**Experimental Design: Procedure Pictures**

**Background**
An important part of studying chemistry (and science in general) is being able to organize and carry out an experiment. No matter what question or problem a researcher is trying to answer or solve, they must be able to set up a process that will give valid answers. In addition the process must be easily understood and potentially reproduced by others. During this activity your goal is to create an experimental procedure that can determine whether a given statement is fact or fiction. There is one twist to this - your procedure must be drawn out in pictures with no words involved!

**Prelab Questions**
Define the terms: independent variable, dependent variable, and control variable.

**Objective**
Develop a procedure using only pictures that can be used to scientifically determine whether a given statement is valid.

**Materials**
- Large piece of construction paper
- Pens, markers, etc. for drawing

**Procedure**
1. With your lab partner, obtain a large piece of construction paper and a few pens or markers.

2. Once ready, your teacher will give you a “fact or fiction” statement. Do not share the contents of this statement with any other group!

3. You will have approximately 20 – 25 minutes to accomplish the following:
   a. Use the paper and pens/markers to draw a picture (or series of pictures) to represent the steps involved in determining the validity of your statement. 
   *You may not use any words or letters on your poster, but numbers are permitted.*
   b. Your poster should be designed so that another person can figure out the question you’re researching as well as the process that you’re planning on using to research that question.

4. Keep in mind the following key ideas when making your drawing(s):
   - What are the independent, dependent, and relevant control variables?
   - What measurements need to be made?
   - What equipment is needed?
   - What sequence of steps need to be performed?
   - How many trials/samples need to be performed or tested?

5. Find a location in the classroom to display your poster. Number it on the front (use the number on this statement given to you by the teacher). Put your names on the back of the poster.
Observations
Once everyone’s posters are put up you will be given a list of possible statements. View each of the posters and write the poster number next to the statement that you think it corresponds with. You are not to talk while doing this! Turn in the list to your teacher once you believe that you have identified each of the statements.

Analysis
Team up with your lab partner and pick a poster other than the one that you drew. The teacher will give you the actual statement that goes with the poster. Now that you know what the poster is trying to present answer the following questions:

1. Was the statement actually something that can be validly answered in a scientific experiment? Provide reasoning to justify your answer.

2. How well did this poster communicate the question and procedure? Provide reasoning to justify your answer.

3. List any information that was missing from this poster or that could be improved. Provide a drawing on a separate sheet to represent at least one of these improvements.

4. Once completed, give your suggestions to the creators of that poster. Once you have received your own poster read through the suggestions, discuss them with your partner, and turn everything in to the teacher.