

Cloudy with a Chance of Science!

Week 3

Day 3: Proceed with Caution: Severe Weather Challenge!

Teacher/Parent Background:

Boom! Clap! Crack! Rumble! Proceed with caution...severe weather ahead! Although we experience changes in weather conditions every day, severe weather is on a whole different level. In science, severe weather is described as a dangerous weather event that puts people, animals and buildings at risk. Depending on the locations and conditions of various environments, people may experience severe weather such as tornadoes, blizzards, hurricanes, floods, droughts, etc. Parts of Arizona are known to also experience severe weather, including monsoons. Since severe weather poses risks to people, animals and buildings, scientists and engineers work together to propose solutions to minimize the negative effects. Through the Engineering Design Process, engineers follow a set of steps to propose solutions to problems in order to make the world a better place.

Overview:

In this activity, students will learn about the risks of an example of severe weather they face in their environment: monsoons. By using the Engineering Design Process, students will begin to address their severe weather challenge: *How can we design a house that can withstand the effects of a monsoon?*

Related Standards:

- Collect, analyze, and interpret data to explain weather and climate patterns.
- Define problem(s) and design solution(s) to minimize the effects of natural hazards.

Key Terms:

- Severe weather: a dangerous weather event that puts people, animals and buildings at risk.
- Engineering Design Process: a set of steps engineers use to propose solutions to problems

- Constraints: limitations or restrictions

Materials List:

- Internet access
- Computer/phone with audio
- Pen/pencil
- *Student Resources - Pages 5-6*
 - *Engineering Design Process Graphic*
 - *Step 1: Ask Table*

Activity Description:

- Ask students to review what they learned about weather and climate during *Day 2: Weather vs Climate*. Briefly discuss with students:
 - How would you describe your climate overall? What weather conditions do you experience throughout the year, mostly every year?
 - How does knowing more about our environment's climate help us? How can you use this information in your life?
- We have learned that tracking weather over time can tell us more about our climate, which in turns helps us better predict and prepare for upcoming weather. But, we experience small changes in weather conditions every day, so what do we need to be prepared for? What kind of big weather events have you experienced in your environment that you needed to be prepared for?
 - Prompt students to discuss and share their experiences. Possible student responses may include:
 - I needed to wear sunscreen and drink lots of water during hot, summer days. I could only go outside for a short time.
 - I needed to stay inside during big, summer rainstorms.
 - My family has used flashlights and candles when the power has gone out, due to a big storm.
- It sounds like we have all experienced some sort of big, weather event! We each needed to be prepared for this event because if we were not, we could be harmed in some way. In the science community, we describe this type of weather as *severe weather*, or a dangerous weather event that puts people, animals and buildings at risk.
 - Depending on the locations and conditions of various environments, people may experience severe weather such as tornadoes, blizzards, hurricanes, floods, droughts, etc.
- In Arizona, we also face severe weather. One severe weather we face every summer is the monsoon! But, how do monsoons form and what risks do they pose?
 - Play the Arizona Emergency Information Network video: [Monsoon Awareness Week](#).

- Engage students in a discussion of main ideas:
 - What kinds of risks do monsoons pose to people, animals and buildings?
 - Flooding, strong winds, dust storms, extreme heat.
 - How does a monsoon form?
 - Winds push moisture towards the desert areas. The combination of moisture and the summer heat produces monsoons over the desert mountains.
 - What risks can we expect during the monsoon season?
 - During the first part of the season, it is drier and hotter. We can expect lightning without rain and strong winds, which can lead to fires.
 - In the middle part of the season, it is less dry and we can expect thunderstorms that bring rain, strong winds, dust storms, and sudden flash floods.
 - As the season nears its end, more flooding can be expected.
- Now that we know how monsoons are formed and what risks they pose, what can we do about it to help lessen the negative effects?
 - Since severe weather poses risks to people, animals and buildings, scientists and engineers work together to propose solutions to minimize the negative effects. As we have seen before, through the *Engineering Design Process*, engineers follow a set of steps to propose solutions to problems in order to make the world a better place.
 - Show students the *Engineering Design Process Graphic* as a reminder of each step.
 - **Note:** Students have previously learned about and experienced the Engineering Design Process through the lessons: *A Wild Ride!*. Please reference *Day 1's: Are You Up For a Challenge?* as needed.
 - By using the Engineering Design Process, you too will propose solutions to weather-related problems to help us all remain safe! Your severe weather challenge is: *How can we design a house that can withstand the effects of a monsoon?*
 - As we have learned before, engineers begin addressing a problem by asking questions.
 - Guide students through the “Ask” step of the Engineering Design Process:
 - **Step 1: Ask -**
 - Ask questions about the problem.
 - Consider what you need to know to solve the problem.
 - Ask about what others have done to solve the problem/similar problems.

- Consider the *constraints* or limits you have to stay within while solving the problem.
 - Example: time, materials, etc.
- Prompt students to record ideas/questions in the *Step 1: Ask Table*.
 - Possible student responses may include:
 - I need to know...
 - Which monsoon conditions are we testing?
 - What materials do we have to build the house?
 - How should the house be built?
 - How much time will we have to build the house?
 - Others have...
 - Used brick, wood, stone, metal, etc. to build strong houses.
 - Used slanted roofs or gutters to move rain off of the top of houses.
 - Experienced and fixed leaks inside houses if the roof wasn't built strong enough.
- Tell students that although we may not have the answers to these questions or "need to knows" at this time, we will know more tomorrow in order to accomplish our goal!

Closure:

- Engage in a discussion with students:
 - Thinking about what engineers do, what are your next steps to move forward in the challenge?
 - What are you most looking forward to as we begin the severe weather challenge?

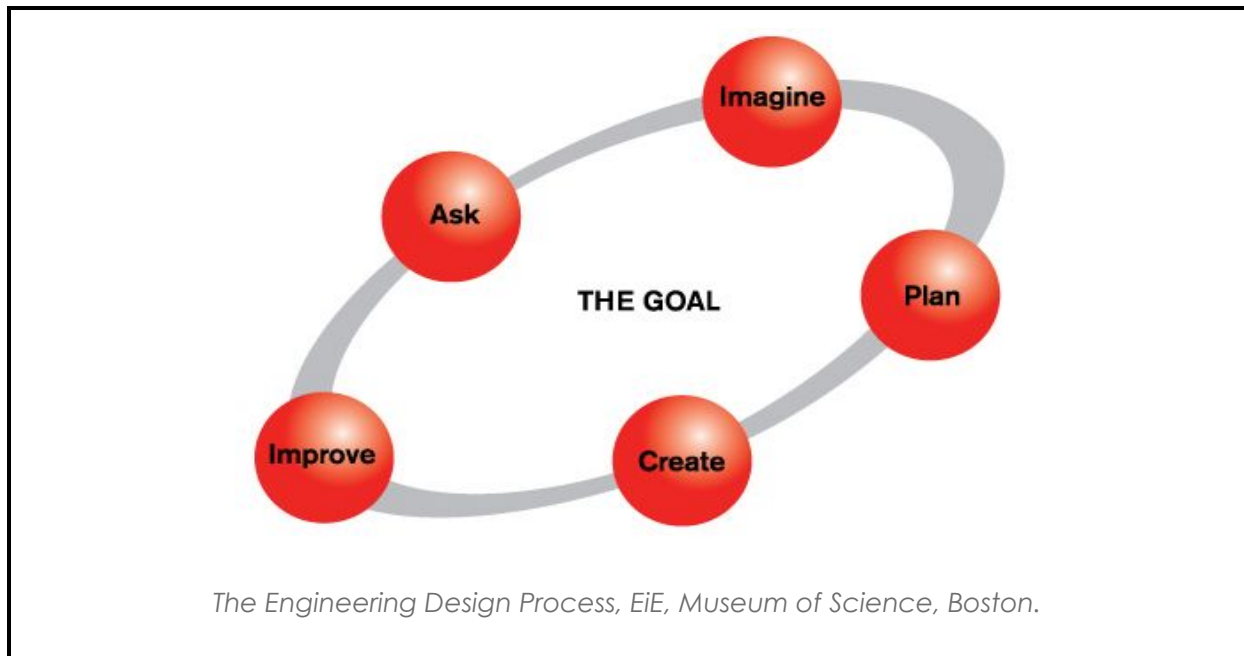
Extensions:

Watch!

- Crash Course Kids: [Severe Weather](#)

Student Resources

Engineering Design Process Graphic



Step 1: Ask Table

What is the problem?	What do you need to know to solve the problem?	What have others done when solving a similar problem?