Engaging with Data Visualizations - Air Temperatures from Different Locations Activity

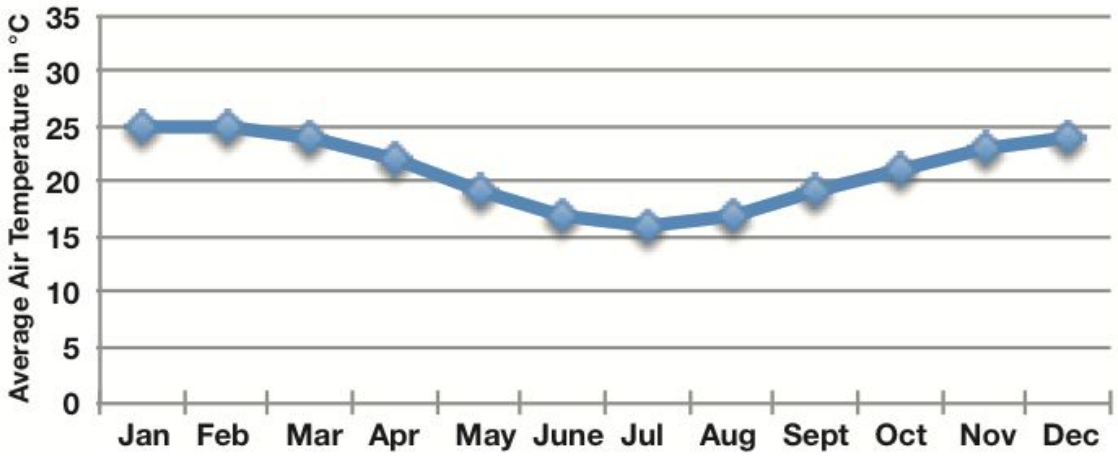
Procedure

1. Interpret the air temperature data plots to determine where they are from in the world.
2. Answer the questions on each handout.

Data Graph

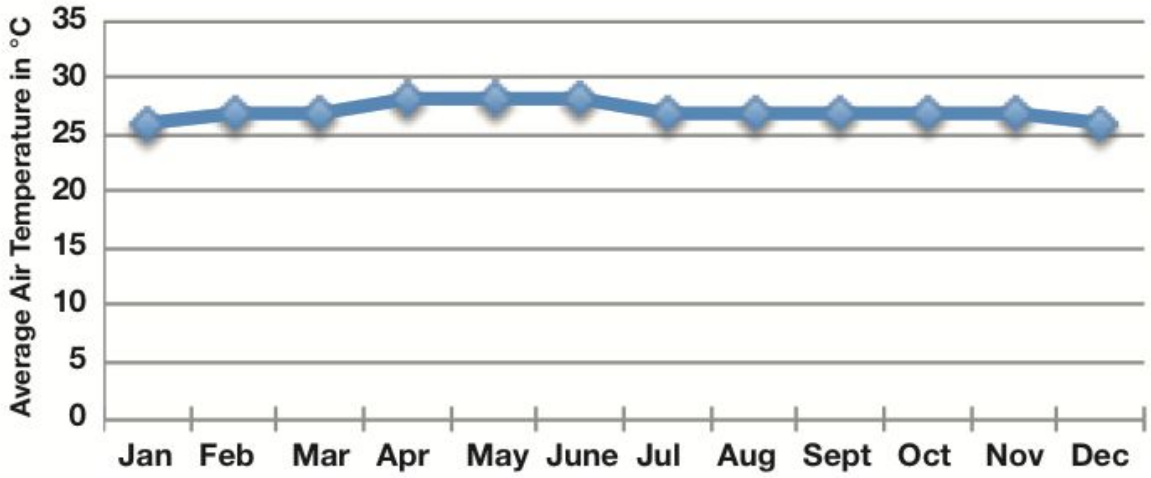
Air Temperature (°C) Over Time for Location Y

Location Y is _____



Air Temperature (°C) Over Time for Location Z

Location Z is _____



Handout A: Orientation

Questions:

1. How do you think the air temperature data were collected? What equipment do you think they used?

Air temperature data were collected using thermometers.

2. What variables are you looking at in this data visualization?
    a. Independent Variable: *Time*

    b. Dependent Variable: *Air temperature*

3. What variable is plotted on the x-axis (horizontal)?

Time, by month

4. What variable is plotted on the y-axis (vertical)?

Average air temperature (C)

5. What kind of graph was used to plot the data?

Line chart

6. Why did you think that kind of graph was chosen to plot the data?

Because we are looking at a change over time and time is a continuous variable

Handout B: Interpretation

Questions:

1. Which graph shows generally warmer average temperatures?

Location Z

2. What was the range/variation in air temperature for each location:

Location Y: FROM ___*~25C*_____ TO _____*~16C*_____

Location Z: FROM ___*~28C*_____ TO _____*~26C*_____

3. Which graph shows a bigger change in temperature over time?

Location Y

4. Compare the air temperatures over time for the both locations. Is there a pattern? If so, what is the pattern?

The air temperature changes over time for both locations seems to be a cycle. At Location Y the temperature is its highest from November-March and its lowest from May to September. At Location Z the temperature is its highest from April to June and its lowest from December to January.

5. Are there any outliers in the data? Explain why or why not.

No, because all of the data points are similar to those around them.

6. Do you think there data are reliable? Explain why or why not.

Yes, because the data are of temperature ranges that we have here on planet Earth.

Handout C: Synthesis

Questions:

1. Explain how the relationship between air temperature and time differs between the two locations.

At Location Y there are larger changes in the average monthly air temperature over the year than in Location Z.

Also at Location Y the lows are in the middle of the year, whereas at Location Z the lows are at the start and end of the year.

2. Can you think of an explanation for why this difference exists between the locations?

I think Location Y must be farther from the equator than Location Z because it has greater changes in temperature over the year.

Also, I think they may be in different hemispheres because the months when they have their low air temperature are almost opposite.

3. What months are in winter at each of these locations? What months are in summer at each of these locations? Use your data to support your answer.

At Location Y winter is June-August, because these are the months with the coldest air temperatures and that is what the weather does in the winter time. And the summer is December-March at Location Y, because these are the months with the hottest air temperatures.

At Location Z winter is December-January, because it is the coldest then. The summer time at Location Z is from May-July.

4. Where do you think each location exists in the world? Use your data to support your answer.

Location Y is away from the equator, as it has larger variations in temperature over time. The average monthly air temperature does not get below freezing so I think it is in a Temperate area. Because the winter is in June-August, I think Location Y is in the southern hemisphere.

Location Z is very near to the equator, as it has almost no variations in temperature over time. Because the winter is in December-January, I think Location Z is in the northern hemisphere.

5. What can these data and the patterns tell you about the relationship between air temperature

and time in terms of the uneven heating of the Earth by the sun?

- *Places near Earth's equator are generally warmer than the poles.*
- *Places near Earth's equator change less in temperature from winter to summer than places near the poles do.*
- *When it's summer north of the equator, it's winter south of the equator. When it's winter in the north, it's summer in the south.*