

Scientific Investigation Planning Form

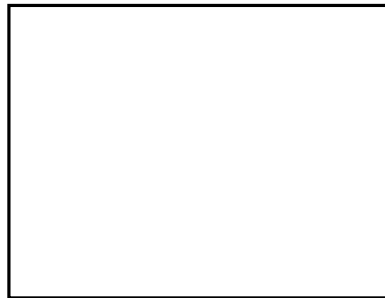
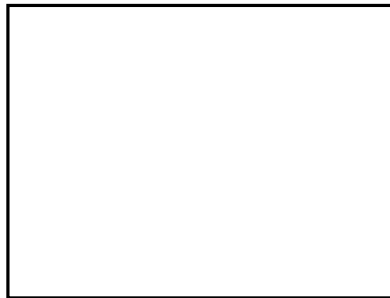
Investigators: _____

Planning Step #1: Brainstorming


Place Post It Notes in the squares below. Only one idea on each note.

General Topic: _____

Things the investigator could change or vary on purpose:



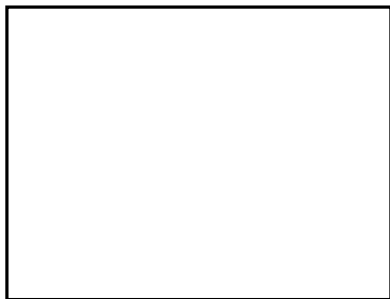
Things the investigator could measure or observe (different from above):



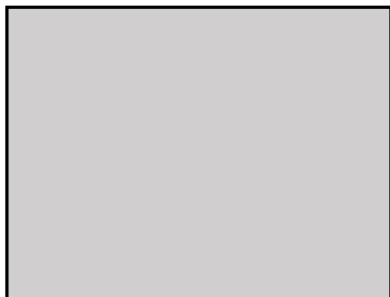
Planning Step #2: Choosing Variables

Place Post It Notes in the squares below.

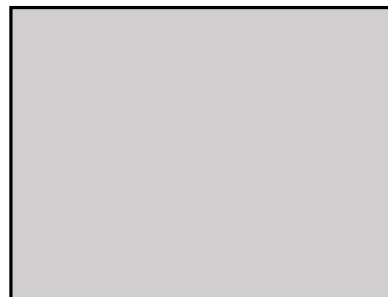
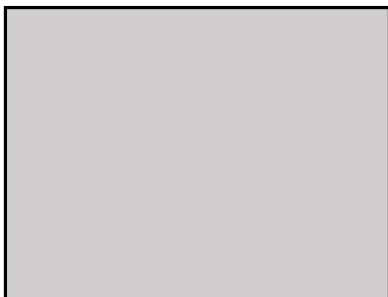
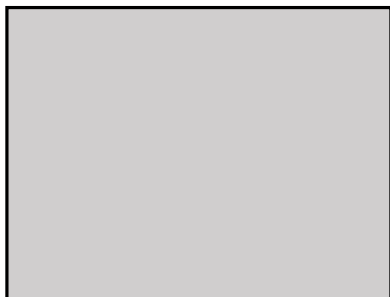
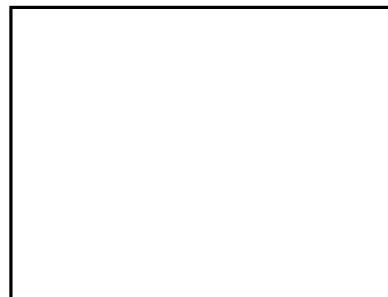
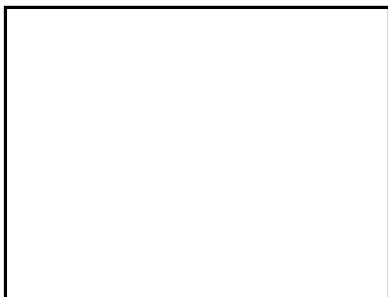
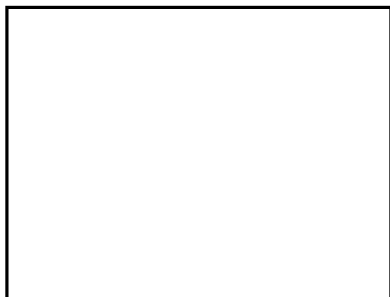
Part to change (independent variable):



Part to measure (dependent variable):



Part or parts to keep the same where possible (controlled variables or constants):



Step 1: Problem/Question

What is the question this experiment will try to answer? Include the independent and dependent variables in the question. For Example: *What fertilizer (independent variable) will cause bean plants to grow to the tallest height (dependent variable).*



Independent Variable



Dependent Variable

Write your question here:

Step 2: Information (Background Research)

What background information would be helpful to know?

Step 3: Hypothesis

Independent Variable

If the **independent variable** changes...

Dependent Variable

...then this is what will happen to the **dependent variable**.

Write your hypothesis below, using the boxes above as a guide.

If the _____ is _____,
Independent Variable describe how you will change it

then the _____ will _____,
Dependent Variable describe the effect of the change

because _____

as measured by (with) _____,
instrument, tool, probe, etc.

Step 5: Results – Data Table

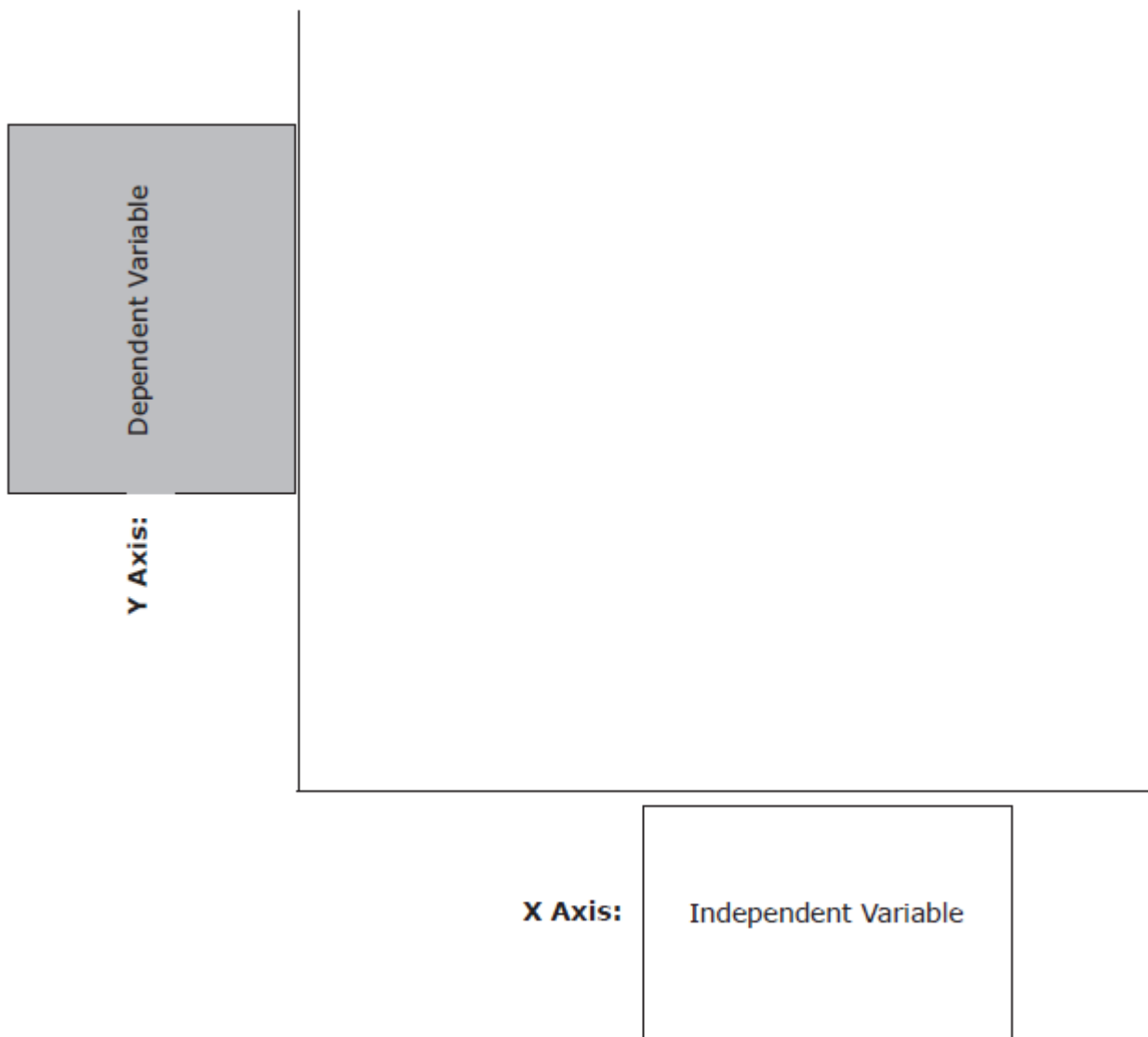
Place Post It Notes in the squares below.

Set up a sample data table like the one below specific to your variables and number of trials.

When the independent variable changed:	This was the result (dependent variable)
<div style="border: 1px solid black; padding: 10px; text-align: center;">Independent Variable</div>	<div style="border: 1px solid black; padding: 10px; text-align: center; background-color: #cccccc;">Dependent Variable</div>

Step 5: Results – Graph

Title: The effect of _____ on _____.
(Independent Variable) (Dependent variable)



Create a graph like this in your logbook or on a separate sheet of paper, as appropriate.

Step 5: Results – Statistics

Statistical tests will be discussed and modeled in class.

Step 6: Discussion

1. Explanation of findings in paragraph form. MUST include numerical data to back up your claims.
2. Summarize trends observed in the data.
3. Discuss the statistical tests that were conducted, why you used the test you did and which comparisons did or did not show statistically significant findings.
4. How did your findings compare with your predictions, other research, other scientific facts you know, or other experimentation?
5. Discuss problems and/or possible sources of error that might have occurred.
6. How could the experiment be improved, or changed for further study? (See "New Design" below)
7. *New Design: The next thing the investigator might want to know is:*

The next variable to
change...

The next variable to
measure...

Step 7: Conclusion – Finding Patterns

Write out your conclusion, answering these questions. Do not introduce any NEW information in your conclusion.

1. What was the purpose of the experiment?
2. What were the major findings: Include data (numbers) examples.
3. Was the hypothesis supported by the data? (Do not use "proved".)
4. What are the practical applications of your experiment?