**Title**

**Name**Click or tap here to enter text.

**Class Period**Click or tap here to enter text.

**Date**Click or tap here to enter text.

**PART 1: Identify a Research Problem**

An EXPERIMENT is an organized procedure to study something under controlled conditions.

Use the table below to help you with your choices:

|  |  |  |
| --- | --- | --- |
| **Area of Interest** | **Research Questions** | **Research Problems** |
| EXAMPLE:* *Algae growth in lakes and ponds.*

*Write in the space below**---------------------------------------------------*Click or tap here to enter text. | EXAMPLE:* *How do algae grow?*
* *How do people measure algae?*
* *What kind of fertilizer would affect the growth of algae?*
* *Can fertilizer and algae be used safely in a lab? How?*

*Write in the space below*--------------------------------------------------Click or tap here to enter text. | * *How does fertilizer affect the presence of algae in a pond?*

*Write in the space below**-------------------------------------------------*Click or tap here to enter text. |

My Research Problem/Question is…

Click or tap here to enter text.

**PART 2: Make a Prediction**

A PREDICTION is a statement of what you expect will happen in your experiment. Before making a prediction, you need to decide in a general way what you will do in your procedure. You state your prediction in an **IF-THEN** format.

EXAMPLE:

**IF** baking soda is added to vinegar, **THEN** carbon dioxide forms.

**If** the amount of fertilizer in pond water increases, **THEN** the amount of algae will also increase.

Write out your prediction in the space below:

 IfClick or tap here to enter text. **,**then Click or tap here to enter text.

**PART 3: Form a Hypothesis**

Experiments are designed to test a hypothesis. A hypothesis is a tentative explanation for an expected result. Your hypothesis goes beyond your prediction to explain why fertilizer has that effect.

EXAMPLE:

If the amount of fertilizer in pond water is increased, then the amount of algae will also increase because fertilizers provide nutrients that algae need to grow.

Write out your hypothesis below:

If Click or tap here to enter text. ,then Click or tap here to enter text. .

**PART 4: Identify Variables to Test the Hypothesis**

Experimental Group and Control Group: An experiment to determine how two factors are related has a control group and an experimental group. The two groups are the same, except that the experimenter changes a single factor in the experimental group and does not change it in the control group.

EXAMPLE:

Experimental Group: two containers of pond water with one drop of fertilizer solution added to each.

Control Group: two containers of the same pond water sampled at the same time but with no fertilizer solution added.

Variables and Constants:

In a controlled experiment, variable is any factor that can change. Constants are all of the variables that are kept the same in both the experimental group and the controlled group.

The independent variable is the factor that is manipulated or changed in order to test the effect. The dependent variable is the factor that the experimenter measures to gather data about the effect.

Fill in the chart below to identify the independent variables, dependent variables and the constants.

|  |  |  |
| --- | --- | --- |
| **Independent****Variable** | **Dependent** **Variable** | **Constant** |
| * Amount of fertilizer in pond water

*Write in the space below**--------------------------------------------------*Click or tap here to enter text. | * Amount of algae that grow

*Write in the space below**--------------------------------------------------*Click or tap here to enter text. | * Where and when the pond water is collected
* The type of container used
* Light temperature conditions where the water is stored

*Write in the space below**----------------------------------------------*Click or tap here to enter text. |

**Materials**

**List ALL materials you are going to need for this experiment. Make sure it is realistic and that the materials are available to you.**

**1.** Click or tap here to enter text.

**2.** Click or tap here to enter text.

**3.** Click or tap here to enter text.

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**12.** Click or tap here to enter text.

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**15.** Click or tap here to enter text.

**Part 5: Write a Procedure**

Write each step of your procedure. Start each step with a verb, or action word, and keep the steps short. Your procedures should be clear enough for someone else to use as instructions for repeating your experiment.

**Before the Experiment:**

**1.**Click or tap here to enter text.

**2**Click or tap here to enter text.

**3**Click or tap here to enter text.

**4**Click or tap here to enter text.

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**10**Click or tap here to enter text.

**During the Experiment**

**1** Click or tap here to enter text.

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**After the Experiment**

**1** Click or tap here to enter text.

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**Part 6-A: Experiment and Collect Data**

Once you have all your materials and your procedures has been approved, you can begin to experiment and collect data. Record both quantitative data (measurements) and qualitative data (observations) on the table below.

Before this chart can be modified, it must be approved by the teacher.

**Title** Click or tap here to enter text.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Experimental****Group** | **Control Group** |  |
| **Date/Time** | **Description** | **Description** | **Description** | **Description** | **Observations** |
| Click or tap here to enter text. | Click or tap here to enter text. | Click or tap here to enter text. | Click or tap here to enter text. | Click or tap here to enter text. | Click or tap here to enter text. |
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**Part 6-B: Drawings and/or Photos**

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**Part 7-A: Analyze Data**

After you have completed your experiment, made your observations, and collected your data, you must analyze all the information you have gather. Tables, statistics, and graphs are often used in this step to organize and analyze the data.

Points are only applies to one graph.

|  |  |  |  |  |  |  |  |  |  |
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**7-B Analysis Data**

**If you choose to use your own graph, paste it on this page.**

**Points are only applied to one graph.**

****

**Part 8: Make Conclusions**

To draw conclusions from your experiment, first write your results. Then compare your results with your hypothesis. Do your results support your hypothesis?

My results are as follows: Click or tap here to enter text.

**My results \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (supports/does not support) my hypothesis.**

**I conclude that**

**Presentation Board (50 points for a presentation board)**

Go to https://docs.wixstatic.com/ugd/b85d57\_fd75bf6e7cec462da44854de84e821a7.pdf to see how the presentation board is set up.

**FEEDBACK:**

Please provide this teacher with any positive or negative feedback in the place below.

Click or tap here to enter text.

**Student Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Class Period \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Project Grading Rubric**

|  |  |  |  |
| --- | --- | --- | --- |
| Is there a cover page? | **YES (**10 points) | **NO** (0 points) | **Total** |
| Is there a research question?  |  |  |  |
| Is there a prediction? |  |  |  |
| Variables identified correctly. |  |  |  |

|  |  |  |  |  |
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|  | Easy to understand. (20 points) | Difficult to understand. (10 points) | No evidence found. (0 points) | **Total** |
| Data collected documented correctly. |  |  |  |  |
| Description of events documented correctly. |  |  |  |  |
| Graph documented correctly. |  |  |  |  |
| Conclusion documented correctly. |  |  |  |  |
| Materials listed. |  |  |  |  |

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| **EXTRA CREDIT #1** | **YES** (50 points) | **NO** (0 points) | **Total** |
| Presentation Board |  |  |  |

|  |  |  |  |
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| **EXTRA CREDIT #2** | **YES** (20 points) | **NO** (0 points) | **Total** |
| Photos in description. |  |  |  |

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| **EXTRA CREDIT #3** | **Date received** | **# of Days** | **Total** |
| Early Submission |  |  |  |

|  |  |  |
| --- | --- | --- |
| **Total Grade** | **130 Possible Points** |  |

**Teacher Comments**