

# CLIMATE CHANGE AND CHANGING WEATHER

GRADES 3-12

## BACKGROUND

The climate of a region is typically defined by the average weather it receives. The weather around us is changing, and the climate is changing, as well. The increasing occurrence of extreme weather events in the past decade has been attributed to climate change. Climate change is the result of increased atmospheric greenhouse gases (including carbon dioxide, methane, nitrous oxide, and fluorinated gases) emitted by human activity.

Greenhouse gases are responsible for the greenhouse effect, which is necessary for life on earth. These gases act like a blanket, absorbing the heat energy from the sun. Excess greenhouse gases absorb more heat rays, and less are reflected back into the atmosphere, causing warming temperatures. These warmer temperatures can contribute to extreme weather events including drought, blizzards and increased snowfall, rainstorms, flooding, heat waves, hurricanes, tropical storms, and tornadoes. While these events are not unusual, the frequency of extreme weather events coupled with overall warming which increases glacier melt and causes rising sea levels is alarming.



Warmer weather may sound attractive to some people (especially in the middle of a cold winter), but a warmer earth can have many consequences for people, animals, and plants. Some species of animals and plants are able to adapt fairly quickly to temperatures that are warmer than usual for their specific environment; others are not. This can affect their populations, sometimes dramatically, and therefore affect others, including plants, animals, and humans who depend upon them. The past 50 years have shown a warming trend and an average temperature increase of more than 1.4°F per century, a figure that scientists predict will increase.

## DEFINITIONS

*Climate*-The average weather conditions of an area over a long period of time

*Credible*-Able to be believed

*Extreme weather events*-Unusual, severe, or unseasonal weather, weather at the extremes of the historical distribution (the range that has been seen in the past)

*Weather*-The state of the atmosphere at a place and time as regards heat, cloudiness, dryness, sunshine, wind, rain, etc.

## **GRADES 3-5**

Discuss weather with students (wind, snow, rain, heat, cold). Ask students what extreme weather is (increased snowfall, blizzard, extreme cold snap, heat wave, drought, tornado, flooding, hurricane). Generate a list from their responses. Discuss the consequences of extreme weather events, including financial costs of heating and/or cooling, loss of property, homes, lives, crops, effects on animals, both domesticated and wild, etc.

### **ACTIVITY OPTIONS:**

#### A. Extreme Weather Illustrations

##### **MATERIALS**

Drawing paper  
Choice of art materials for students to create drawings/pictures

##### **INSTRUCTIONS**

1. Have each student choose an extreme weather event.
2. Students will write the name of the event they've chosen at the top of their paper, followed by a definition and a consequence or consequences of the extreme weather event.
3. Have students illustrate the event they've chosen. (Students might illustrate drought by drawing a dried-up river, heavy snowstorm by a building with a caved-in roof, etc.)
4. Help students create a display of their drawings. Give each student the opportunity to tell what weather event they chose, the definition, and consequences.
5. As a class, discuss how these extreme weather events are related to climate change.

#### B. Extreme Weather Pictionary

##### **MATERIALS**

Small pieces of paper that are the same size, shape, and color  
Box or small bowl to mix papers in  
Markerboard  
Paper for keeping score  
1 six-sided die  
Timer

## **INSTRUCTIONS**

1. Generate a list of consequences of extreme weather events, adding it to the list generated in the discussion at the beginning of the activity.
2. Assign a word for each student to write on his/her piece of paper.
3. Gather papers and mix.
4. Divide class into two teams.
5. Assign scorekeeper.
6. Have one student on each team roll the die. Lowest number begins.
7. Players on each team take turns drawing for their team. First player draws a paper from the box or bowl.
8. Using the chalkboard or markerboard, each player has one minute to illustrate the word they've chosen. No words, numbers, or letters are permitted.
9. After one minute, if the correct answer has not been guessed by the player's team, the other team is allowed one guess. Correct answers include weather event and consequences, e.g., crop loss due to flooding, increased glacial melt due to warmer temperatures, illness due to heat wave, etc.
10. If there are an unequal number of players on each team, choose one student to draw twice. The team with the most correct answer wins.

### **C. Extreme Weather Charades**

Instructions are as above, replacing drawing with acting. The student acting out the event may not speak.

### **GRADES 6-12 EDITORIAL PAPER**

Assign students a one-page paper stating their opinion on whether or not extreme weather is caused by climate change. Students research the effects of climate change on the weather and write a paper explaining their viewpoint, including three main points, five sources, and an annotated bibliography with reasoning for choice of sources. Before assigning the paper, discuss with students how to determine if the source is well-researched and credible and how to prevent plagiarism by properly citing sources. The links provided below under Additional Resources are a good starting point for their research.

Optional:

Publish editorials in a school newspaper, newsletter, blog, or submit to the local newspaper.

## **ADDITIONAL RESOURCES**

<http://www.worldwatch.org/fact-sheet-impacts-weather-and-climate-change>  
(Fact sheets regarding the impacts of weather and climate change)

<http://www.grid.unep.ch/glaciers/>  
(UN report on glaciers)

<http://www.epa.gov/climatechange/science/indicators/weather-climate/>  
(Concise explanation of weather and climate)

<http://oceanservice.noaa.gov/education/pd/climate/factsheets/whatrelationship.pdf>  
(Illustration of the relationship between weather and climate change)

<http://ncse.com/climate>  
(National Center for Science Education - Initiative for Climate Change website with rationale, support and resources for teaching climate change)