

Lesson Outline for ALEX

General Lesson Information

Title: Made for Each Other: Coevolution of Plant and Pollinator Species

Overview/Annotation- *A short summary or description of the lesson including activities and science concepts.*

Coevolution is the reciprocal evolutionary process where species influence each other's development, often leading to specialized interactions like those between plants and pollinators. This highlights the interdependence in ecosystems, showcasing how different organisms rely on one another. However, the introduction of invasive species can disrupt this balance, particularly affecting plants, and pollinators by outcompeting native species and jeopardizing the delicate relationships that sustain biodiversity.

This lesson would allow students to explore this relationship between plants and pollinators and draw their own conclusions about the balance of these relationships.

Understanding Nature's Complexity:

- These concepts introduce students to the intricate and dynamic relationships that exist in nature. It helps them appreciate the complexity of ecosystems and the interconnectedness of living organisms.

Biodiversity Appreciation:

- Exploring these concepts emphasizes the importance of biodiversity. Students learn that diverse ecosystems are more resilient and adaptable to changes, which is crucial for the sustainability of the planet's ecosystems.

Critical Thinking Skills:

- These concepts encourage critical thinking by prompting students to analyze and evaluate the relationships within ecosystems. This skill set is transferable to various aspects of their education and future decision-making.

Fostering Environmental Stewardship:

- Learning about these concepts instills a sense of responsibility for the native environment. Students are more encouraged to become environmentally conscious citizens who value and actively contribute to the protection of natural resources.

Setting or format (outdoors, in groups, lab, etc.):

Indoor lesson and individual activity.

Intended group size (if groups are used):

Intended grade level(s):

5-8

Approximate Time of Lesson (Ideally break down into 20-50 minute periods):

Lesson: 20 minutes

Activity: 15-20 minutes

Conclusions: 20 minutes

Researcher Biography

Name & Professional Title:

Kaitlyn Via
Undergraduate Researcher
Marine Science and Biology 2025
President of Bama Bee Club

Affiliation:

The University of Alabama Department of Biology

Contact Information (Email, Twitter, Personal Website, etc.):

kevia@crimson.ua.edu
www.linkedin.com/in/kaitlyn-via

Brief Description of Research Interests:

I am interested in the ecology of the marine system and environmental changes under the pressures of climate change, with particular emphasis on conservation and restoration of these systems.

Associated Standards and Objectives

SC15.7.7

Use empirical evidence from patterns and data to demonstrate how changes to physical or biological components of an ecosystem (e.g., deforestation, succession, drought, fire, disease, human activities, invasive species) can lead to shifts in populations.

SC15.7.10

Use evidence and scientific reasoning to explain how characteristic animal behaviors (e.g., building nests to protect young from cold, herding to protect young from predators, attracting mates for breeding by producing special sounds and displaying colorful plumage, transferring pollen or seeds to create conditions for seed germination and growth) and specialized plant structures (e.g., flower brightness, nectar, and odor attracting birds that transfer pollen; hard outer shells on seeds providing protection prior to germination) affect the probability of successful reproduction of both animals and plants.

SC15.7.18

Construct an explanation from evidence that natural selection acting over generations may lead to the predominance of certain traits that support successful survival and reproduction of a population and to the suppression of other traits.

DLCS18.7.R5

Locate and curate information from digital sources to answer research questions.

Primary Learning Objectives- Sentences beginning with “Students will be able to...” that describe what students will do in the lesson that relates to how students will be assessed.

- Students will be able to identify a variety of traits that have been impacted by a species interdependence and interactions with other species.

- Students will be able to describe selection pressures on plant and pollinator pairs.
- Students will be able to critically think about the impacts of invasive species on native ecosystem balances.
- Students will be able to locate information from an online database.

Additional Learning Objectives- *Any learning outcomes that are not directly related to the content standards but may relate to other local or national standards*

- Students will be able to identify the concepts of the lesson plan in the local environment.

Preparation Information

Total Duration- *How many minutes will the lesson last?*

Lesson: 20 minutes

Activity: 20 minutes

Drawing Conclusions: 20 minutes

Materials and Resources- *List of materials teacher will need to gather or prepare for lesson*

- Students will need internet access to utilize database information.

Technology Resources Needed- *What technology will teacher and students need for the lesson?*

- Smart Board for lesson lecture.
- Internet access for students to use online databases.

Background and Preparation- *Description of information (science content, use of materials, etc.) teacher and/or students will need to know prior to this lesson; list steps for any preparation prior to the lesson*

- Students will need to have a preexisting understanding of concepts of natural selection, competition, and adaptation.

Procedures and Activities

Step-by-step description of lesson that would allow another teacher to successfully complete the lesson (suggest possible reflection or comprehension questions along with examples of correct answers or common misconceptions)

Engagement (sparking interest, introducing phenomenon, engage students' everyday experiences)

Connect the concept of plant and pollinator interdependence to their everyday experiences using familiar examples like bees pollinating flowers in their gardens or a hummingbird eating at a feeder. Emphasize the real-world relevance of understanding these relationships, connecting it to issues like conservation.

Main activity (suggest possible reflection or comprehension questions along with examples of correct answers or common misconceptions)

Follow presentation and activity. Encourage conversation among the class throughout the presentation.

Wrap up and Reflection (wrap up activity, reflecting on learning, informal assessments of student learning)

Reflect on the lesson with class conversation. Have students share their hypothesis and explanations for their assignment answers.

Final product/Summative evaluation (e.g. quiz, presentation, essay, etc., may occur during a later class period)

Optional: Ask students to observe plant and pollinator interactions outside of class. Share the observations with the class the following meeting.

Attachments- Any materials for the lesson such as video links, worksheets, etc., listed here

Lesson Powerpoint:

<https://docs.google.com/presentation/d/1CgIXrVrcfiSCWTEhNx7lpn8gord7aX2rBuHPuYR0ZVE/edit?usp=sharing>

Activity Worksheet:

https://docs.google.com/document/d/1fivBTO0pki2juMy8Y0dXO4DQa6yWB0bKpMvx_bhOxps/edit?usp=sharing