



## PUZZLE: CREATE A PROTOTYPE THAT PREVENTS SOIL EROSION

**STANDARDS & CONNECTIONS:** NGSS.3-5-ETSI, NGSS.MS-LS2-5, NGSS.HS-ESS2-2

**SUGGESTED MATERIALS:** Water, different types of soil, potted plants, mesh netting, screens

**BACKGROUND:** Soil erosion is the removal of soil from the earth's surface from either wind or water. Soil erosion is bad for agriculture because it reduces the amount of farmable land available. The wind and water carry away the topsoil, which is often the soil with the most nutrients, making it difficult for plants to grow well. Water quality can also be poorly affected as the soil runs into streams and waterways. Soil erosion is a problem across the globe that must be addressed in order to produce enough food.<sup>1</sup>

**1. IDENTIFY:** Share the background information with the students, then share the puzzle to be solved. Determine constraints (e.g., time allotted, space, materials provided, etc.) and divide students into small groups.

**2. IMAGINE:** Ask a series of questions to help students brainstorm solutions to the puzzle. Encourage students to list all ideas – don't hold back! Before moving on, make sure each group selects a solution that fits within the constraints.

- Ask: *How can you solve this puzzle? Which of your ideas can you build a prototype for given the constraints?*

**3. DESIGN:** Students diagram the prototype, identify the materials needed to build the prototype, and write out the steps to take. Students describe the expected outcomes.

- Ask: *What steps will you take to create your solution? What do you expect your solution to look like and be able to do?*

**4. CREATE:** Students follow their design plan and build their prototypes. Monitor their progress and remind them about how much time they have.

**5. TEST & IMPROVE:** Students evaluate their creation and compare it with the expected outcomes. Students seek areas of improvement and make changes where needed.

**6. SHARE:** Students share their solution to the puzzle and communicate lessons learned.

- Ask: *What was your biggest takeaway? What would you do differently?*

**ADDITIONAL RESOURCES:** For more background information on this topic, please visit [www.purpleplow.org](http://www.purpleplow.org).



.....  
Research what your local community is doing to prevent soil erosion.  
.....

<sup>1</sup> Al-Kaisi, M. (2000, July 24). Soil erosion: An agricultural production challenge. Retrieved from: <https://crops.extension.iastate.edu/soil-erosion-agricultural-production-challeng>