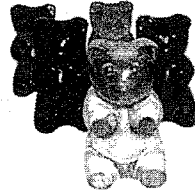# Gummi Bear Lab: The Scientific Method

Problem (Circle ONE):

- Will changing the water temperature affect how quickly a gummi bear dissolves in water?
- Will a dismembered gummi bear dissolve faster?
- Does the color of the gummi bear affect how quickly it dissolves?
- Will gummi bears dissolve faster in water with an acidic pH?

Based on the above, how is a PROBLEM PHRASED?

Hypothesis: If we were examining the problem "Does fertilizer A increase bean plant growth?" A hypothesis could be "It is hypothesized that fertilizer A will increase bean plant growth.

Based on the above, how is a HYPOTHESIS PHRASED?

Create and record a hypothesis for the problem you selected:

Procedure/Methodology: Here the steps of the experiment are described in enough detail to be replicated by someone else. Some items that must be discussed include:

- The one variable being tested in a controlled experiment (INDEPENDENT)
- Identify the independent variable in your experiment:

- The EXPERIMENTAL GROUP is the group receiving the INDEPENDENT variable, while the CONTROL GROUP DOES NOT.

- Explain the purpose of a control group:

- How would the experimental group differ from the control group in your experiment?

- All other factors remain constant between the experimental and control groups (CONSTANTS).
- Identify three constants for your experiment:

- The DEPENDENT variable is the one that results from the independent variable being tested, and should be something that can be measured.
- USE THIS PHRASE: THE EFFECT OF THE INDEPENDENT VARIABLE ON THE DEPENDENT VARIABLE
    - For example, returning to the bean plants- The effect of <u>Fertilizer A</u> on <u>bean plant growth</u>
    - Identify the dependent variable for your experiment:

Results/Data: These are measurable observations (including units, when applicable) to determine if the hypothesis is supported.

- Data should be organized into a table and an appropriate graph should be created to observe trends
- What kind of data are you going to collect in your experiment?

- Create a data table in the space below:

- Create a basic graph illustrating the trends of your data:
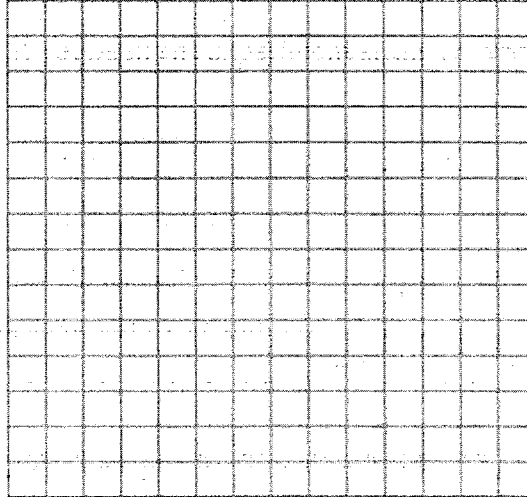
Conclusions: These are statements regarding whether or not the data supported the hypothesis, and should be reinforced with actual data from the experiment.

- After conducting your experiment, was your hypothesis supported? Cite specific evidence from the data collected.

Improving Validity: This is where suggestions are made regarding how to make the experiment more reliable.

- Scientists should be able to repeat the experiment and obtain similar results (the more times it is repeated and similar results obtained, the greater the validity of the findings).
- Large sample sizes are more reliable as they account for outliers.
- How could your experiment be improved besides the aforementioned factors (list two and explain).