PURPLE PLOW
Uncovering STEM Solutions

PUZZLERS

#8 Vertical Garden

2 HOURS

PUZZLE: BUILD A VERTICAL GARDEN

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

SUGGESTED MATERIALS: Soil, wood pallets, containers, metal wire, pots, various seedlings, water, canvas, felt, wire mesh, nails, hammers

BACKGROUND: Vertical gardens save space because they grow up, instead of out, like most gardens. They can be utilized inside a home or office or used outside in a backyard or city square. Mexico City installed vertical gardens to combat the increasing pollution.[i] There are many different varieties of vertical gardens to choose from. One easy option is a container-style garden, which means potted plants are attached to a wall or displayed in rows, or planters are stacked. Another is a "pocket" garden, featuring plants tucked into pockets made from felt or canvas. Vertical gardens can also be grown using wood pallets. In wood pallets, landscaping fabric is stapled to the back, bottom, and sides of the pallet. The inside of the pallet is completely filled with soil, and plants are grown in the slat openings.[ii]

1. IDENTIFY: Share the background information with the students, then share the puzzle to be solved. Determine constraints (e.g., time alotted, 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 contraints.

- Ask: *How can you can 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.

Could your community use any beautification efforts? Vertical gardens are a great way to spruce up your town!

[i] Cave, D. (2012, April 9). *Lush walls rise to fight a blanket of pollution.* Retrieved from https://www.nytimes.com/2012/04/10/world/americas/vertical-gardens-in-mexico-a-symbol-of-progress.html

[ii] Yang, S. (2016, July 21). *How to grow a vertical garden.* Retrieved from: https://www.realsimple.com/home-organizing/gardening/how-to-make-