Specific Heat and Coastal Cities /84 Name: _____ Hr._____

H_2O (water) has a high **specific heat capacity**, which means it requires a lot of energy to raise the temperate by 1°. Water's specific heat capacity is 4.186 J/g°C, meaning that it requires 4.186 J of energy (1 calorie) to heat a gram by one degree. Sand on the other hand has a specific heat capacity of 0.290 J/g∘C, so it takes much less energy to heat it up. Substances with a high heat capacity take a long time to heat up and once heated, they also take a long time to cool back down.

Scientific Questions:

How does the specific heat capacity of H_2O affect the climate of coastal cities?

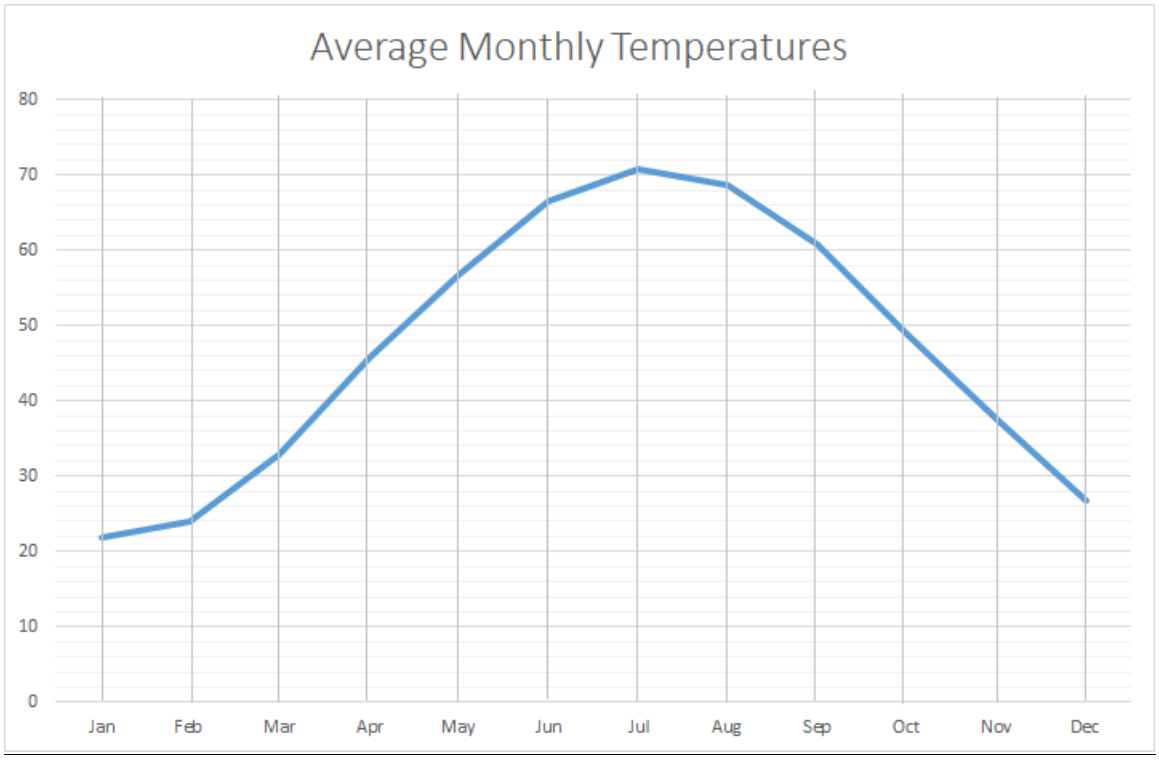
Hypothesis: (1pt)

I think _____

_____

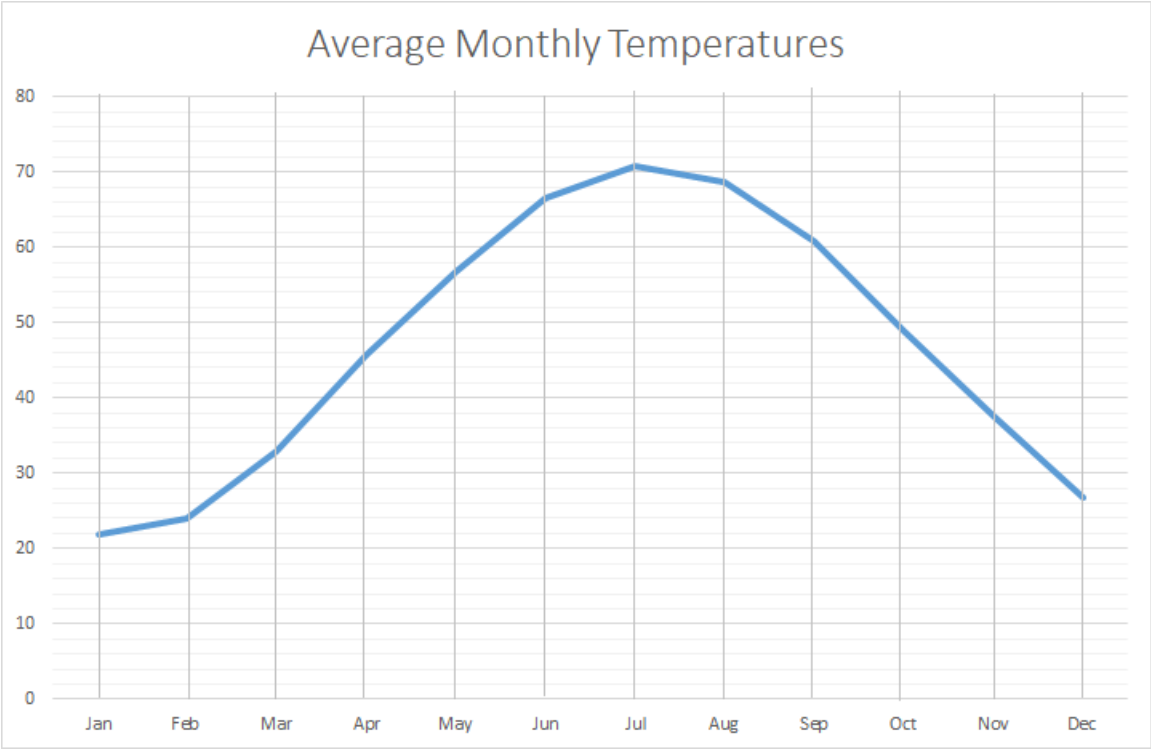
Procedure:

I. Label the cities on the map on page 4 (5 pts)
II. Complete the line graph below by plotting the month and temperature of Copper Harbor, MI, and Minneapolis, MN. (24 pts) Alma has been plotted for you as a comparison. Make a key to distinguish between lines. (3pts) Label X axis and Y axis (4pts)



Data collected 1/26/2018 from: http://www.weatherbase.com/weather/state.php3?c=US

III. Complete the line graph below by plotting the month and temperature of Seattle, WA and London, England. (24 pts) Alma has been plotted for you as a comparison. Make a key to distinguish between lines. (3pts) Label X axis and Y axis (4pts)



<u>Analysis:</u>

1. Which city is located the farthest South? _____

2. Which city is located the farthest North? _____

3. Which city has the largest temperature range? _____
   Is this city located near a large body of water? _____
   If so, which body of water? _____

4. Which city has the smallest temperature range? _____
   Is this city located near a large body of water? _____
   If so, which body of water? _____

5. Why do cities near the ocean experience milder climates (smaller temperature ranges) than cities that are land locked?_____
_____

6. The farther North or South you travel from the Equator, the solar radiation intensity decreases. Therefore, the temperatures *should* be cooler the farther north you travel (in the Northern Hemisphere). Figure out the average temperature of each city to see if this is true. Write the averages next to the name in the table below.

Alma	Minneapolis	Copper Harbor	Seattle	London

NOTE: These numbers are NOT the numbers you will use for the bar graph on the next page!

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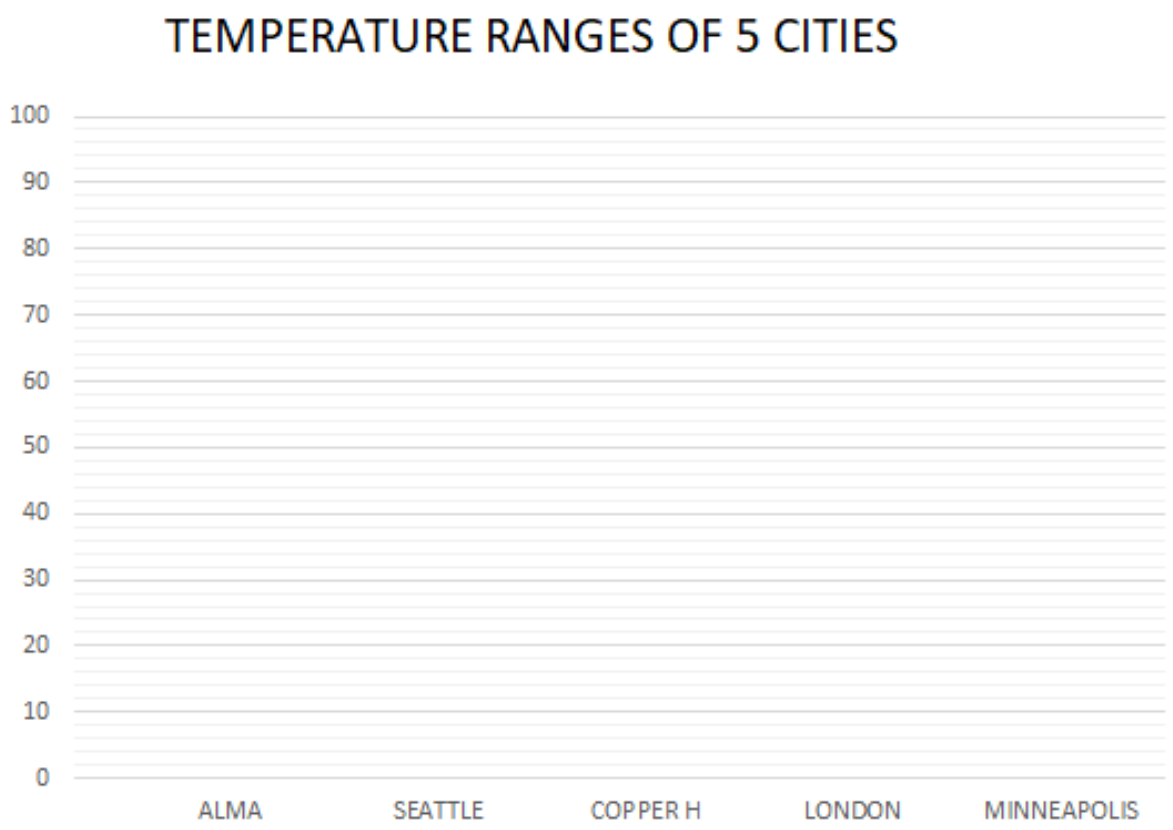
IV. Make a bar graph showing the ***temperature range*** of all 5 cities. (High temp – Low temp = temp range) Round up/down to the nearest whole number. (5pts) DON'T USE AVERAGES FROM THE PREVIOUS PAGE!!



7. Seattle and London are located at a higher latitude than the other cities listed. Explain why they have the two highest average temperatures.

_____

_____

_____

Conclusion:

8. Answer the scientific question at the start of this lab. A good argument is a statement of fact backed up by evidence. Be sure to include data from this lab as your evidence.

_____

_____

_____

_____

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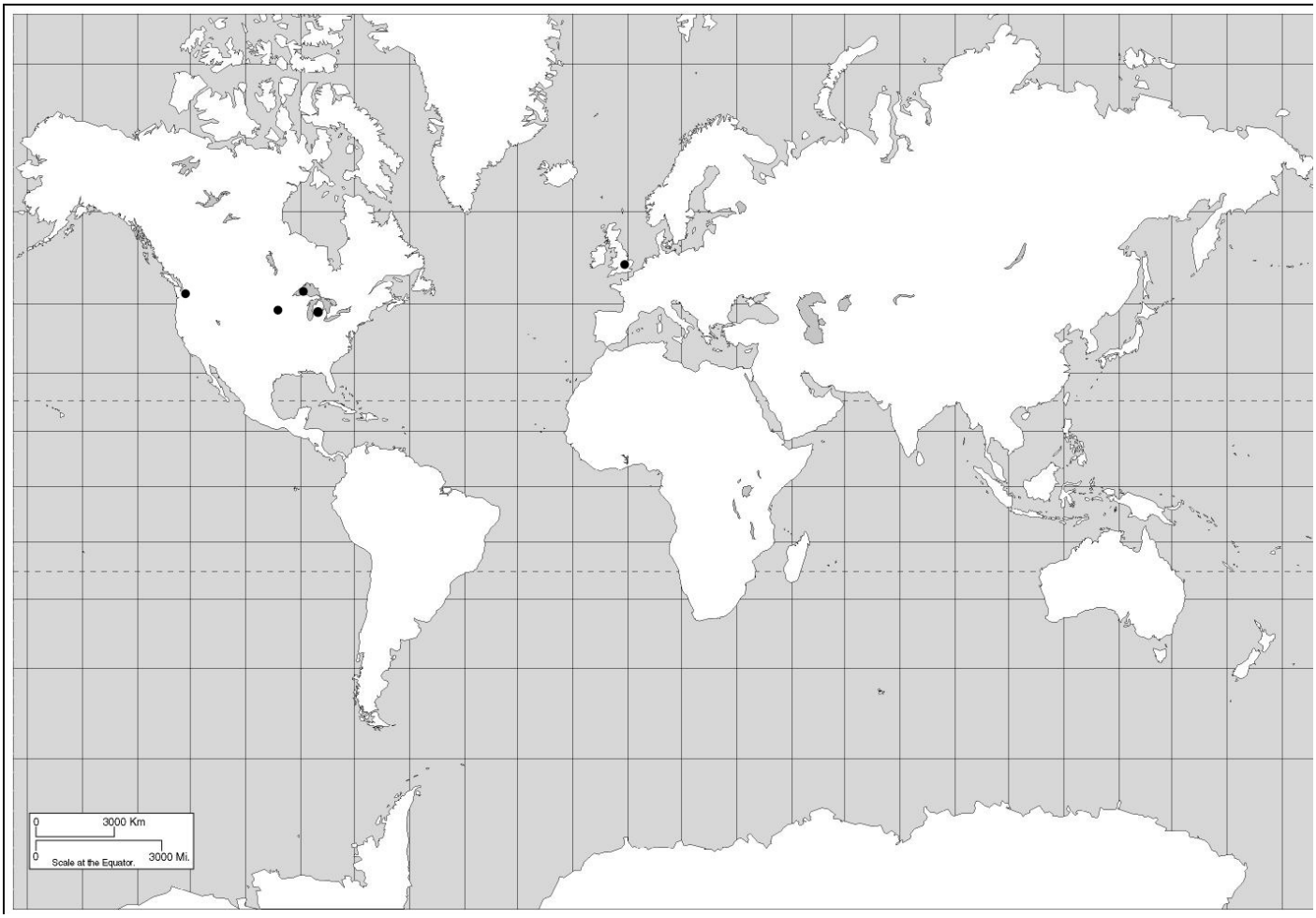
ALMA, MI 43.37° N Average Temperature in ºF									years on record: 30		
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
21.8	24.1	33	45.7	56.8	66.6	70.7	68.7	60.7	48.8	37.6	26.8

SEATTLE, WA 47.60° N Average Temperature ºF									years on record: 30		
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
42	43.4	46.5	50.3	56	60.9	65.7	66.1	61.3	52.8	45.4	40.6

LONDON, ENGLAND 51.50° N Ave. Temp. ºF									years on record: 30		
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
39.7	40	44.3	47.7	53.8	59.1	63.1	62.6	57.7	51.6	44.9	40.5

COPPER HARBOR, MI 47.46° N Ave. Temp. ºF									years on record: 30		
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
19.7	21	27.3	38.8	49.1	57.3	63.6	64.6	57.6	46.1	34.8	24.8

MINNEAPOLIS, MN 44.97° N Ave. Temp. ºF									years on record: 30		
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
15.6	20.8	32.8	47.5	59.1	68.8	73.8	71.2	62	48.9	33.7	19.7



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