

# The Scientific Method Exploring Experimental Design

## *Scientific Method Practice 1*

*When providing the best possible answer to the following questions please apply all learned scientific techniques and procedures, do not use abbreviations, use proper scientific terminology, show work for all mathematical calculations, use all significant figure and scientific notation rules, apply S.E.E.C. writing strategies, and note that at all times spelling counts. Your ability to meet these and all established classroom expectations, including labeling of BINs, providing heading information, and your ability to follow directions may be included in computation of grade.*

**DIRECTIONS:** Read the following paragraphs and then answer the questions that follow. Use complete sentences to answer all questions. Be sure to restate the question in your answer.

Science differs from other subject areas in the way it seeks to answer questions. This approach to problem solving is called the scientific method. The scientific method is a systematic approach to problem solving. Listed below are the basic steps of the scientific method, in one possible order:

- Stating the problem
- Gathering information on the problem
- Forming a hypothesis
- Performing an experiment to test the hypothesis
- Recording and analyzing data
- Stating a conclusion
- Repeating the work

Erika baked a cake for her mother's birthday. When the cake was taken from the oven, Erika noticed that the cake had not risen. She guessed that the oven had not heated to the correct temperature. She set up the following experiment to test her hypothesis.

First, Erika put a thermometer in the oven. She then turned the oven dial to 375 °F. She noticed that the preheating light came on when she turned the oven on. She waited until the preheating light went out, indicating that the oven was up to the specified temperature. Erika then read the thermometer she had placed inside the oven. It read 375 °F. Erika concluded that the oven was heating properly.

## CONCLUSION QUESTIONS

1. What was Erika's problem? [The problem should be stated as a question.]

Why didn't the cake rise?

2. What was Erika's hypothesis? [This is an if/then answer to your problem question.]

If the oven is not heated to the correct temperature, then the cake will not rise.

3. What was Erika's conclusion? [This states whether your hypothesis was supported or refuted.]

Erika's hypothesis is refuted.

The oven was working and the temperature was accurate, but the cake did not rise.

4. Which step in the scientific method do you think Erika should do next? Explain your reasoning.

Erika should go back to the step on formulating a new hypothesis.

Her previous hypothesis was refuted so she needs to identify other possible factors that may lead to the problem.

5. List two other hypotheses which might explain why the cake did not rise.

If the yeast is not alive, then the cake will not rise. (or any possible problem related to the yeast)

If the composition of the cake is not right, then the cake will not rise.

If the baking powder is stale/old, then the cake will not rise.