



PUZZLE: BUILD A PIPE PROTOTYPE THAT CAN TRANSPORT WATER ACROSS A 10-FT DISTANCE

STANDARDS & CONNECTIONS: NGSS.3-5-ETSI, NGSS.MS-ETSI, NGSS.HS-ETSI-3

SUGGESTED MATERIALS: Water, straws, pipes, buckets

BACKGROUND: Water is critical to food production and human survival. In many developed countries, like the U.S. and Canada, they are fortunate enough to have access to clean water. However, not every person has the luxury of having clean, safe water nearby. In other parts of the world, women and girls are often responsible for collecting water with buckets, and can spend up to 6 hours every day collecting water.¹ There's an ongoing effort to build up the infrastructure to more easily transport water, but there is still much more work to be done.

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.



.....
Research a different country and compare their water security to your home country.
.....

¹ Water.org. (n.d.). *Water crisis - Learn about the global water crisis*. Retrieved from: <https://water.org/our-impact/water-crisis/>