DIRTY DECOMPOSERS

Name _____
Period _____
Date _____

Problem: How does temperature affect the rate of decomposition?

Background Information:

Bacteria are single-celled organisms, and they can produce special proteins that will pass through their cell membranes. These proteins, called enzymes, come into contact with the dead materials and break them down into simpler, liquid components. Then the bacteria cells can take the liquid back into themselves, through the cell membrane, as a source of food.

Fungi do basically the same thing, although some of the details are a little different. Both bacteria and fungi get food from the dead material, which we describe as "rotting" once they have gone to work on it. (That's when the material gets slimy, smelly, and/or has fuzzy stuff growing on it.) What is especially useful, though, is that while the bacteria and fungi are getting their nutrition, some of the chemical parts of the rotting material are left behind in the soil. The parts left behind contain minerals that living plants can use to help them grow. So the decomposers are important ecologically because they cause natural recycling to occur. The minerals that were once in a living plant or animal get returned to the soil by decomposers when the plant or animal dies.

There are many factors that can affect the decomposition process. Like most living things, the decomposers usually do best when they have good supplies of air and moisture. Besides air and water, there are other physical features of the environment that can affect decompostion and how quickly it occurs. In this experiment we will see how temperature affects decomposition.

Materials:

1. 6 ziploc bags
2. labels
3. potting soil
4. carrots
5. knife
6. ruler
7. balance
8. graduated cylinder
9. water
10. probe
11. forceps
12. paintbrush

Procedure:

1. Label 6 ziploc bags for the necessary experimental groups.
2. Add 200 mL of potting soil to each of the six ziploc bags.
3. Cut six carrot pieces that are about 2 cm wide and 4 cm long.
4. Use a balance to find the carrot piece with smallest mass. Carefully shave the other carrot pieces until all six have about the same mass. Try to keep the shapes similar also.
5. Record the beginning mass of each of the six carrot pieces in the data table below and place it on the correct ziploc bag. Also, record your balance number and use the same balance every day.
6. Once all of the carrot masses are close to the same, place the carrot pieces in the correct ziploc bag. Make sure the carrot piece is completely covered with soil.
7. Add 20 mL of water to each bag. (More or less water may be needed depending on the beginning moisture level of the potting soil.)
8. Seal each ziploc bag and put them in the places indicated on the labels.
9. Over the next few days, carefully remove one carrot at a time from its ziploc bag using a probe or pair of forceps and gently brush off as much soil as possible with a small paintbrush.
10. Find the mass of each carrot piece and record it in the data table. Use the same balance each day.
11. Return the carrot pieces to the correct ziploc bags and put them back in the places indicated.
12. At the conclusion of the experiment, on a separate piece of graph paper, make a graph of your averages for each of the experimental conditions. Put the days on the horizontal axis and the mass on the vertical axis. Label each axis appropriately. Use three colors for the different lines and make a key. Title your graph.