

Composting: Why Bother? Syllabus

Summary: About 30 percent of our waste is valuable, biodegradable material that can be diverted from expensive, expanding landfills. *Composting* is controlling the natural decay of organic matter in a moist, aerobic (oxygen-demanding) environment. Tiny organisms (mainly bacteria, fungi, and protozoa) break down kitchen or yard waste to create a valuable product called compost—a dark, crumbly, earthy-smelling form of decomposing organic matter. In this unit, you control the natural decomposition process by providing appropriate conditions for composting organisms to convert your school kitchen waste to a product which can be returned to the landscape or garden.

You will participate in the “Rot Off!” Challenge with other teams in your class to see who diverts the most waste and makes the most thoroughly decomposed compost in 3 months. Following the composting challenge, you will share the knowledge you have gained with your community in a variety of ways.

Materials

- Computer with Internet connection
- Research resources, texts, journals, books, and community resources
- Multimedia software
- Materials to build a compost bin, school kitchen waste, and other needed composting material, such as scales and thermometers

Tasks

Introduction Activities

- Track garbage in your community from the point it is thrown away to its final resting place.
- Visit a local waste management facility and record the process (create a video, photo essay, or audio interview) or invite a local waste management specialist to the class and record the visit.
- Conduct a composting survey in your class and community, and present the information.

Survey Guidelines

1. Brainstorm a list of questions you want to ask about composting.
2. Choose the 10 best questions.
3. Design a one-page survey sheet.
4. Interview other students, families, teachers, neighbors, and relatives. Try to interview 50 people, and complete one form for each interview.
5. Collect forms, and list questions and number of responses for each answer. Compile percentages for each response option.
6. Discuss results with the class and address the following questions:
 - What is the participation rate?
 - Why do people compost?
7. Organize results in a graph and spreadsheet.
8. Publish results in a brochure, Web site, or newspaper, or use them in a presentation.

- Compile survey information from other groups.

Group Project (“Rot Off!” Challenge) Requirements

- ❑ Compile notes about the scientific factors that contribute to a successful compost (use Internet resources).
- ❑ Compile notes about setting up a long-term experiment.
- ❑ Divide group tasks, and write the names of the students who are responsible for the following tasks and information:
 - Analyze effective compost design and construction _____
 - Learn what materials can become compost _____
 - Find a proper location for the composting project _____
 - Determine necessary supplies

 - Manage all data in a spreadsheet

- ❑ Create a written plan that describes your group’s bin design and its construction, and describes your plan for managing the compost. The plan should include a statement about how the group will collect the materials to build the bin, where the bin will be placed, how the bin or pile will be maintained, and what source(s) and methods of gathering organics will be used. A plan for how data will be recorded and organized should also be included.
- ❑ Create a composting log that includes the following information:
 - ❑ Composting start date
 - ❑ Additions of organic material in pounds
 - ❑ Probe data (nitrogen levels, moisture level, pH, and temperature)
 - ❑ Types of materials added, and whether additions are wet or fibrous, chopped or whole
 - ❑ Dates it is turned for mixing and aeration
 - ❑ How often water is added
 - ❑ Addition of critters, such as red wiggler worms or nematodes
 - ❑ Addition of compost boosters, such as blood meal, bone meal, or rock phosphate
 - ❑ Observations of chemical and physical changes
 - ❑ Identification of different types of chemical reactions (such as synthesis, decomposition, single displacement, double displacement, or combustion)
 - ❑ Pros and cons of composting
 - ❑ Problems associated with composting and suggestions for solving them
- ❑ Respond to essay questions on conservation of mass and chemical reactions

Group Research Project

- Topic

- Thesis or Proposal

- Research Sources

- Presentation Method—Multimedia, Video, Audio Presentation, Publication, Charts, Graphs, Photo Essay, or Other

Topic List and Questions

- Visualize and design an alternative to landfills.
- Locate other schools or communities in the your country that are engaged in composting projects, and compare processes and results.
- Study innovations in home, community, and agricultural composting.
- Experiment with controlling the variables of composting in an empirical study (with or without air, different materials, cut or uncut materials, rates of decomposition, and so forth).
- Observe and record naturally occurring compost invertebrates and microorganisms, and explain their part in the composting process.
- What are other methods of removing biomass from the waste stream?
- What are some other major uses for composting, beyond backyards?
- What are the problems, costs, and major issues involved in large community composting projects?
- How can composting reduce the use of pesticides or restore contaminated soil?
- How can compost control erosion and manage storm water?

Presentation of Project

- Composting Recipe
- Compost Challenge Summary
- Community Presentation
Topic _____
Audience _____
- Answers the questions, *How can our community manage waste better?* and *How can composting today benefit tomorrow?*

Product List

- Make a slideshow presentation to a community group (such as a city council, neighborhood association, or gardening group) and explain your research project.
- Design a pamphlet describing how to compost and include resources from the community.
- Create a Web site for the community providing the latest consumer education on recycling and composting resources in your area.
- Design a video that shows the value of composting. Public access television channels might air this for the group
- Create a flowchart poster using graphic organizer software to illustrate the composting process and/or waste reduction process in your community to post in your community.

Other Requirements

- Participate in class discussions and debates.
- Complete peer and self-assessments.