

Temperature Controls

Earth Science

Name: _____

Date: _____ Hr: _____

Background: The data below are for two cities with similar latitudes, but different elevations. Use them to explore the role elevation plays in controlling temperature month by month.

Procedure:

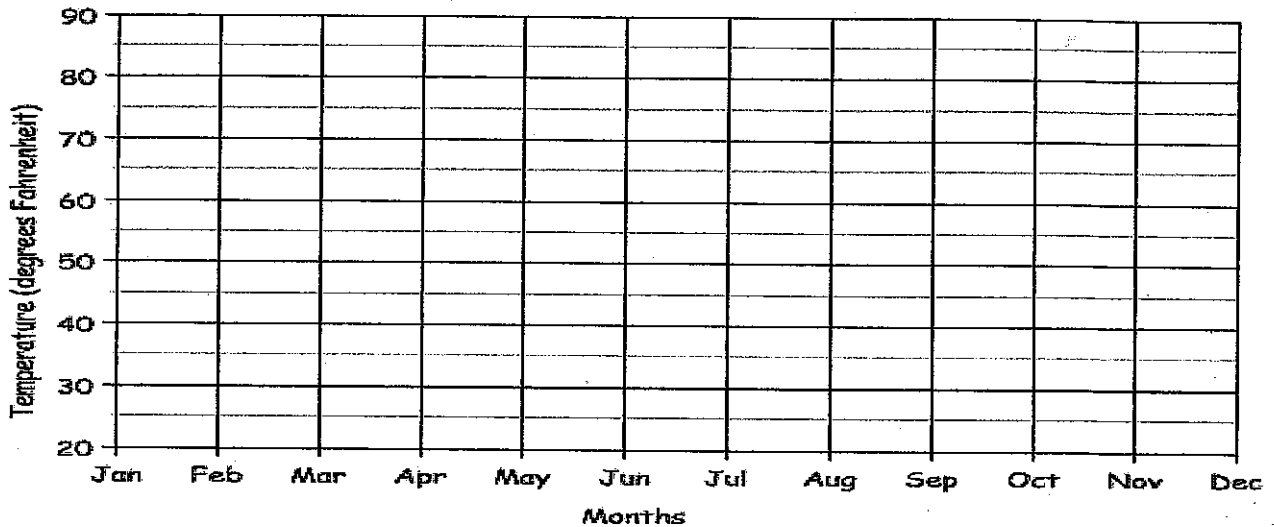
3. Plot temperature for each city below, connect points (use different colors or and label each line).
4. Answer the analysis questions below.

Table 1: Temps for Arizona Cities

City, State	Latitude	Elevation	Average Monthly Temperature (°F)											
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Phoenix, AZ	33°N	1180 ft	52	55	60	67	75	84	90	88	83	72	59	52
Flagstaff, AZ	35°N	6993 ft	29	32	36	43	51	60	66	64	58	48	37	30

Analysis Graph:

Temperature vs. Elevation for 2 Cities



www.weatherbase.com

1. Look back at the temperature trend in the troposphere drawn in your 5.02 graph. Explain what it shows about temperature as you go up in the troposphere.
2. Describe what happens to air pressure as you go upwards from the surface?
3. If these two cities are at roughly the **same latitude**, explain how the higher elevation always maintains a lower temperature than the other city.
4. (Bonus) Temperature changes 5.4°F/1,000 feet in dry air and 3.3°F/1,000 feet in moist (rain/snowy) air. If the ground temperature on a cloudy, snowy day is 30°F in Grosse Pointe (elevation 600 ft), what is the air temperature at elevation 14,000ft? Show work.

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Background: This assignment investigates factors that affect the temperature for a city from month to month, and ultimately the climate for the city/region. The two cities below have very different latitudes.

Latitude vs. Temperature

Table 1:

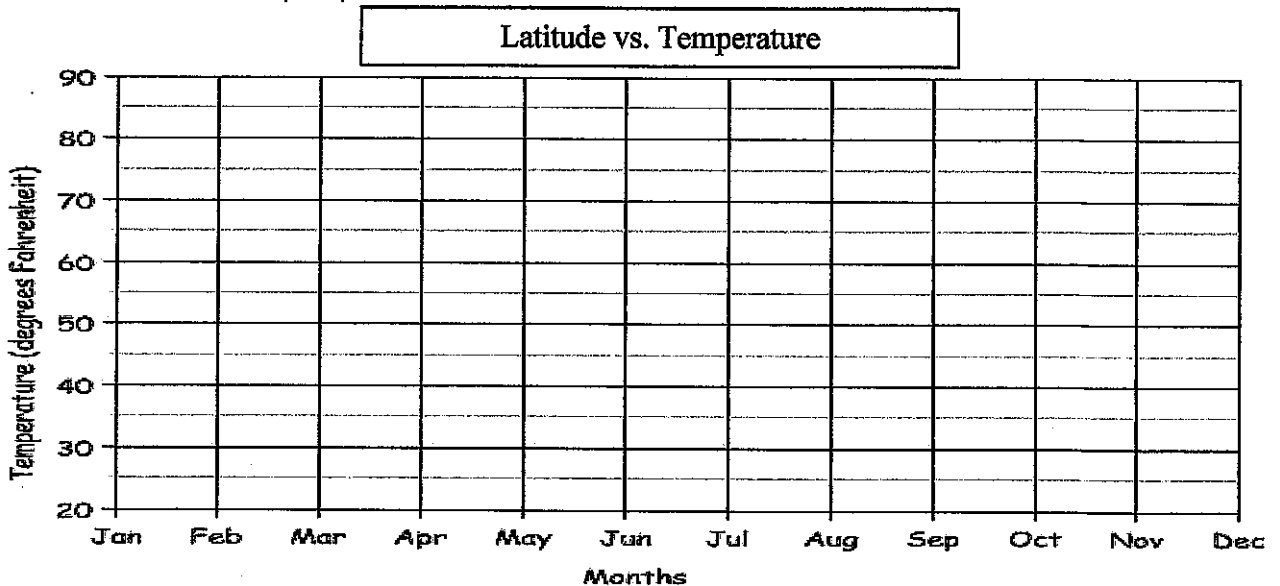
		Average Monthly Temperature (°F)											
City, State	Latitude	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Miami, FL	25.7°N	76	78	80	83	87	89	90	90	89	86	82	78
Grosse Pointe, MI	42.3°N	29	32	36	43	51	60	66	64	58	48	37	30

Table 2:

		Sun Angle at Noon (° above horizon)											
City, State	Latitude	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Miami, FL	25.7°N	42	50	60	72	84	88	84	77	70	57	43	40
Grosse Pointe, MI	42.3°N	25	35	45	58	65	70	68	59	49	38	26	24

Procedure:

1. Plot temperature for each city below, connect points (use different colors or and label each line).
2. Answer the analysis questions below.



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1. Study the latitude graph you just plotted along with the sun angle data.
 - Write a statement that relates the average monthly temperature to the noon sun angle.

2. Imagine you were living in Barrow, Alaska (latitude 71.3°N).
 - Describe how your sun angle would differ from Grosse Pointe's during each month.

 - Explain how that would affect the monthly temperatures compared to Grosse Pointe.