BrainStorm
STEM EDUCATION

STEM KIT

BUILD & LEARN

GUIDE

TORNADO

SUSTAINABLE MATERIAL

NO GLUE OR MESS

SAFE AND EASY USE

STEMI AUTHENTICATED

TORNADO COMMANDER OVERVIEW

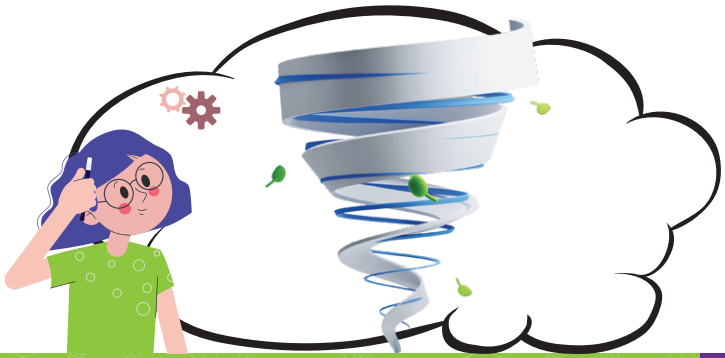
Get ready to dive into the thrilling world of tornadoes with your very own DIY STEM kit! You'll explore the wild science behind natural disasters and uncover what makes these powerful whirlwinds spin. Learn all about how a vortex works, the incredible process of tornado formation, and the role air plays in creating these twisting forces of nature. With hands-on experiments and cool tools, you'll be able to create your very own mini-tornado and see science come to life right before your eyes. Get ready to unleash your inner storm scientist and become a master of the whirlwind!

LEARNING GOALS

1. Understand Natural Disasters: Learn what tornadoes are, how they form, and their role in natural weather patterns.
2. Discover the Science of a Vortex: Explore how vortexes work and why they're a key part of tornado formation.
3. Explore Air Dynamics: Study the role of air pressure, temperature, and movement in creating tornadoes.

WHAT'S INCLUDED

- Pre-cut tornado parts for easy assembly.
- Fan, Light and Circuitry
- Water resevoir and humidifier



⚠ SAFTEY WARNINGS:

Please read all safety warnings before use.

• Choking Hazard – This kit contains small parts. Not suitable for children under 6 years of age or any individual who may place non-food items in their mouth.

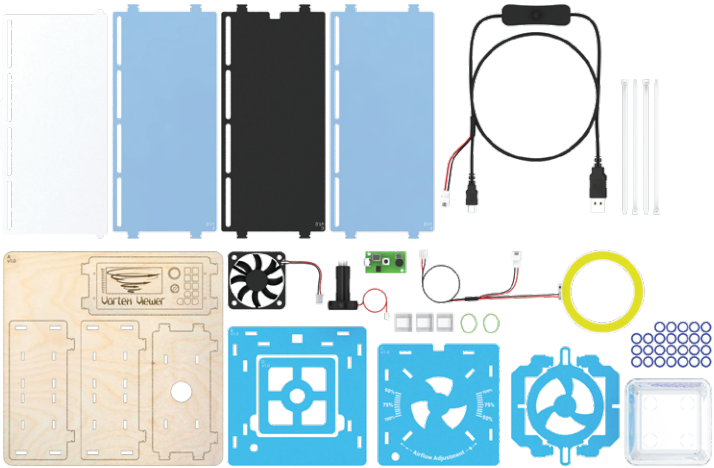
• WARNING: Circuit board may be hot! Do not touch when unit is on. Make sure to allow for it to cool after use before handling.

• WARNING: Do not turn on the Tornado STEM kit unless the humidifier is plugged into the circuit board. Also, wait at least 5 minutes for the humidifier's cotton swab to soak up water before turning it on.

• WARNING: Circle light may be hot! Do not touch when unit is on. Make sure to allow for it to cool after use before handling.

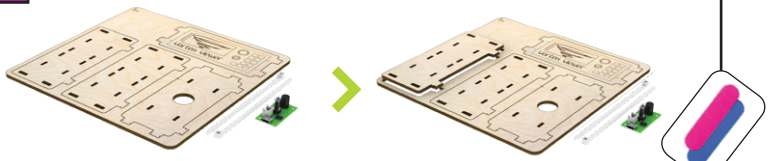
• Adult Supervision Required – An adult must be present during assembly and use.

MATERIALS:



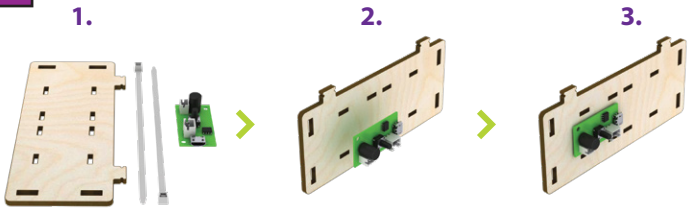
Disclaimer: Colors and parts may vary slightly from those shown in images or instructions, depending on available materials. All variations function the same and do not affect the performance or assembly of the kit.

1



NOTE: *If any wooden pieces are hard to remove, use a blunt tool to carefully punch them out, and ask an adult for help if needed. Use the sanding stick included in your kit (it looks like a small nail file) to smooth out any rough edges or spots where pieces don't fit together easily. Just find the tight spot and gently sand the edge until it fits just right.*

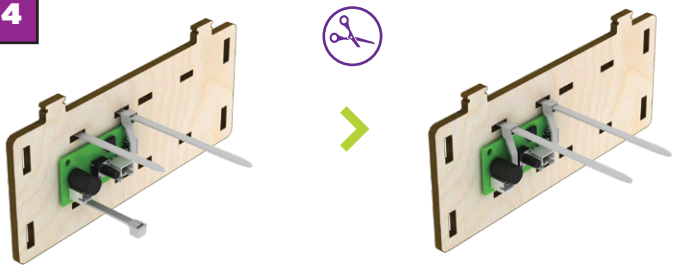
2



3

Attach the circuit board to the wooden panel using a zip tie.

4



Carefully trim the ends of each zip tie using scissors.

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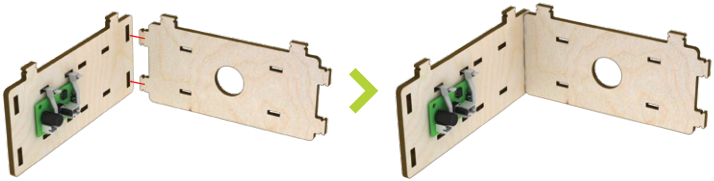

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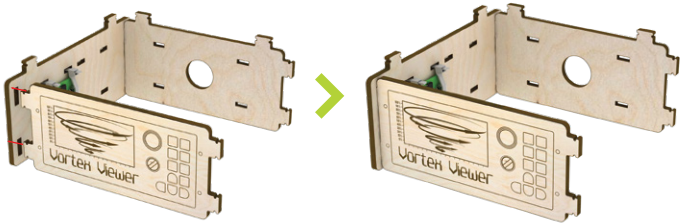

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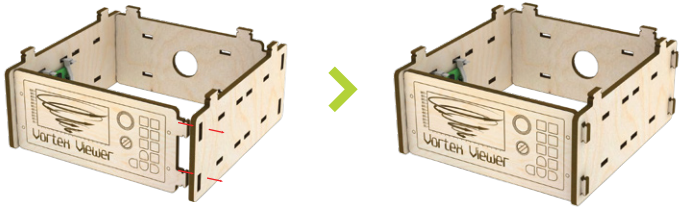

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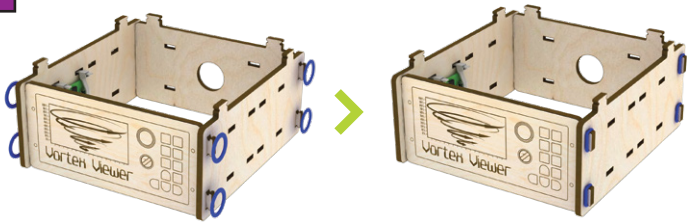
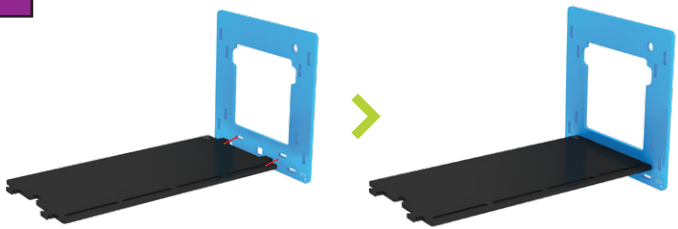


Place an O-ring fastener onto each slotted connector.

9



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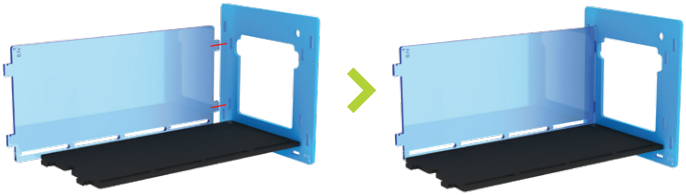

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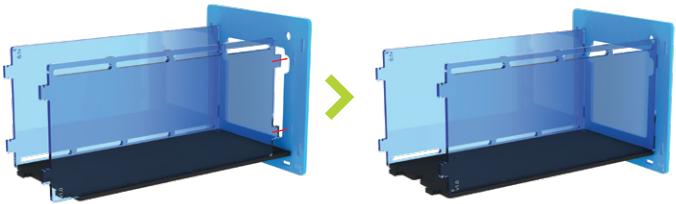

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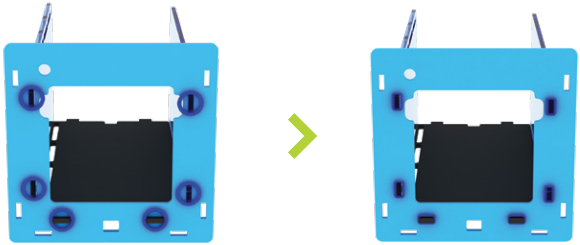

Place an O-ring fastener onto each slotted connector.

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Place an O-ring fastener onto each slotted connector.

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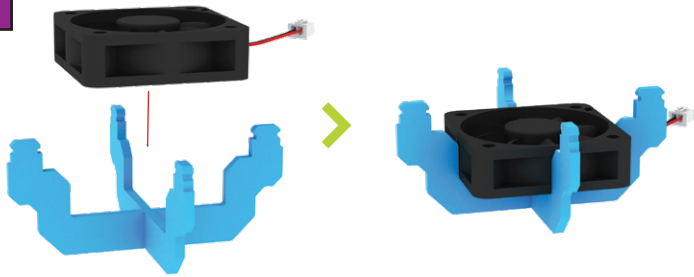

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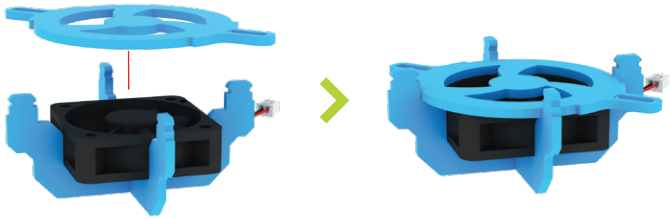

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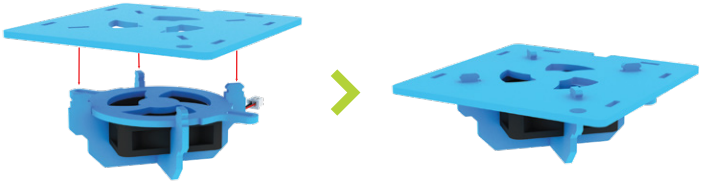

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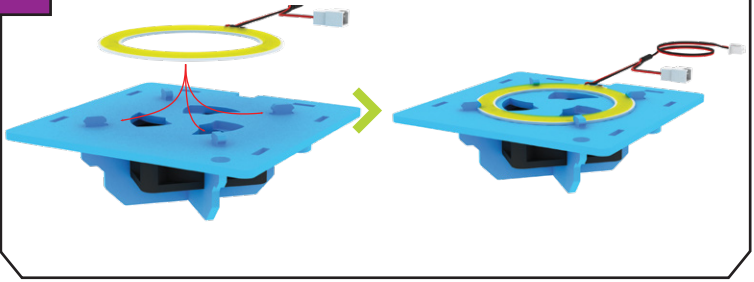

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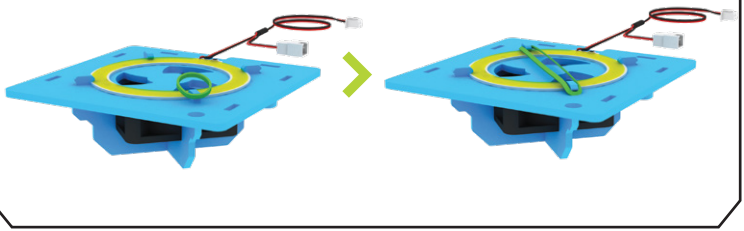

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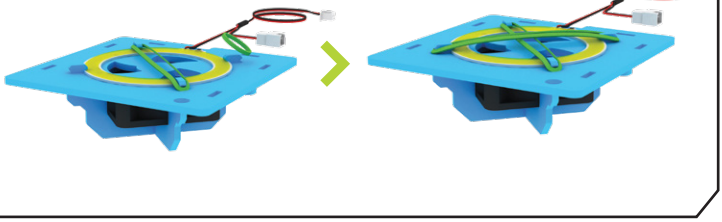

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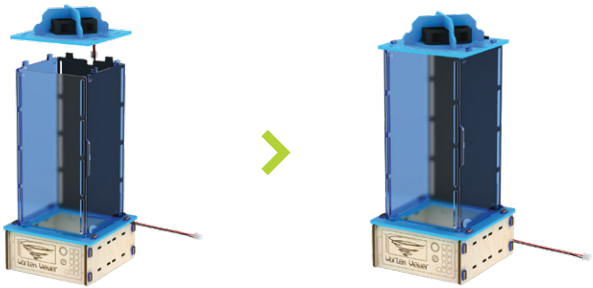

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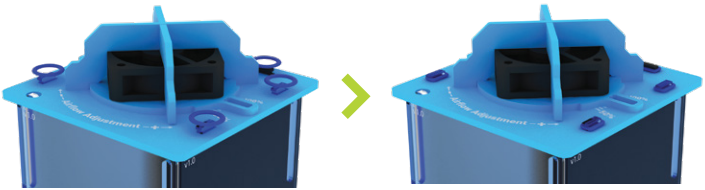
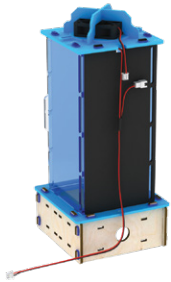
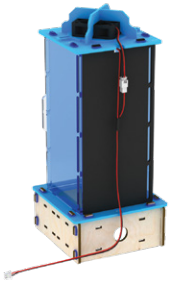


Place an O-ring fastener onto each slotted connector.

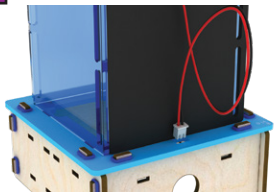
25

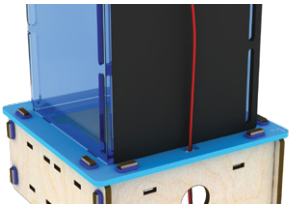




Connect the fan wire to the light wire.

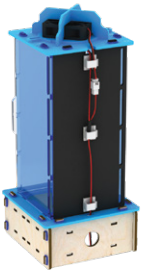
26





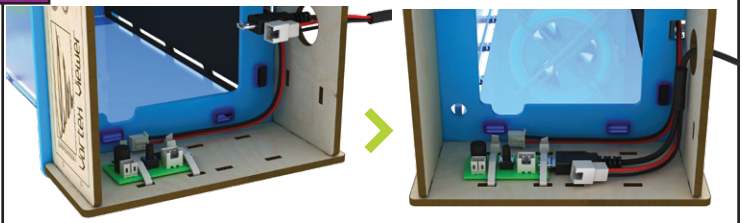
Insert the wire connector into the rear slot.

27



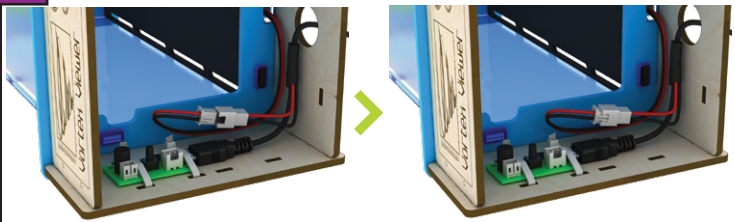
Peel off the paper backing and use the adhesive hooks to organize your wires.

28



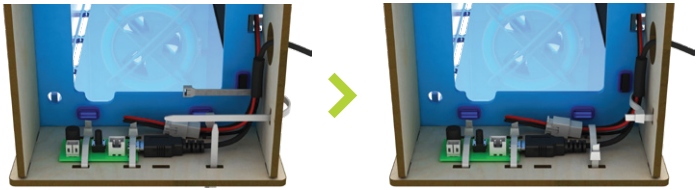
Plug the Mirco-USB cable into the circuit board.

29



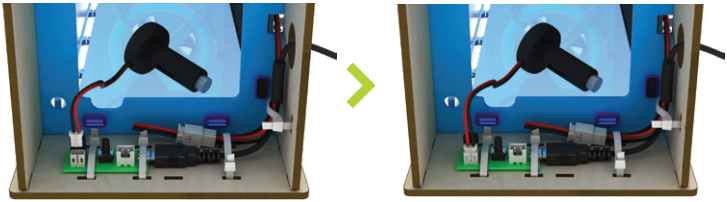
Plug the Fan cable into the circuit board.

30



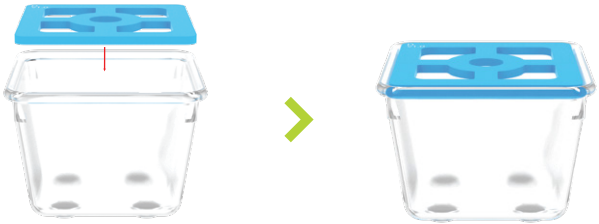
Fasten the cables with a zip tie and trim off the excess.

31



Plug the humidifier into the circuit board.

32



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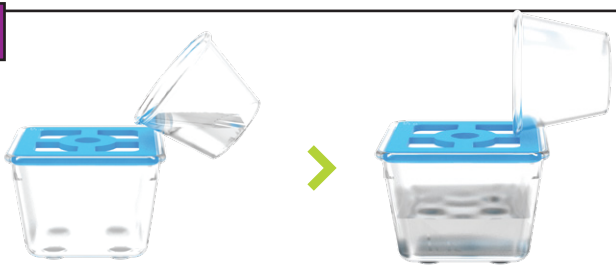


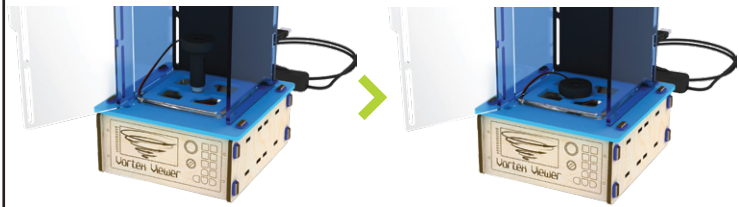
Fill the water reservoir with water.

34

Make sure the humidifier is placed above the water reservoir.

35

Note: Make sure the humidifier has a cotton swab.



Place the humidifier into the center hole.

36

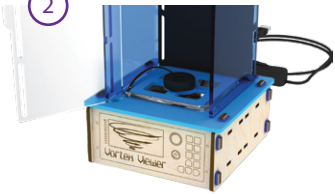
Close the clear front door.

HOW TO USE

1

1. Make sure the water reservoir has water.

2



2. Set the humidifier into position.

3

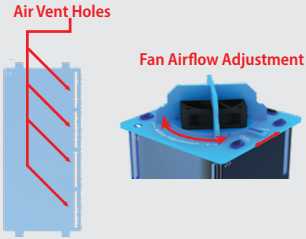
3. Wait 5 minutes for water to absorb

4

4.Plug-in and Turn on

EXTENSION

Experiment by covering some of the air vents in the chamber or adjusting the fan's airflow to see how it changes the vortex. Start by using tape to cover the lower vents, then try covering only the upper vents. Next, try lowering the fan's airflow, then increasing it again.



If you enjoyed this STEM Kit, check out some of our other Kits!

EARTHQUAKE

SOLAR OVEN

WIND TURBINE

AND MORE!

Things to think about

Tornado: A big, spinning column of air that stretches from the clouds all the way down to the ground. It moves really fast and can pick things up!

Vortex: A twisty, spinning shape in the air or water—kind of like a little tornado in a box.

Funnel Cloud: A cloud that looks like an upside-down cone and spins really fast. It becomes a tornado if it touches the ground!

Supercell: A giant, powerful thunderstorm that can make tornadoes. It's like the boss of storms!

Air Pressure: The weight of air pushing down on everything. When air pushes unevenly, it can help make tornadoes.

Cold Front: The place where cold air crashes into warm air, which can cause storms. It's like a weather battle!

Warm Front: The edge of warm air moving into cold air. It helps create rainy or stormy weather.

Updraft: Warm air that zooms upward into the sky, giving storms their energy.

Downdraft: Cool air that rushes down from a storm. It helps make wind and rain.

Wind Shear: When the wind changes direction or speed at different heights, it can make the air spin and help tornadoes form.

Rotation: Spinning air, like when you twirl in circles—it's how tornadoes start to spin.

Cyclone: A big spinning storm made of lots of wind and air. Tornadoes are a smaller, faster kind of cyclone.

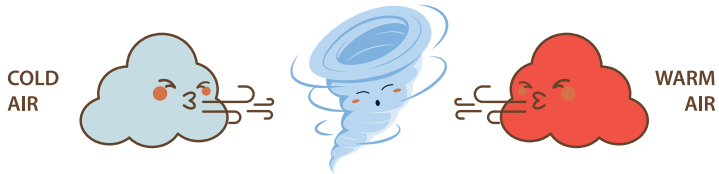
Eye: The middle of a tornado or storm where it's calm, even though it's spinning all around.

Debris Field: The area where all the stuff a tornado picks up—like leaves, sticks, or toys—gets scattered.

Understand Natural Disasters: Tornadoes!

Tornadoes are some of the most powerful and exciting natural disasters! A tornado is a fast-spinning column of air that forms when a storm starts to twist. Imagine a giant straw reaching down from the sky, and it picks up everything in its path! Tornadoes can range in size, from small ones that last just a few seconds to big, scary ones that can last for minutes or even hours. But don't worry! Scientists study tornadoes to understand how they form and how to keep us safe.

Tornadoes happen when warm, moist air meets cold, dry air. The warm air rises into the sky, and the cold air rushes in to meet it. This battle between warm and cold air causes the air to twist and spin, like when you stir your drink with a straw. As the spinning air keeps twisting, it can form a funnel cloud, which might touch the ground and become a full-blown tornado! This spinning air is called a vortex, and it's what makes tornadoes so powerful.



Tornadoes are part of the Earth's weather system and can happen anywhere, though they're most common in places like the United States' "Tornado Alley." Even though tornadoes can be dangerous, they also help us learn more about how air moves and changes in our atmosphere. By studying tornadoes, scientists can predict when and where they might occur, which helps keep people safe. Tornadoes are also important because they can help balance the Earth's weather by mixing air from different parts of the atmosphere.

Discover the Science of a Vortex: Spinning Into Fun!

What is a Vortex?

A **vortex** is a spinning motion that happens when air, water, or even other liquids start to move in a circle. You can think of it like a "whirlwind" or "swirl."

Examples of Vortexes

Tornadoes – A tornado is a huge vortex made of air. The warm air and cold air mix in a thunderstorm and create a powerful spinning column of air that can cause a lot of damage.

Whirlpools – When you drain water from a bathtub or sink, you might see a whirlpool form as the water spins around the drain. This is a small vortex formed by the water moving in a circle.

The Eye of a Hurricane – Hurricanes have a massive vortex at their center. The winds around the eye of the hurricane spin in a circle, causing strong storms on the outside and calm in the middle

A vortex is caused by the way air or water moves. When things move in a circle, they push the liquid or gas outward, while the center stays low pressure. This low pressure is what makes things get sucked toward the center of the vortex. Think of it like spinning a basketball on your finger. The air that's spinning in a vortex is moving in a circular motion, creating a low-pressure area in the middle. This low-pressure center is what makes tornadoes so powerful. The faster the air spins, the tighter the vortex gets, and that's when you can get a tornado!

Vortexes are important because they can help us understand how things move in nature. Scientists study vortexes to learn about weather, ocean currents, and even how air moves in airplanes!

Try This at Home: Fill a bowl with water, and use a spoon to stir the water in a circular motion. Watch closely to see how the water starts to spin in a vortex. You'll see that the water moves faster and faster as it swirls, and things like bubbles or leaves will get pulled toward the center!

STEM KIT

TORNADO BUILD BOOKLET

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