Case Details

Case Title:

Vortex

Author(s):

Molly Embree, Emory University
Kevin McMahon, Renfroe Middle School
Carly Price, Renfroe Middle School
Aimee Webb, Emory University

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Grade Level(s):

Middle School

Subject(s):

Physical Science

Summary:

On her way to Marc's house, Margarite observes a strange greenish light, feels the still air turn to strong wind, and sees rain turn to hail. In Marc's yard, a tree catches fire and a skateboard, bicycle, and car get sucked up into a swirl of air. What could be the cause of all these strange events?

Suggested Citation:

Embree, M., & McMahon, K. M., Price, C. J., & Webb, A. L. (2008). *Vortex*. Retrieved June 03, 2012 from Emory University, CASES Online Web site: http://www.cse.emory.edu/cases/casedisplay.cfm?case_id=243

Notes:

This is the first in a series of four cases addressing physical/earth science concepts for sixth-graders. See the next case in the series: The Day After Tomorrow.

Learning Objectives:

1. Diagram the stages of tornado formation, detailing the changes of state which occur in the supercell and how forces act to create a vortex of aiir.
2. Create a safety plan for your own home in the event of a severe thunderstorm or tornado.
3. Quantify the distances (in m & km) of objects thrown from a tornado; estimate the differences in mass of the objects and calculate the differences in distances thrown.
4. Hypothesize about why a skateboard, bike, and car, picked up by the tornado from the same spot, end up at different distances away.
5. After research, write a paragraph explaining the forces involved in tornadoes picking up objects, and how those objects are expelled from the vortex.
6. Conduct research using textbooks, dictionaries, online encyclopedias and web sources to investigate: What is wind? and what causes wind?; How does rain change to hail?; What is a hurricane?; What is a tornado?; What is a

thunderstorm?; supercell; humid (air); updraft, convection current; vortex; tornado warning, tornado watch; How does an air mass take on or lose humidity and/or heat?; safety precautions for tornado.

7. Prepare research reports on the above learning issues giving complete definitions, citing sources of information, and explaining concepts in your own words.

National/State Standards:

Georgia Performance Standards Addressed:

SCS1. Students will explore the importance of curiosity, honesty, openness, and skepticism in science. (NSES Content Standard A)

SCS3. Students will use computation and estimation skills necessary for analyzing data and following scientific explanations. (NSES Content Standard A)

SCS4. Students will use instruments for observing, measuring, and manipulating equipment and materials in scientific activities. (NSES Content Standard A)

SCS6. Students will communicate scientific ideas and activities clearly. (NSES Content Standard A)

SCS10. Students will enhance reading and all curriculum areas.

S6E4. Students will understand how the distribution of land and oceans affects climate and weather. (NSES Content Standard D) (NSES Content Standard E)

S8P1. Students will examine the scientific view of the nature of matter. (NSES Content Standard B)

S8P2. Students will be familiar with the forms and transformations of energy. (NSES Content Standard B)

S8P3. Students will investigate relationships between force, mass, and the motion of objects.(NSES Content Standard B)

S8P5. Students will recognize characteristics of gravity, electricity, and magnetism as major kinds of forces acting in nature. (NSES Content Standard B)