

LESSON 6:

TORNADO PROOF

Students will create a structure that can withstand a high winds.

OBJECTIVES



Create a structure that will stay supported when tested by wind from a "tornado."

SUPPLIES

TEACHER PURCHASES

- None

CREATOR BOX

This is a Creator Box experiment, which means the kids can use the materials in the creator's box and small materials bin freely to make their creations. Please be careful to leave enough supplies for other Creator Box Experiments. For information about the specific materials, refer to the supply guide.

OTHER SUPPLIES

The remaining supplies for this experiment can be found in the following locations in your bin

SMALL MATERIALS BOX

- Plastic Animals (1 or 2 per student)

PENCIL BOX

- Pencils/Markers
- Tape, glue, scissors, and other crafting supplies as needed

FOLDER

- Printer paper
- Construction paper for making fans, building, and decoration

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TORNADO PROOF

Students will create a structure that can withstand a high winds.

HOOK

🕒 2-3 min

Have you ever experienced a tornado or seen one on TV or simulated in a movie? How about experiencing a storm with very high winds? What types of destruction can tornados cause to towns and nature? Do you know which states are prone to tornados? Discuss.

DISCUSSION

🕒 3-5 min

Today we are going to mainly think about what happens during a tornado and what destruction is seen after. But how does a tornado form?

A tornado is usually attached to the bottom of a thunderstorm. When warm, humid air collides with cool, dry air, the warm air rises through the cool air and can begin to rotate. The currents in the middle of the tornado spin so fast that winds can get above 200 mph. Think about that! If a normal day is considered very windy, the weatherman might say that winds are around 40 or 50 miles per hour. On these days, small branches may fall off trees, light furniture may blow off decks, etc. 200 mph can obviously do some excessive damage!

Tornados usually happen in what is called "tornado alley." This is a strip of area from north to south going down the middle of the United States.

It might be interesting for the students to see/hear how scientists & meteorologists measure tornadic winds (the Enhanced Fujita Scale). [See the chart on Page 2.](#)

So... let's think about people who build houses and businesses in "tornado alley." What do you think they need to keep in mind when building homes so that people are safe and homes stay intact in the event of a tornado?

HYPOTHESIS

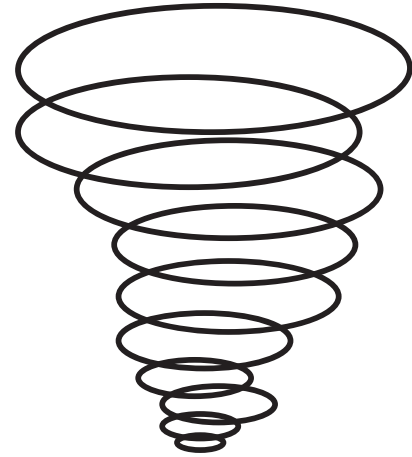
🕒 3-5 min

What features will be present on a structure to help it withstand very high winds?


Ideas: By clustering steel columns and beams in the skyscraper's core, engineers create a stiff backbone that can resist tremendous wind forces

ENHANCED FUJITA SCALE

EF Rating	3 Second Gust (mph)
0	65-85
1	86-110
2	111-135
3	136-165
4	166-200
5	Over 200



EXPERIMENTATION

 15-20 min

Today, you and a partner are going to create a structure that can withstand our "tornado" (a fan you create!) Your challenge is to build a structure that is the general shape of a small home that will keep your plastic animal safe. The plastic animal will symbolize a family huddled together inside the house during a dangerous tornado. The goal is to keep the family safe inside and the home intact.

1. First, distribute a piece of paper to each student and have them fold about 1/2 inch to 1 inch sections across to form a fan like the picture below.



2. Remind students of the supplies available in the Creator Box and let them begin building. The "home" should have walls and a roof, but otherwise it is up to them to be creative! Encourage them to use materials such as toothpicks and Q-tips to reinforce the structure and make it stronger.

Encourage them to test out their structures once they think it is sturdy. If it is not able to withstand the fan wind, they should go back and revise their building strategy, or make certain spots more secure. This is a trial and error, build and revise type process!

EXTENSION

After discussion and experiment/observation activities there will likely not be extra time in this lesson. But if students complete a successful build before other groups, they could begin to test their project at a closer distance from the fan to simulate a stronger tornado or make a list of some other actions that could be taken to stay safe in a tornado.

OBSERVATION & EXPLANATION

🕒 10-15 min

Come together as a group about 10-15 minutes before class is over. Let students share where they got in their process and if they were able to successfully create a sturdy home. Students should share what they learned as they built and tested and modified and tested again. Discuss these questions: What type of features did the homes that were sturdy enough have in common? What changes did you make after testing the performance of your first build? If you lived in tornado alley, how would you want your home to be built?

CONCLUSION

🕒 5-7 min

Students may write this answer on their sheet of paper or verbally tell the instructor as they leave: How does a tornado form?

ASSESSMENT

🕒 3 min

Students may write this answer on their sheet of paper or verbally tell the instructor as they leave: How does a tornado form?

SCIENTIST'S WORKSHEET

Tip: Can draw or write the following down on whiteboard!

Hypothesis	Observation	Conclusion
What features will be present on a structure to help it withstand very high winds?	What type of features did the homes that were sturdy enough have in common? What changes did you make after testing the performance of your first build? If you lived in tornado alley, how would you want your home to be built?	Was your hypothesis correct?