



The Bio/Diversity Project

Data Science Outreach Curriculum Fall 2025 Lesson 6: Introducing Green Space Design Challenge

Grade Level: 8th

Time: 50 minutes

AZ Science Standards:

- **8.L2:** Organisms require a supply of energy and materials for which they often depend on, or compete with, other organisms.
- **8.U2:** The knowledge produced by science is used in engineering and technologies to solve problems and/or create products.

Student Facing Learning Objectives:

- I can select an area for their green space by analyzing heat maps for temperature, light intensity, and soil moisture.
- I can identify the environmental challenge(s) their green space design addresses.
- I can describe the impact their green space design will have on the Tucson community.

Guiding Questions:

- What is the importance of green spaces within urban settings?
- How do shade-bearing trees benefit the Sonoran Desert environment and Tucson community?
- How do pollinating plants benefit the Sonoran Desert environment and Tucson community?
- How do native, drought-tolerant plants benefit the Sonoran Desert environment and Tucson community?
- How can abiotic factors such as temperature, light intensity, and soil moisture be used to inform the most strategic location of green spaces in an urban setting?

Vocabulary:

- Green Space
- Data Visualization
- Lux
- Soil Moisture

Materials:

- Teacher Example Poster
- [L6 Team Bloom Builders Packet](#)
- [L6 Team Desert Tough Packet](#)
- [L6 Team Shade Savers Packet](#)
- [L6 Slides Energy](#)



Lesson 6: Introducing Green Space Design Challenge

Mini-Lesson (22 min)

Section Objective: Establish context for the Green Space Design Challenge by reviewing with students the purpose and benefits of green spaces within urban settings.

Review of Green Spaces (5 min):

Teachers will deliver 5 minute mini-lesson either reviewing with students the key benefits/purpose of green spaces in urban settings OR introducing new content on green spaces that will help provide students context as they engage with the Green Space Project Challenge.

If teachers choose to review green space content rather than introduce new content, some ideas for review include:

- Showing [this video](#) and generating discussion with students about the importance of green spaces in urban areas:
 - According to the video, what are some environmental benefits of urban green spaces? (improved air quality, absorbs Co2, creates habitats, etc)
 - According to the video, what are some community benefits of urban green spaces? (improved mental health, less stress, more relaxation, social spaces for connection, etc)
- Play a trivia review game in which you ask students 3-4 questions regarding the definition/benefits of green spaces that were discussed in Lesson 5.

Introduce Green Space Design Challenge (17 min):

- Distribute the Greenspace Tucson Design Challenge Team Packets which will consist of the Challenge Overview, Final Product: Poster Proposal Components, Team Focus Scenarios, Data Analysis Worksheets, Data Table, and Heat Maps. We will distribute a second packet with the rest of the project materials on Lesson 7 once we have those materials finalized.
- Ask students to open the packet to its first page and review the Challenge Overview with you. Read it aloud. Generate conversation by asking students if they know where Kino Sports Complex is, what sports they've played there, what activities go on there. We are



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trying to draw connections between students' personal lives and the location of this project challenge. If you've visited Kino Sports Complex for anything, share that too.

- Next, review with students the Final Product: Poster Proposal Components page. Make clear that their end product is a poster in which they make a proposal for a green space design that will benefit Tucson's environment and community. Briefly review each poster component and tell students they will see examples of these poster components on the next slide.
- Also make clear to students that the poster components highlighted in green on the slideshow reflect the portions of the poster they will draft today. Emphasize that it's important for students to meet this daily goal so that they can stay on track to finish the project by Lesson 8. Perhaps have students draw stars next to these components so they remember they must finish these parts today.
- Next, show students your model poster. Have a picture of it in your slides and the physical poster in front of you (if possible). Briefly review each portion and how it exemplifies the poster components from the previous slide.
- You will then divide students into their project teams. Have an idea of how you will do this as quickly as possible or how you might ask for your partner teacher's help in dividing/organizing students.
- Once in teams, review the Team Focus Scenarios page with students. Tell students which team focus is theirs. Make them circle or star it really big.
- As you review each design team focus aloud, ask the following corresponding questions to get students thinking. Though teams will ask themselves these questions while working on their data worksheet, this can be an opportunity to get ideas going and engage students so they metabolize the meaning/purpose of each team focus.
 - Desert Tough: "Why would we want to design for cacti and plants that can survive Tucson's hot, dry climate? What are the benefits of planting drought-tolerant plants?"
 - Shade Savers: "Why would we want to plant shade-giving trees? What benefits come from having shade-giving trees in our cities?"
 - Bloom Builders: "Why would we want to plant plants that support bees, hummingbirds, and butterflies? What benefits do these insects provide us?"



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Work Time (20 minutes)

Section Objective: Students consider the environmental challenges their design focus addresses and the community impact their design proposal will have; students analyze data to make an informed decision about the best location for their green space that aligns to their design focus.

Data Analysis Worksheet Part A (12 min):

- Tell students that they will have 10 minutes to complete Part A of their Data Analysis Worksheet. Explain to them that Part A is where they can draft their Goal Statement & Community Impact Pitch for their posters. This is the portion where they consider the environmental issues their project focus addresses and the ways their design might benefit the Tucson community.
- Remind students that they should work together to answer the questions and that there are sentence frames to help guide their thinking. Encourage them to use these frames. If certain groups want to change the sentence frames or answer in their own way, that is okay. Have notebook paper ready for them to use should they choose this route, though I wouldn't necessarily advertise this route.
- Also tell students that they can access the QR codes that lead to helpful videos that might give them some ideas for how to answer the questions. Emphasize that they should only do this if they are stuck and don't have any ideas themselves.
- It will be super important for interns to walk around the room and help groups get started. Go to groups where you anticipate they might have more trouble. Ask them guiding questions if they're having trouble understanding the environmental challenge their project focus addresses.

Data Analysis Worksheet Part B & C (8 min):

- Before having students begin Part B & C where they will analyze data/heat maps, do a mini practice with the whole class where you all practice reading a heat map together. Model your thinking aloud to students as you identify the cell with the highest light intensity:



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- “So the question is asking me to find the cell with the highest light intensity. A cell is a collection of four boxes that are all the same color (point to different cells on slide to give examples). If I want to know which colors on the cells represent the highest light intensity, I must look at the color legend (point to color legend). I notice when I look at the color legend that the light intensity is measured in lux. That’s because lux is the unit of measurement from which we measure light intensity. Who remembers that word from last week? Okay so according to this color legend, are the higher levels of lux towards the top in yellow (points) or to the bottom in dark dark blue (points)? Correct, the cells with the highest light intensity will be in yellow (points to cell with brightest yellow). Okay so now that I know it’s this cell, I need to understand how to describe this cell to others. We label the cells by letter and number. The letter is found at the bottom (drags finger from bright yellow cell down to the letter A, showing students that this cell is in column A). So now that I know the cell letter, I must find the cell number. Who thinks they know the cell number? (students will probably be able to tell you based off the logic you used to identify the cell letter. If not, drag finger from bright yellow cell left to the number 2). So my cell number is 2. If I put both the cell letter and number together, I can answer the question by saying the cell with the highest light intensity is cell A2.
- Have students identify the cell with the lowest light intensity on their own. Call on volunteers to share out.
- Tell students they will now have 5 minutes to complete Part B & C on their worksheet. Remind students that they have two resources to help them answer these questions: the heat maps & the data table. Clarify with students that the data table has the same information as the heat maps, it’s just displaying the information in a different way.
- Walk around the class as teams work on Part B & C. Target groups you anticipate might struggle more. Encourage high focus and concentration. Congratulate groups when they finish on time.

Wrap-Up (8 minutes)



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Section Objective: Students use data to justify their decision for where they'll build their green space design; students select a data visual that best supports their decision about where to build their green space design.

Data Analysis Worksheet Part D (8 min):

- Explain to students that this next portion of the worksheet will help them draft the Data Visualization component of their poster proposals.
- Tell students that this section does not require them to find new information, rather summarize the information they already found from Part B & C. In other words, they will be pulling information from Part B & C and inputting it into the sentence frames on Part D.
- Review the question prompts briefly and the sentence frames students can use to answer the question.
- Make clear for students that any blank space that follows the word “cell” is asking them to list the cell they chose for their green space design in Part C. So if they chose cell A2 in Part C, they input A2 for all the blanks that mention a cell in Part D. This might seem self-evident, but students will need this explicit clarification and clarifying this early-on will help students finish this section much faster.
- Thank students for their hard work at the conclusion of the lesson and be sure to collect their Project Packets as you will read their responses and provide feedback to them for Lesson 7.