

**The Bio/Diversity Project****Lesson Title: Plant Adaptations and Pollinators**

Teacher: Emma Turpin & Zabrina Duran

Grade Level: 6th grade

Lesson Length: 55 minutes

This lesson has been adapted from: <https://agclassroom.org/matrix/lesson/542/>

AZ Science Standard:	6.L2U1.13 • <i>Develop and use models to demonstrate the interdependence of organisms and their environment including biotic and abiotic factors.</i>
Learning Objective:	• <i>Students will be able to describe two abiotic and biotic factors in the Sonoran Desert ecosystem.</i> • <i>Students will be able to describe one Sonoran Desert abiotic/biotic relationship.</i>
Scientist of the Week:	 Helia Bravo Hollis - Botanist - Mexican - Born and raised in Mixcoac (present-day Mexico City) - She made contributions to the area of floriculture, although in the arid regions of eastern Mexico, she focused on the taxonomy of cactaceae. She organized a collection of live cactaceae and other succulent plants in order to observe their development and evaluate morphological characteristics.

Vocabulary	Materials
• <i>Abiotic</i> • <i>biotic</i> • <i>population</i> • <i>adaptation</i>	• <i>Powerpoint</i> • <i>Apple Time Lapse Video</i> • <i>Flower Power: Anatomy and Function</i>- 10 copies



• <i>characteristics</i> • <i>reproduction</i>	• aab_flower_anatomy_activity.pdf -90 copies • Abiotic/Biotic cards - 10 copies • 30 colored pencils			
Seasonality:				
<i>Monsoons</i> July-Sept.	<i>Autumn</i> Oct.-Nov.	<i>Winter</i> Dec.- Feb.	<i>Spring</i> Mar.-Apr.	<i>Dry Summer</i> May-June
Guiding Questions: • How does variation among individuals in a population affect overall survival? • How do the physical structures and functions of plants and pollinators allow them to meet their needs?				

Engagement/Introductory Activity: (5-7 mins)

- Ask students to brainstorm the ways we use and rely on flowers each day. Make a list on the board. Allow students to offer their ideas using their background knowledge. (They will likely think of ornamental flowers used in flower arrangements or landscaping first.)
- After a few ideas come up, show the [Apple Time Lapse](#) video, and ask again if they can think of any other ways we rely on flowers. This video is supposed to encourage students to think about how we rely on flowers for food, something essential for survival.

Exploratory Activity: (15 mins)

- We will break students up into groups of three based on their elbow partners (the classroom is set up in a way where they are already grouped into 3's). Together they will read through the [Flower Power: Anatomy and Function](#) worksheet together.
- Students will receive a copy of [this worksheet](#) and be asked to color and fill out the parts of the flower based on what they read and talked about in class with us.

Explain: (7-10 mins)

- What parts of the flower are important for the process of pollination?
 - Explain to the students that the parts of a flower that are directly involved in pollination are the anthers, which are the male part of the plant, and the stigma, which is the female part of the plant.
- Why is pollination important for both the pollinator and the plant?
 - Pollination is important for **reproduction** of plants since many plants cannot reproduce without being pollinated. And pollinators need plants for food which means they depend on each other for survival. A relationship between a plant and a pollinator is a relationship between two **biotic** factors.
- What environmental factors may encourage/inhibit pollination?
- What are some abiotic and biotic factors that are involved in the pollination process?
 - biotic factors: plants, pollinators, bacteria
 - abiotic factors: soil, wind, water, sunlight, temperature,

**Extension Activity/Questions: (20 mins)**

- Give groups of 3 students a set of [Abiotic/Biotic cards](#). Have students sort the cards into two piles — (1) abiotic factors and (2) biotic factors. Allow students to research as needed in the sorting process.
- Have the students sort the "biotic factors" pile into two piles— (1) plants/pollinated factors and (2) animals/pollinators.
- After the sorting, in their groups of 3, students will draw a pie chart in their notebooks based on their 3 piles of cards (abiotic/biotic(plants)/biotic(animals)) to visualize abiotic and biotic factors (26.9% abiotic, 42.3% pollinated biotic factors, 30.8% unpollinated biotic factors)

Evaluation Activity: (5 mins)

We will have our students play this 7-question kahoot quiz on their chromebooks at the end of class.

Kahoot: <https://create.kahoot.it/share/plant-adaptations-and-pollinators/671451e9-34fd-46d0-8448-69dee793ec28>

1. What is an example of an abiotic factor?
 - a. Soil or Sunlight
2. What part(s) of a flower are important for pollination?
 - a. Anthers or Stigma
3. About what percent of grown foods need pollinators?
 - a. 35%
4. What environmental factor(s) might encourage and/or inhibit the process of pollination?
 - a. All of the above (Sunlight, air quality, mineral, natural disasters)
5. T/F: Plants are an abiotic factor.
 - a. FALSE
6. Plants need pollinators for _____.
 - a. Reproduction
7. T/F: Bacteria is a biotic factor.
 - a. TRUE

For extension activity:

Abiotic (7)	Biotic (Plants) (11)	Biotic (Animals) (8)
- Sunlight - Minerals - Monsoons - Humidity - Sandy/Rocky soils - Bedrock - Temperature	- Saguaro cactus - Prickly pear cactus - Agave plants - Beans - Squash - Corn - Sunflower seeds - Oranges - Pomegranate - Mesquite tree - Desert milkweed	- Javelina - Cactus wren - Leafcutter Bee - Rufous hummingbird - Monarch butterflies - Lesser long-nosed bats - Flower fly - Yucca moth