



# TEACHER GUIDE

## EXTREME WEATHER SOLUTIONS GRADES 3-5

### COMMON MISCONCEPTIONS

- **Students may think humans can eliminate natural hazards.**  
Natural hazards are driven by natural processes and cannot be eliminated by humans. Humans can engineer ways to reduce the impact of natural hazards.
- **Students may think that all natural hazards are likely to occur everywhere.**  
Natural hazards that occur in any given area happen due to the geography of the area. Not all hazards can occur in every location—for example hurricanes only occur in areas over or near the ocean.
- **Students may think that one design is the only way to solve a problem.**  
Engineers work to solve problems using a structured approach called the engineering design process. Part of this process is being open to better ideas developing from existing ideas.
- **Students may think arguing from evidence actually means fighting.**  
When we talk about “argument” in terms of science or engineering, we are actually referring to professional discussion and disagreement. When scientists and engineers argue using evidence they are discussing what might work better and why, not fighting.

### NATURAL HAZARDS

A natural hazard is an event that is caused by natural processes but is out of the realm of normal conditions, and can cause harm to humans, plants, and animals. Extreme weather events can be natural hazards, as can volcanic eruptions, tsunamis and earthquakes. In this lesson - and largely at this level - focus is on weather events that students are likely somewhat familiar with, such as floods, hurricanes, tornadoes, high winds, and lightning. However, students will be most familiar with extreme weather events most likely to occur near where they live. It is recommended to start with natural hazards that are most relevant to your students and then think more generally. Use the National Weather Service for up-to-date information in your area and around the world.

## EXTREME WEATHER EVENTS AND CHANGING CLIMATE

There is much evidence supporting global temperature rise. Shifts in climate can lead to more severe and more frequent extreme weather events. Although there is potential to connect extreme weather events with learning about changing climates, at this grade level, students are just starting to understand the differences between weather and climate. This lesson and the associated NGSS connections focus on natural hazards, such as extreme weather events, and solutions to reduce impacts. Students will learn more about changing climate in other lessons and later school years.

## REDUCING IMPACT FROM NATURAL HAZARDS

One key aspect of this lesson, and the topic at this level, is for students to be able to differentiate between what we, as humans, can and cannot control as far as natural hazards go. We have the ability to mitigate the impact, but natural hazards cannot be eliminated by humans.

The NGSS Performance Expectation addressed by this lesson (3-ESS3-1) ties in Engineering Design concepts. Students think about how solutions can be designed to reduce impact. They also engage in argument from evidence when thinking about how existing solutions can be improved.

