SCIENTIFIC METHOD STUDY GUIDE ANSWER KEY

1-6 Directions: Write the steps of the scientific method in order. Give at least one example of what a scientist would do at each step.

1. Ask a question – come up with one question you want to ask.

2. Research and Collect Data – do research, use your senses to make observations, write down what you already know.

3. Form a hypothesis – Write a possible answer to your question

4. Plan the experiment – write down the procedure (steps) you will take, list all the equipment you will need.

5. Conduct the experiment – follow the steps, observe and measure, record results, organize your data

6. Interpret the results, draw a conclusion – analyze the data, make charts/tables/graphs, write a conclusion

DIRECTIONS: Write a hypothesis for each scientific problem.

7. Which chewing gum holds its flavor the longest?

Hypothesis: The chewing gum that will hold the flavor the longest is ____________________ (ex. Orbit)

What is your variable? The brand of chewing gum

What do you need to control? – the size of the piece of gum, how many times the person chews the gum, the flavor of the gum

8. Which will boil faster, water on a gas stove or water on an electric stove?

Hypothesis: Water will boil faster on a gas stove (or electric stove).

What is your variable? The type of stove

What do you need to control? – list at least 2 – the amount of water, the temperature at which you turn the stove on, the type of pot you are boiling water in, the size of the pot, the temperature of the water before you start boiling it
9. Does a temperature change in water affect a fish’s rate of breathing?

**Hypothesis:** A temperature change in the water does affect the fish’s rate of breathing.

**What is your variable?** The temperature of the water

**What do you need to control?** – list at least 2 – the kind of fish, the amount of water the fish is in, the kind of water the fish is in, the type of aquarium, the size of the fish

10. Mrs. Szafranski wanted to know if there was any relationship between eating breakfast and school performance. She looked at 10 of her students’ grades who she knew ate breakfast everyday and compared their grades with the grades of 10 students who she knew did not eat breakfast. She recorded the results and made a line graph.

**What is the experimental group of this experiment?** The students that ate the breakfast.

**What is the control group of this experiment?** The students that did not eat breakfast.

**What is the variable?** Eating breakfast

11. Mrs. Steidel is designed an experiment using the scientific method. She wanted to know which bread would mold faster – wheat or white bread. She placed 5 pieces of wheat bread in the refrigerator. She placed 5 pieces of white bread on the kitchen counter. After five days, she noticed the white bread is beginning to mold and concluded white bread molds faster. **What is wrong with this experiment?** She has too many variables that she is changing. In an experiment, one factor should be tested. In this experiment, Mrs. Steidel has wheat and white bread and she is putting them in 2 different places.
12. After 6 weeks of experimentation, Maddie created this graph to document her results. What can you conclude about the height of her radish plants?

Radish plants grow best when given plant food. OR Radish plants do not grow well when given coffee.

13. After completing a science fair project, Patrick created this graph. What is he missing?

Patrick is missing the labels on the x and y axis of the graph. From the information on the chart, we are not sure if the numbers reflect pounds, number of items picked up, etc.

14. Emily recorded the following results when testing her hypothesis: “When salt is added to water, it boils at a higher temperature.” Was her hypothesis correct? How do you know? When salt is added to water, it does boil at a higher temperature. Emily’s hypothesis was correct because the water in the control group boiled at 212.9° F. Once she added 1 Tbl. of salt, the water then boiled at 215.6° F. When additional salt was added, the water then boiled at 218.3° F.

<table>
<thead>
<tr>
<th>Data Obtained: 2/25/95, Mankato, MN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount of boiling water</td>
</tr>
<tr>
<td>Temperature of boiling water (Control)</td>
</tr>
<tr>
<td>Amount of table salt added to boiling water: Run #1</td>
</tr>
<tr>
<td>Temperature of boiling water after adding salt: Run #1</td>
</tr>
<tr>
<td>Additional amount of table salt added to boiling water: Run #2</td>
</tr>
<tr>
<td>Temperature of boiling water after adding salt: Run #2</td>
</tr>
</tbody>
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