

Decomposition Column

Grade Level: Middle school

Overview This activity could go along with a lesson on decomposers, recycling, or composting. When you reduce, reuse, and recycle, everyone benefits. Many people may be recycling at home, but how many are composting? Composting reduces the number of things that are thrown away. Building a decomposition column allows people to compost in their own house or classroom.

Objectives

Upon completion of this activity, students will be able to:

- Identify the benefits of composting.
- Identify decomposers and understand their role in an energy cycle.
- Identify the benefits of reducing, reusing and recycling.

Important Words

- Compost
- Decomposer
- Energy cycle
- Recycling
- Biotic
- Abiotic

Materials

- three two-liter soda bottles. Make sure one still has the cap.
- scissors or x-acto knife
- marker
- small piece of screen or plastic with holes in it
- clear packing tape

Time Needed

1 1/2 hours, plus additional time for observations

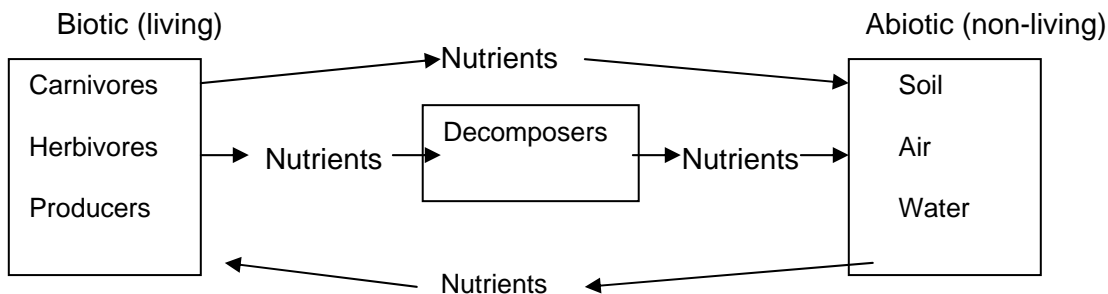
Teacher Preparation Teachers might want to review how food chains and energy cycles work. Decomposers play a very important role in the energy cycle. When they break down their food, they put nutrients and energy back into the soil.

Decomposition Column

Background Information

Decomposition is a natural process in which dead things are broken down into the basic materials they are made of, as the result of living organisms feeding on them. When decomposers eat they are putting nutrients and energy back into the soil, which helps plants and trees grow. It is ultimately fungi and bacteria that are the decomposers. Animals such as millipedes, wood lice, etc. help break down material like teeth break apart food. Building a decomposition column will help students get a firsthand look at how composting works and what decomposers can do to help the composting process.

Nutrient cycling The nutrient cycle is the transfer of nutrients back and forth between living things and the non-living environment. It is important to know a cycle never ends.



Activity 1: Building the Decomposition Column 45 minutes

1. Remove labels from all three soda bottles.
2. Take the first bottle with the cap and cut it in half across the middle.
3. Take the second bottle and cut off the top and bottom of the bottle so that you have a slight curve or taper at the top or bottom of the cylinder you have just made. Discard the top and bottom.
4. Take the third bottle and cut off the bottom third of the bottle. Discard the bottom.
5. You should now have four pieces. Fit the pieces together in this order from the top to the bottom: The top of the bottle from Step 2, then the cylinder from Step 3, then the top of the bottle from Step 4 TURNED UPSIDE DOWN, then the bottom of the bottle from Step 2.
6. Tape the bottom three sections securely together using bookbinding or clear packing tape.
7. Attach the top with only one or two pieces of tape so that you can add items to the column.
8. Poke some holes in the straight section of the column.

Decomposition Column

Activity 2: Filling the column

45 minutes

1. Take your decomposition column into the woods or a garden, a place where there is a lot of soil and a good place to find decomposers. A rotting log is a great place to find decomposers.
2. Fill the decomposition column half way up with soil. If you don't see any decomposers in the soil, then try to find a few, such as worms, wood lice, or millipedes and put them in your soil. Now put other items from the surroundings in the decomposition column, such as leaves, grass and/or dead wood, so the decomposers have something to eat. Students may also put items such as wrappers, bottle caps or other trash so that they can learn about how long it takes for items like this to decompose.
3. Add enough water to make the inside moist, but not too much. Too much water will cause the decomposition column to smell. However, students can team up to experiment with measuring and adding various amounts of water to different columns to see the effect.

Conclusion

10 minutes (and ongoing)

1. Now just place the decomposition columns around your room and let the composting begin. Have students make some predictions about what the animals will eat and/or how long it will take an item to decompose. Have the students make daily or weekly observations.
2. Students can add more items as time goes on, and can pose different questions for observation. As long as the decomposers have something to eat and there is enough moisture, the column will continue to work for many weeks or months.
3. Other extensions would include building different size columns or adding more decomposers to vary the factors involved in the columns and then making observations.
4. See the Bottle Biology Website (below) for additional projects.

Resources

Adapted from the Bottle Biology Website: <http://www.bottlebiology.org/>