



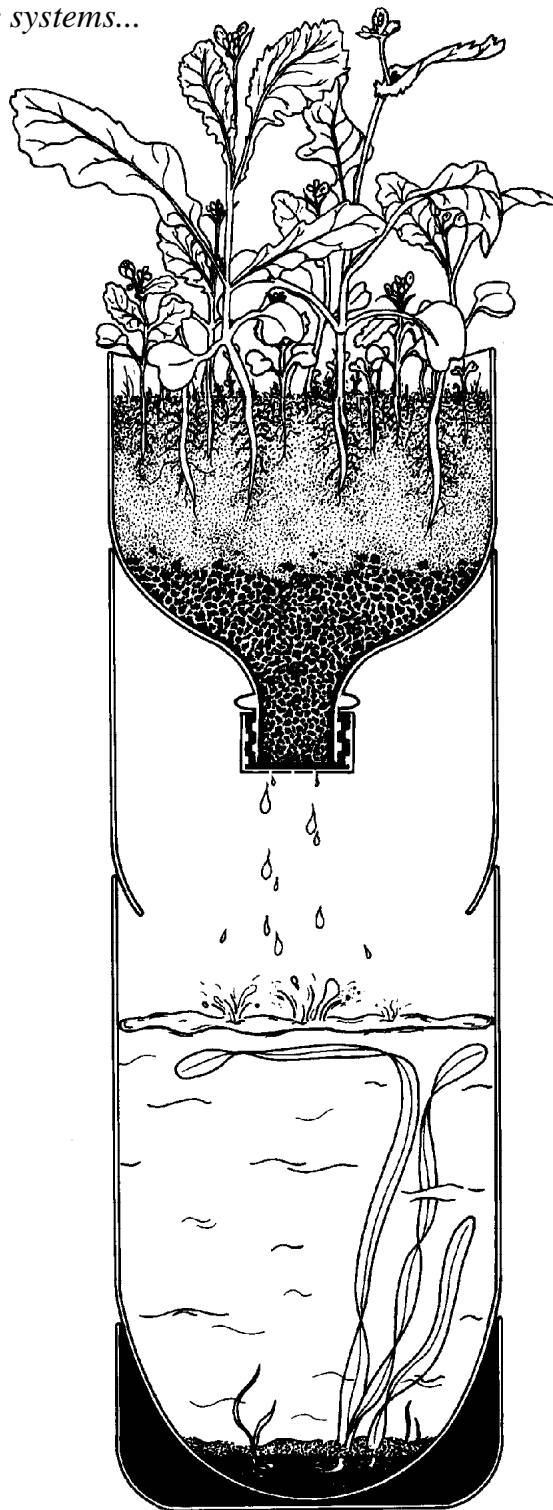
TerrAqua Columns

Explore interactions between terrestrial and aquatic systems...

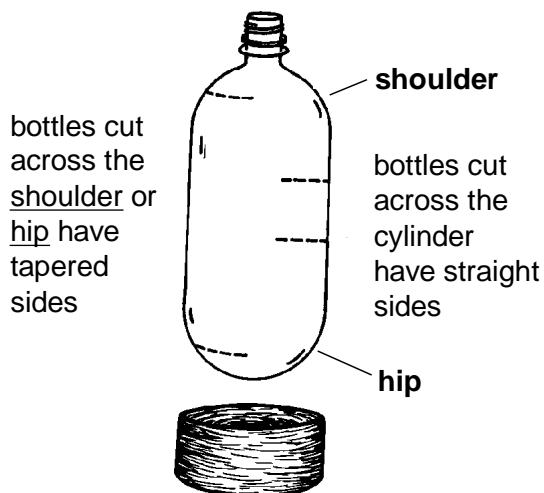
Terrestrial and aquatic ecosystems are frequently viewed as two separate and independent entities. However, land and water systems are connected in many ways. One of the major links between terrestrial and aquatic ecosystems is water.

Water is the life blood for the terrestrial community and usually finds its way to wetlands, rivers, lakes and oceans. Passing through the soils of fields and forests, the water picks up compounds such as nutrients and agricultural chemicals. As this solution enters an aquatic community it then modifies biological, physical and chemical aspects of that community.

Construction of a TerrAqua Column can allow you to model and explore relationships between land and water ecosystems.



Bottle Anatomy



Column Construction

This column is composed of two units. The upper, terrestrial unit is made by cutting a bottle to make pieces A and B as shown in the illustration. These two pieces can be held together by a wide transparent tape such as bookbinding or mailing tape. The lower, aquatic unit is made by cutting a second bottle to produce piece C. Biological materials for the aquatic system can come from a pond, lake, puddle or fish tank and can include algae, phytoplankton, zooplankton, aquatic plants and insects. A variety of plants can be used in the terrestrial system. Because of their rapid life cycle, Fast Plants work well.

Studying the Flow of Agricultural Chemicals

Recent concerns about the interaction between land use and water quality have led to the study of nutrient and chemical flow from terrestrial to aquatic ecosystems. Fertilizers and pesticides used for lawn care and agriculture make their way into aquatic systems causing water quality problems ranging from algal growth to the build-up of toxins in drinking water.

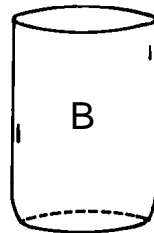
The TerrAqua Column allows for the study of various aspects of land-water interactions such as the effects of:

- nutrient sources for terrestrial system;
- nutrient concentration;
- type and amount of soil in terrestrial system;
- type(s) of plants in terrestrial system;
- physical factors such as temperature and light;
- effect of various pesticides; and
- frequency of fertilizer and/or pesticide application.

Cut Bottles

1st Bottle

cut, leaving 1-2" of the cylinder on the shoulder



cut, leaving 3/4" of the hip on the cylinder

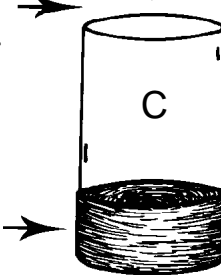


2nd Bottle

cut across top of cylinder leaving straight sides

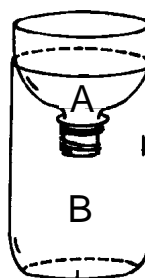


leave base attached

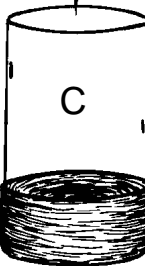


Combine Bottles

invert Part A onto the straight side of Part B



slide the A/B unit onto C

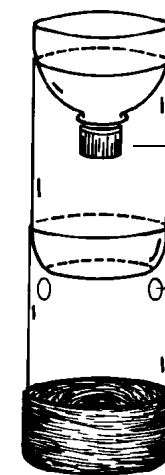


Add Finishing Touches

punch small holes in cap



screw cap onto bottle



cut or melt holes into the top sides of the lower bottle

Various aspects of the terrestrial and aquatic systems can be monitored such as the growth of plants and algae. For plants in the terrestrial system, percent germination, height, weight, leaf size, length of life cycle, and seed production can all be measures of plant health. Populations of algae, aquatic plants and animals can be monitored in aquatic systems. Changes in the soil micro-organism populations and soil structure can also be monitored. Finally, the solution flowing from the terrestrial to the aquatic system can be examined with a Fast Plant bioassay.