



Composting

Student Handout 1
Activity M.s/H.k

Name: _____

What is Composting?

Backyard compost piles are familiar to many people. Usually, they consist of leaves, grass clippings, orange peels, etc., slowly turning into rich soil. This is undoubtedly the oldest form of recycling known to humans. Composting transforms organic items that are no longer needed into something of value. Municipal Solid Waste (MSW) composting, however, is a relatively new method of managing our garbage.

MSW composting is similar in many ways to backyard composting. But MSW composting possesses several significant advantages over traditional composting. Most importantly, it can make use of a much broader range of household wastes, including paper and wood products. In addition, MSW composting is much faster than backyard composting. This is because MSW composting uses a mechanical process that includes shredding of the waste and closely monitoring its condition while it degrades. MSW composting greatly accelerates the process of turning organic garbage into a soil-like material called “humus.”

Because of these advantages, MSW composting can play an important role in managing our solid waste in the future. Experts say that MSW composting can keep up to 60% of all solid waste from going to the landfill, thereby turning today’s refuse into tomorrow’s compost.

Compost has beneficial properties for growing plants. It helps retain moisture while allowing good drainage. Nutrients are better able to cling to composted soil particles, so the need for chemical fertilizers can be reduced. Roots are able to penetrate deeper, resulting in healthier plant growth. Less fertilizer and better soil penetration reduces fertilizer run-off into rivers and streams.

This valuable product has many uses. It can be solid to gardeners and homeowners for use as potting soil, on their vegetable gardens or around shrubs and trees. Compost is used in parks and nurseries, on Christmas tree farms and along highways where soil is damaged from the use of winter salt. Compost is used by towns and cities for park projects and for landscaping “green spaces.”

How is Compost Made?

MSW compost is made through a process known as biodegradation or decomposition, aided by mechanized controls. The collected organic waste is mixed and then shredded or crushed to a uniform size and consistency in a large machine that looks like a cement mixer. Temperature, moisture, and oxygen content are monitored closely to maximize the rate of biodegradation. Much of the work in the decomposition process is done by anaerobic bacteria. Anaerobic bacteria are small organisms that can

live without oxygen. These organisms break down the organic material that has been collected into the soil-like material we call compost.

During the composting process, the bacteria generate heat. At times, the temperature in a compost pile can reach well over 100 degrees Fahrenheit. This is as hot as a very hot summer day! The heat in the compost pile actually “cooks” the product. After processing, compost must be placed in long rows called “windrows” where it is cured for up to 180 days. During the curing process, the compost must be turned occasionally to help the process of biodegradation and to keep odors to a minimum.

Composting Around the World

While new in the US, MSW composting has been used for many years in Europe. MSW composting has been more popular there because landfill space is even more scarce than in this country. In Fact, there are more than 200 municipal solid waste composting facilities operating in Europe.

Municipal composting in the US is not yet as widespread as in Europe. But, as available landfill space shrinks even further, composting is growing. There are over 100 MSW composting facilities in the planning, development, or construction stage in America today.

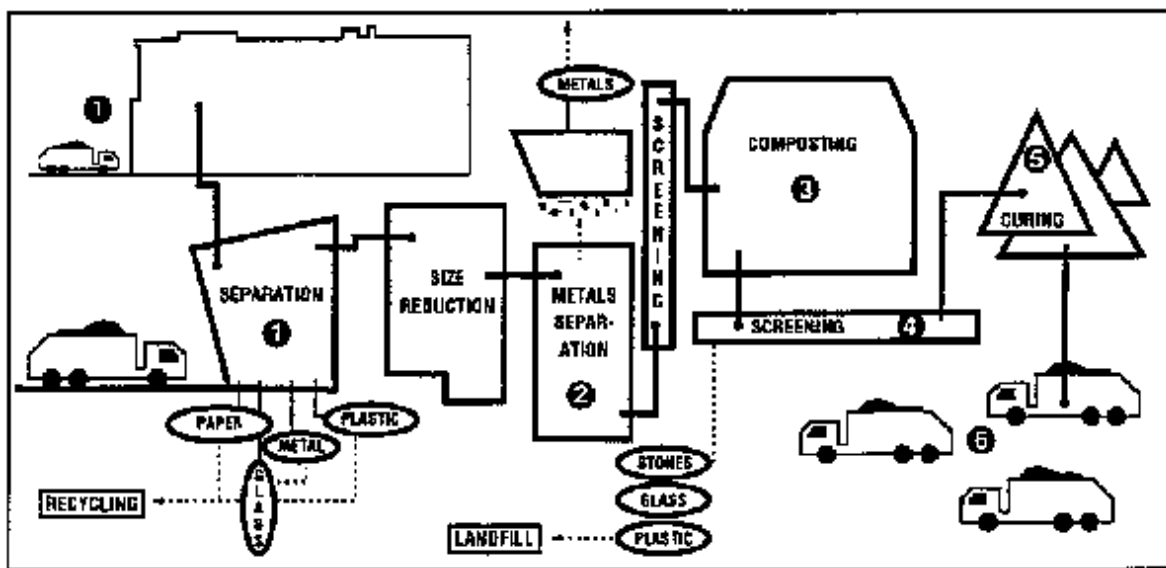


Composting

Student Handout 2
Activity M.s/H.1

Name: _____

Modern composting is a sophisticated process that uses biodegradation—and holds the potential to keep millions of tons of material out of our landfills.



Composting Process

1. Trash is taken to a facility where compostable material—like food scraps and soiled paper—are separated from recyclable material—like glass, plastic, metal, and newspaper. Compostable materials continue the process and recyclable materials are sent to recycling areas.
2. Magnets and screens remove additional non-compostable materials.
3. The remaining material enters a special composting chamber where temperature, moisture and oxygen are carefully controlled to maximize the rate of decomposition.
4. The composted material is then screened one more time.
5. The final step is curing—which takes from one to six months—and produces a nutrient-rich product for plant growth.
6. Compost—the material that comes from this process—is used to enrich the soil for gardens, golf courses, parks, roadways, and fields for crops.



CREATE A CLASSROOM COMPOST COLUMN

Student Handout 4

Making Your Own Composting Column

The basic column requires making a hollow cylinder out of 2-liter plastic soft drink bottles that will hold the materials to be composted. It can be made from one or more empty 2-liter plastic bottles. An additional bottle is needed to hold the column upright and to catch drippings. These instructions are for one two-bottle column.

Materials

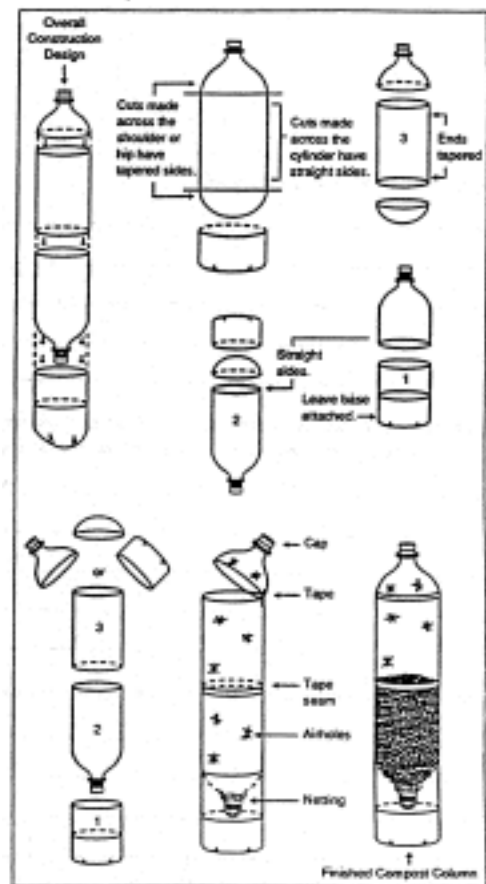
Three 2-liter plastic beverage bottles
 Tools: marking pen, knife or razor blade, scissors, hot water, sharp needles for poking holes, clear tape, plastic electrical tape
 Netting or mesh fabric, rubber band
 Organic material for composting, such as kitchen scraps, leaves, newspapers, and grass clippings
 Garden soil (not potting soil, which is sterilized)

Remove the labels from all three bottles. Cut them as illustrated, and assemble. Most columns will require air holes for ventilation, and these can be poked into the plastic with a sharp needle.

Experiments

Make several identical columns and fill each with a different type of solid waste. Layer the waste with handfuls of garden soil. Pour equal amounts of water into each column, and wait several hours for it to percolate through. If none comes out the bottom, add more in equal amounts until about a half cup drips into the base. Add water every few days. Which column decomposes faster?

Make several identical columns, and fill each with an identical quantity of compostable waste. Vary the amounts of garden soil, water, and sunlight each column receives. Which column decomposes faster? Use a chart to record any observable changes in the column, such as the amount of water added, temperature of the compost, date, color changes, and evidence of decomposition.





A TRIP TO A COMPOSTING FACILITY

Student Handout 5

Questions to be asked during a trip to a composting facility:

1. From where does the solid waste composted at this facility come?
2. Why was the composting facility located on this site? What tests or studies were done before it opened? When did it open?
3. Who owns and operates the composting facility?
4. What types of materials are composted at this facility?
5. How much solid waste is composted at this facility per day?
6. What is the fee for using the composting facility?
7. Are any hazardous materials handled by this facility?
8. How is the site managed for the control of blowing trash, odors, noise, animals, and dust?
9. How does the facility monitor the composting process?
10. What are the end markets for the finished compost?