

## Case Details

### Case Title:

The Day After Tomorrow

### Author(s):

Aimee Webb, Emory University  
Kevin McMahon, Renfroe Middle School

### Date Published:

2/18/2008

### Grade Level(s):

Middle School

### Subject(s):

Physical Science

### Summary:

Marc and Margarite watch the movie "The Day After Tomorrow" and debate the scientific merit of the movie and the events that occur in the movie.

### Suggested Citation:

Webb, A. L., & McMahon, K. M. (2008). *The day after tomorrow*. Retrieved June 03, 2012 from Emory University, CASES Online Web site:  
[http://www.cse.emory.edu/cases/casedisplay.cfm?case\\_id=245](http://www.cse.emory.edu/cases/casedisplay.cfm?case_id=245)

### Notes:

This is the second in a series of four cases addressing physical/earth science concepts in sixth-grade. See the next case in the series: [Liftoff!](#)

### Learning Objectives:

1. Appropriately use a variety of text and electronic materials to research learning issues.
2. Classify the individual greenhouse gases as elements, compounds, and/or mixtures.
3. Clarify that water and salt are both compounds but that salt water is a mixture
4. Identify that fossil fuels are based on the element carbon and that the process of burning fossil fuels releases carbon dioxide, a compound
5. Identify that the melting of ice caps is a physical change
6. Identify that fresh water mixing with salt water is a physical change
7. Identify that the burning of fossil fuels is a chemical change
8. Describe how the molecules of water change as they melt and refreeze in an ice shelf
9. Distinguish between the effects of ice melting from an ice shelf that is floating in water versus the melting of ice shelves from on land and the effects of each of these on sea levels
10. Identify that one of the ways global warming will cause sea levels to rise is via expansion of sea water as it warms
11. Diagram how the earth is warmed by solar radiation in the greenhouse effect

- and the convection of heat via the North Atlantic Current
12. Distinguish between radiation and convection
  13. Define thermal pollution and explain how global warming and greenhouse gases may or may not be a thermal pollution issue
  14. Identify the fossil fuels and recognize that they are based on the element carbon.
  15. Discuss the process of burning fossil fuels and its implications for global warming / greenhouse effect
  16. Distinguish between the greenhouse effect and global warming.
  17. Describe why the greenhouse effect is natural and necessary but also how human and non-human factors can exacerbate the greenhouse effect and how that is related to global warming.

### **National/State Standards:**

*Georgia Performance Standards Addressed:*

S6CS5. Students will use the ideas of system, model, change, and scale in exploring scientific and technological matters. (NSES Content Standard A)

S6CS10. Students will enhance reading in all curriculum. (NSES Content Standard A)

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

b. Describe the differences between pure substances (elements and compounds) and mixtures.

c. Describe the movement of particles in solids, liquids, gases, and plasma states.

e. Distinguish between changes in matter as physical (i.e. physical change) or chemical change (i.e. development of a gas, formation of a precipitate, and change in color).

SPS3. Students will investigate relationships between force, mass, and the motion of objects. (NSES Content Standard B)

b. demonstrate the effect of balance and unbalanced forces on an object in terms of gravity, inertia, and friction.

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

a. Demonstrate how the land and water absorb and lose heat at different rates and explain the resulting effects on the weather patterns.

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

d. Describe how heat can be transferred through matter by collisions of atoms (conduction) or through space (radiation). In a liquid or gas, currents will facilitate the transfer of heat (convection).

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

c. Relate how moisture evaporating from the oceans affects the weather patterns and the weather events such as hurricanes.

S6E6. Students will describe various sources of energy and with their use and conservation. (NSES Content Standard B)

b. identify renewable and non renewable resources.