Honors Biology
Choi/Beggs
Name: _____
Date: _____ Period: _____

Constants & Controls

Notes from the PowerPoint:

- A controlled experiment is: _____
  ***Example**:* _____
- The control group: _____
  Example: _____
- The experimental group: _____
  Example: _____
- Constants: _____
  Example: _____

Directions:

Identify the control group, and the constants from the experiment. *You can identify the constants listed and specify any more constants that you think would be necessary to obtain reliable experimental data.*

1. Three redwood trees are kept at different humidity levels inside a greenhouse for 12 weeks. One tree is left outside in normal conditions. The height of each tree is measured once a week.
   Constant(s): _____

   Control(s): _____

2. Ms. Beggs is testing to see if a new fertilizer, Fertilize-E, will increase the yield of corn. She has two 100m x 100m plots of land that are line up next to each other. On plot 1 she adds the Fertilize-E and on plot 2 she does not add any fertilizer. She uses the same number and types of corn seeds when she plants the plots.

   Constant(s): _____

   Control(s): _____

3. Tyler wants to know if she can dissolve more sugar into her coffee if she increases the temperature of the coffee. Her coffee is normally at 85°C when she pours it out of the coffee pot. She adds 1 cup of sugar to four cups of coffee that are at 85°C, 90°C, 95°C, and 100°C. Then she filters the coffee to separate the liquid from the undissolved sugar and masses the solid sugar.

   Constant(s): _____

   Control(s): _____

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4. Why is it important for an experimenter to keep track of everything that is held constant during an experiment?

5. Why is it important for some experiments to have a control group? Give an example to help explain your answer.

6. Baking soda, or sodium bicarbonate ($NaHCO_3$), is a common ingredient used in baking to help dough rise. Carbon dioxide (CO_2) gas is released during baking, and as the gas gets trapped in the dough bubbles form. Steven wants to test how the amount of $NaHCO_3$ affects the "fluffiness" of pancakes. Because it is difficult to quantify "fluffiness" he determines that "fluffier" will be taller than less fluffy pancakes. His famous pancake recipe calls for 1 tsp of baking soda ($NaHCO_3$), 1 egg, 1 cup of milk, 1 tsp of salt, and 2 cups of flour. To experiment to see if he should make any changes to his recipe, he makes four batches of pancakes with different amounts of baking soda and runs 2 trials. Batch 1 had no $NaHCO_3$ and pancake height for trial 1 was 1.04 cm and 1.25 cm for trial 2. Batch 2 had ½ tsp of $NaHCO_3$ and pancake height for trial 1 was 1.79cm and 1.93cm for trial 2. Batch 3 had 1 tsp $NaHCO_3$ and pancake height was 2.20cm for trial 1 and 2.07 for trial 2. Finally, batch 4 had 1 ½ tsp of $NaHCO_3$ and pancake height for trial 1 was 2.67cm and 2.60cm.

   Steven's hypothesis should have been: _____

   _____

   Independent variable: _____

   Dependent variable: _____

   Constants: _____

   _____

   Control group(s): _____

   Experimental group (s): _____

7. On a separate sheet of paper create a data table and a line graph for Steven's data.