



WATER WARRIORS

COMMUNITIES FIGHTING FLOODS WITH STEM



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EDUCATION THROUGH EXPLORATION

In the **Water Warriors Design Thinking challenge**, middle and high school students imagine and prototype flood barriers that can protect their community from flooding. Teams can tackle this challenge using a wide-range of materials and technology, from everyday materials available in the classroom to 3D printed components. The focus is on the ideas and approaches, not the products.

Through this challenge, students will:

- ◆ Acquire deep understanding of the challenge posed by flooding
- ◆ Build and apply foundational and advanced STEM knowledge and skills, cutting across many disciplines, from earth science to physics to computer science and engineering
- ◆ Build important career skills, such as problem solving and design thinking, teamwork, entrepreneurship, and communication, and develop a supportive network of peers, educators, and career mentors / advocates
- ◆ Grow in confidence, think creatively and engage deeply with their community and possible careers
- ◆ Translate their new-found strengths into innovation, local impacts and jobs

Students can earn a **Water Warriors Design Thinking badge** by submitting a description of their flood barrier prototype and its capabilities, supported by photographs or a short (1-minute maximum) video.

The **Water Warriors Design Thinking challenge** also offers an opportunity for elementary grade students to identify people in the community who help others in natural disasters and come up with ways they could help people in their community recover from these events.

Day of Design Challenges encourage students to create like an innovator by employing creative problem-solving skills and an entrepreneurial mindset while innovating a solution to a problem.

Design Thinking is a widely-used methodology that seeks to create solutions for the future, rather than solving problems that have occurred in the past. It is focused on achieving the best possible outcome for the end user, who could be a person, an organization or even a community. It draws on logic, imagination, intuition, knowledge and reasoning to explore, design and test possible solutions. It provides an engaging and meaningful connection between learning in the STEM classroom and the world beyond it.

A fun and easy way to introduce students to design thinking is to run the “Wallet Project” from the Institute of Design at Stanford University:

https://drive.google.com/open?id=0B5AACdnRM_mUMVdLSWIZN2NQZmM

Natural disasters such as hurricanes can be frightening for children. Focusing on people who help others during such disasters is one way to help students focus on some of the positive effects. In a major disaster like a hurricane, community helpers such as police, firefighters, and doctors provide help. However, many others step in to assist, as well. Neighbors help each other, and people also come from outside the community to help. Having students identify these helpers and the ways in which they provide help can pave the way for students to identify ways in which people will need help and how they can help them.

The Elementary Grade **Day of Design Water Warriors Challenge** is to design something that a person in our community might need to help recover from flooding.

ELEMENTARY GRADE WATER WARRIORS LESSON PLAN

TIME: 1 instructional period (40 - 50 minutes)

MATERIALS: Paper; pencils; crayons, markers, or colored pencils; index cards

STEP 1. UNDERSTAND THE PROBLEM

1. Begin by asking students what they know about hurricanes. Students may have some fears related to this topic, so allow time for them to share their concerns. Students have likely taken in information about hurricanes from television or from direct experience or the experiences of family members. Use this discussion time to assess and address any misconceptions students may have about hurricanes or flooding.
2. Understanding how a natural phenomenon works can help to make it less frightening. Describe very simply what a hurricane is and how it can cause flooding. For example you can say that a hurricane is a very powerful storm. Sometimes wind and water from a hurricane can cause damage and hurt people. Sometimes there is so much rain from a hurricane that some places might flood.

STEP 2. DIG INTO THE PROBLEM

1. Tell students that in any emergency or natural disaster you can always find helpers.
2. Ask students to share any stories they have heard of helpers after the recent hurricanes in Texas and Florida
3. Show students images or short video of people helping after the recent hurricanes in Texas and Florida. Be careful to avoid images or videos that might be upsetting to students.

Example images and video:

Coast Guard helicopter rescue: <http://bit.ly/2hm5NPc>

A man preparing his boat for rescue: <http://bit.ly/2fCiEN4>

Deputies rescuing two children: <http://bit.ly/2xquiE2>

Mattress Store Opens as Shelter (first minute): <http://nyti.ms/2fdHdiV>

Images of people helping each other: <http://bit.ly/2xqCPGW>

4. As you show students the images and videos, ask them to identify the people who are helping and how they are helping. Keep a list on the board of the ways people helped.

STEP 3. BRAINSTORM IDEAS

1. Ask students to work in small groups to think of things people might need help with after a hurricane. Encourage them to be creative. Some examples might be providing a place for pets to stay, providing a place for people to wash their clothes, getting food and water to people, giving people temporary places to stay, helping people fix their homes.
2. Have each group share some of their ideas with the class. List their ideas on the board.
3. Ask students to brainstorm how they could help with some of these needs.

STEP 4. DESIGN A SOLUTION

1. Give each student paper, a pencil, and crayons or markers.
2. Ask students to work with their group to think through one way of helping people after a hurricane.
3. Have the group identify and answer the following. Help younger students write their ideas.
 - a. What is the problem?
 - b. Who needs help?
 - c. How will we help?
4. Then have students draw a picture demonstrating how they will help. Allow groups to share their solutions with the class.

Extensions and Water Warriors Badge

- Read "The Magic School Bus Inside a Hurricane" by Joanna Cole (appropriate for grades 1-2).
- Create a word wall using the words you listed on the board during the lesson.
- Have students follow up on their ideas for ways to help.

Your students can also earn a Water Warriors Design Thinking BADGE. Simply create a short, digital presentation (with pictures if possible) or a short (1-minute video) that describes their ideas for ways to help meet the needs they identified. Upload instructions can be found at <http://www.jason.org/waterwarriors>.

