

Climate Change: Impacts and Solutions in Texas

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This module explains the difference between climate and weather. It describes how our civilization is largely based on the assumption that climate is relatively stable. It then introduces students to why climate change matters, describing its impacts on West Texas and Texas-based solutions for adapting to the changes we can no longer avoid and mitigating or reducing carbon emissions to avoid even more severe impacts.

After completing this module, students will understand why Texas is so vulnerable to a changing climate, the specific effects of climate change on farming and agriculture, and a range of climate solutions that are already being used in Texas today and/or could be implemented in the future.

The lesson plan consists of (a) a short lecture that can be delivered via a recorded video by Dr. Hayhoe or a live PowerPoint presentation delivered by the instructor, (b) a PBS Global Weirding episode, (c) a short real-life application video, (d) a student classroom activity, and (e) several short readings.

Key Lessons

- Our entire civilization, from our agriculture to our energy systems, is built on the assumption that climate is relatively stable; but today, climate is changing faster than any time in the history of human civilization.
- Texas already experiences severe weather and climate variability naturally, but it is also the most vulnerable state in the United States to climate change impacts.
- Climate change impacts on Texas include stronger and longer droughts, more frequent heavy rain events, extreme summer heat, and bigger, stronger hurricanes.
- There are many solutions that could help reduce Texas' vulnerability to climate change impacts and reduce its carbon emissions, from water and energy conservation to regenerative agriculture and wind and solar energy.

Lecture (two options)

- A pre-recorded [video lecture](#) by Dr. Hayhoe (14 min) *or*
- A set of [PowerPoint slides](#) for the instructor to deliver themselves or provide to the students to follow along with the recorded lecture

Short Recommended Viewings (select as many as desired)

- [Global Weirding episode](#): "Texans don't care about climate change, right?" (5 min 15s)
- [Application video](#): "VERIFY: Does conservative Texas actually lead the U.S. in green energy?" (5 min 45s)
- [Application video](#): "Smithsonian Natural History Museum: Capturing carbon" (5 min 2s)
- [Application video](#): "Houston's plan to combat climate change" (2 min)

Student Activities (select one or more – can be done in class or as an assignment)

- WEATHER STORY: Everyone has a weather story--what's yours? Describe a time when you experienced extreme weather [here in Texas](#) and another time when you experienced it [somewhere else](#). What happened? How did it affect you, your family, and the place where you were? [How were the two experiences different?](#) [How were they similar?](#) [What does that tell you about](#) how vulnerable people [who live in each place](#) can be to extreme weather? This can be done as a written exercise and/or in pairs or small groups.
- ELEVATOR PITCH: Think of a specific type of person who lives in Texas and needs to make decisions about the future. For example, they could be the governor, an elected official, a city mayor, a local landowner, a water district, a farmer or producer, a business owner, or a homeowner. Then, create and deliver a one-minute elevator pitch that is customized to that specific person or group of people. Explain why climate change matters to them/their industry and how solutions can benefit them. This can be done as a written exercise and/or in pairs or small groups.
- NEWS STORY: Find a news story that discusses climate change impacts or solutions related to Texas. Read the article and summarize its main points in three sentences. This can be done as a written exercise, in groups, or as a class discussion for a smaller class.
- DOING THE CLIMATE MATH: In the lecture, Dr. Hayhoe "does the climate math" for West Texas. Select a different location and list one or two natural factors that makes it a challenge to live there, one or two ways that humans have made it an even bigger challenge, and finally one or two ways that climate change is making it even more difficult. This location could be in Texas if you only have time for a short activity (see below), it could be another U.S. state, [or it could be an international location, if the students have time to do some research](#). This can be done as a written exercise and/or in pairs or groups and shared in a class discussion. If desired, the instructor can assign a location.

Example for Coastal Texas/Houston. Natural factors: low-lying area subject to flooding and hurricanes; Human factors: destroying coastal wetlands that protect from storm surge and building large cities with valuable infrastructure that can be damaged by flooding, and lots of impervious surfaces which means the water has nowhere to go; Climate change: increasing the risk of heavy rain and making hurricanes stronger.

Recommended Readings (choose as many as desired)

- This [summary](#) from the EPA on climate change impacts in Texas
- The [executive summary](#) of the Southern Great Plains chapter of the US National Climate Assessment on climate change impacts across our region
- This [article](#) from the Dallas Morning News on longer droughts and extreme rainfall in Texas
- This [story](#) about Fort Hood's renewable energy plan from the American Association for the Advancement of Science
- This [article](#) from NBC News on young farmers adapting to a changing climate
- This [article](#) from The Wall Street Journal on solar power in Texas
- This [article](#) from USA Today on wind energy in Texas