Roper Mountain Science Center

Pre-Visit/Post-Visit Guide ***Lesson Name: Incredible Flight of the Monarch***

Summary of Lesson:

Students will observe the life of a Monarch Butterfly and model how it uses energy from its ecosystem. They will explore butterfly adaptations, both physical and behavioral, that allow the Monarch to migrate across different ecosystems while traveling from the United States to Mexico. By using the Engineering Design Process, students will also create and test butterfly wings in our wind tunnels.

South Carolina Science Standards: 5.L.4B, 5.S.1A.2, 5.P.5A.3

Pre-Visit Resources

- **Teacher/Chaperone Expectations:** Please help us by letting us know of any special accommodations for your children prior to the lesson. Your assistance with classroom management and distribution of materials will also be greatly appreciated.
- **Instruction for Teachers:**
  - Please report to the Harrison Hall of Science for this lesson.
- **Key Vocabulary:** life cycle, balanced and unbalanced forces, drag, lift, thrust, weight, migration, technological design, energy flow, neutrally buoyant
- **Key Questions Addressed in Lesson:** What is the source of energy for butterflies? Why do some animals, like butterflies and birds, glide through the air? How do butterflies fit into the web of life in an ecosystem?
- **Content Preview Video:**
  - "The Great Monarch Migration" (4:48) https://www.youtube.com/watch?v=3njFNmc-W2k

Post-Visit Resources

- **Writing Prompt:** You are an incredible journey from Canada to Mexico to overwinter! Write a detailed unique narrative about the plants and animals that helped or (almost) hurt you along the way!
- **Possible Lesson Link:**
  - Go with the Flow https://www.teachengineering.org/lessons/view/cub_bio_lesson03
    - Summary: Students learn about energy and nutrient flow in various biosphere climates and environments. They learn about herbivores, carnivores, omnivores, food chains and food webs, seeing the interdependence between producers, consumers and decomposers. Students are introduced to the roles of the hydrologic (water), carbon, and nitrogen cycles in sustaining the worlds' ecosystems so living organisms survive. This lesson is part of a series of six lessons in which students use their growing understanding of various environments and the engineering design process, to design and create their own model biodome ecosystems.
- **Video Link:**
  - Smithsonian Magazine presents "Biomimicry and Butterflies: How Nature is Inspiring Design and Innovation" (1:44) https://www.youtube.com/watch?v=QpEsb-fun44
  - "Butterfly wings inspire invention" (0:34) https://www.youtube.com/watch?v=TqgYZhyeRsc
- **Career Connections:**
  - "I want to be an Entomologist" (5:00) https://www.youtube.com/watch?v=cxlLHv9Pbwg
  - "Entomologist Answers: Commonly Googled Questions about Entomology and Entomologists" (11:06) https://www.youtube.com/watch?v=Hf80Qm4XR0U