BACKGROUND
Our third grade Science text includes a lesson on carnivores, herbivores, omnivores, and decomposers. The students had learned the characteristics of the first three in second grade, but, for many, decomposers was a new category. The text book was limited to one picture of a mushroom as an example of a decomposer.

Following directions for an investigation outlined in our textbook, each class prepared bread and cheese in plastic bags, which we observed over a period of four weeks, keeping notes on the growth of molds and how the molds were working to break down the cheese and bread. The classes were interested in the idea of decomposers and wanted to know more!

One class requested that we investigate our nature area to see if we could find evidence of decomposers. The idea sprang from a visit to our nature trail where class members observed different varieties of mushrooms. I let this particular class plan most of the investigation with a few suggestions from me to include record keeping and data sharing time.

We researched decomposers on the Internet and found that most are neither plant nor animal, but possess characteristics of both. This fascinated the students. We also used our media center resources for more information.

The Mowing is the investigation one class proposed and was carried out in each of my four Science classes.

LEARNING GOALS
The investigation meets the following AKS objectives for Gwinnett County, Third Grade Science Curriculum as each student will:

- Keep accurate records of investigations and observations
- Ask scientific questions based on observation and experience
- Explain verbally and non verbally to others how to solve a problem
- Record data in a log, journal or data base using Standard International Units
- Use technology to communicate his or her findings

MATERIALS
Resource and reference books; web sites
- Meter stick for each group
- Student field books for recording information
- poster board for each group
- graphing sheet for each student / another for class results
- crayons for graphing
- Plastic bag, tweezers for each group
- timer
- latex gloves for each student (optional)
- stereoscopic microscope (optional)
- "Dirt Cup" snacks (prepared by parents)

**STUDENT-GENERATED INQUIRY QUESTIONS**
- Are there different decomposers in our woods?
- Is there more than one kind of fungi in our woods?
- Where are more decomposers found?

**SAMPLE HYPOTHESIS AND PREDICTION**

*Hypothesis:*

*Prediction:*

**PROCEDURE**

**Pre-Investigation**
- After a discussion about decomposers, have the class write down questions and bring them to class the following day.
- Discuss which questions could lead to an investigation.
- Guide the students to make a decision on how large an area should be chosen for observation.
- Given the length of class time each day discuss different units of measure that would work. Suggestions: meter stick, cutting standard lengths of string, laying a piece of poster board on the ground and marking the corners.
- Agree on a length of time for observation and recording of data.
- Discuss what to look for in the woods.
- Research pictures of different fungi, molds, yeast and bacteria.
- If other decomposers like earthworms and termites are mentioned in resource material or discussion, include them in the discovery lists.
- If worms are included in the investigation, scan the area quickly for worms before continuing with more detailed observation, due to their rapid exit the worms would make upon arrival of inquiring hands.

**Day One**
- Investigate the control site the afternoon prior to the students’ investigation to allow more freedom in visiting each group and watching their work.
- Number each group let them scout the nature trail for an area they wish to investigate.
- Once each group has a site, set the timer for a 30-minute observation period.
- Record observations of each site before disturbing the area.
- Encourage sketches and use of many adjectives in their observations so they remember more detail.
- Allow each group to take a small sampling of material (excluding worms!) to bring back to class for observation under the microscope.
• Discuss the importance of replacing leaf litter, rotting wood, rocks, etc. that we disturbed during observation.
• Be conscious of avoiding poison ivy and disturbing as little of the area as possible.
• Guide the group to select a control area, which looks less promising as far as leaf litter and rich soil
• At the end of the observation time, gather the class together and take about 10 minutes of quiet writing and reflection time. Students should feel free to write or draw whatever comes to mind, they can also use the time to finish writing in their field books

Day Two:
• In class have students began to share their notes within their groups.
• Have students prepare posters using descriptions and sketches, as well as some samples to show the type and number of places within the site that a particular fungus, mold, termite or worm was observed
• Have each group decide on the job each member should perform.
• During the work time, allot each group time to take their sample bag to the microscope, place the samples in Petri dishes, and take turns observing their collection. Label each Petri dish with the group’s number and select a spot at the microscope table for sharing with others.

Day Three:
• Have each group continue work on the poster presentations and individual graphs of the findings.
• One possibility is to use bar graphs graduated from most types found to smallest number found.
• Groups that finish early can be allowed microscope time or passes to the media center for further research.

Day Four:
• Allot class time to each group to present their posters, graphs, samples, and to share pan of the writing they had done in the field books.

Day Five:
• Share the findings of the control site with the rest of the class
• Compile a chart showing our overall class findings. Ask the students to think about other investigations that could spring from this one. Save these suggestions for the next class’s investigation
• Have a celebration for the class’s findings by enjoying "dirt cups" - snacks made in plastic, see-through cups, holding chocolate pudding topped with smashed Oreo cookies with a gummy worm hidden inside.

Extensions
• Keep a record of the different types of mushrooms found in a given area throughout the year.
• Choose an area with many kinds of decomposers available. Put a piece of paper,
a piece of plastic bag, and a dead branch under the leaf litter. Check each item each week to watch for changes and to keep notes in the field book. Check the items at the beginning of the next school year.
• Take the leaf litter off the soil in one area, leaving everything else, and observe if decomposition still takes place.
• Start a school composting pile and study the changes that take place.

**RESOURCES**

[http://www.joplin.k12.mo.us/R8WebPage/InternetLinks/INTERFACE/decomposers.htm](http://www.joplin.k12.mo.us/R8WebPage/InternetLinks/INTERFACE/decomposers.htm)