Climate Change Is Dramatic

Global temperature is warming, weather patterns are changing, polar ice is melting, and sea level is rising.

4-5 days **Environmental Science, English, Social Studies** **Grades 6-8**

Learning Objective

Students will explain the concept of extreme weather.

Students will interpret data to draw conclusions about weather trends in their community.

Students will explore the connection between climate change and extreme weather.

Essential Question

What is the connection between climate change and extreme weather?

PA STEELS Standards

3.4.6-8.D Gather read and synthesize information from multiple sources to investigate how PA environmental issues affect PA's human and natural systems

3.4.6-8.E Collect, analyze and interpret environmental data to describe a local environment.

Materials: Agree/Disagree signs, Climate vs. Weather Visual, Computer Access

Engage

Activity:

Set up two signs at opposite corners of a space.

One sign should read AGREE- the other DISAGREE

Read each of the following statements and ask students to choose a place to stand in relation to the signs. The nearer they stand to the sign, the stronger they feel.

Those who don't know how to respond can move towards the middle.

Once they have chosen a position ask why they are standing where they are standing. Ask students taking different stances to explain why they placed themselves where they did.

Statements

1. Weather is the same as climate.

Weather refers to short-term changes in the atmosphere, climate describes what the weather is like over a long period of time in a specific area

2. Cow burps are a major cause of climate change

30% of the methane released into the environment is from livestock (cows in particular).

Methane is also a powerful greenhouse gas. Over a 20-year period, it is 80 times more potent at warming than carbon dioxide.

https://www.pbs.org/newshour/show/cow-burps-are-a-major-contributor-to-climate-change-can-scientists-change-that

3. Going vegan helps to improve the climate.

People who follow a plant-based diet account for 75 percent less in greenhouse gas emissions than those who eat more than 3.5 ounces of meat a day (that is about the size of a hamburger at McDonalds), and a vegan diet also results in significantly less harm to land, water and biodiversity, according to new research from the University of Oxford.

https://www.nytimes.com/2023/07/21/climate/diet-vegan-meat-emissions.html#:~:text=People%20who%20follow%20a%20plant,from%20the%20University%20of%20Oxford.

4. Electric cars are good for the natural world.

EV is typically responsible for lower levels of greenhouse gases (GHGs) than an average new gasoline car because they have no tailpipe emissions.

https://www.epa.gov/greenvehicles/electric-vehicle-myths

5. Climate change causes flowers to bloom at the wrong time of year.

This warming has led to a significant shift in the plant community's peak flowering time, moving forward by 22 days.

This phenomenon is widespread, affecting 80% of the observed species by advancing their flowering start, and 68% by moving up the end of their flowering period.

https://www.neefusa.org/story/climate-change/early-blooms-spring-how-climate-change-impacts-growing-seasons-and-you

6. Rainforests are the biggest preventers of climate change.

Rainforests are one of nature's best defenses against climate change. All forests and other landscapes sequester carbon dioxide and store carbon, but tropical rainforests do better. Sequestered carbon is then stored in live trees, deadwood, litter and forest soils—contributing to the worldwide carbon "reservoir" that serves to mitigate climate change.

https://www.rainforesttrust.org/our-impact/rainforest-news/5-ways-rainforests-mitigate-climate-change/

7. Scientists agree that humans are responsible for climate change.

Multiple independent studies over the past 19 years have found that between 90 and 100 per cent of scientists agree that humans are responsible for climate change, with most of the studies finding a 97 per cent consensus.

https://www.un.org/en/climatechange/science/mythbusters

8. Polar bears are at risk of extinction due to climate change.

Two-thirds of the world's polar bears could be extinct by 2050 if greenhouse gas-fueled global warming keeps melting their Arctic sea-ice habitat.

https://www.biologicaldiversity.org/species/mammals/polar_bear/index.html

9. Agriculture is a leading contributor to climate change.

Agriculture accounts for one third of greenhouse gas emissions globally, according to the UN Food and Agriculture Organisation.

https://www.oxfamamerica.org/explore/stories/how-will-climate-change-affect-agriculture/#:~:text=Farming%20contributes%20to%20global%20warming.UN%20Food%20and%20Agriculture%20Organisation.

After students have responded to each statement, have the group as a whole determine what points they agree upon collectively.

Explore

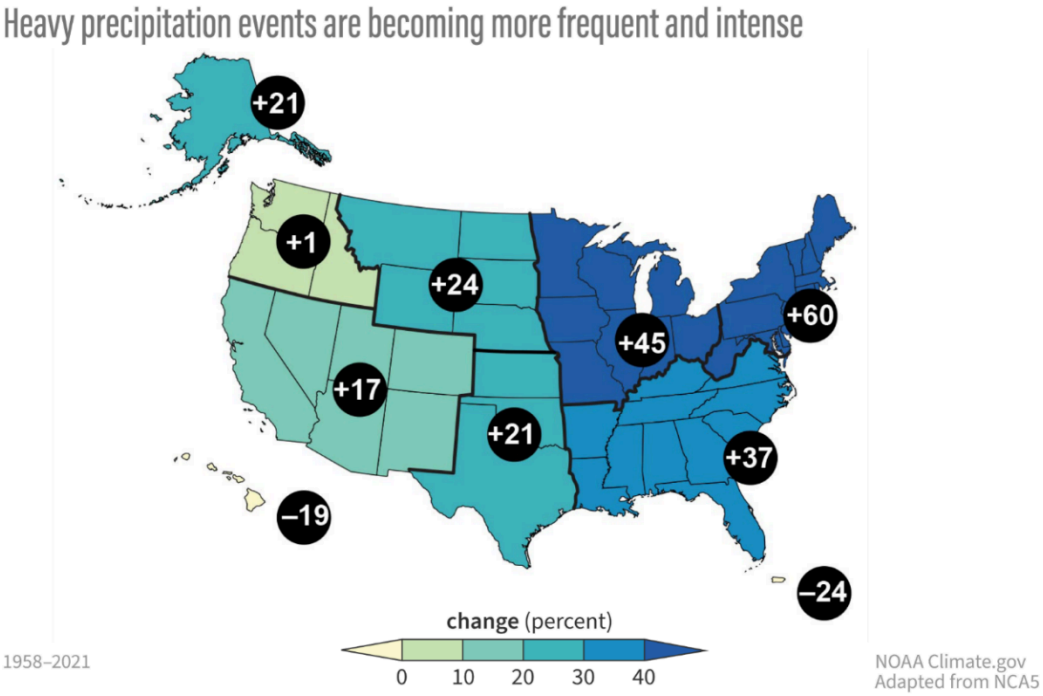
Activity:

Questions to Consider

How do we measure climate change impact?

How do we define extreme weather?

Present students with the graphic below. What does it say about extreme weather?



How does climate change affect the likelihood or severity of an extreme weather event?

Is climate change causing these extreme weather events?

No. Climate change is indirectly causing these events. Climate change is creating more favorable conditions for extreme weather events to take place. This increases the likelihood and severity of these weather events.

After discussion direct students will examine data found in the US Climate Resilience Toolkit.

Students will explore information gathered about their community.

Divide the group up int teams of 2. Each team will then go to

https://toolkit.climate.gov/#climate-explorer and click on launch the Climate Explorer

Each team will respond in writing to the following prompt.

According to the data provided, is your area experiencing more extreme weather events? What data supports your response?

Explain

Activity:

To provide more insight into the connection between weather and climate change view the following video.

Climate Change Video (16 minutes 52 seconds)

https://www.youtube.com/watch?v=raijIFglj6c&t=216s

"Floods, heat waves, droughts, and megafires: all are phenomena linked to Earth's changing climate. People hear about climate change all the time, but how well do they know the evidence? This film begins with phenomena linked to climate change and then examines how Earth's temperature is controlled, how we know it is changing, and how the current changes compare to those over the last 800,000 years. Along the way, we meet scientists working at the forefront of climate change: fire scientist Crystal Kolden, soil scientist Asmeret Asefaw Berhe, atmospheric scientist Ralph Keeling, and ice core scientist Kathleen Wendt. The scientists explain how we know what we know about Earth's changing climate and make the critical point that we can solve climate challenges."

Questions to Consider

What are the scientists saying about climate change and its impact on the earth?

What do you think the future will be like if climate change is not addressed?

Elaborate

Activity:

2 Options (small groups, 4-5 students per group)

Student Directions

1. **Create a weather report from 2050**

Examples of weather becoming more intense and uncomfortable:

-long periods without rain (drought)
-lots of rain
-intense heat
-bigger, stronger hurricanes
-blizzards
-violent thunderstorms
-increase in # of tornados
-wildfires

As a group create a TV News Weather report for the year 2050.

First pick a season.

You must include local weather which you will determine based on the data you explored previously.

Then decide what major weather events you would like to cover: wildfires in Hawaii, violent thunderstorms and tornados along the east coast of the United States, hurricanes in Louisiana, Florida, Puerto Rico.

Each extreme weather location needs to have a reporter and some locals to interview. In the interest of realism use weather events that have occurred to inform your reporting, this will require some research.

2. **Create a public service announcement explaining what climate change is, its connection to extreme weather events and one thing people can do to help mitigate its effects.**

Each group will write a script, create costumes, scenery, props etc. and perform for classmates.

Evaluate

Data analysis based on the information found through use of U.S. Climate Resilience Toolkit.

Student performances can serve as a culminating activity based on creativity and how information acquired through previous activities is incorporated.

WEATHER

Tells you what to wear each day

CLIMATE

Tells you what types of clothes to have in your closet

IoT4Ag
The Internet of Things for Precision Agriculture
an NSF Engineering Research Center