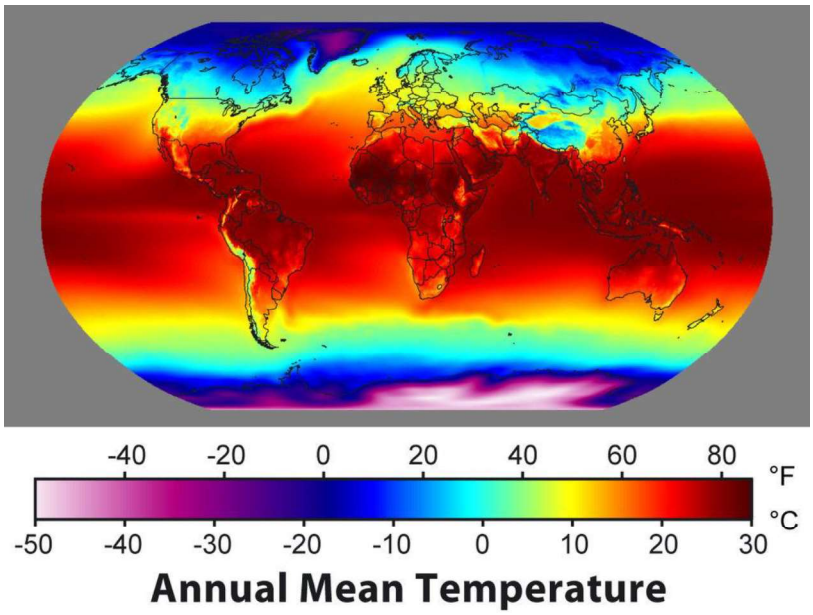
NAME: _____ **PERIOD:** _____ **DATE:** _____

LAB PARTNERS: _____**LAB # 36**

INVESTIGATING CLIMATE FACTORS: ELEVATION AND TEMPERATURE

PHENOMENON

Using the Annual Mean Temperature Map to the right, locate and circle two areas that you think may have a high elevation. Based on prior knowledge, explain why you think these circled locations have a higher elevation. *(To draw circles using Google Docs, click insert → drawing → new → then click "shapes" → click on circle → draw a circle → save and close → click your circle and "wrap text." Then move your circle to the appropriate location over the map)*



INTRODUCTION

In this climate factors lab, you will be investigating the relationship between elevation and temperature. Since latitude is a factor that also impacts climate, the locations chosen both have approximately the same latitude. You will be investigating how elevation is a factor that affects climate. You will be exploring the relationship between elevation and temperature throughout the year at both of these Northern Hemisphere locations: Fort Kent and Mount Rainier. Fort Kent is 610 feet above sea level, while the elevation of Mount Rainier is 14409 feet above sea level.

OBJECTIVES

HS-ESS2-2 Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems.

PREDICTIONS

1. **Plot the latitude and longitude coordinates** for both cities below on the Tectonic Plates map provided on page 4. Please plot Fort Kent in **blue** and Mount Rainier in **red**. *(Using Google Docs, click insert → drawing → new → then click on line → draw an X → save and close → click your "X" and "wrap text." Then move your "X" to the appropriate location over the Tectonic Plates map)*
   a. Fort Kent, Maine: 47˚N, 68.5˚W
   b. Mount Rainier, Washington: 47˚N, 121.75˚W

Using the locations of the two cities, **predict which city** (Fort Kent or Mount Rainier) will have the **highest annual average temperature**. Explain why you made this prediction.

PROCEDURE

Using the data and graph on the following page:

1. Calculate and record the **annual average temperature** for each city in the space provided in the data table below. *To calculate the average, add up all of the data points in the column, and divide by the total number of months provided in the data table.*

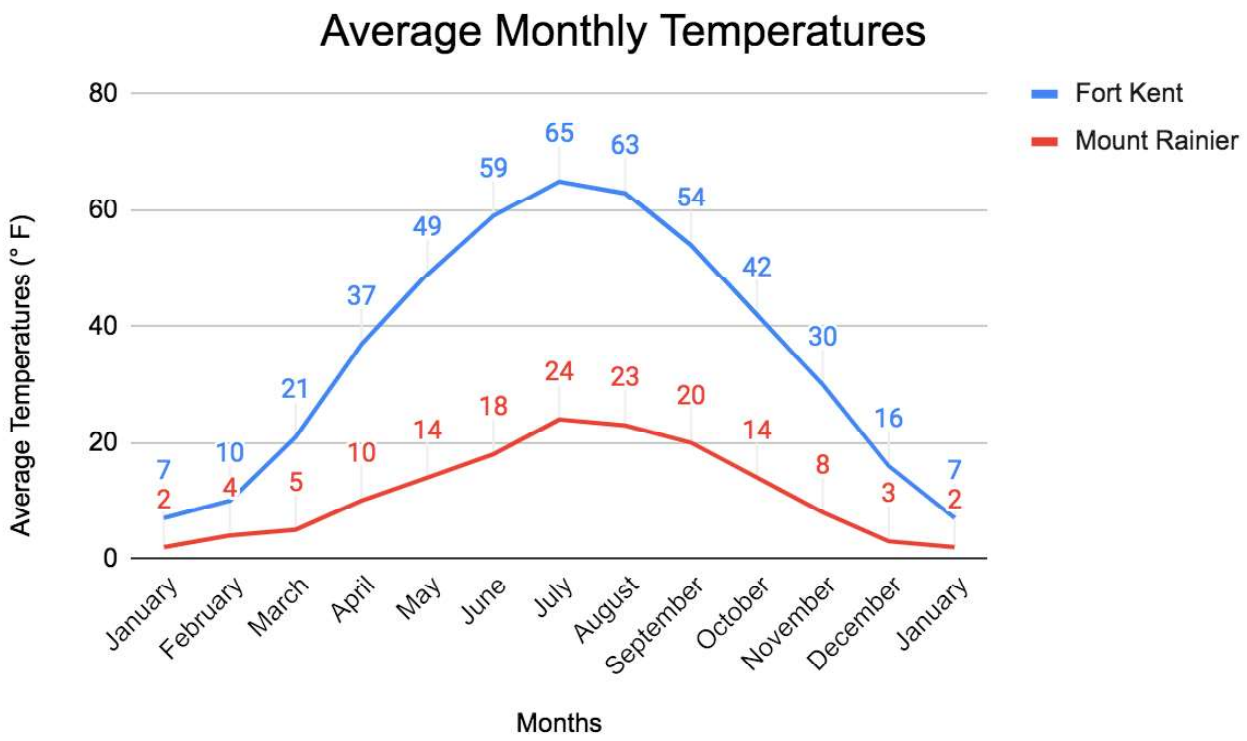
2. **By determining the warmest temperature and coldest temperature for each city, state the annual temperature range**. Then, make sure to record the annual temperature range for each city in the last line of the table below. *You will need to subtract the warmest temperature and the coldest temperature for each city to obtain the annual temperature range.*

3. Analyze and interpret the graph on page 2.
4. Then, answer the following questions provided on page 3.

Data Table:

Average Monthly Temperatures (Degrees Fahrenheit)		
City	**Fort Kent, Maine**	**Mount Rainier, Washington**
Latitude and Longitude	47.25˚N, 68.5˚W	47˚N, 121.75˚W
Elevation	610 feet	14409 feet
January	7	2
February	10	4
March	21	5
April	37	10
May	49	14
June	59	18
July	65	24
August	63	23
September	54	20
October	42	14
November	30	8
December	16	3
January	7	2
1. Annual Average Temperature *(add up the column temperature data, and divide by the total number of months)*		
2. Annual Temperature Range *(to calculate range, take the largest number in the temperature column, and subtract it with the smallest number in the column)*		

Graph:



Answer the following questions by analyzing and interpreting the data provided above.

1. What is the latitude of:
   a. Fort Kent:
   b. Mount Rainier:

2. What is the minimum temperature of:
   a. Fort Kent:
   b. Mount Rainier:

3. What is the maximum temperature of:
   a. Fort Kent:
   b. Mount Rainier:

4. Using the data above, how much higher in elevation is Mount Rainier than Fort Kent? *(find the difference)*

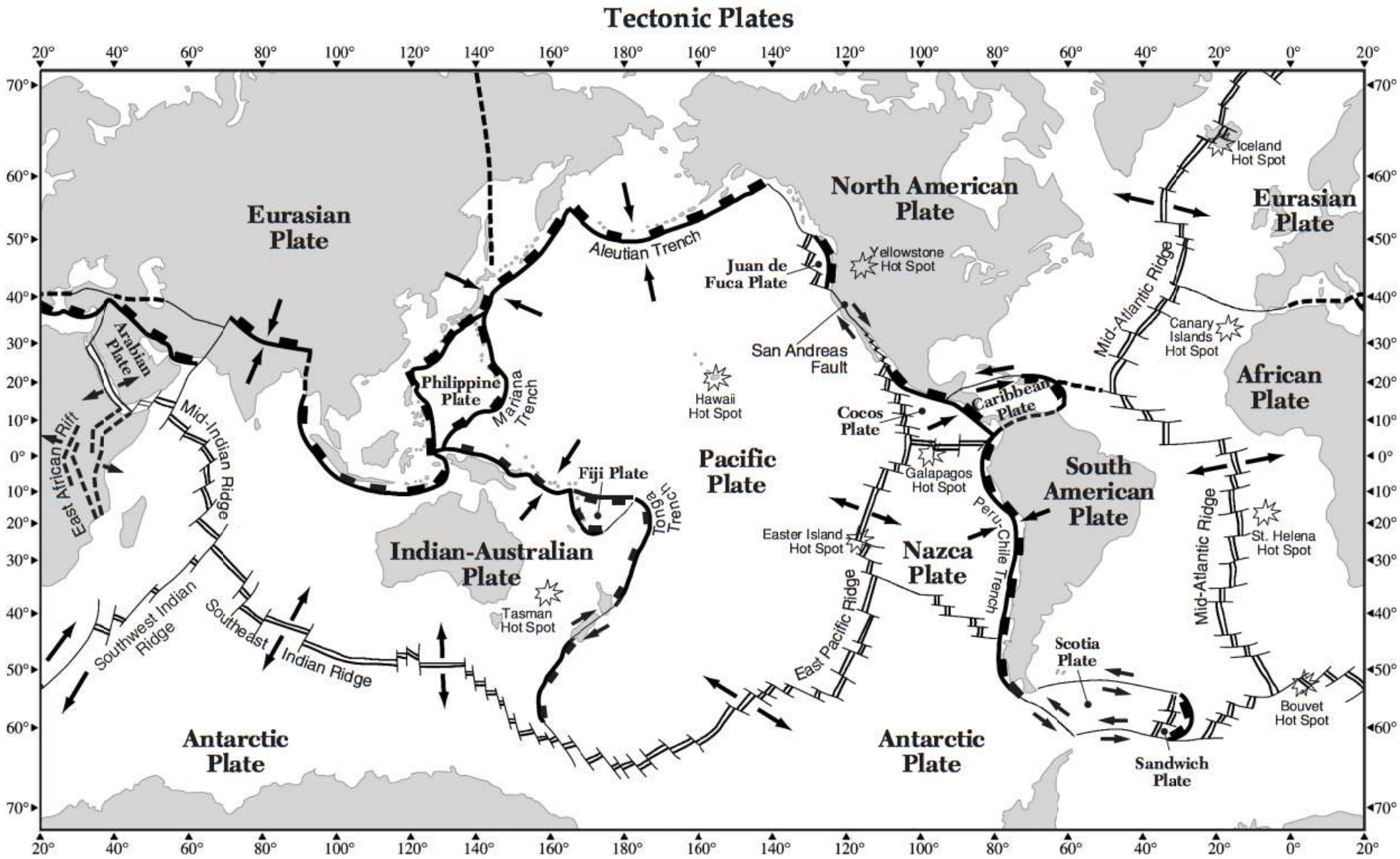
5. Was your original prediction for the highest annual temperature correct? State why or why not.

6. Using the table and graph above, state the relationship between elevation and average yearly temperature. *(as _____ increases/decreases/stays the same, _____ increases/decreases/stays the same)*

7. Using the table and graph above, state the relationship between elevation and average temperature range. *(as _____ increases/decreases/stays the same, _____ increases/decreases/stays the same)*

8. Using the Tectonic Plates map on page 4, place a **green** X, on another location with the same latitude as Fort Kent and Mount Rainier. Write "done" below, when you have completed this. *(Using Google Docs, click insert → drawing → new → then click on line → draw an X → save and close → click your "X" and "wrap text.". Then move your "X" to the appropriate location over the Tectonic Plates map)*

9. Another location has the **same latitude** as Mount Rainier with an **elevation of 24,000 feet**. How will the average annual temperature compare to Mount Rainier? Explain what climate factor is playing a role in this temperature change.


Tectonic Plates
Eurasian Plate
North American Plate
Eurasian Plate
African Plate
South American Plate
Pacific Plate
Nazca Plate
Indian-Australian Plate
Antarctic Plate
Antarctic Plate
Arabian Plate
Philippine Plate
Caribbean Plate
Cocos Plate
Juan de Fuca Plate
Fiji Plate
Scotia Plate
Sandwich Plate
Aleutian Trench
Mariana Trench
Tonga Trench
Peru-Chile Trench
East Pacific Ridge
Mid-Atlantic Ridge
Mid-Atlantic Ridge
Mid-Indian Ridge
Southwest Indian Ridge
Southeast Indian Ridge
East African Rift
Iceland Hot Spot
Yellowstone Hot Spot
San Andreas Fault
Canary Islands Hot Spot
Hawaii Hot Spot
Galapagos Hot Spot
Easter Island Hot Spot
St. Helena Hot Spot
Tasman Hot Spot
Bouvet Hot Spot