Reduce, Reuse, Recycle

Objective: Students become familiar with the concepts of recycling and reuse.

Summary: Students will make a compost container, fill it and observe the results.

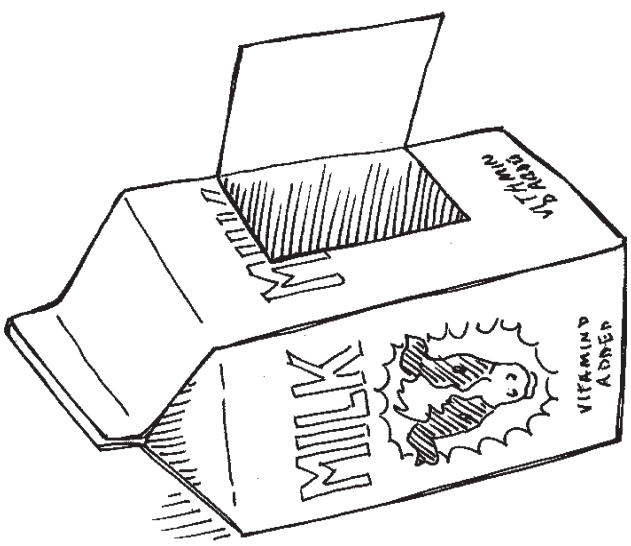
Time: ½ hour to construct, five minutes per week to maintain over three to five weeks.

Student Grouping: Three to four students per group

Materials: One paper milk carton per group, two pieces of newspaper per group to work on, about one gallon of kitchen/lunch scraps, shears for cutting cartons, scraps and straw (straw is commonly mixed with manure), about a gallon bucket of manure, about a gallon of soil with a trowel or cup to scoop both.

Background Information: Our planet has resource limits. The more efficiently we use resources, the more use we can get from them. Using resources efficiently not only makes environmental sense, but in the long run it saves money, too. Locally in California we have experienced water shortages. We have all learned to get things done with less water as a result. Water use is reduced when it is reused, saved after one process and used for another. For instance, if the water used to rinse vegetables was taken outside and poured on a plant, it has been used twice, it has been reused. Water at a car wash can be filtered and cleaned then reused to wash other cars. This is an example of water recycling or "reclamation." Recycling cans, bottles and paper is becoming more common in our community as people realize the benefits of recycling.

We are using our resources best when we reduce our use of them. The next most efficient use is to reuse resources. The final option for efficient use of resources is recycling, or remanufacturing a material back into its original form again.



All the counties of California were mandated to reduce their solid waste flow by 50 percent by 2000. Marin County is in compliance and does divert 51% of its waste either by recycling, reusing or composting. Still, Marin County deposits over 200,000 tons of trash each year into landfills. This represents 5lbs. of garbage per person per day.

In this activity students will REUSE a milk carton and some food scraps, both of which might otherwise ended up in a landfill. They will end up with some high quality potting soil that can be applied to a growing plant as fertilizer or used as potting soil. Thus, they will REDUCE the amount of waste going to the landfill and REDUCE the use of commercial potting soil or fertilizer. Hopefully, there is a way for them to RECYCLE all the paper they use at school. Students will thus experience three useful ways to use resources efficiently.

The process used to make this soil is called "composting." (See the Resources Directory index under "soils" for composting information.) The manure and soil contribute decomposing or composting organisms to the mixture. These little critters digest the ingredients and break them down into soil. Some common decomposers are mushrooms, sow bugs and earthworms. Microorganisms, tiny animals you can't see without a microscope, are also doing a lot of the decomposing. These create heat as they devour the compost ingredients and can make a compost pile get hot. The end result is finished compost.

Marin Ag. Facts: Composting is a growing enterprise in many California communities. In some cities citizens are encouraged to keep plant materials as well as glass, paper and cans separate from their trash for curbside pick-up. Plant material in Marin County is recycled at the Marin Resource and Recovery Center. Plant material is shredded and layered with soil sludge from the Central Marin Sanitation Agency and turned regularly. Over time, bacteria and other

organisms turn it all into rich potting soil which is sold as fertilizer and topsoil. This reduces the burden on landfills, allows wastes to be put to good use and can even provide income for a community.

Organic farms use a lot of compost because it not only adds nutrients without chemical fertilizers, it also improves the soil texture. Nonorganic farmers apply compost to their fields as well. Composting manure helps ranchers get rid of piles of animal waste and can be profitable at the same time.

Preparation:

1. Collect the materials. Have students bring in half-gallon milk cartons a week before the activity. You can get a bucket of dry manure (usually mixed with wood shavings or straw) from anyone who has horses, cows, sheep, goats, etc. Look under "Horse Stables" in the yellow pages, ask a student who owns livestock, or drive in and ask anywhere you see that has animals. The soil can be any type. Bring a bucketful of soil and manure to class the day of the activity.
2. You can have students bring in lunch scraps, get some from the cafeteria if you have one, save your own vegetable wastes for a week or so and bring them in. Otherwise you can get scraps from a produce shop or grocer. Avoid using meat, as it will compost but takes longer than vegetative material and has a tendency to attract more pests and smell bad.
3. You may want to get some old forks from the thrift store or garage sales for use as mini-pitchforks. Students can mix the compost by hand otherwise.

Procedure:

1. Group students and distribute the milk cartons. Explain to students that they are going to turn garbage into something useful and valuable.
2. Have students spread their newspaper on their work space. The floor works well because things can't fall off.
3. Have a student take the bucket of soil around to each group's newspaper and deposit one scoop. Repeat with the scraps and manure buckets.
4. Have students record observations of each substance.
5. Demonstrate how to cut the side of the milk carton open (see illustration). Have students cut open their cartons.
6. Have students shred all the compost ingredients into small pieces (1/2" maximum) then put them all into their cartons and dampen the mixture with water. It should not be soggy.
7. Have students keep the mixture damp and stir it once weekly. They can record observations each time they stir the compost. The activity is done when the compost is finished. It will have broken down into tiny particles that resemble and smell like rich soil. The finished compost can be used on plants as fertilizer or used as a rich potting soil.

Questions for Discussion:

- Is all this stuff garbage?
- Does anyone know the word "compost"? "Recycle"?
- Does anyone compost at home?
- How is composting also recycling?
- What else is being recycled here besides the compost ingredients? (carton)

Extensions:

- Place an earthworm in the container and see how it helps. Be sure to turn the compost gently so the worm is not injured.
- Plant seeds in the resulting potting mix and in some plain soil and compare growth.
- Take the temperature of the compost twice a day and record the changes. Talk about microorganisms eating and digesting the compost ingredients, making it into soil.
- Compost various materials found in the garbage and see how long it takes them to decompose.