



Irrigation Systems

Applied NGSS Science:

Developing models of water irrigation systems and using them to demonstrate how the irrigation system at PPP

Constructing explanations on various irrigation design ideas and designing solutions for irrigation issues.

Learning Target: Students will learn what an irrigation system is and better understand how irrigation systems work by learning the installation process of cisterns and importance of Paradise Parking Plot's irrigation system.

Sub-Learning Target: Students will learn the story of the garden's irrigation system using engineering scientific models that reflect the real-life application of irrigation systems within the garden.

Content Background: For a garden to grow it needs to have a consistent source of water. Lots of clean water is already supplied through rain, however, it doesn't rain all the time and it's expensive to pay for water. Therefore, we are harvesting rainwater, by storing it and using irrigation systems as a cost-efficient and more sustainable method to water our gardens.

Printout(s) (Email for access): Paradise Parking Plots story flashcards.

Materials:

- PVC pipes
- Clear plastic trays
- Large pipe
- Flashcards of Paradise Parking Plots construction
- 2 Watering cans

Lesson Prep: Gather materials and set up stations beforehand.

- For Station 1: PVC pipes, plant watering thing/ hose, etc should be placed near designated garden beds
- For Station 2: partial tour/ flashcards

Activity: The lab introduces what an irrigation system is and how it works. While exploration and storytelling parts are to explain how the irrigation system is applied to the garden.

Storytelling

1. **Irrigation System Scavenger Hunt:** If the plants in the garden need lots of rain in the summer, but it doesn't rain very much in the summer, how can we water them? *What do you notice?*
2. **Tell the story of Paradise Parking Plots:** Use Paradise Parking Plots flashcards (which have a picture on the front and a vocabulary phrase on the back; see printout section) from different stages of construction of our rainwater harvesting. Set the flashcards on the ground and allow students to guess what the correct order is before correcting order and relaying the story to them.

Flashcards concepts:

- i. Depaving
- ii. Cisterns coming onsite
- iii. Trenches being dug
- iv. Pipe being laid
- v. Hose hydrants installed
- vi. Water spraying

3. **Start the Irrigation System Lab:** To start, have students think about how Paradise Parking Plots works:

- a. Ask students if they know...
 - i. How our cistern gets water.
 - ii. How our garden plots use water.
- b. Explain to students how the water travels from our cistern to our garden plots.

- c. Then assign roles or allow students to work together to choose their role:
 - i. A person who will get the materials (younger students)
 - ii. Team leader - (Either the guardian or older student)
 - iii. A person who will return the materials. (younger students with the help of older students)
- d. Show students the materials available to them.
 - i. Start with the biggest pipe
 - ii. Show them the ending points
 - iii. Show the connectors of the points
- e. Construct a water delivery system using PVC pipes
 - i. Must start at one location and end at the “garden” (trays) that it must water.
 - ii. Have variations of pipe length and redirection at the different stations (two trays side by side, one tray above the other tray, three trays side by side)
 - iii. Clean up
- f. After the activity, relate to the real water system that is on-site.

Supplementary Activities: Create problems in their PVC pipe layout. Such as: This layout needs to have two outlets, one on top and one on the bottom.

Adjustments for Age:

5th – 8th When students are stuck, have them answer their own questions. Where is the problem? How can I use what I know (i.e. gravity and water pressure) to make this PVC pipe work? What parts do I need?

2nd – 4th These students are discovering what parts work together. Have them work with K-1st students to gather materials that will work for their layout. When these students are stuck, ask them if their specific part will help with the layout/what part they are missing.

K – 1st Have students focus on helping their older siblings create the PVC pipe activity layout. These students will be gathering materials the most.