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Analysis, Inquiry, and Design
Part 1. Use the description below and your knowledge of science to answer the questions in this section.

Your friend notices that after a snowfall, snow on the part of the garage roof facing south disappears faster than the snow on the part facing north. Your friend wants to find out why and asks you to help design an experiment to explain this.

1. Which sense does your friend use to make the "observation"? (1 pt.)
2. In the space to the right, make a simple drawing to show what your friend noticed. (2 pts.)
3. What would be a clear statement of the question you are investigating? (2 pts.)
4. What is the hypothesis that you and your friend develop? (3 pts.)

IF

THEN

## BECAUSE

5. What is the "dependent" ("responding") variable in your investigation? (1 pt.)
6. What is the "independent" ("manipulated") variable in your investigation? (1 pt.)

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7. Describe the experiment that you and your friend design. (3 pts.)
8. What is your explanation for your friend's observation? (2 pts.)

Part 2.
Presented in the data table are monthly average temperatures and total precipitation values. Use these to make:
--a line graph showing the temperature pattern
--a bar graph to show the precipitation pattern

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| Temp. | 34 | 31 | 41 | 52 | 62 | 73 | 77 | 75 | 68 | 59 | 42 | 38 |
| Precip. | 3.3 | 3.0 | 4.1 | 5.4 | 4.2 | 2.7 | 2.1 | 1.7 | 3.6 | 2.5 | 3.9 | 3.5 |

For each graph, you need to provide a title (1 pt.), label the X-axis (1 pt.), label the Y-axis (1 pt.), and plot the data correctly (2 pts.)

Title: $\qquad$

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Title: $\qquad$

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[Check to see if you have a title, labeled X -axis and Y -axis, and presented the temperature as a line graph and precipitation as a bar graph.]

## Part 3.

A. At 6 a.m., the temperature was $50^{\circ} \mathrm{F}$, and at 11 a.m, it was $62^{\circ} \mathrm{F}$. Find the rate of change in each hour.

Show your work. (1 pt. for equation, 1 pt . for correct numbers in equation, 2 pts. for correct answer, including proper units.)
B. Students on a trip to historic cemeteries in Bergen County notice that limestone tombstones show more wear than sandstone tombstones from the same time period. Provide one possible explanation (2 pts.) and a way that you could test this. (2 pts.)

