



Predicting Climate Change Impacts

Overview

In this critical thinking activity, students will predict how various types of climate change might impact the environment, food chains, human health, and the economy by focusing on a photograph depicting a scene relevant to North Carolina's citizens. This activity is adapted from *Teaching About Climate Change: Cool Schools Tackle Global Warming*, Green Teacher Magazine, 2001.

Courses

Biology; Earth and Environmental Science; Civics and Economics

North Carolina Standard Course of Study for Biology

- Objective 5.01: Investigate and analyze the interrelationships among organisms, populations, communities, and ecosystems.
- Objective 5.02: Analyze the flow of energy and the cycling of matter in the ecosystem
- Objective 5.03: Assess human population and its impact on local ecosystems and global environments.

North Carolina Standard Course of Study for Earth and Environmental Science

- Objective 2.07: Analyze the sources and impacts of society's use of energy.
- Objective 4.05 Investigate and analyze environmental issues and solutions for North Carolina's river basins, wetlands, and tidal environments.
- Objective 5.03: Analyze global atmospheric changes including changes in CO₂, CH₄, and stratospheric O₃ and the consequences of these changes.

North Carolina Standard Course of Study for Civics and Economics

- Objective 5.06: Analyze roles of individual citizens, political parties, the media, and other interest groups in public policy decisions, dispute resolution, and government action.
- Objective 9.08: Analyze the influence of environmental factors, economic conditions, and policy decisions on individual economic activities.
- Objective 10.01: Explain the distinction between personal and civic responsibilities and the tensions that may arise between them.
- Objective 10.05: Describe examples of recurring public problems and issues.

Essential Questions

- What are the various types of climate change?
- How might climate change influence NC's environment?
- How might climate change influence the health of NC's citizens?
- How might climate change influence ecosystems and the interdependence of organisms?
- How might climate change influence NC's economy?

Materials

- A selection of photographs (e.g. a tobacco farmer, a cow eating grass, a cheeseburger, a person with allergies, etc.)
- Copies of *Predicting Climate Change Impact Student Worksheet*, provided
- Tape
- Textbooks, *optional*
- Computers with Internet access, *optional*

Duration

20-25 minutes or longer, depending on your goals for this activity and the level of student.

Procedure

1. Divide students into groups of two or three and distribute a copy of the student worksheet to each student. Alternatively, you may have advanced students work individually.
2. Provide a selection of photographs and direct each group to select one. Alternatively, you may ask the class to analyze the same photograph.
3. Direct students to carefully study their photograph and to then follow the instructions on their worksheet to complete the activity. Emphasize that students do not have to fill in every square of their prediction chart but should think critically to make as many predictions as they can regarding their chosen scene. For each type of climate change listed, ask students to consider the following:
 - How will this climate change impact the scene in your photo?
 - How will this climate change impact what is needed to make the scene possible (e.g. water is needed to grow crops).
 - How will this climate change impact what exists in the scene that you can't see in your photo (e.g. microbes, insects, etc).
4. To conclude, invite groups to share their scene and their predicted impacts with the class. As a facilitator:
 - Do not classify student predictions as being right or wrong – simply listen to responses and keep in mind misconceptions to address later.
 - Invite classmates to make predictions for groups expressing difficulty with a category.
 - Emphasize both positive and negative effects of climate change, when appropriate.
 - Inquire about how humans might deal with the effects of climate change.
5. In closing, use one or more of these questions to stimulate further discussion:
 - Of the predicted impacts shared, which do you think has the potential to make the biggest impact on you, the state of North Carolina, and the world? Ask students to explain their reasoning.
 - Based on your predictions, which particular groups of people do you feel will be most impacted by climate change and in what way (e.g. a farmer's economic livelihood can be affected by severe weather)?
 - What choices can individual citizens, entire communities, and local governments make to counter the possible negative impacts we have discussed?

Culminating Activities

- Ask students to summarize their predictions in writing.
- Ask students to discuss why making predictions about climate change impacts can be challenging.
- Present findings from the 2007 IPCC Climate Change Report: *Climate Change Impacts, Adaptation and Vulnerability* (see Resources section).

Differentiation

Students with Special Needs

- Place students in mixed ability partners or small groups for activity completion.
- Ask the class to analyze the same photograph.
- Allow students to use the textbook or Internet to complete the activity.
- Give students additional time to complete the activity.

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- Students can work individually to complete this activity.
- Ask students to summarize their predictions in writing.
- Students can do research to see what scientific data exist to support any of their predictions.

Resources

IPCC (Intergovernmental Panel of Climate Change). 2007. *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, UK.
<http://www.ipcc-wg2.org/index.html>

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NAME: _____

Please choose a photograph from the selection provided by your teacher and study it carefully. For each type of climate change listed in the left-hand column below, be sure to consider the following:

- How will this climate change impact the scene in your photo?
- How will this climate change impact what is needed to make the scene possible (e.g. water is needed to grow crops).
- How will this climate change impact what exists in the scene that you can't see in your photo (e.g. microbes, insects, etc).

Discuss potential impacts with a partner and then record what you think the consequences might be if the following climate changes occurred:

	Type of Climate Change	How might this change affect the physical environment (water, air, soil) in your scene?	How might this change affect the plants and animals, including the food chain in your scene?	How might this change affect your health ?	How might this change affect the local economy ?
	Increased Rain or Snow				
	Decreased Rain or Snow				
	More Sunshine				
	Less Sunshine				
	Increased Temperatures				
	Decreased Temperatures				