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# Lesson Plan: Dino-Expert Challenge - Design a Prehistoric Habitat!

## Materials Needed:

- **Research Tools:** Computer with internet access (for sites like the Natural History Museum, National Geographic Kids), or dinosaur encyclopedias/books.
- **Art & Creation Supplies (Choose one path):**
  - **Diorama Path:** A shoebox or cardboard box, modeling clay (various colors), craft supplies (small rocks, fake plants, sand, blue paper for water), scissors, and glue.
  - **Digital Path:** A tablet or computer with presentation software (like Google Slides, PowerPoint, or Canva) or a digital drawing app.
  - **Blueprint/Story Path:** Large paper or poster board, colored pencils, markers, and pens.
- **Dino-Expert Challenge Sheet (provided below).**
- **Pencil or pen for brainstorming.**

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**Subject:** Science (Life Science, Paleontology, Ecology)

**Grade Level:** Ages 11-13 (Middle School)

**Time Allotment:** 90-120 minutes (can be split over two days)

## 1. Learning Objectives

By the end of this lesson, Amelia will be able to:

- **Apply** knowledge of dinosaur characteristics (diet, habitat, era, adaptations) to design a scientifically plausible ecosystem.
- **Analyze** the relationship between different species and their environment, specifically predator-prey dynamics.
- **Create** a unique visual representation (diorama, digital presentation, or blueprint) of a prehistoric habitat, justifying her design choices.
- **Communicate** her understanding and creative process through a verbal presentation or a written report.

## 2. Alignment with Standards and Curriculum

This lesson aligns with middle school Next Generation Science Standards (NGSS), focusing on:

- **MS-LS2-1:** Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. (Amelia will have to ensure her habitat provides enough resources for her chosen dinosaurs).
- **MS-LS2-2:** Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. (Amelia will explain the predator-prey relationship in her habitat).
- **MS-LS1-4:** Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the
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probability of successful reproduction of animals and plants respectively. (Amelia will justify how her dinosaurs' adaptations help them survive in her designed habitat).

3. Instructional Strategies & Lesson Flow

Part 1: The Mission Briefing (15 minutes)

Introduction/Hook:

"Good morning, Expert Amelia! You've been hired as the lead paleontological consultant for a groundbreaking new project: 'Habitat 65'â€”the world's first scientifically accurate prehistoric nature preserve. Your mission is not just to show dinosaurs, but to create a stable, thriving ecosystem where they can live as they did millions of years ago. Your first task is to design a showcase habitat. Here is your design quiz, which will guide your project."

Activity:

1. Present Amelia with the **Dino-Expert Challenge Sheet**.
2. Read through the "quiz" questions together to ensure she understands the creative tasks.
3. Brainstorm some of her favorite dinosaurs and discuss what she already knows about them to activate prior knowledge.

The Dino-Expert Challenge Sheet (The "Quiz")

Instructions: Answer the following design prompts to create your 'Habitat 65' showcase. You will use your answers to build your final project.

1. **CHOOSE YOUR STARS:** Select one large herbivore and one large carnivore that lived during the **same time period** and in the **same geographic area**. (For example, Tyrannosaurus Rex and Triceratops in Late Cretaceous North America). Who did you choose and why are they a good match for a single habitat?
2. **DESIGN THE ENVIRONMENT:** What did their world look like? Describe the climate (warm, wet, dry?), the plants (ferns, conifers, early flowers?), and the landforms (rivers, volcanoes, plains?). Explain *why* this environment is perfect for both of your chosen dinosaurs.
3. **MAP IT OUT:** Create a blueprint for your habitat. Where is the main water source? Where are the dense forests for hiding? Where are the open plains for grazing or hunting? Label at least five key features on your map.
4. **SOLVE A PROBLEM:** A crisis has struck Habitat 65! A sudden drought is drying up the river. As the expert, what is your **two-step plan** to ensure both your dinosaurs survive? Think about water, food, and their behavior.

Part 2: Research & Creation (60-90 minutes)

Instructional Strategy: Project-Based Learning

This is the core of the lesson where Amelia works independently to bring her vision to life. The parent/teacher acts as a facilitator, helping with research questions or creative roadblocks.

1. **Research:** Amelia uses the provided books or websites to research her chosen dinosaurs and

their environment to answer the Challenge Sheet questions accurately.
2. **Create:** Based on her research and answers, Amelia starts building her project.
    - **Diorama Path:** She can sculpt her dinosaurs from clay, build the landscape, and add plants and water features.
    - **Digital Path:** She can create a slide presentation with images, maps, and text explaining her habitat design and problem-solving plan.
    - **Blueprint/Story Path:** She can draw a large, detailed, and colored map of the habitat, with call-out boxes explaining key features and a separate written report for the problem-solving plan.

Part 3: The Habitat Tour (15 minutes)

Closure & Presentation:

"Welcome, board members! Expert Amelia is now ready to present her design for the first showcase in Habitat 65. Please give her your full attention."

Amelia presents her finished project, acting as a tour guide. She should:

- Introduce her chosen dinosaurs.
- Explain the key features of the habitat she designed, using her model/slides/blueprint as a visual aid.
- Describe the relationship between the two dinosaurs.
- Present her solution to the drought crisis.

4. Differentiation and Inclusivity

- **To Provide Support:** Offer a pre-selected list of dinosaur pairs that coexisted (e.g., Allosaurus & Stegosaurus; Velociraptor & Protoceratops). Provide a checklist of what the final presentation should include. Offer sentence starters for the problem-solving section.
- **To Provide a Challenge:** Require Amelia to add a third, smaller dinosaur (omnivore or scavenger) and explain its role in the ecosystem. Ask her to calculate the approximate area (in square miles) her habitat would need to be to sustain its population. Have her research and include at least three specific, real prehistoric plants in her habitat design.

5. Assessment Methods

The assessment is the final project and presentation, evaluated with a simple, positive rubric.

- **Formative Assessment:** Discussion during the brainstorming phase and checking for understanding of the Challenge Sheet questions. Asking questions during the creation process ("Why did you decide to put the forest there?").
- **Summative Assessment:** The "Habitat Tour" presentation.

Evaluation Rubric:

Criteria	Developing	Proficient	Exemplary
Scientific Application	Dinosaurs chosen may not have coexisted, or habitat does not match their needs.	Chosen dinosaurs coexisted and the habitat is appropriate for their survival.	Habitat shows deep understanding, including specific plants and landforms from that era and region.
Creativity & Design	Project is basic and meets minimum requirements.	Project is well-constructed, organized, and shows clear effort and thought.	Project is highly detailed, imaginative, and clearly communicates a unique vision for the habitat.

Criteria	Developing	Proficient	Exemplary
Explanation & Justification	Can answer basic questions about the design.	Clearly explains the "why" behind most design choices and the problem-solving plan.	Confidently explains all design choices with scientific reasoning and provides a creative, plausible solution to the problem.

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