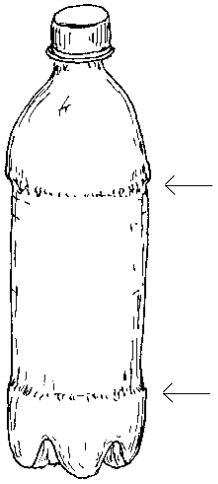
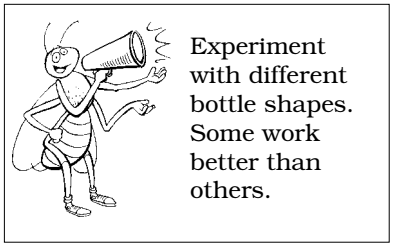
Bottle Cap Gardening

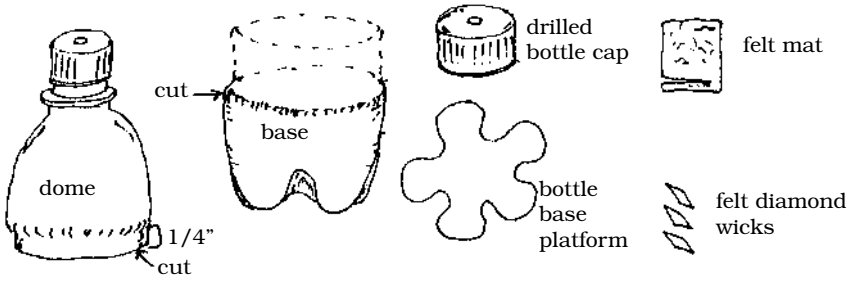
Building a garden dome:



1. Collect two 16-24 oz. plastic bottles per garden.
2. With a blade, make a 1-2" cut in body of straight-sided bottle.
3. Insert scissors, tips down, and cut up to the top of label and then around the rim of the label to create the dome leaving about 1/4" of straight side.
4. Cut down to bulge at base, then remove the rim of the bulge.
5. Press dome into base; if necessary, trim rim so the dome fits snugly.
6. Using another bottle, with a sharp knife or blade, cut a 5-point platform from the base of another bottle.
7. Drill a hole in 4 bottle caps approximately 13/64".
8. Using felt, cut a 2" X 2 1/4" mat and 3 diamond wicks, each 1" X 1/4".

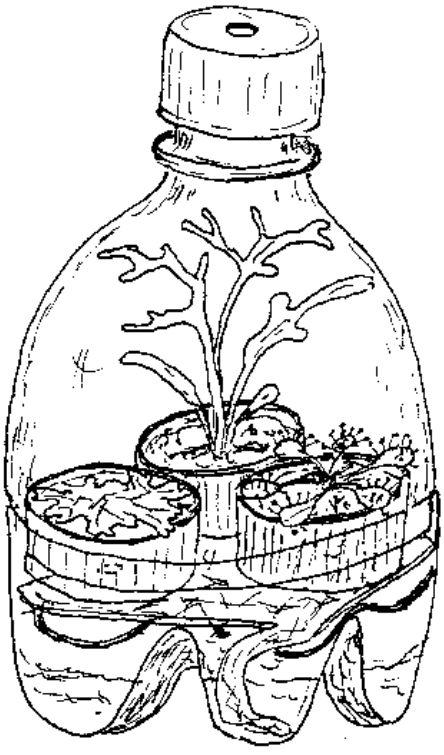


Experiment with different bottle shapes. Some work better than others.



Planting a bottle cap garden:

1. Place felt mat on inverted bottle base platform, tuck tail down and under and place in base of dome.
2. Soak the mat thoroughly, using deionized water (e.g. rain or snow melt).
3. Insert diamond wicks into holes of 3 bottle caps.
4. Fill bottle caps with soil.
5. Place bottle caps on the wet felt mat and wet soil with deionzed water.
6. Select plantlets and press gently onto wet soil in each of the 3 bottle caps. (Tiny snippets of moss, Kalanchoe and liverworts thrive in these gardens).
7. Firmly fit dome over base.



Care for your bottle cap garden:

1. Place your garden near a window where it will receive indirect light. (Direct sunlight will overheat your plants.)
2. Keep a small quantity of deionized water in the bottom of the reservoir of your dome. You will only need to add water once a month or so.

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Activity 1: To know a moss - grow a moss

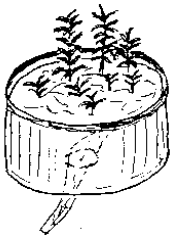
Skills and Concepts:

- growing, observing, counting, sampling
- estimating, calculating, graphing
- using a magnifying lens

date	total # shoots	# shoots sampled	# leaflets sampled	average # leaflets	est. total leaflets

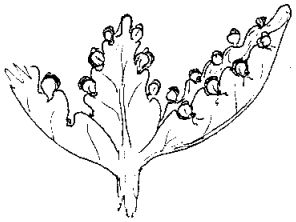
Using a hand lens,

1. observe your sprigs of moss
2. record the following data:
   - date of observation
   - number of moss shoots in bottle cap
   - number of shoots sampled for leaflet count
   - total number of leaflets on sampled shoots
   - average number of leaflets per sampled shoot
   - estimated total number of moss leaflets in bottle cap on date
3. plot a graph of moss growth over a few weeks
4. make a drawing, to scale, of your moss



Activity 2: Kalenchoe kids, mother of millions

1. Observe your Kalenchoe plantlet over a few weeks and record the following data:
   - date of your observation
   - number of leaves on plant
   - overall size of plant: height, width, etc.
   - note when leaves change shape
   - note when plantlets appear on leaves
2. Make drawing, to scale, of your plant
3. Break off desired number of plantlets at edge of leaf of the mother plant, and transfer your new plantlets to new bottle cap gardens



Skills and Concepts:

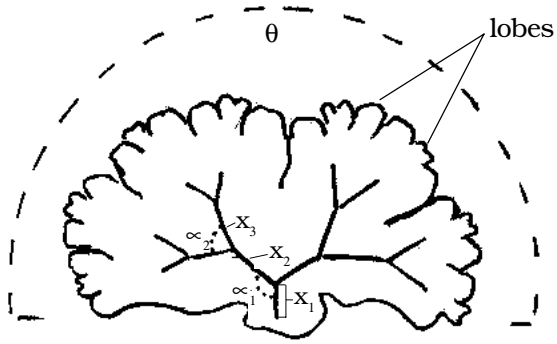
- growing, observing developmental events
- measuring and graphing
- asexual (clonal) propagation of plantlets

date	total # leaves	size of plant	notes

Activity 3: Liverwort sports

Skills and Concepts:

- growing, observing, measuring linear (x) and angular (∝) growth
- modeling two dimensions
- predicting outcomes based on models



1. Use a film can hand lens and observe your liverwort
2. Each week, measure liverwort growth by recording
   - n = number of lobes
   - x = length between branches (mm)
   - ∝ = angle of branching event (degrees)
   - θ = arc of growth at margins (degrees)
3. Make predictions and evaluate results for when the liverwort will reach the bottle cap rim

	Predicted	Observed	Notes
date			
# lobes			
arc (^{0})			