Living Environment Summer Assignment Task Card

Task A- Read and annotate the text in order to identify the components of the Scientific Method in Redi's Controlled Experiment. Be sure to identify all parts listed below on a separate sheet of paper.

Components of the Scientific Method in a Controlled Experiment:

1. Problem/Question-
2. Background Research-
3. Hypothesis-
4. Experiment (Controlled)
   Experimental group-
   Control Group-
   Independent Variable-
   Dependent Variable-
   Constants-
5. Materials & Methods (procedure)-
6. Collect data-
7. Analyze data-
8. Conclusion-

(On a separate sheet of paper)

Task B- Use the rubric below and your knowledge of the scientific method to design a "hypothetical" (you will *not* conduct it) Controlled Experiment that follows the Scientific Method. Be sure to identify the components above, including the experimental group, control group, independent variable, dependent variable, and constants. Make sure this experiment is realistic and practical. You will only need to complete steps 1-5 above since you are not actually conducting an experiment.

Let's say you wanted to experiment whether added fertilizer can increase plant growth. The problem/question you might ask is "Does the addition of fertilizer increase plant growth"? You would formulate a hypothesis based on this question/problem as well as the background research you conducted. Perhaps, your hypothesis would be: If I add fertilizer, then the plants will grow more. Next, you would set up your controlled experiment by collecting your materials and writing your procedure, making sure that you experimental group receives the fertilizer and the control group does NOT. After, you would collect and analyze data draw a conclusion based on this data. Keep in mind that your independent variable is what we are testing (the addition of fertilizer) and the dependent variable is what we are trying to find out (plant growth).

Extension- Research a controlled experiment that follows the scientific method. Identify the components from task A.

Helpful Websites-

http://www.sciencebob.com/sciencefair/scientificmethod.php

http://sciencefairproject.virtualave.net/scientific_method.htm

Common Core Standards

- RST 8.1-Cite specific textual evidence to support analysis of science and technical texts.
- RST 8.2-Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.
- RST 8.3-Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

Francesco Redi's Experiment

The cell theory states that cells can come only from other living cells. Since living things are made up of cells, living things must come from other living things. You might be thinking,"Of course! Everybody knows that!". Yet, years ago, many people had a different idea. About 300 years ago, the Italian scientist Francesco Redi wondered where maggots—small, wormlike organisms—came from. The popular belief at the time was that rotting meat turned into maggots. This idea, that living things could come from nonliving material, was called spontaneous generation. He spoke to other scientists and conducted some background research on maggots. After, Redi designed an experiment to test this belief.

Redi and others observed that flies and then maggots could be seen around pieces of meat that were left out in the open. He therefore asked the following questions: "where do flies come from"? "Is the rotting meat transformed into the flies"? From these observations, Redi formed the hypothesis that only flies can make flies and rotten meat cannot be transformed into flies. Redi sought to test this hypothesis by performing the following experiment. He placed pieces of meat into three glass jars. The first jar was left open, the second was covered with a loose netting and the third was completely sealed. All jars were exposed to flies in the surrounding room. Redi predicted that if meat could not be transformed into flies then the sealed containers should not produce maggots or flies. Whereas if the meat can e transformed, then the sealed jar should also develop maggots and flies. Redi recorded the presence or absence of flies in each of the three types of jars. As he predicted, neither flies nor maggots were found in the sealed jars, whereas in the open jars, maggots and flies were abundant. In the jars covered with netting, maggots were found within the netting itself but not on the meat inside the jar. Redi concluded that meat could not transform into flies, only flies could produce flies. The theory of spontaneous generation could not be supported and was therefore incorrect.

Rubric

	1	2	3	4
Problem/Question	Problem is stated incorrectly	Problem is not clearly stated and is not in question format.	Problem is not clearly stated and may not be in question format.	Problem is clearly stated to accurately explain to the reader the focus of the experiment and is in question format.
Hypothesis	Hypothesis is vague or unrelated to the problem/question.	Hypothesis predicts the outcome of the experiment but is not reasonable and does not relate the independent and dependent variables.	Provides a statement that clearly predicts what the outcome of the experiment will be. Prediction is reasonable. Relates independent and dependent variables.	Clearly predicts what the outcome of the experiment will be. Prediction is reasonable and demonstrates insightful thinking. Relates independent and dependent variables.
Methods & Materials	Doesn't provide enough information to represent an experimental procedure. Materials missing.	Materials are mentioned but without amounts. Steps are vague but in paragraph form.	Materials are mentioned but without amounts. Steps are easy to follow and in paragraph form.	Materials and amounts are identified. Steps are easy to follow and in paragraph form.
Background Research	Most of the research and information collected does not relate to the hypothesis.	Some of the research and information collected relates to the hypothesis.	Most of the research and information collected relates to the hypothesis.	All of the research and information collected relates to the hypothesis.

Sources:

TITLE: Science as a Process
SOURCE: Audesirk et al., *Biology: Life on Earth,* Eighth Edition, Pearson Prentice Hall, Inc.
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Rohm, Anthony. "Redi's Experiment." Wikispaces, n.d. Web. 10 June 2013.