them out, and create little stands so they can be placed in the scene.
    - Encourage problem-solving: "The tree won't stand up. What could we use as a base?"
3. **Food Chain Challenge (15 mins): What's for Dinner?**
    - Explain a **food chain**: "It shows how energy moves. An arrow points from the organism being eaten to the one that eats it."
    - On an index card, have the student draw or write a simple food chain for their biome. For example, in a grassland: **Grass â†’ Zebra â†’ Lion**.
    - This reinforces the concept that all living things in their biome are connected.
4. **Closure & Presentation (15 mins): Biome Tour Guide**
    - The student presents their finished diorama. Encourage them to act as a "tour guide."
    - They should introduce the name of their biome, point out the key plants, animals, and non-living features, and explain the food chain they created.

Summative Assessment:

Use the simple rubric below to evaluate the final project and presentation. The focus is on the application of knowledge, creativity, and the ability to explain the "why" behind their creation, not on artistic perfection.

Differentiation & Extension

- **For Extra Support:** Provide a curated list of websites or a specific book for research. Offer pre-cut shapes or more direct guidance during the construction phase. Provide a fill-in-the-blank template for the food chain.
- **For an Extra Challenge:** Ask the student to research and model a specific animal adaptation (e.g., camouflage, hibernation). Instead of a food chain, have them create a more complex "food web" with interconnected chains. They could also write a short story from the perspective of an animal living in their diorama.

Resources & Templates

Biome Research Guide

Biome Name:	
Climate & Weather:	(Is it hot/cold, wet/dry?)

Plants (Flora):	1. 2. 3.
Animals (Fauna):	1. 2. 3.
Non-Living Features:	(e.g., rocks, sand, water, sun) 1. 2.
One Amazing Fact:	

Project Rubric

Category	Beginning (1 pt)	Developing (2 pts)	Excellent (3 pts)
Biome Accuracy	Includes 1-2 elements that fit the biome.	Includes several plants and animals appropriate for the biome.	Diorama clearly and accurately represents the chosen biome with correct flora, fauna, and non-living features.
Creativity & Effort	Project is incomplete or shows minimal effort.	Project is complete and shows good effort and some creative ideas.	Project is thoughtfully constructed, detailed, and shows a high level of creativity and effort.
Verbal Explanation	Can name the biome but struggles to explain it.	Can identify most features and gives a basic explanation.	Clearly explains the biome, its inhabitants, and how they are connected (including the food chain) with confidence and detail.