

# PUZZLERS

## #49

## NATURAL DISASTERS AND THEIR IMPACT ON THE WORLD'S WASTE



### Puzzle

Create an infographic that explains the ways in which communities are impacted by waste and debris due to natural disasters.

### Standards & Connections

NGSS.5-ESS3-1, NGSS.MS-ESS3-3, NGSS.HS-ESS3-1, CCSS.ELA-LITERACY.CCRA.W.4

### Background:

After a natural disaster, there are many aspects a community must deal with. One of the most overwhelming of these is waste and debris generated by severe disasters, such as flooding caused by hurricanes, tsunamis, earthquakes, windstorms, etc. "The debris generated by most severe disasters overwhelms existing solid waste management facilities or forces communities to use disposal options that otherwise would not be acceptable."<sup>1</sup> The EPA has made recommendations for the development of pre- and post-disaster waste management strategies in the United States; however not all communities have developed them. Stakeholders have important roles to play in eliminating the impact of natural disasters on waste management programs such as resource conservation, environmental protection, sustainable development of programming, and health and sanitation concerns surrounding disaster preparedness.

### Suggested Materials:

Computer with internet access



#### 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.



#### 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?



#### 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?



## CREATE

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



## TEST & IMPROVE

Students evaluate their creation and compare it with the expected outcomes. Students seek areas of improvement and make changes where needed.



## 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).



**Visit a local government office or agency to discuss disaster management planning strategies.**

**Write a letter to your local government officials highlighting possible solutions to managing natural disaster waste that you discovered through your research.**

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<sup>1</sup> <https://www.tandfonline.com/doi/pdf/10.3846/1648-715X.2009.13.171-190>

[http://swana.org/Portals/Press\\_Releases/Hurricane/Managing\\_Wastes\\_Produced\\_by\\_Natural\\_Disasters\\_2011.pdf](http://swana.org/Portals/Press_Releases/Hurricane/Managing_Wastes_Produced_by_Natural_Disasters_2011.pdf)

<https://www.waste360.com/safety/how-waste-and-recycling-industry-prepares-natural-disasters>

[https://www.epa.gov/system/files/documents/2022-11/EPA-TribalJournal-TJW13-508\\_v3f.pdf](https://www.epa.gov/system/files/documents/2022-11/EPA-TribalJournal-TJW13-508_v3f.pdf)

[https://www.who.int/environmental\\_health\\_emergencies/natural\\_events/en/](https://www.who.int/environmental_health_emergencies/natural_events/en/)