**NASA's Mars Curiosity Rover**

NASA's Mars rover *Curiosity* landed in early 2004 and began investigating both the Martian weather around it and the soil beneath it. The rover's weather station checked air temperature, ground temperature, air pressure, wind, and other variables every hour at the landing site in Gale Crater.

"We will learn about changes from day to day and season to season," said Javier Gómez-Elvira, principal investigator for the suite of weather sensors called the Rover Environmental Monitoring Station (REMS) at the Centro de Astrobiologia in Madrid, Spain.

On a typical Martian day, or 'sol', air temperatures swing from - 2° to - 75° C. Ground temperatures change even more between afternoon and pre-dawn morning, ranging from -3° to - 91° C.

Below is a graph of temperature readings from the Mars Curiosity Rover. Your task is to interpret the changes in temperature over time.
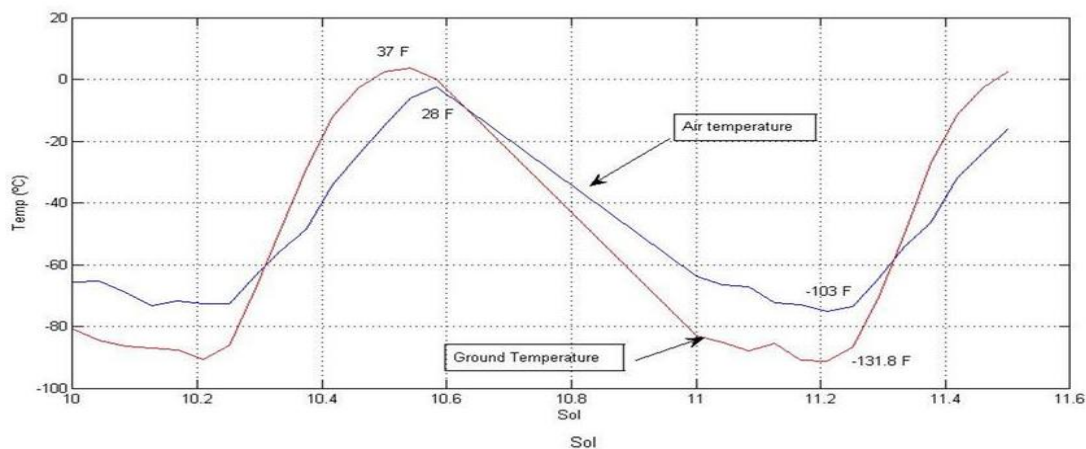
1) Select an increase and a decrease as represented on the graph, and describe each using numbers and precise mathematical language.

2) What is the range of temperatures?

3) Did the ground temperature change faster or slower than the air temperature?

4) Based on the information given, when is pre-dawn on this graph?

5) If the graph were to continue, what would you predict the ground temperature to be on Sol 11.8?

6) Why is the ground temperature higher than the air temperature at some times and not at other times?

7) Where on Earth might the temperature change be a similar increase or decrease?

Source: http://www.nasa.gov/mission_pages/msl/news/msl20120821b.html

Rubric

Score	Description	Example Questions at This Level
4	**In addition to exhibiting level 3 performance, in-depth inferences and applications in situations that GO BEYOND what was taught in class.**	Interpret the relationship between Celsius Temperature to Fahrenheit.
3.5	*In addition to exhibiting level 3 performance, partial success at in-depth inferences and applications that go beyond what was taught in class.*	
3	**No major errors or omissions regarding any of the information and/or processes (SIMPLER OR COMPLEX) that were explicitly taught.**	You must select an increase and a decrease as represented on the graph, and describe each using numbers and precise mathematical language.
2.5	*No major errors or omissions regarding any of the simpler information and/or processes and partial knowledge of the more complex information and processes.*	Based on the information given, when is pre-dawn on this graph? If this graph were to continue, what would you predict the ground temperature to be on Sol 11.8 ?
2	**No major errors or omissions regarding the SIMPLER details and processes BUT major errors or omissions regarding the more COMPLEX ideas and processes.**	What is the range of temperatures? Did the ground temperature change faster or slower than the air temperature?
1.5	*Partial knowledge of the simpler details and processes, but major errors or omissions regarding the more complex ideas and processes.*	
1	**With help, a partial knowledge of some of the simpler and complex details and processes.**	
.5	*With help, a partial knowledge of some of the simpler details and processes but not of the more complex ideas and processes.*	
0	**Even with help, no understanding or skill demonstrated.**	

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