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| **Schoolyard Ecology: Decomposition** |

**Baltimore Ecosystem Study**

**Cary Institute of Ecosystem Studies**

**Towson University**

***Decomposition***

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| **Source** |  | Alan Berkowitz, Bess Caplan, Sarah Haines, Tim Meyers, Trevor Shattuck. Cary Institute of Ecosystem Studies and Towson University. |
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| **Questions** |  | 1. Is there a difference in the decomposition rates between areas above and below ground? 2. Is there a difference in the decomposition rates between in the field and the woods? 3. What other factors hasten decomposition other than the microfaunal action? |
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| **Overview** |  | Nonliving organic matter must decompose, making the carbon and other nutrients available for living things. Soil biota—mostly unseen—influence the rate of nutrient release because they are responsible for processing dead organic matter. There are many factors that contribute to the compositions of soil communities and the organisms that are found within. The BES has many long term studies on the composition of these communities and what influence urbanization and other human practices have on them. |
|  |  | This study will give students an introduction of differences in composition of soil communities. By monitoring decomposing organic matter in different micro-environments, students will begin to understand that soil consists of not just dirt, but living things that are vital to all life. After this study, students should have a better perceptive on what the BES soil scientists are researching and why they are doing that research. |

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| **Materials** |  | * Hard pretzels * Roll of window or door screen * Scissors * Soldering iron * Plastic tags with twist ties * Steaks or flags for marking the soil * Scale * Drying oven (or regular oven) |
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| **Procedure** |  | **→ Determine what areas are to be studied…**   1. Look at a photograph of the schoolyard or walk the campus and decide what areas should be used in the study. Find areas that are large enough to have multiple replicates. 2. Find areas that differ in vegetation as well as how often the area is managed by people and how close it is to heavy human activity. 3. Make note of the moisture of the soil in the different locations.   **→ Construction…**   1. Using the scissors cut identical sized squares out of the screen that are slightly larger than the pretzels. You will need two squares of screen for every pretzel that you plan on burying, plus two for a control pretzel that will not be buried. 2. Take two of the squares at a time and solder three edges of the pair together, making a screen “baggie.” Repeat for all of the squares. 3. Place one pretzel in each baggie and seal the final edge with the soldering iron. 4. Weigh each pouch that contains a pretzel and label it with the tags, or label the bags with a letter or number and record the original weight separately.   → **Placing the bags…**   1. For each of the areas selected, use the same amount of pouches. Bury half of the pretzels four to eight inches beneath the surface and place the other half of the pretzels on top of the soil. 2. Label all of the pretzels with a steak so it will be easier to retrieve them later. 3. Keep the control pretzel in the classroom. 4. Leave the pretzels for 5 to 10 days.   → **Retrieval…**   1. After the predetermined time period, retrieve all of the pretzels. It is possible that some of them will have been lost for one reason or another 2. Dry all of the pretzels in the oven at a low temperature (65̊-93̊C) overnight in order to remove all of the moisture. 3. Weigh the dry pretzels in the pouches and record the difference in their mass from before and after the experiment. 4. Calculate the mean difference in mass for each area (above and below ground) and graph the results for comparison. Be sure to include the change in mass of the control pretzel(s). 5. Alternatively, if there were enough replicates, the change in mass can be analyzed using an appropriate ANOVA.   → **Discussion…**   1. Decide in which of the areas the organic matter decomposed the fastest and the slowest. 2. Speculate on why the decomposition rates were different for the different areas. 3. Talk about the importance of soil composition and soil communities in the role of nutrient release. 4. Explore the soil studies on the BES website and talk about the implications of each and how they might relate to your findings. |