Student Scaffold for Designing and Conducting Experiments

PRE-DESIGN CONSIDERATIONS

Phenomenon, object, or event being observed: ________________

What am I wondering about (initial question)? :

What prior knowledge, including observations made, do I have about this?

Part A: Things I could change or vary about the phenomenon, object, or event:
(Place sticky notes of the same color in the squares below)

[Blank spaces for sticky notes]
Part B: Things I could measure or observe about the phenomenon, object, or event: *(Place sticky notes of a new color in the squares below)*

![Sticky notes diagram]

**IDENTIFYING VARIABLES**

I will change: [Sticky note from Part A here]

I will measure: [Sticky note from Part B here]

I will not change (conditions held constant so it is a fair test): *Place remaining sticky notes from Part A here.*

![Sticky notes diagram]
I will not measure: *Place remaining sticky notes from Part B here.*

FORMULATING A QUESTION *(Refining the initial question)*

When I change:  \[ \text{What I will change} \]  \[ \text{What I will measure} \]  What will happen to:

Fill in the question that will guide your experiment:

When I change \[ \text{______________________________} \], what will happen to \[ \text{______________________________} \]?

DEVELOPING A PREDICTION OR HYPOTHESIS *(Note: This can be stated as a hypothesis instead of a prediction if you have prior experiences, knowledge, or observations)*

Based upon my question, I predict (or hypothesize):
THE EXPERIMENTAL DESIGN (Note: Others should be able to follow your design without needing to ask you any questions)

Materials I will need: ____________________________________________________________
__________________________________________________________________________

What I will change or vary (also called the independent variable)

What I will do (how I will carry out the change):

Number of trials I will conduct: ______

The data I will measure or observe (also called the dependent variable):

How I will collect the data: __________________________________________________________
__________________________________________________________________________
__________________________________________________________________________

How I will record and display the data (for example- table, graph, chart, picture)
DATA COLLECTION

When I changed: ————> What measurements resulted?

<table>
<thead>
<tr>
<th>What I changed (Independent Variable)</th>
<th>What I measured or observed (Dependent Variable)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sample chart for recording measurements or observations (Note: This is intended simply as an example to help get you started. You may design your own chart or modify this one to fit your design.)

<table>
<thead>
<tr>
<th>What I changed: ____________________ (specify units of measurement where appropriate)</th>
<th>What I measured or observed: ____________________ (specify units of measurement where appropriate)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

GRAPHING RESULTS

What type of graph is best- line graph or bar graph? __________________

<table>
<thead>
<tr>
<th>What I measured or observed (specify units where appropriate)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Y axis

<table>
<thead>
<tr>
<th>What I changed (specify units where appropriate)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

X axis (Note: Both axes will need to be labeled and the appropriate scale marked)
FINDING PATTERNS AND RELATIONSHIPS IN RESULTS

When I changed:  →  What happened to?:

What I changed

What I measured or observed
CONCLUSION
Summarize what you learned as a result of this experiment. *(Include the question you investigated, your evidence-your findings, patterns, cause and effect relationships that support or do not support your prediction or hypothesis, and any new questions that you might investigate to further confirm your conclusion or support an alternative explanation)*: