

Climate Change Trends & Effects

Learning Objectives

Students will be able to:

1. Evaluate data graphs and determine a conclusion.
2. Create a data graph and determine a trend.
3. Explain at least three effects of climate change observed in Tennessee.

Materials:

- Worksheets
- Pen/pencils
- Internet-abled device
- Ruler
- Markers

<https://tiny.utk.edu/climatechange>

Setting the Stage

A changing climate affects life in many ways across Tennessee, both for people and for the environment in which we live. Scientists have collected much data to help explain the effects we see and make preparations for the future. In this activity, we will look closer at how climate change is affecting seasonal temperatures, risk for mosquito-borne illnesses, frequency of heavy downpour rains, the agricultural growing season, and the occurrence of extreme weather events such as tornados.

Seasonal Warming Trends

Climate change is causing global temperatures to rise throughout the year, but some seasons are warming faster than others depending on location. Winter is the season that is warming the fastest for most part of the United States. Since 1907, winter has warmed by at least 1 degree F and up to 4 degrees F in some areas. These patterns affect things like plant blooms and the resulting allergy season.

Mosquito Danger Days

A mosquito danger day is defined as a day with an average temperature between 61 and 93 degrees F, which is the range for transmission of diseases spread by specific types of mosquitoes. In a survey of 244 United States cities, 94% are seeing an increase in the number of mosquito danger days. This means higher risk for spreading of mosquito-borne illnesses and an increase in bites per year.

Frequency of Heavy Downpour Rains

Storms are measured in terms of both rainfall depth and intensity, or how fast or heavy the rain falls. Heavy downpour rains are on the rise across the country, meaning more rain is falling in shorter amounts of time. This can result in higher amounts of soil erosion and increase risk of local flooding on roads.

Agricultural Growing Season

The growing season is the period of time each year that local weather conditions allow for normal plant growth. In Tennessee, this begins generally in April and ends in October, but the specific dates vary regionally. Warmer falls are becoming a trend across the country, with the first freezes of the season falling on a later date than before. This means that for much of the country, including Tennessee, the growing season is being extended, allowing for more time to grow crops and produce food, fuel, and fiber for our communities.

Occurrence of Tornados

Tornados are an extreme weather event that occur when warm, moist air collides with cooler, drier air. This collision creates an unstable atmosphere, and combine that with winds, and there is a recipe for a tornado. So far, there is not enough information to draw conclusions about the impacts of climate change on tornados, but there is no doubt that the atmosphere is becoming a warmer and wetter one as greenhouse gasses are on the rise.

Have you observed an effect of a changing climate?

Example questions to pose:

- Does winter seem to come later and with less sustained cold temperatures?
- Do you notice more mosquitoes?
- Have you seen more flooded roadways?
- Are there more frequent tornado warnings?

Backyard STEM for Tennessee 4-H

Climate Change Trends & Effects Worksheet

Access to the internet is required to complete this activity. Please use the following website to access resources needed to answer the questions below: <https://tiny.utk.edu/climatechange>

Seasonal Warming Trends in Tennessee and the United States.

1. In which season is Tennessee experiencing the fastest warming?	Spring Summer Fall Winter
2. Approximately how many degrees has each of the four seasons warmed during the period from 1970 to 2017 (round to the nearest 0.25 degree F)?	Spring _____ Summer _____ Fall _____ Winter _____
3. Which season is warming the fastest by the most states?	Spring Summer Fall Winter
4. Name a state that is experiencing fastest warming for each of the seasons.	Spring _____ Summer _____ Fall _____ Winter _____

Mosquito danger days.

1. What is the range of average daily temperature that is considered "disease danger days?"	_____ F to _____ F
2. Which Tennessee city has seen the biggest increase in "mosquito danger days" per year?	Chattanooga Nashville Jackson Memphis Knoxville Tri-cities
3. Name a city outside of Tennessee that has seen more of an increase in "mosquito danger days" than any city in Tennessee.	_____

Frequency of heavy downpour rains.

1. Approximately how many heavy downpours occurred in Tennessee in the years listed?	1955 - _____ 1960 - _____ 1975 - _____ 1985 - _____ 2010 - _____
2. Is the trend in frequency of heavy downpours increasing or decreasing in Tennessee?	Increasing Decreasing

Agricultural growing season.

1. Approximately how many days longer is the current growing season than it was in 1975 in the United States?	5 days 12 days 25 days
2. Rank these Tennessee cities from longest to shortest number of days later the first frost is coming.	Knoxville _____ Memphis _____ Nashville _____ Tri-Cities _____

Occurrence of tornados.

1. Is there a consensus on whether climate change is affecting tornados?	Yes	No
2. Is the trend in number of tornados per year in Tennessee going up or down? Use the data table to create a graph and answer this question.	Up	Down

Tennessee Tornados

Data from www.tornadohistoryproject.com

<u>Decade</u>	<u>Number of Tornados</u>
1950 - 1959	95
1960 - 1969	74
1970 - 1979	180
1980 - 1989	114
1990 - 1999	220
2000 - 2009	289
2010 - 2016	277

