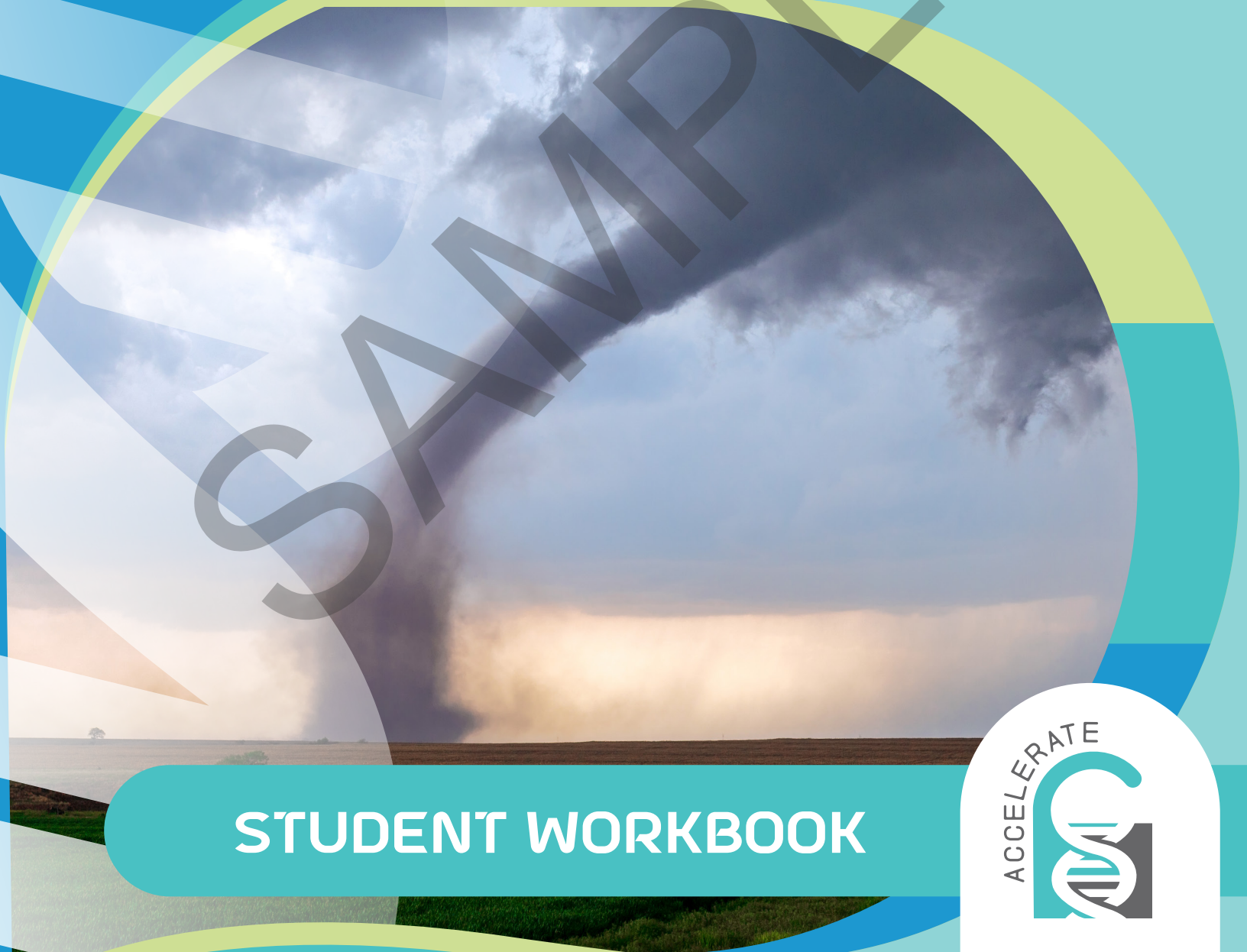
FEELING THE PRESSURE



STUDENT WORKBOOK

ACCELERATE

ACTIVITY 1

WILD WEATHER

What would you do if you looked out the window and saw a storm coming? You'd probably want to observe severe weather and wonder about the causes of unique weather events. In this activity, we'll do just that!

1 CLOUDY WITH A CHANCE OF...

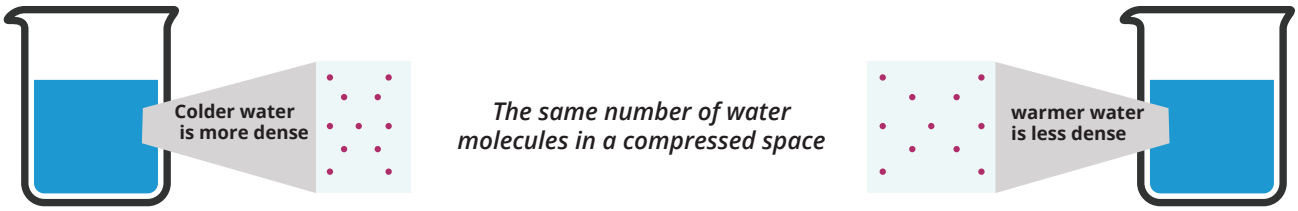
WHAT TO DO:

STEP 1 Study these extreme weather events and think about how they might form. Consider the temperature, winds, and moisture.

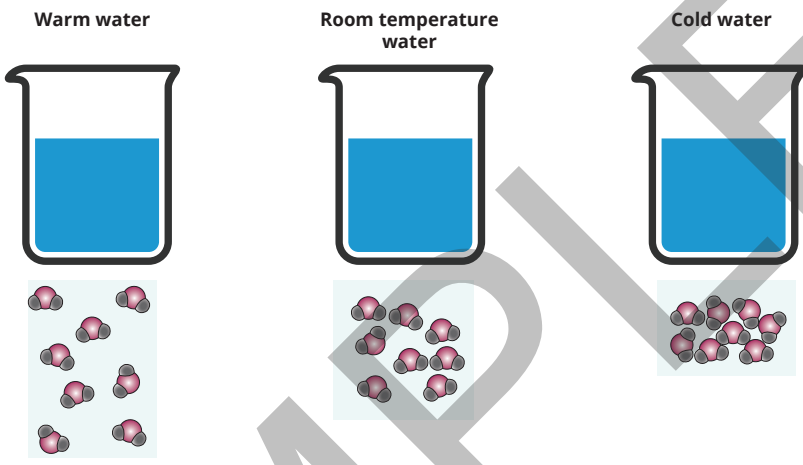
STEP 2 Draw or describe the weather conditions that lead to each event. Even if you've never seen or heard of these types of weather, make your best guess! You will learn more about each of them as you complete this kit.

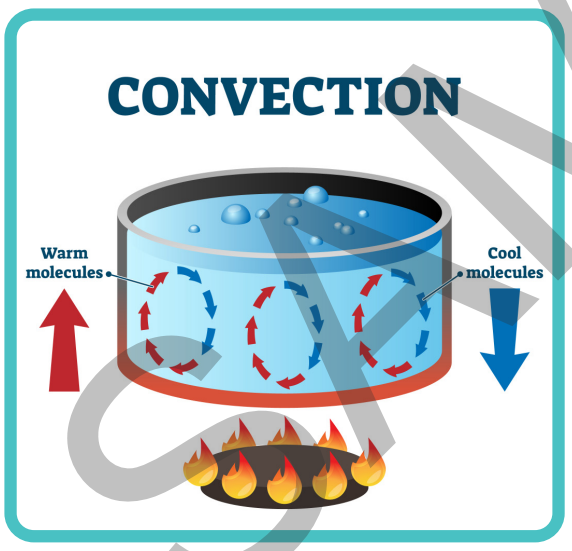
National Aeronautics and Space Administration (NASA)

HURRICANE



There's not any more or less water in terms of mass, so let's look at water on a molecular level. **Molecules** are groups of atoms joined together, and **atoms** are the smallest piece of a chemical element that is still that element. Water is commonly known as H_2O, or two hydrogen atoms joined with an oxygen atom.





When water molecules warm up, they move faster and spread out, which makes the warm water less dense than cold water. So, the compact cold-water molecules sink down through the warmer water. The cold water has the same mass, but the volume is compressed.

This principle of density also applies to air molecules. Cold air sinks in the same way, however you might be more familiar with the phrase, "warm air rises." As air molecules are heated by the Sun, they spread out and create a warm pocket of air. The air is less dense, which begins to float up into the atmosphere.

The **atmosphere** is a layer of gases that covers our planet. These gases expand and contract, constantly moving across the surface of the earth. This process, in both air and water, is called **convection**, or the process of heat transferring through a fluid based on difference in density. Air is not heated evenly by the Sun, so these pockets of air are constantly moving and changing temperature. As the warm air rises, it cools and sinks back down.

WILD WEATHER – THUNDERSTORMS

You have seen and read about the ways that warm and cold air masses interact. Crushing this can was a model of how severe storms can develop quickly! As the pressure dropped inside the can, more air tried to rush into the area of low pressure.

The storms that are featured throughout this kit all begin in a similar way: as thunderstorms. Hurricanes, dust storms, and even tornadoes all start as thunderstorms. A cold, low pressure front mixing with warm rising air. As the warm air rises and cools, the moisture in the air condenses into towering clouds.

The rising and falling air creates strong winds and even tornadoes if the conditions are right. The low-pressure center at the heart of the storm causes more air to push into the storm cell. If conditions are right over a warm ocean, this can add more moisture to feed into a hurricane. If this storm cell becomes a supercell, then the rising and falling of air might swirl into a funnel cloud and become a tornado.

Why do they call it a "thunder" storm anyway? Where does all that noise come from in a thunderstorm? Well, the thunder clap comes from a lightning-fast burst of air pressure. A bolt of lightning is electricity that super-heats the air to around 20,000°C in less than a microsecond. The hot air quickly expands and immediately collapses back into the space. The crashing air molecules make an explosion of noise we call thunder.

ACCELERATE

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Kit	SU-FEELPR
Instructions	IN-FEELPRS
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