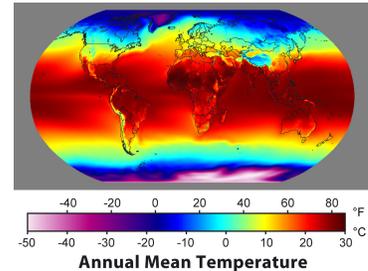


Activity 2.2: Expert Group C Worksheet

In your expert group, complete each task answer the questions related to each task. In the next activity, you will explain your phenomenon to your home group members. Be sure to ask questions about anything you don't understand about your phenomenon.

Task A: Read about the Phenomenon: Annual mean global temperature

- What is annual mean global temperature?* It is the mean (average) of land and ocean surface temperatures measured around the world over one year.
- How do we measure average global temperature?* It is measured around the world at different locations. Scientists have been making these measurements since 1880! Each year's average is expressed as a temperature "anomaly:" the difference between average temperature for that year and the long-term average temperature. For example, if the 2017 global average temperature is 10°C and the 1980-2010 average was 6°C, the 2017 temperature anomaly is +4°C.
- Why is average global temperature important?* The global average temperature tells us how much the Earth's climate is changing. Even a small change in global average temperature can cause changes in wind patterns, floods, and droughts in different parts of the world.



Annual mean temperatures around the world are averaged to get a global annual mean. Image from Wikimedia Commons: https://commons.wikimedia.org/wiki/File:Annual_Average_Temperature_Map.jpg

Task B: Watch a video about temperature from the NASA Earth Observatory website. Then answer the questions below.

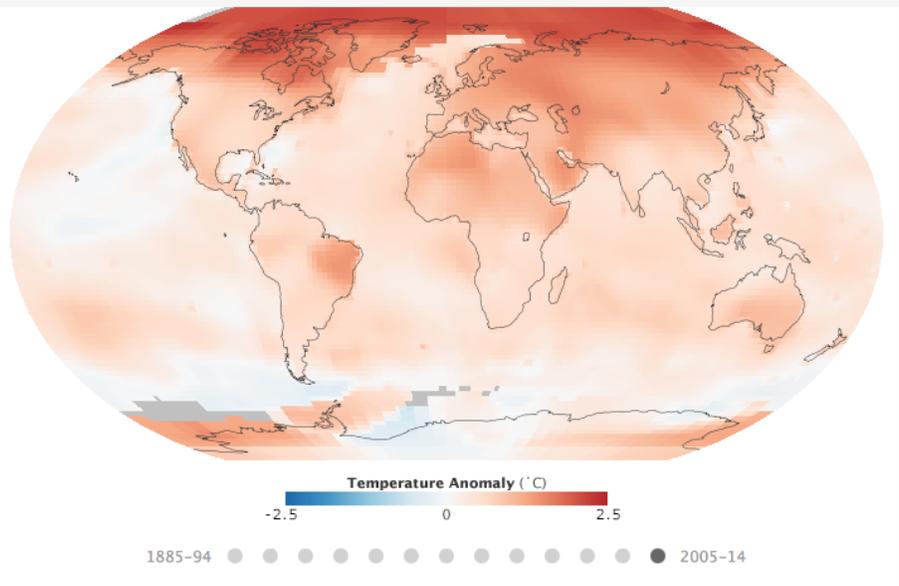
<http://earthobservatory.nasa.gov/Features/WorldOfChange/decadaltemp.php>

In this video you will see an interactive animation of global temperature data. The data presented is the temperature anomaly, or difference from the average temperature in the years 1951-1980. Therefore, the colors on the map show how much warmer or colder a region is compared to the region's average temperature from 1951-1980.

Look For: When you are watching the temperature anomaly video, pay attention to these things:

- The colors:* The blue indicates anomalies (or changes) in temperature that are below average. The red indicates anomalies (or changes) in temperature that are higher than average.
- The temperature change:* Notice that the red color indicates only a 2.5° C change. Even though it sounds like a small amount, this is a big change for the planet.
- The picture of the earth.* Note where the colors appear. What does this mean?
- The time scale:* The video shows temperature anomalies (changes) starting in 1885 and going until 2014.

Figure 1: Temperature Anomalies Video



Questions: Answer these questions about the video.

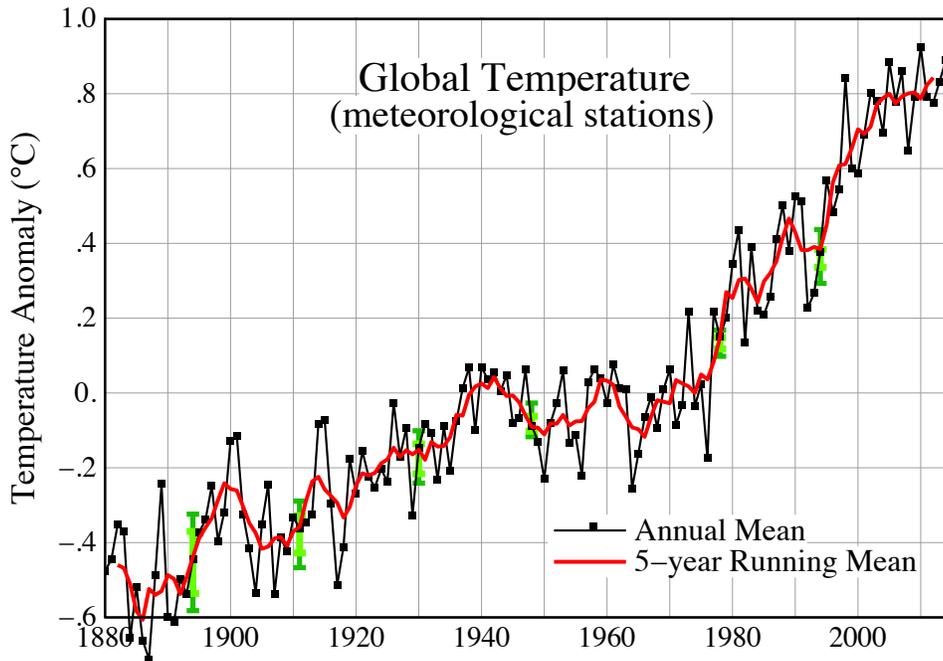
1. Describe what you see happening to the colors on the map in the animation.

2. What patterns do you notice in the global temperature anomaly data over time?

3. What questions do you have about the video or the data it represents?

Task C: Interpret a graph about temperature anomalies.

Figure 2: Temperature Anomalies Graph¹



Questions: Answer these questions about the graph.

4. How does the temperature anomaly in 1900 compare to the temperature anomaly in 2010?
Hint: use the running mean (the red line) to make your decision.

5. Explain why the period from 1950 – 1980 hovers right around a 0°C temperature anomaly (hint: reread the information about temperature anomaly data at the top of the worksheet).

6. What is the largest temperature anomaly recorded in the 135 years? _____ °C

7. In what year was this recorded? _____

¹ The graph above represents the annual mean temperature anomalies from the average temperature over the period of 1951-1980. http://data.giss.nasa.gov/gistemp/graphs_v3/

Task D: Complete the charts below. Discuss anything you don't understand with your group or teacher. Use this to explain your phenomenon to your home group.

Representation

	What variables are represented?	Which part(s) of the Earth are represented?	What time period is represented?
Video			
Graph			

Generalizability

What information does the video tell us that the graph (Figure 3) leaves out?	What does the graph (Figure 3) tell us that the video leaves out?	Which of Earth's regions are included?	What does this data tell you about global patterns?

Short-Term Variability vs Long-Term Trends

Describe the short-term variability in the data. Is it predictable or unpredictable?	Describe the long-term trend in the data. Is it predictable or unpredictable?