

SURVIVAL VEHICLE



LESSON OVERVIEW

Grade Levels: 3-8

This project-based learning activity is based on the *I Survived* series by Lauren Tarshis. It is designed to connect the various concepts in the series to real-world problems and ideas. Students may work independently or in groups to explore the topic of surviving a natural disaster. Students must actively research, brainstorm, design, and create model solutions.



STANDARDS

CCSS ELA.RI.4-5.3	Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.
CCSS ELA.RI.4-8.8.1	Cite the textual evidence that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text.
CCSS ELA.W.4-8.7	Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions for further research and investigation.
CCSS ELA.SL.5.4	Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.
NGS 5-ETS1-S.3.1	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
NGSS 3-5-ETS1-2.	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
NGSS MS-ETS.1-1	Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

OBJECTIVES

Students will be able to:

- Research a specific natural disaster and cite problems that arise during the event.
- Explore possible solutions to the identified problems through research and brainstorming.
- Design a unique solution that will address a variety of the identified problems.
- Produce a drawing and diagram that clearly communicates their solutions.
- Adapt their design to accommodate another unforeseen problem.

MATERIALS

- *Now, What?* cards
- Large drawing paper
- Recycled scrap paper for working out ideas
- Crayons, markers, pencils, (optional: rulers, drawing compasses)

TEACHER PREP

- Prepare a set of *Now, What?* cards. You do not need a different one for each person, but a variety is required. Here is a set of possible ideas to use:
 - You rescue 5 more people. You need more space and supplies.
 - Lightning knocks out your power supply.
 - Rats ruin your food.
 - A large rock creates a hole in your roof.
 - Debris damages all the moving parts of your vehicle.
 - The disaster destroyed a chemical plant. Toxic fumes make breathing difficult.
 - You run out of fuel.
 - Your steering mechanism breaks.
 - You run out of drinking water.
 - Your navigation system fails.
 - Your chosen path is completely blocked by miles of debris.
 - Your vehicle falls in a deep ditch or is hit by a wave. It is now upside down.
- You may want to use information from the FEMA Youth Emergency Preparedness Curriculum website to provide background information for students. <https://www.fema.gov/media-library/assets/documents/34411>
- Vocabulary. Some words may need to be defined for students. Be sure that students understand the following:
 - Accommodate
 - Debris
 - Locomotion
 - Mechanism
 - Mechanical
 - Modification
 - Toxic
 - Vehicle

PROCEDURE

- STEP 1:** Student/group each chooses a natural disaster: Hurricane, tornado, flood, blizzard, forest fire, volcanic eruption, tsunami, or earthquake.
- STEP 2:** Use 1 – 2 class periods to research the disaster. What causes it? What happens? How long can it last? Find historical information about this type of disaster in the past. Are there future predictions about this type of natural disaster?
- STEP 3:** List the problems that would need to be overcome, in order to survive this disaster.
- STEP 4:** Instruct students that they are to design a survival vehicle that will save their family.
- STEP 5:** The vehicle must:
- Provide shelter
 - Allow for storage of food and water
 - Have a power source
 - Have room to sleep
 - Have a navigation system
 - Have a means of locomotion to travel to safety
 - Meet any special needs of the specific disaster: heat in a blizzard, ability to float in a flood, ability to drive through ash, etc.
- STEP 6:** Instruct students that they are to draw the outside of their vehicle and label the special features.
- STEP 7:** Instruct students that they are to draw a diagram of the inside and label the special features.
- STEP 8:** Have each student/group explain the design created.
- STEP 9:** Each student/group takes a *Now What?* card.
- STEP 10:** Allow time to brainstorm ideas of how to solve the new problem.
- STEP 11:** Students must create a plan and make modifications to the safety vehicle to overcome this new problem.
- STEP 12:** Allow time for students to explain the modifications.

RUBRIC

	Exceeds (3)	Meets (2)	Partially Meets (1).	Does Not Meet (0).
RESEARCH	All questions were answered and requirements were present	Most questions were answered and requirements present	Some questions were answered and requirements present.	Questions were not answered and requirements were not present
VEHICLE DESIGN REQUIREMENTS	Meets all 7 of the requirements for the project.	Meets 5-6 of the requirements for the project.	Meets 3-4 of the requirements for the project.	Meets 2 or fewer requirements for the project.
DRAWING OF EXTERIOR	All parts of the vehicle are recognizable and correctly labeled.	Most of the parts of the vehicle are recognizable and correctly labeled.	Some parts of the vehicle are recognizable and correctly labeled.	Few or no parts of the vehicle are recognizable and correctly labeled.
DIAGRAM OF INTERIOR	All parts of the interior are recognizable and correctly labeled	Most of the parts of the interior are recognizable and correctly labeled.	Some parts of the interior are recognizable and correctly labeled.	Few or no parts of the interior are recognizable and correctly labeled.
DEMONSTRATION OF KNOWLEDGE OF CONTENT IN DISCUSSIONS AND ACTIVITIES	Does a great job showing an understanding of the content covered in class.	Does an okay job with showing an understanding of the content covered in class.	Tries but has a difficult time showing an understanding of the content covered in class.	Does not show an understanding of the content covered in class.
Total				/15

EXTENSIONS

- Write a story about what it is like to be inside the safety vehicle. What do you see, hear, feel, taste, or smell? What did you do during the disaster? After?
- Have students vote on the best design. (No fair picking your own). Students then write a paragraph justifying their selection. The paragraph must include at least 3 logical reasons for their choice.
- Create a Power Point that explains the key features of your design.
- Write a story about using your survival vehicle in a different type of natural disaster. What still works? What doesn't help you at all? How would you need to modify it, in order to survive?
- Build your prototype out of cardboard, foil, string, straws, popsicle sticks, paper clips, paper cups, paper plates, Styrofoam, newspaper, masking or duct tape, and other items that you can recycle. Take it one step further, create a stop motion animation movie of your vehicle in action. Use PicPac TV - <http://picpac.tv/>