

The Bio/Diversity Project
 Lesson Title: Pollinators in Urban Areas

Teachers: Grace and Lily
 Grade Level: 9th
 Lesson Length: 50 minutes

This lesson has been adapted from [Planting for Pollinators](#), [How to Create an Urban Garden in Small Spaces](#)

AZ Science Standard:	U3: Applications of science often have both positive and negative ethical, social, economic, and/or political implications.
Learning Objective:	- Students will be able to list three ways urbanization impacted pollinators - Students will be able to explain one pollinator conservation strategy - Students will be able to draw and plan an urban garden
Scientist of the Week:	 Dr. Alexandra Nicole Harmon-Threatt Her interest in the environment started when she was in college, at the age of 25. She's led groundbreaking research on pollination biology, bees, and how pollinators interact with urban areas like cities. Works as an entomologist (studies insects) at the University of Illinois. She is passionate about providing the same opportunities to her female students, especially those of color, to increase the representation of women of color in academia and the natural sciences.



Vocabulary		Materials		
● Conservation ● Habitat Loss ● Ecosystem Diversity ● Landscape		●  Lesson Plan 6 ● Poster boards or white construction paper ● Pencils, color pencils, or markers ● Plant and seed options booklet ● Tucson news article		
Seasonality: Any				
Monsoons July-Sept.	Autumn Oct.-Nov.	Winter Dec.- Feb.	Spring Mar.-Apr.	Dry Summer May-June
Guiding Questions:				
● How has urbanization impacted pollinators? ● How can urban areas act as places of refuge for pollinators? ● How do pollinators contribute to the overall ecosystem diversity in urban areas?				

Engagement/Introductory Activity:

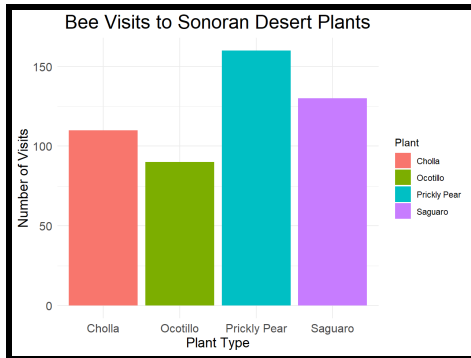
- Objective: Kickstart the lesson by engaging students with real-world issues affecting bees in Arizona, their importance to biodiversity, and how urban gardens can play a pivotal role in their preservation.
- Invite students to volunteer for a reading activity. Present them with quotes from the January 2024 local Tucson news article “Gardening helps protect threatened bees in Arizona.” The quotes are carefully chosen to highlight the critical situation of bees in Arizona due to urban expansion and the practical steps individuals can take to mitigate these threats.
- Selected Quotes:
 - “Arizona is home to the second-most diverse bee population in the country ... more than 1,300 native bee species reside in the state.”
 - “[Bees in Arizona] tend to nest underground in abandoned burrows from other animals and dead or hollowed-out plants. Urban expansion limits their habitat options and puts more space between the bees and the water and food sources they need access to.”
 - “People can attract native bees to their gardens and help them thrive by planting native [desert] wildflowers.”
 - “To help the bees access water, people should create water stations outside their homes so bees can have reliable access to the water they need to cool down their homes.”
- These quotes will help lead into today’s lesson on urban gardens and their role in supporting pollinator populations.

Exploratory Activity:

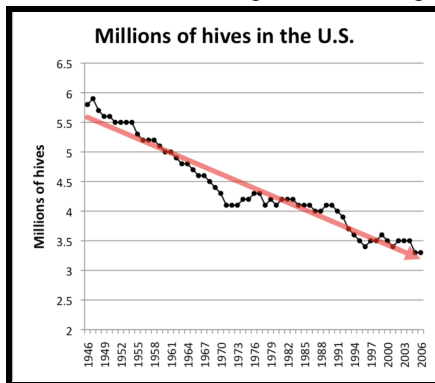
- Begin by explaining the concepts of a bar graph:
 - ❖ A bar graph is a type of graph that shows how many times something happens.
 - ❖ A bar graph helps us quickly see which amounts happen often and rarely.
 - ❖ Bar graphs make it easy to compare different groups or times.
 - ❖ We can see if most values are high, low, or in the middle.



- Then, show students an example of a bar graph with bee data:



- Students will be asked to answer questions about how they interpret the bar graph in a think/pair/share format:
 - ❖ About how many times did bees visit Saguaros?
 - ❖ Which plant did these bees like the most?
- Next, explain the concepts of a scatter plot:
 - ❖ A scatter plot is a type of graph that uses dots to show the relationship between two different things.
 - ❖ They help us understand how one thing is related to another. For example, does studying more lead to better test scores?
 - ❖ Scatter plots can reveal if there's a pattern or trend between the two things we're looking at, like an upward trend showing that as one thing increases, so does the other.
- Show students an example of a scatter plot:



- Discuss how the X and Y axis are related by saying, “As __ goes up, __ goes (up or down).”

Explain:

- Students will watch the short YouTube video “How to Help Pollinators in Cities.”
- <https://youtu.be/JsypVU8Vks4?si=qdvznfytXpkUQIsV>
- Afterward, they will participate in a Think, Pair, Share exercise to explain and share one place where they commonly see pollinators, such as bees, butterflies, and hummingbirds, and tell a neighbor why they think pollinators like to roam this area.

Extension Activity/Questions:

- ❖ Students will create an urban pollinator garden design on a poster board or piece of construction paper.
- ❖ Challenge students to think about how they would design one area of their school.
- ❖ They will consider what plants are native to Tucson and those pollinators like to visit by referring to the Plants and Seeds Booklet [Plant and seed options booklet](#).
- ❖ In addition, they should consider:



- Space size and landscape
- The amount of sunlight the space receives
- Using vertical gardening techniques or raised beds to maximize the growing area
- Drip irrigation system, self-watering planters, feeders, houses, etc
- How humans interact with the space
- ❖ After learning several conservation strategies, students will design a fictional or personal space incorporating various conservation strategies and tools.
- ❖ Students can use colored pencils or markers to complete their posters.

Evaluation Activity:

- Think about it question: “What is one way you plan to help protect pollinators after leaving this class today?”
- Students will volunteer to share their answers to this question and takeaways with the class.