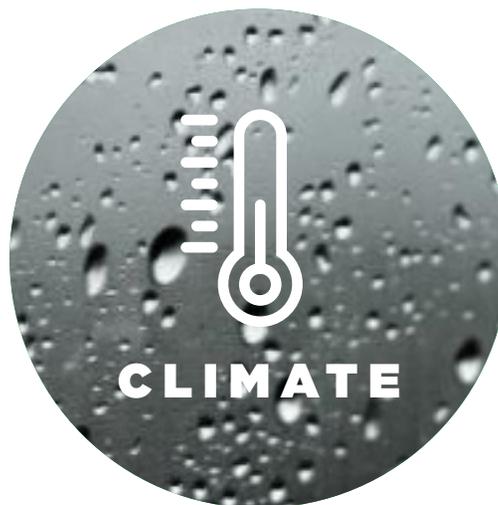


A background image showing numerous water droplets of various sizes on a dark, reflective surface. The droplets are more prominent in the foreground and become smaller and more blurred towards the background. A dark grey horizontal band is overlaid across the middle of the image, containing the text.

4TH GRADE
STEAM & SOCIAL STUDIES



ROCK ME LIKE A HURRICANE

Driving Question:

How could you design a hurricane shelter that would protect families and homes, and prevent community evacuations when storms are approaching?

Materials Needed:

Notebook, writing utensil, access to computers or devices to use the internet to do research about hurricanes, recycled building materials such as cardboard, plastics and paper, tape and glue

In this lesson, students will:

- analyze scientific explanations of hurricanes by using evidence obtained through research and viewing videos to identify what forces within the storm cause damage,
- identify ways people have adapted and modified the environment in Texas over time and as a result of major storms, and
- design and build a model of a hurricane shelter that could be installed in a home for residents of South Texas.

National Learning Standards:

Science: 4-ESS2-1
Math: 4.OA.A.3
Social Studies: III,h
Art: Cr1.1.4a



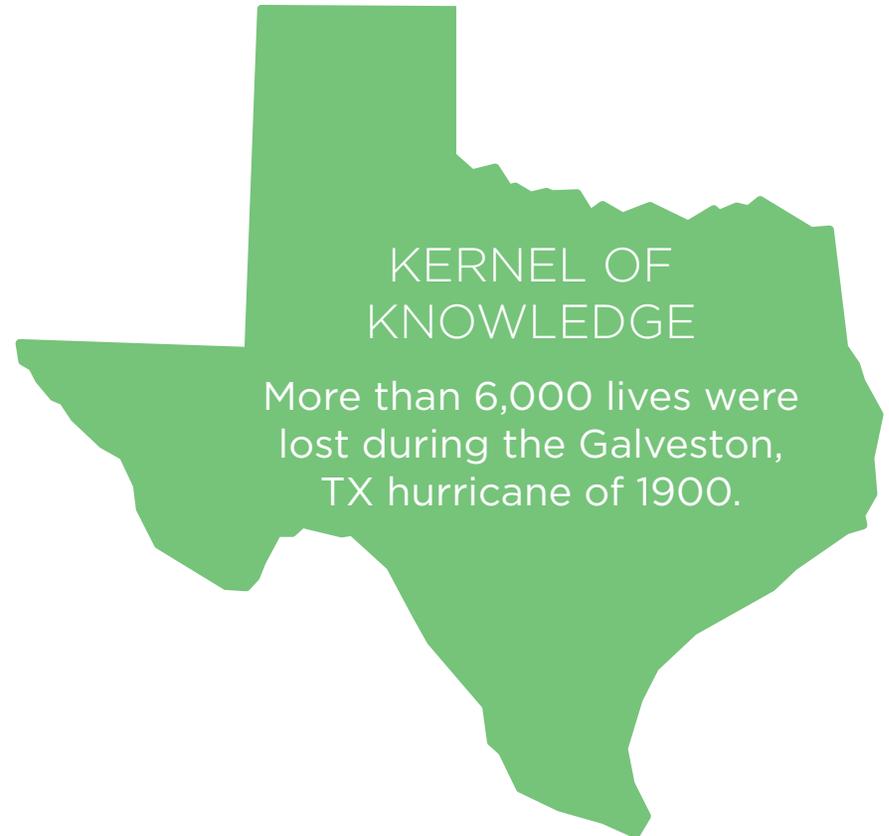
SPINNING THE COCOON

Hurricanes are among nature's most powerful storms. Damage from hurricanes can include storm-surge flooding, inland flooding from heavy rains, high winds, tornadoes, and high surf and rip current. Show the students footage of hurricanes like this [video](#) of Hurricane Harvey from CNN.

Next, have students do their own research to find out what forces within a hurricane cause damage and document these forces in their notebooks. Students should view footage of past Texas hurricanes. Remind them to use reliable sources and document where they find their information. After the research, lead a class discussion to share findings. Be sure to have students analyze the videos and use specific evidence from the videos to identify the damaging forces.

Review key vocabulary before continuing with the exploration.

- **Storm-surge flooding** is the rise in seawater level caused solely by a storm.
- **Inland flooding** occurs when powerful coastal storms move over land. As storms lose wind strength and move slowly, they drop massive amounts of rain in streams, rivers, and lakes that cause more flooding away from the coast.
- **Reliable** means consistently good in quality or performance, able to be trusted.





METAMORPHOSIS

Look at photographs of Rockport, TX before and after Hurricane Harvey. As a class, identify ways people have adapted and modified the environment as a result of that hurricane. Brainstorm what people need to rebuild quickly after a damaging storm to carry on with everyday life, and have students justify their thinking. Next, propose the following question: “How can you design a structure that provides safety from a hurricane, prevents relocations and allows residents to resume everyday life as quickly as possible after a storm?”

Divide students into small groups to continue brainstorming and make their designs. Remind them to think about what island residents would need immediately after the storm. These things should also be protected and included in the design, if possible. After working on their designs, have each group partner with another group and share their designs. Encourage groups to pose questions about one another’s designs and allow for the opportunity to make modifications and adjustments. Finally, have the original groups build a scale model of their design out of recycled materials, and include a representation of their scale in their designs.



THROUGH THE LENS

Have students create a news report about their new shelter and how it will benefit island communities. They should include details about their design and how it will protect the community. When creating the news report, they should write out a script and practice with their group before recording. Their videos can be shared with the class and on social media. As an example, view [this](#) report by Leilani Münter about Empowered by Light’s installation of solar panels at a Puerto Rico fire station after Hurricane Maria.

UPCYCLE

To begin a discussion about island communities, show students the trailer for *Anote’s Ark*, which was screened at EarthxFilm2018. After watching the video, brainstorm as a class what it would be like to live in an island community. Document the discussion in a thinking chart or on a whiteboard, and include what types of housing residents might use, where they get food, and what types of jobs and activities they do on a daily basis. Then, have students work in groups to analyze the model they built and whether it would still be helpful to island populations.



eARTh

In addition to including necessities needed during a natural disaster, have students include some art in their designs as well! You can select multiple themes and have the groups draw from them or allow the groups to choose their own theme to draw and paint on their structure designs. When they present their shelters to the class, have them also discuss how they incorporated the theme in their shelters using the elements of art and principles of design.

Community Garden

- As a class, create disaster survival backpacks. Visit this [site](#) to find a list of supplies to have on hand in the event of a natural disaster. You can distribute these packs within your own community or send them to people who have recently been victims of a natural disaster.



CAREER CONNECTION

Meteorologist - A meteorologist is a scientist who studies the atmosphere, including weather and climate. This job requires a bachelor of science degree in meteorology.

Oceanographer - An oceanographer studies the physical geography of the oceans. This job requires a master of science or doctoral degree in oceanography.

Solar Engineer - Solar engineers create solar cells that collect and store energy from the sun. They design, plan and implement solar-energy projects for cities, businesses and homeowners. A bachelor's degree in mechanical or electrical engineering is typically required for solar engineering positions, and in some areas additional certification and/or a license may be required.



CAREER HIGHLIGHT

Danni Washington is an advocate for oceans and science communication. She has a degree in marine science/biology and creates educational films to promote conservation and care for the world's oceans. Danni is the first African-American woman to host her own science education TV show called *Untamed Science* and she is also the host of a STEM video series called *Xploration Nature Knows Best*. She is passionate about the ocean and science and wants to help inspire the next generations to connect with nature.

