

Pre and post-visit activities for *Extreme Weather* Field Trip Packages

Earth and Agricultural Science Lessons for Grades 3-8.

Learning Goals (for field trip and pre/post-activities)

Through pre-visit, field trip, and post-visit activities, students will:

1. Learn the difference between weather and climate.
2. Identify the criteria and conditions for weather to occur.
3. Experience how atmospheric processes like convection result in the creation of clouds, lightning, and thunder.
4. Identify the causes and effects of climate change and extreme weather.
5. Learn how climate change and extreme weather impacts farming and food production.
6. Explore how technology and innovation can address the impacts of climate change on agriculture and food production.

Standards Addressed

Next Generation Science Standards (NGSS)

- Elementary Standards: 3-ESS3-1, 3-LS4-4, 4-ESS3-1, 5-ESS3-1, 5-ESS2-1
- Middle School Standards: MS-ESS2-5, MS-ESS3 (all)
- High School Standards: HS-ESS3-6, HS-ESS2-6, HS-LS2-5

Pre-visit Activities

Before bringing students to the Science Center, you may want to try some of the following activities to activate prior knowledge and prepare them for their field trip. Activities can be adjusted for grade level.

1. Have the students watch the news, read newspapers or magazines, or search the internet for current examples of natural disasters and extreme weather. Discuss the causes of these extreme weather events and the impacts of the events on people, businesses, agriculture, and the environment.
2. Define the following terms and describe how each is connected to extreme weather: climate, weather, convection, tornado, hurricane, blizzard, dust storm, drought, wildfire, glacier & climate change.
3. Create a Venn diagram displaying the similarities and differences between weather and climate.
4. Explore how human activity impacts the amount of carbon in the atmosphere. Have students create an energy journal where they monitor their energy use for a day or week and then help students brainstorm ways that they could minimize their energy use.

Post-visit Activities

Extend and enhance your Science Center experience by trying some of the following activities and lessons at school. Activities and lessons can be adjusted for grade level.

1. Play the Smithsonian Institute's soil interactive game to explore how farming practices like tilling and fertilizer application are connected to greenhouse gas emissions and productive crop yields. Adobe Flash required. <http://forces.si.edu/soils/interactive/web/index.html>
2. Dinosaur Breath Activity: Students learn about the geological carbon cycle, investigate the role of dinosaurs in the carbon cycle and the eventual storage of carbon in the form of chalk. The experiment uses chalk and vinegar to demonstrate the storage and release of carbon. https://www.teachengineering.org/activities/view/cub_carbon_lesson01_activity1
3. Have students investigate and record their own carbon footprint, using this carbon calculator: www.nature.org/en-us/get-involved/how-to-help/consider-your-impact/carbon-calculator/ Create a plan for reducing your classroom carbon footprint. Ideas include: Bike or walk to school day, creating a composting program, planting more trees, etc.
4. Play the Greenhouse Gas Game to help students learn about the heat trapping properties of greenhouse gases that contribute to climate change. <https://scied.ucar.edu/greenhousegasgame>
5. Have students research the technology covered in the program: weather stations, agricultural robots, agricultural drones, and genetically modified plants. Encourage students to creatively brainstorm new technological inventions for climate change mitigation.

Resources

Websites

- National Geographic - <https://www.nationalgeographic.org/education/extreme-weather>
- NASA's website about climate change in a kid friendly format. Good for Grades 3-6. <https://climatekids.nasa.gov/>
- NASA's site for climate information for Grades 6-12 and adults. <https://climate.nasa.gov/>
- Weather Wizkids - <http://www.weatherwizkids.com/index.htm>
- Science Kids-weather - <http://www.sciencekids.co.nz/weather.html>
- Web Weather for Kids - <http://eo.ucar.edu/webweather/tornado.html>
- Global Forest Watch Fires - <http://fires.globalforestwatch.org/home/>
- U.S. Drought Portal - <https://www.drought.gov/drought/>
- Mesonet-Epscor weather monitoring station at the Saint Louis Science Center <https://missouriepsco.org/data/missouri-mesonet>

Books

- Tornadoes! by Gail Gibbons. Ages 6-9
- Wildfires by Seymour Simon. Ages 6-10
- Inside Tornadoes by Mary Kay Carson. Ages 8-12
- What is Climate Change? By Gail Herman. Ages 8-12
- Extreme Weather: Surviving Tornadoes, Sandstorms, Hailstorms, Blizzards, Hurricanes, and More! by Thomas M. Kostigen. Ages 8-12
- In the Shadow of Melting Glaciers: Climate Change and Andean Society by Mark Carey
- A Kid's Guide to Climate Change and Global Warming: How to Take Action! by Cathryn Berger Kaye. Ages 10+