Land and Sea Lab

I. Title

I. Title: Heating of Land and Sea Lab

II. Purpose

II. Purpose: The purpose of this lab is to understand the difference in the way water and land heats up and cools off.

II. Purpose - Background

- Using your text, write a paragraph applying the concepts of how heat moves through our atmosphere. Quote the book following this format
- EXAMPLE

  "These mechanisms operate to transfer energy between Earth's surface(both land and water) and the atmosphere." (Earth Science, p. 480)

III. Hypothesis

- Given this back ground, write your hypothesis. Use an “IF” and “then” sentence. <DO NOT WRITE THE INSTRUCTIONS>
- Write a hypothesis based on what you think will happen.

IV. Procedure

- Set up two containers. One with half full of water, one half full with “land”.
- Place the lamp over the containers with the bulb 10-15 cm above the top of the containers.
- Place a thermometer just below the surface of sand and water.
- Design a data table so you can record 46 temperatures for each container. Record the temperatures of both thermometers before the light is turned on. Record this on the data table in the space for “0”(zero) time. (Refer to pg 740 of your text for how to set up the data table.

IV. Procedure Continued

- Switch the lamp on and record both temperatures every 60 seconds for 15 minutes.
- Turn off the light and continue to record the temperatures every 60 seconds for another 30 minutes.
- Using excel enter your data and create a graph that represents your two sets of data. Label on line "Water" and the other "land" (Refer to pg. 740 for reference on plotting data into a graph).

V. Data

- Your data table should be done in excel, highlight the table and copy into your word document.

VI. Analysis and Conclusion

- Cut and paste your analysis graph into the first part of this section
- Questions:
  1. During the lab, which heated up the fastest? Justify your answer by comparing the lines on your graph.
  2. Which cooled the fastest once the light was shut off? (Compare the lines on your graph again)
  3. There are four reason why water warms more slowly than land. Come up with two.
  4. Air in the troposphere is heated form the bottom by the heat given off by the surface. If the sun shines equally on Seattle(near water) and Bismarck, North Dakota (near the center of the continent), which would get hotter during the day? Think about the lab.

VI. Analysis and Conclusion con't.

- Questions continued
  5. Based on the results of your lab, which city would probably have a bigger difference between it's day and night temperatures?
  6. Anchorage (southern coast of Alaska) is several hundred miles north of Helena, Montana yet it's January temperatures are similar to Helena's. Explain why.
  7. Which regions tend to have a greater difference between summer and winter temperatures; areas close to oceans, or areas far from oceans?

Analysis and Conclusion

- Write a conclusion revisiting your hypothesis. Was it correct or incorrect. Site evidence from your lab analysis that supports your findings.

- Extend your thought. What variables could account for your findings? How could we do the experiment differently to affect the outcomes?