Manipulating Independent Variables Lab Name: _____

HR: _____ Date: _____

Some chemicals, called enzymes, help break down substances into smaller molecules. Some laundry detergents contain enzymes that help break down protein stains in clothing. In this investigation, you will test how different conditions affect the activity of the enzymes in laundry detergent.

Problem: How is enzyme activity affected by changes in conditions?

Materials:
4 graduated cylinders with gelatin
4 marbles
Metric ruler
10ml water
2 10ml graduated cylinders
10ml detergent (10%) or pH 4
10ml detergent (30%) or pH 7
10ml detergent (50%) or pH 10
Stop watch
Safety Goggles

Procedure:

1. Obtain four graduated cylinders filled with gelatin. One of the clyinders is for the control condition. The other three are for the experimental conditions.
2. Decide which variable you would like to test pH or detergent concentration.
3. The dependent variable is the amount of gelatin broken down by the enzyme in the detergent. Measure the dependent variable by placing a marble on top of the gelatin and measuring how far the marble sinks into the gelatin.
4. Identify the independent variable in your experiment. Form a hypothesis that explains the effect of the independent variable on the dependent variable.
   Hypothesis:

5. Label each cylinder. Pour 10ml of water onto the gelatin in one graduated cylinder. This graduated cylinder will be your control condition. Label this cylinder control. Pour 10ml of each different detergent solutions into each of the other graduated cylinders. These graduated cylinders represent the experimental conditions. Be sure to label each with the type of detergent solution.
6. Place a marble on the top of the gelatin in each graduated cylinder. Wait five minutes, then measure the distance that the marble has sunk into the gelatin.