# Eco-Engineers: The Hopper Mission

## Materials Needed

- Paper and colored pencils/markers
- Recycled materials (cardboard boxes, plastic bottles, string, tape)
- Small toys or figurines (to represent animals)
- A ball of yarn or string
- A notebook or "Field Journal"

## Learning Objectives

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

- **Define** an ecosystem and explain how different parts depend on one another.
- **Identify** the role of a "Keystone Species" (like the beavers in *Hoppers*).
- **Analyze** a real-world environmental problem and **design** a creative "Hopper-style" solution.

## 1. Introduction: The Undercover Agent (Hook)

**The Hook:** "In the movie *Hoppers*, we saw how being 'undercover' allowed humans to see what animals really do when we aren't around. Imagine you've been given a top-secret mission. You can transfer your mind into any animal in your backyard or local park for 24 hours. Which animal would you pick, and what secret do you think you'd discover about how they help the earth?"

**Objective Chat:** Today, we are going to become Eco-Engineers. We'll learn how animals are the world's best builders and how we can use our 'human brains' to protect their hard work, just like the characters in the movie.

## 2. Content & Practice: The "I Do, We Do, You Do" Model

### Part 1: The Keystone Secret (I Do)

**Instruction:** Explain the concept of a "Keystone Species."

**Talking Points:** "In the movie, we saw beavers. Beavers are called 'Keystone Species.' Think of a stone archway—the keystone is the one at the very top that holds everything together. If you pull it out, the whole bridge falls. Beavers build dams that create ponds, which provide homes for fish, water for deer, and mud for birds. Without that one animal, the whole neighborhood (ecosystem) changes!"

**Example:** Show a picture or describe a "Trophic Cascade" (The Domino Effect). If the bees disappear, the flowers don't grow; if the flowers don't grow, the bunnies have no food; if the bunnies leave, the hawks get hungry.

### Part 2: The Ecosystem Web (We Do)

**Interactive Activity:** The Web of Life.

- **Step 1:** On a large piece of paper, write the name of a local ecosystem (e.g., The Forest, The Pond, The Backyard).
- **Step 2:** Together, list 5-8 things found there (Sun, Water, Grass, Grasshopper, Bird, Fox, Decomposers/Mushrooms).
- **Step 3:** Use the ball of yarn to connect them. Hold one end and pass it to the next item. (The Sun gives energy to the Grass → The Grass gives energy to the Grasshopper).
- **The "Human Impact" Moment:** Have Natalie hold a part of the string representing "Clean Water." Now, simulate a human problem (like littering or building a giant parking lot over the water source). Have her let go of the string. Watch how the whole web sags.
- **Discussion:** "How does this look like the problems we saw in the movie?"

### Part 3: Design Your Hopper Mission (You Do)

**The Challenge:** "Environmental Responsibility means finding ways for humans and animals to live together happily. You are going to design a 'Hopper' (a robotic animal or a clever invention) to solve a specific problem."

**Scenario Options (Pick one):**

1. **The Busy Road:** Turtles are trying to cross a road to get to their pond, but it's too dangerous.
2. **The Plastic Ocean:** Sea birds are accidentally eating small bits of plastic floating on the water.
3. **The Lost Pollinators:** Bees in a city have no flowers to visit because there are too many buildings.

**Activity:** Use the recycled materials to build a prototype (a model) of your solution. If you choose the "Busy Road," maybe you build a "Turtle Tunnel" or a "Hopper Beaver" that moves turtles across safely.

## 3. Conclusion: Mission Debrief

**Summary:** Have Natalie present her model or drawing. Ask:

- "How does your invention help the 'Keystone Species'?"
- "How does this make the whole ecosystem stronger?"

**The Hopper Pledge:** Create a one-sentence pledge of environmental responsibility. *Example: "I promise to protect the web of life by [reducing my plastic use / planting flowers / watching animals respectfully]."*

## Assessment

- **Formative (During):** Can the student correctly identify connections in the "Yarn Web" activity?
- **Summative (After):** Does the "Hopper Mission" prototype address a specific environmental problem? (Success Criteria: The invention must show a clear benefit to at least one animal and explain how it helps the ecosystem).

## Adaptability & Extensions

- **For the Advanced Learner:** Research "Real Life Hoppers"—scientists who use drones or "critter-cams" to study animals without disturbing them. Write a short field report on what those scientists found.
- **For the Kinesthetic Learner:** Go on a "Nature Walk." Look for evidence of a "Keystone Species" (like a bird’s nest, an anthill, or a spiderweb) and document it in the Field Journal.
- **Classroom Adaptation:** If teaching a group, assign each student a different animal in the same ecosystem and have them build a "Community Solution" where all their inventions work together.