



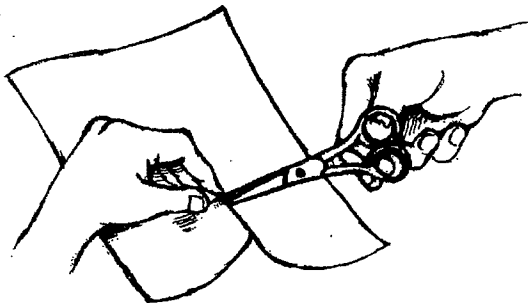
## Making the Model



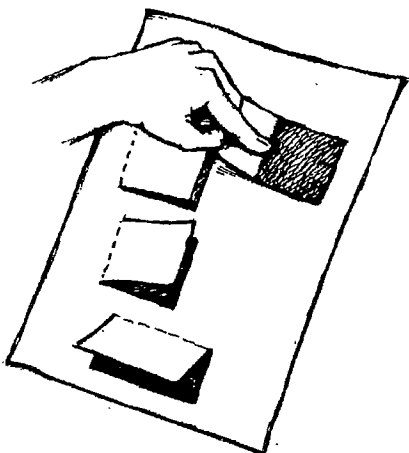
### Weathering Park

**MATERIALS:** reproducible pages 64–66 • scissors • tape • crayons, colored pencils, or markers

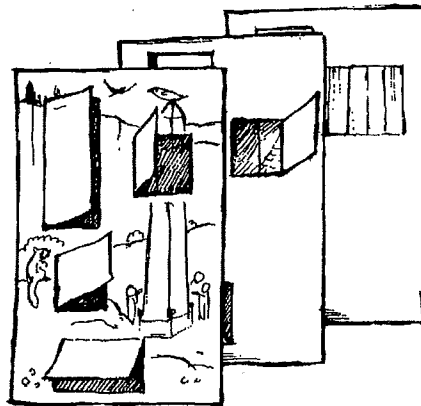
1. Photocopy pages 64–66.
2. Cut out the large rectangle on page 64.
3. Cut open all four of the flaps along their three heavy black lines. One side of each rectangle will remain uncut. **HINT:** Fold the paper, snip an opening, and insert the scissors to more easily cut out the flaps.



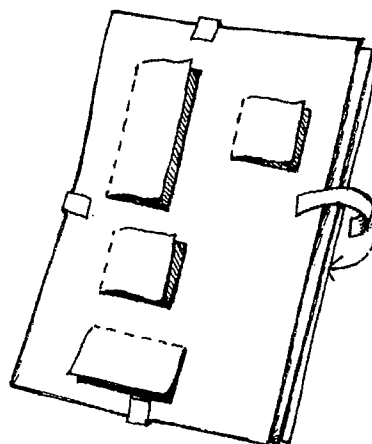
4. Fold back each flap along the dashed line, crease well, and then close.



5. Repeat steps 2 to 4 for page 65.
6. Repeat step 2 for page 66.
7. Stack all three rectangles on top of one another. They should be in the same order as their original pages, as shown.



8. Line up all the edges and hold while taping together, as shown. By overlapping the tape from the top page to the bottom page, the middle page will be sandwiched inside.





(continued from page 60)

3. Point out that there are two main kinds of weathering: mechanical and chemical. In mechanical weathering, rocks are broken into smaller and smaller pieces but the minerals in the rocks remain unchanged. In chemical weathering, the minerals in rocks are changed or dissolved away. As a result of these changes, the rocks weaken and eventually crumble.
4. Ask students to describe what they see on the top page of the model. Explain that by opening the top flaps they will see agents of weathering in action. Challenge students to identify the weathering agents and which type of weathering is occurring—chemical or mechanical.
5. After students have had a chance to think, go over each example. (The flaps are arranged counterclockwise from the top right.)
  - ◆ **Obelisk.** As rain falls, it combines with carbon dioxide gas in the air and becomes a weak acid, like soda water. This acid can chemically change or dissolve away minerals in the obelisk's rock.
  - ◆ **Cliff.** Cliff rocks wedged loose by plant roots or freezing water tumble down under the pull of gravity. Roots and freezing are agents of mechanical weathering.
  - ◆ **Seeds near chipmunk.** Seeds that land in rocks can grow roots that reach into cracks. As roots grow, they push against rocks, enlarging old cracks and forming new ones. Roots split rocks by mechanical weathering.
  - ◆ **Crack in the rock.** Water seeps into cracks in rocks, and during the winter it can freeze into ice. Freezing water expands and pushes open cracks even more. Such

repeated freezing, thawing, and refreezing is called *frost action* and is an example of mechanical weathering.

6. Invite students to open the second inner flaps and challenge them to interpret the long-term effects of weathering such as: fallen rocks pile up at the foot of the cliff and continue weathering to rubble; the carvings on the obelisk are nearly worn away; cracks in rocks keep growing larger; the hillside crumbles.
7. Students can label each of the weathering agents and type of weathering on the top flaps.

## EXTENSIONS

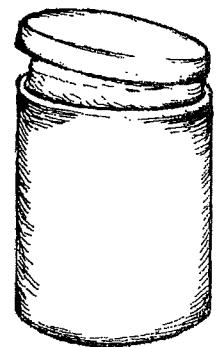
### HANDS-ON

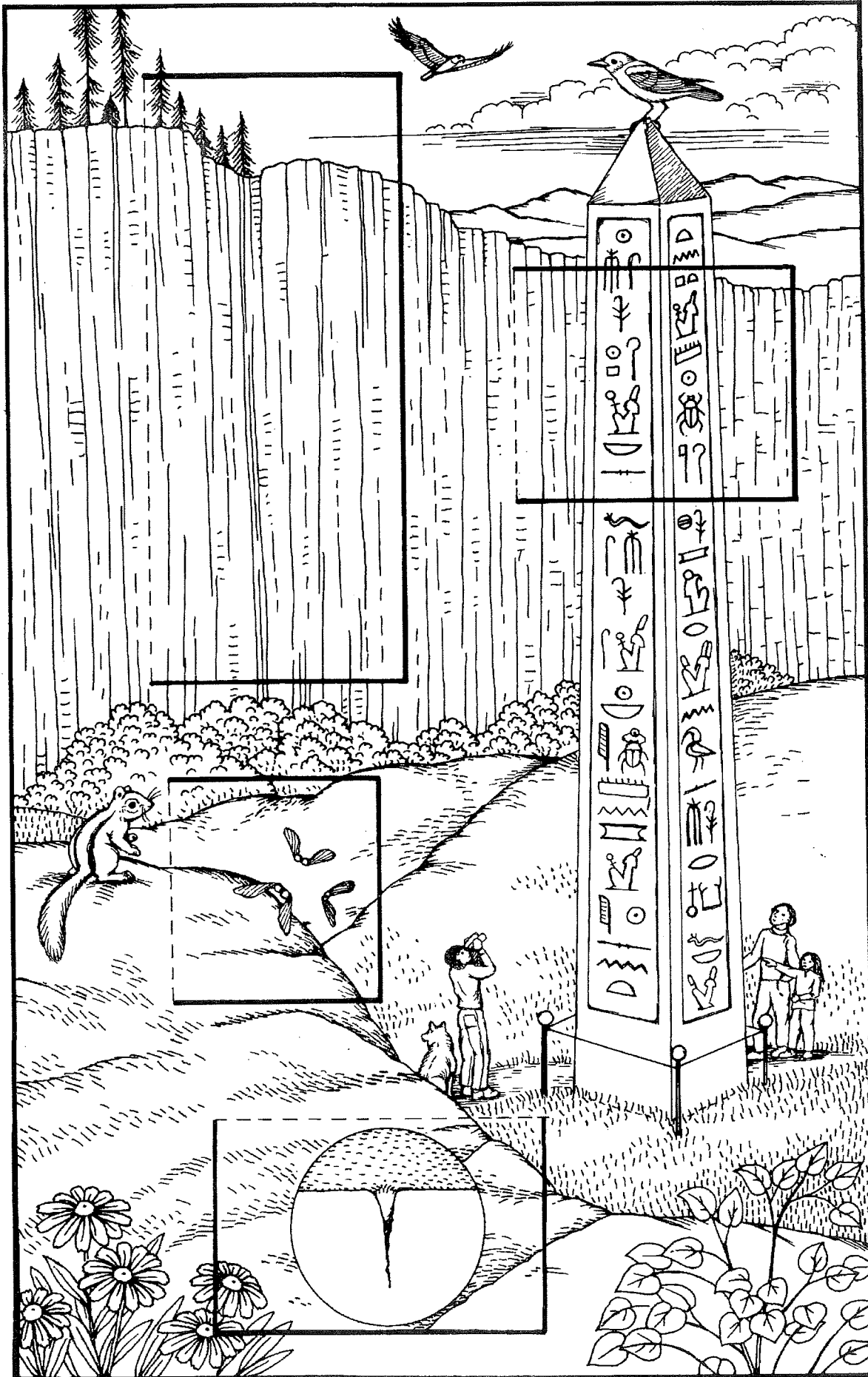
## Pop Goes the Bottle

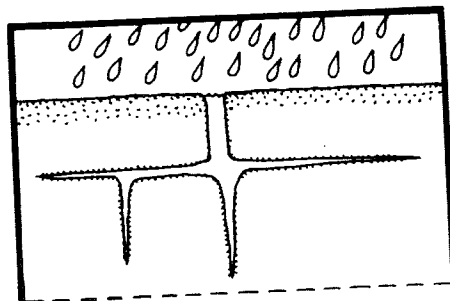
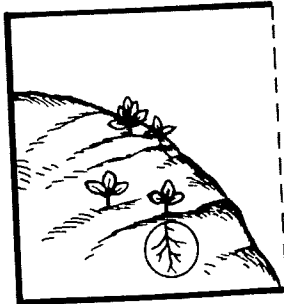
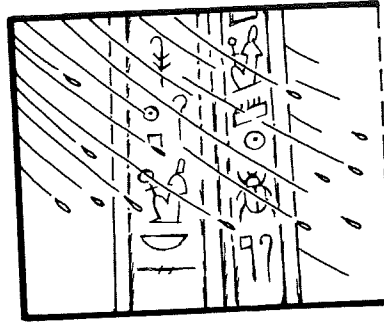
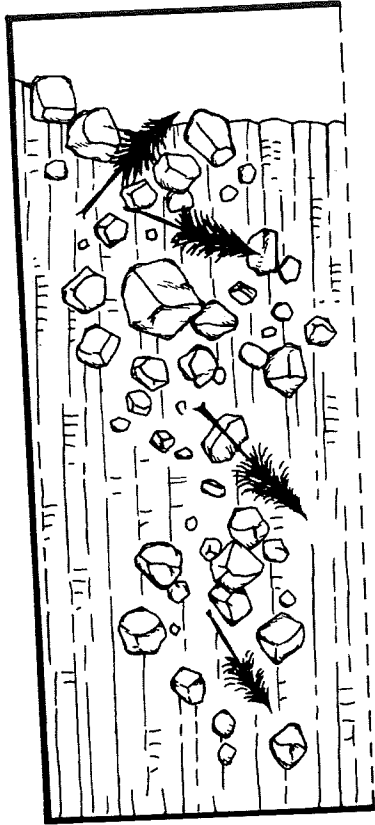
Students investigate how freezing water expands, exerting a pushing force.

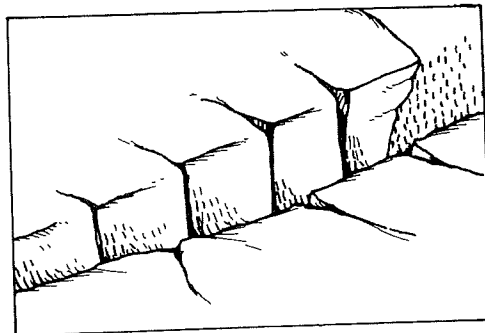
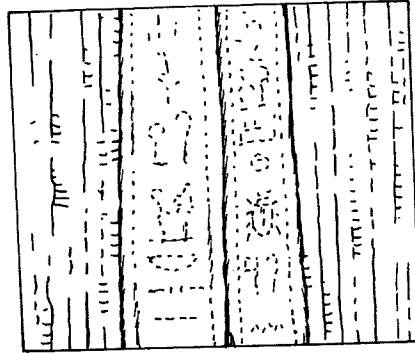
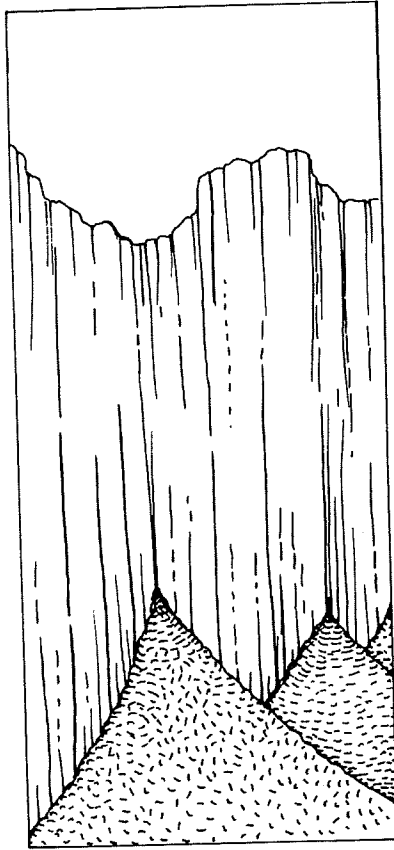
**MATERIALS:** plastic film canister (or plastic water or juice bottle with a push-close cap, not screw-on) ● water ● freezer

1. Fill the film canister with water. Make sure it's completely filled. Cap it and place in a freezer overnight.
2. Remove the film canister the next day. Ask: What happened? (*Ice pushed up the cap.*) Does frozen water take up more or less space than liquid water? (*more*) If the bottle were a rock, which kind of weathering would this be? (*mechanical*) Why? (*physical force broke the rock, not chemical change*)









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