MEASURING DECOMPOSITION USING TITRATION
DATA FORM 1: SAMPLES

Complete this form for each soil sample.

Name(s) _____ Date _____

Soil sample ID number _____

Soil sampling location _____

Type of area sampled (e.g., forest, schoolyard) _____

_____

Date soil sample was collected _____

Protocol 5, Part 2. Preparing Soil Samples

1. *Calculate dry weight of soil.*

Weight of container without lid (**G**) = _____ g

Weight of container without lid and soil (**H**) = _____ g

Total soil weight (H-G) = _____ g

Use total soil weight and % soil moisture from Part 1, step 6 on the **Measuring Decomposition Using Soda Lime Data Form 1: Soil Moisture Content** to calculate dry weight of soil. Remember to use the fraction for moisture content (not multiplied by 100).

Dry wt (g) = total soil wt – (moisture content x total soil wt)

= _____ g

This answer will be in grams of dry soil. For use in the final equation, you'll need to convert it to kilograms:

Dry wt (kg) = dry wt (g) x 0.001 kg/g

= _____ kg dry soil

Protocol 5, Part 3. Titration

2. *Record the amount of time you used for the incubation.*

   Date and time incubation began _____

   Date and time incubation ended (should be 24–48 hours) _____

   Length of incubation period = _____ **days**

   (# of days incubated. e.g., 27 hours = 1.125 days)

3. *Calculate the CO_2 produced by soil samples and present in the blank(s).*

   Molarity of HCl used in titration _____

   (This should be 1. If different, ask your teacher for help in altering the final CO_2 respiration equation.)

   Milliliters HCl used to titrate blank (**B**) _____

   (If you used more than one blank, determine the average and record it here.)

   Milliliters HCl used to titrate sample (**S**) _____

   CO_2 produced in milligrams = (B-S) x 22*

   = (_____ mL - _____ mL) x 22

   = _____ mg

4. *Calculate the CO_2 production rate.*

   The CO_2 production rate is the rate of CO_2 produced in milligrams CO_2 per day per kilogram of dry soil. Use the kg dry soil from step 1, number of days incubation from step 2, and mg CO_2 from step 3 above.

$$CO_2 \text{ production rate} = \frac{[(CO_2 \text{ produced in milligrams})/(\#\text{ of days incubated})]}{(\text{kilograms dry soil})}$$

$$= \_\_\_\_\_ \text{ (mg } CO_2\text{/ day) /kg dry soil}$$

**You may wonder why there is a "22" in the equation. It is necessary to convert from milliliters HCl into milligrams CO_2 as shown in the following equation:*

$$(HCl_{blank} - HCl_{sample}) \times 22 = (HCl_{blank} - HCl_{sample}) \times \frac{1 \text{ liter}}{1000 \text{ mL}} \times \frac{1 \text{ mol HCl}}{\text{liter}} \times \frac{44 \text{ g } CO_2}{\text{mol } CO_2} \times \frac{1 \text{ mol } CO_2}{2 \text{ mol HCl}} \times \frac{1000 \text{ mg}}{\text{g}}$$