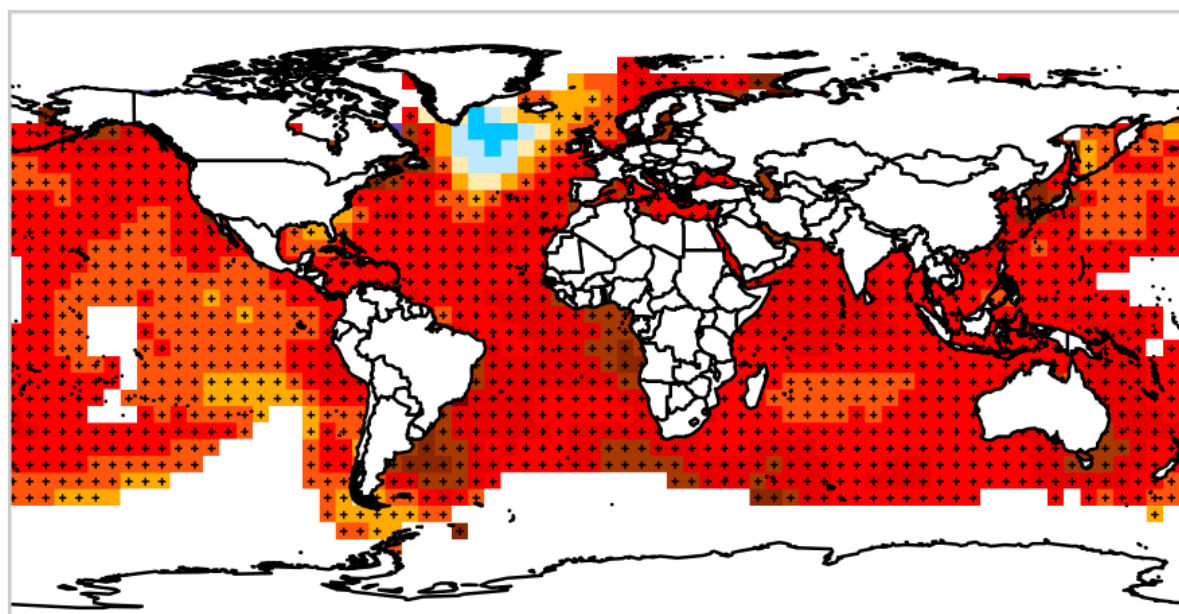


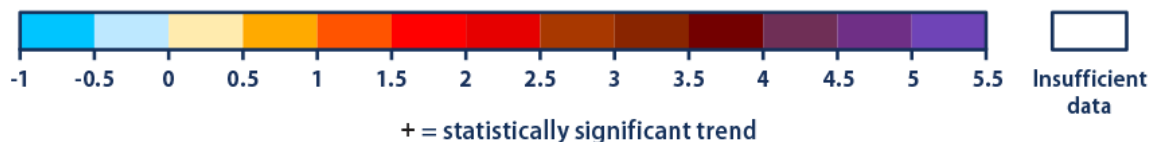
Climate Change Indicators: Sea Surface Temperature

Sea surface temperature - the temperature of the water at the ocean surface - is an important physical attribute of the world's oceans. The surface temperature of the world's oceans varies mainly with latitude, with the warmest waters near the equator and the coldest waters in the Arctic and Antarctic regions. As the oceans absorb more heat, sea surface temperature increases, and the ocean circulation patterns that transport warm and cold water around the globe change. Changes in sea surface temperature can alter marine ecosystems, reduce circulation patterns that bring nutrients from deep sea to surface waters, and overall dramatically alter ocean ecosystems that could lead to declines in fish populations.

Below is a graphic that shows the change in sea surface temperature from 1901 - 2020.



Change in sea surface temperature (°F):



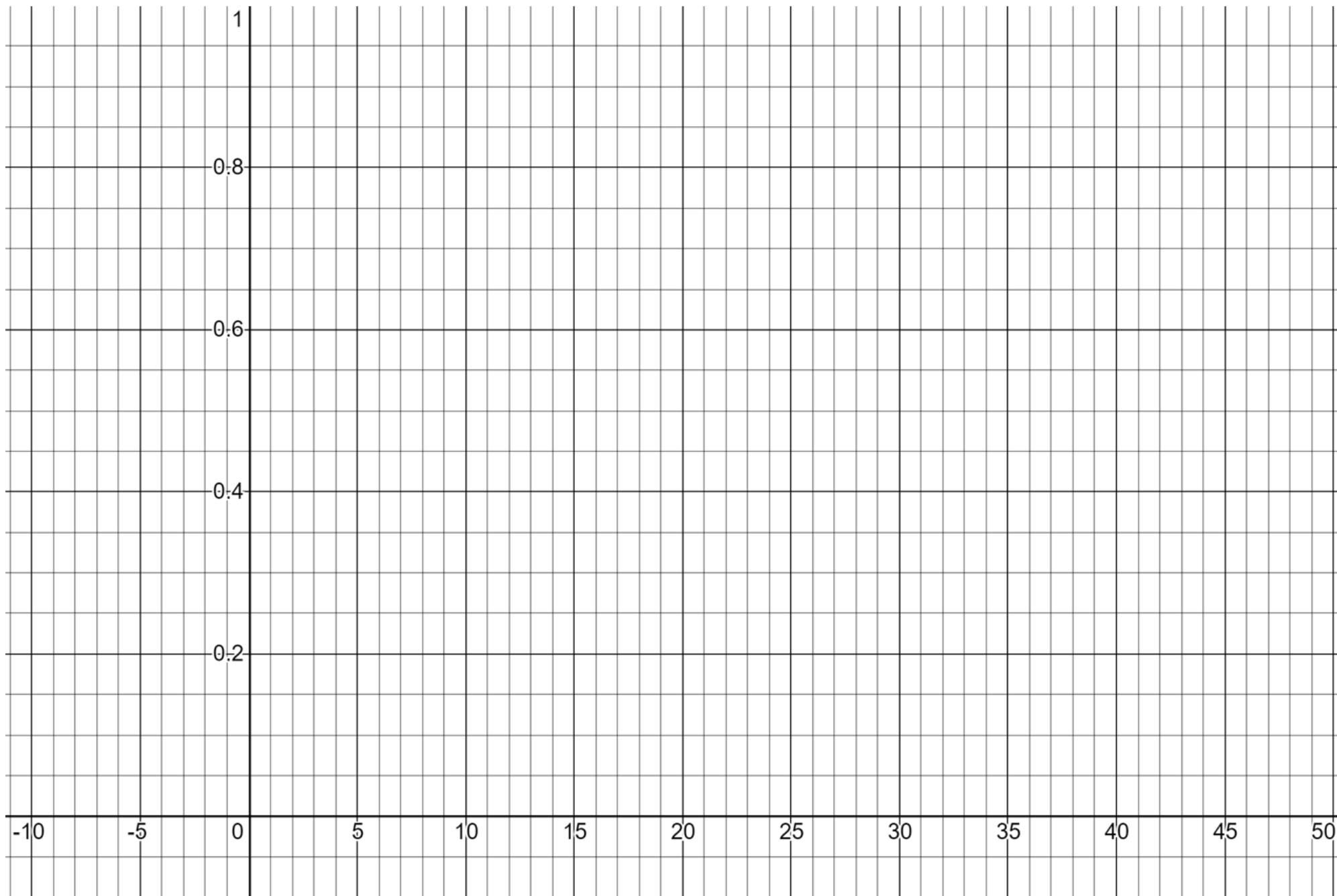
It can also be beneficial to view this data another way. Using the table below we will create a scatter plot displaying the years and their corresponding change in water temperatures so that we can look for patterns and trends. Think about the following questions before you start plotting your data points.

- 1) What does it mean when the change in water temperature is a negative number?
- 2) What does it mean when the change in water temperature is a positive number?
- 3) Is there an easier or more efficient way to show the number of years from 1980 to 2020?

YEAR **Temperature Change**

1980	0.066
1981	-0.006
1982	-0.006
1983	0.138
1984	-0.042
1985	-0.114
1986	-0.042
1987	0.21
1988	0.138
1989	0.066
1990	0.246
1991	0.192
1992	0.048
1993	0.048
1994	0.084
1995	0.174
1996	0.084
1997	0.354
1998	0.444
1999	0.084
2000	0.12

2001	0.354
2002	0.408
2003	0.462
2004	0.426
2005	0.426
2006	0.426
2007	0.3
2008	0.264
2009	0.498
2010	0.516
2011	0.318
2012	0.444
2013	0.48
2014	0.642
2015	0.858
2016	0.93
2017	0.822
2018	0.732
2019	0.876
2020	0.84



- 4) What do you notice about the ocean temperatures as the years go on? How would you describe the trend of this graph to someone?

- 5) Now we will *approximate* this data with what is called a 'line of best fit'. Using a ruler, draw a line through and as close to as many data points as possible.

- 6) Next, we will write the equation for our line of best fit. Remember, a linear equation can be represented in $y=mx+b$ form, where m is the slope and b is the y -intercept. To find slope, you need two points on the line.

- 7) When we have a line of best fit we can use that equation to predict the temperature change of the ocean's surface water over the next few years. Using your model, predict 2021's average temperature change.

- 8) Can you now FIND 2021's average temperature change? How was your prediction?

- 9) Predict 2030's average temperature change using your model.