

Name(s) _____ Period _____ Date _____

How Has Temperature Changed Since the Industrial Revolution?

Exploration 2: Estimating and Using Linear Regression to Calculate Temperature Trends

Part A – Estimating the Temperature Trend For the Past 125 Years

Use the interactive, time series graphing tool to answer the following questions.

1. Click on the *Show Slope* button.
2. Adjust the slope and the y-intercept by moving the sliders below the graph. Make your best estimate of the slope and location of the trend line.
3. Click on the *Take Snapshot* button. An image of the graph with your trend line will appear.
4. Right click on the image and save the image to your computer.
5. Insert the image (Insert>Picture) into the student worksheet.
6. What is the slope of this line? (The slope is shown in the bottom left corner.) Round to the nearest one thousandth. _____
7. Based on your estimated slope, what is the average rate of change in temperature anomalies over 100 years? (Hint: Multiply your slope by 100.)

Part B – Determining the Temperature Trend For the Past 125 Years Using Linear Regression

You will calculate the slope of the line for different time periods using a simple regression analysis in Microsoft Excel.

(NOTE: You will need the separate set of instructions for this activity.) Open the instructions and download the data now. Throughout the instructions, you will be asked to enter your results in the table in your student worksheet.

| Time Interval (Years) | Corresponding Number in Instructions | Slope of the Trend Line/Rate of Change Calculated by Excel Formula for Regression – SLOPE (See Instructions 1-5.) |
|-----------------------|--------------------------------------|---|
| 125-Year (1885-2010) | 1.k | |
| 100-Year (1910-2010) | 2.d | |
| 75-Year (1935-2010) | 3.d | |
| 50-Year (1960-2010) | 4.d | |
| 25-Year (1985-2010) | 5.d | |

Analysis of Findings

1. How does the slope of the recent 25-year trend line generally compare to the slope of the past trend lines?
2. During which time interval was the rate of change in temperature anomaly the highest?