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Data Science Outreach Curriculum Fall 2025 Lesson 7: Green Space Design Challenge - Day II

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 identify plants that can survive within the selected cell conditions of their design space.
- I can draft a design space with plants and site features that advance their environmental solution.

Guiding Questions:

- What is the importance of green spaces within urban settings?
- How does the strategic selection of plants within a green space address a specific environmental challenge?
- How might site features in a green space we used to propel an environmental goal?

Vocabulary:

- Green Space
- Legend
- Lux
- Site features

Materials:

- Teacher Example Poster
- [L7_Student Packet](#)
- [L7 Slides Energy](#)
- L7_Plant cards [1](#) & [2](#)
- L7_Site feature cards [1](#) & [2](#)



The Bio/Diversity Project

Lesson 7: Green Space Design Challenge–Day II

Note for instructors: This lesson is packed and you may find yourself short for time. Assess whether the feedback session towards the beginning of the lesson is necessary for your classes. For instance, if most of your groups within a class finished the goal statement/community impact pitch and had mostly quality answers, then perhaps you don't need to do the feedback session with the whole class. Instead you might address the few groups who need extra help/support by approaching them privately as they work today and asking one of their team members to work with you to revise their goal statement/community impact pitch. (This can apply for any segment of the packet students didn't finish last class). In other words, I'd only do the whole-class feedback session if more than half of the groups in a class need to revise/finish their goal statement/community impact sections.

Other tips for saving time: when it comes to the design draft drawing, tell groups who are struggling to finish not to worry about completing the budget worksheet. It's more important that students draft a solid design. The budget element is more of a fun addition but we want to avoid it becoming a complexity that halts group progress.

Mini-Lesson (12 min)

Section Objective: Reorient students to the Green Space Design Challenge by generating a small discussion around the project's purpose, objective, and context; allow students to improve their goal statement and community impact pitches by pulling from positive student examples.

Review Design Challenge (2 min):

- Pass back the Student Packets from last class.
- Ease students into the lesson by asking them to share out what they remember about the Green Space Design Challenge from last week. If they're having trouble recalling, you might ask any of these prompting questions:
 - Where are we designing a green space? What part of town?
 - There were three different teams with different environmental focuses. Who remembers their team? What was your team's focus?
 - Last week we looked at data to select the best plot of land for our green space. What sort of abiotic factors did our data show us?
- Project the Challenge Overview slide with students. Review with students the goal/objective of the challenge. Prompt them to look at the photo of the cells at Kino Sports Complex as a memory jogger.

Optional Feedback Session (10 min):



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- Select 3 positive student examples (one from each team) of a goal statement/community impact pitch. Have these selected and typed into the slideshow before the lesson starts.
 - Within these positive examples highlight the 1-2 segments/ideas that make these goal statements particularly effective.
 - Before reading these examples to the entire class, prompt students to pay attention by telling them that not all groups finished these sections last class and that today's class will be the last opportunity for them to do so. If they are confused or need ideas for what to write, they should pay attention to these positive examples you're about to review with them right now and borrow from their ideas.
 - Review the 3 positive examples aloud to the class
 - Provide groups 5 minutes to apply the feedback and improve/finish their responses.
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Work Time (35 minutes)

Section Objective: Students select plants that will thrive within the cell conditions of their choosing; students draft a design of their green space that follows the design site checklist components.

Review today's goals and make plant selections (15 min):

- Project the poster components slide for students. Explain that the portions with green checkmarks reflect the sections we completed last class (Title, goal statement/community impact pitch, data visualization), and that the boxes with green arrows and highlighted in green reflect what we'll work on and finish in this class. Remind students that it's important they meet these deadlines in order to finish their projects on time.
- Next, distribute the L7: Student Packets - one per group. Also distribute the plant cards and site feature cards in baggies. Tell students not to open the plant card/site feature card bags yet.
- Prompt students to look at the first page with you - What Plants Make the Cut? Tell students you will show them how to complete this section with an example cell. Emphasize that this is an example cell and that they should NOT be writing exactly what you write.
- Question 1: What cell did you select for your green space? – Ask students where they can find this information for themselves? Where did they record the cell they selected for their green space? (L6 student packets). Tell students they must pull this information



The Bio/Diversity Project

from their packets from last class - perhaps prompt them by turning to the exact page where they can find that information.

- Question 2: Use the data table in this packet to determine the exact temperature, light intensity, and soil moisture levels of your selected cell. – Tell students that in order to find this information they must turn to the data tables in their new packets. Show them what this data table looks like on the slideshow—make sure they are turning to this page in their packets.
- Highlight for students how to identify the data information of the cell they are looking for. On the board project how you used the data table to identify the exact temperature, light intensity, and soil moisture of the example cell. Emphasize the units of measure and remind students they must also record the units of measure on their own papers.
- Give groups 3 minutes to find/complete this information on their own.
- Next review Question 3 with students: With your team, review all 10 plant cards to see which plants could survive the conditions of your selected cell. List those plants below.
- Tell students they will need to refer to their plant cards in order to complete this section. Explain to them that there are 10 plant cards and on each plant card there is a picture of the plant and the conditions it can survive within (e.g. temp, light intensity, soil moisture).
- Show students how to complete this section by telling students they must refer to the cell conditions they just recorded for question 2. To model this, project your example cell conditions on the slide along with an example plant card. Tell students they are going to help you determine whether this agave plant fits the conditions of your example cell. If so, we can add it to the list of potential plants to include in our green space design.
- Review each condition one at a time - have students tell you whether the agave plant meets each condition.
 - “Okay so my example cell has a temperature of 36 °C/ 97 °F. Does this fall within the temperature range of the agave plant? (Point to the portion of the card where students can find this information). Yes, it does (displays green check mark). Okay now, let's check for light intensity. My cell's light intensity is 95 000 lux. Does this fit within the range of the agave plant? (Points to portion of card that displays light intensity). Yes, it does fit within the range (display green check mark). Now let's check for soil moisture. It looks like the agave plant needs a soil moisture level between 2-7%. Does my cell condition have a soil moisture between that range? (No). So that means the agave plant is not a plant that



The Bio/Diversity Project

would thrive within my cell (projects thumbs down emoji). Let's do one more for practice!"

- Do one more whole-class practice with the Brittlebush plant card. This example should fit the conditions of the example cell, which means we should write it on our list of viable plants. Remind students not to write Brittlebush on their own papers because this is a class example. They will create their own plant list based on the conditions of the cell they chose in Lesson 6.
- Give groups 5 minutes to compose their own plant list. Walk around and assist groups who are having trouble.

Draft a Design Using your Design Site Checklist (20 min):

- Prompt students to turn to their Design Site Checklist in their L7: Student Packets. Explain to them that the checklist contains all the required components they must include in their design draft. Tell them you will review with them each component of the design site checklist and show them how you incorporated each component on your model design draft.
- Emphasize that these drafts are in pencil today because we want students to correct themselves if they make a mistake.
- Begin with the legend component. Review with students: What is a legend? Why are they helpful? Explain how each plant and site feature that's included in the design draft must be represented in the legend.
- Next, explain to students that their design must incorporate at least 3 plants which they should list on their design site checklist. Show students how three separate plants were included in the design draft (circled in green highlighter) and how you wrote those plant names in your legend and on your design site checklist. Remind students that the plants they feature must come from the plant list they just brainstormed on the previous page.
- Next, move on to the two required site features, one of which must directly connect to their team's environmental focus and the other which serves the community or people who visit the green space. Circle for students where the selected site features appear on the design drawing and point out to them how you also incorporated these site features in your legend.



The Bio/Diversity Project

- Lastly, explain to students that their design should also incorporate people and that they should place these people in areas of the green space where they think people would be drawn to. Show them on the example how you placed people near the benches and under the shade of the blue palo verde tree because people seek shade and places to sit.
 - Before you release groups to begin their draft design, remind them of the budget sheet. Tell them to assign 1-2 people in the group to calculate all the costs for the plants and site features. If the cost is over \$2000, then perhaps we need to eliminate the quantity of plants or site features, while still meeting all the required components of the design site checklist. Encourage students to divide the work—while some group members are designing the drawing and completing the checklist, other group members should be balancing the budget and letting them know what the team can afford and not afford.
 - Walk around and offer assistance to groups as they work. If some groups are struggling and falling behind, don't have them worry about balancing the budget. Prioritize the design draft drawing.
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If there's time...

Wrap-Up (10 minutes)

Objective: Students explain their design choices by writing 3-5 sentences explaining how their design selections align to their team's environmental focus.

Design Justification (10 min):

- Direct teams to turn to the design justification section of their worksheet. Explain to them that now that they've drafted a design of their green space, they must write 3-5 sentences explaining their design choices and how those decisions align to their team's environmental focus.
- Encourage teams to use the sentence frames provided to help guide their thinking. Point out to them that there's a table with the design focus of each team in case they need a reminder of their team's design focus while drafting their justification.