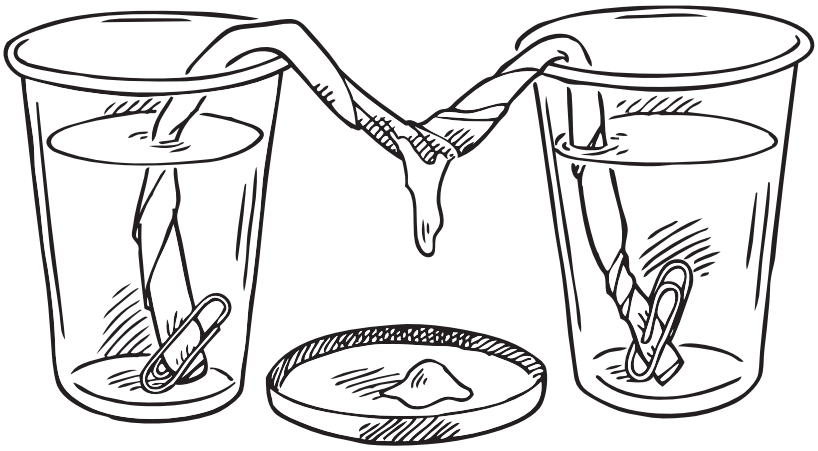
CONTENTS

Creating Crystals

Making Your Own Stalagmites and Stalactites *(cont.)*

Step 3



a. Place one twisted end of the cloth rope or paper towel (with the attached paper clip) in one cup. The paper clip should help the rope stay near the bottom.

b. Place the other end of cloth rope or paper towel in the second cup. Make sure both ends touch the bottoms of the cups.

c. Place a polystyrene foam tray between the two cups. There should be a slight dip or bend of the rope in the middle above the plate or bowl.

Sketch your setup in the box below.

Leave this crystal experiment undisturbed. Do not touch it. It may take a night or a weekend for the crystals to start to form. You will examine this formation during Activity 3.

Construction Zone: Multi-Level Structures

Challenge Activity—Create Your Own Multi-Level Structures

These pages are designed to stimulate your imagination with some suggestions for the project. You will probably want to work with one or two other teams to combine your work and display it. Use the Design Process Worksheet on page 5 to help guide your work.

Team Materials

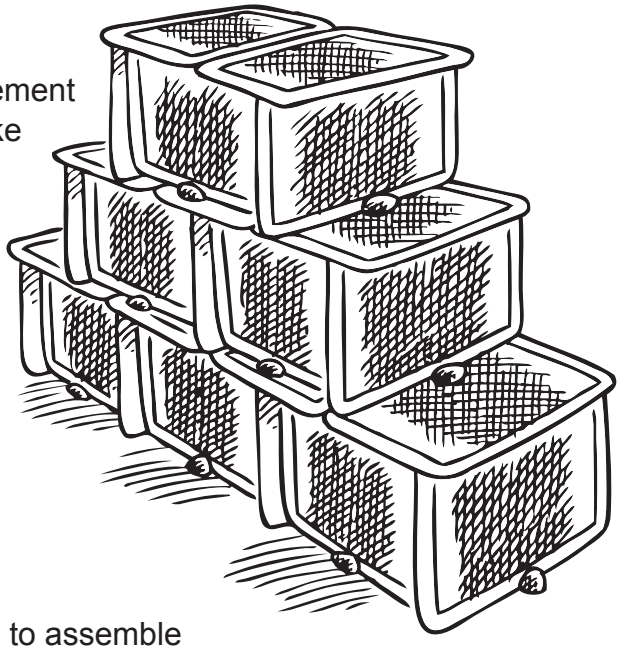
- electric fan or hair dryer
- masking tape or small sticky notes
- modeling clay
- paper clips
- playing cards or index cards
- rulers

- Gather your notes from the previous exercises in this unit. Compare each structure made for durability, strength, and attractiveness.
- Build extra structures ahead of time, or as needed, when you start building high.
- For all structures, especially these higher buildings, check that the balls of clay are connected to all adjacent cards.

Try This—Choices to Consider

The Six-Plex

1. Start by assembling a six-plex apartment arrangement with three units on the bottom floor in a line. Make sure the tape/sticky notes and balls of clay are firmly attached.
2. Place the next two units centered on top of the three as shown to the right. Use tape/sticky notes and/or balls of clay to attach the two structures to the three below.
3. Place the final unit centered on top of the two mid-level units.



Arranging an Apartment Complex—Construction Team (Four to eight workers)

You can use the staggered approach described above to assemble more structures in the same style. You can also build a series of ground-floor units. Center a second layer of units on three base units as you did with the six-plex. Assemble the third story on top of the second layer by staggering these structures as well. Use your tape/sticky notes and balls of clay to securely attach these units.

Liquid-Fueled Rockets

Launching Your Rocket

1. Help draw a chalk starting line across an empty playground area free of students.
2. Use yardsticks, metersticks, rulers, or a measuring tape to measure the distance down the side of the launch area.
3. Mark the distances with chalk along both edges of the area or where the distances are clearly visible. Mark the launch areas in meters, yards, or feet.
4. Have paper and pencil to record the distances for your team.

Launch Rules

- Your teacher or a chosen classmate may record distances for the whole class. Teams may also record their own distances.
- You will want to launch the rocket pointed away from you (at about a 45-degree angle) downfield from the starting line. Make sure the bottle stays within 35–50 degrees from the ground.
- You are trying to achieve the greatest distance that can be measured and recorded. (Height can't be easily measured.)

First Launch (4 ounces of vinegar—120 mL)

When it is time for your team to launch, choose one partner to do the first launch. All students should read all instructions before starting.

Follow these steps—carefully:

1. Make sure there are 4 ounces of vinegar in your bottle.
2. Carefully slip the long thin tube into the bottle—**above the vinegar**.
3. Hold the fishing line tied to the tube—**above the vinegar**.
4. Firmly **twist in the cork as tight as you can and point it away immediately**.
5. Aim down the field on the firing range. **Do not look into the bottle top anymore**.
6. Holding the bottle firmly at a **45-degree angle facing away from yourself**, shake until the cork is blown loose by the carbon-dioxide gas. Always point the cork away from yourself and anyone else.

Measure and record your distance for the first launch: _____

Motorized Racers

Challenge Activity—Motorize Your Racer

You will work in teams of two to create your own motorized cars based on what you've learned in the previous activities. You may choose to build longer, stronger, bigger, or smaller versions of the types you have already made. The suggested lessons are designed to help you get started if you don't have a specific idea in mind. Use the Design Process Worksheet on page 5 to help guide your work.

Team Materials

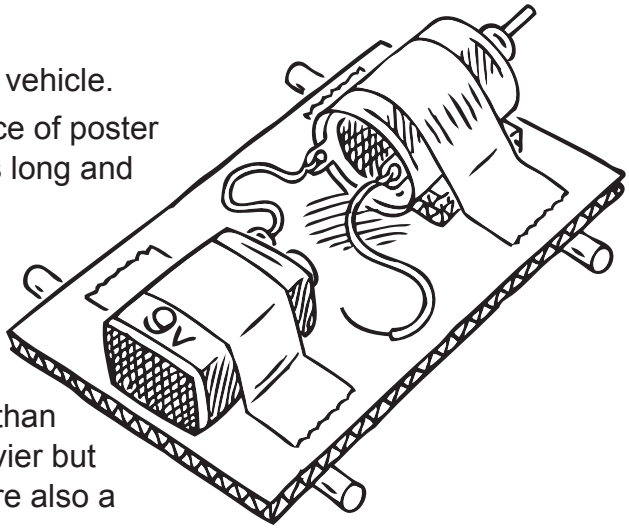
- 1.5-volt motors with 2 wire leads
- batteries and battery holders or rubber bands
- construction materials and tools from earlier lessons (rulers, scissors, etc.)
- index cards
- paper clips
- poster board or corrugated cardboard
- racers and other vehicles made in earlier lessons

Suggested Activity # 1

Propeller-Driven Cars

Using a motor to power your vehicle requires you to be very careful and meticulous in your work. Follow the instructions below and experiment with different materials until yours is successful.

Getting Started—Preparing the Car



1. Use a large, flat table to build and try out your vehicle.
2. Create a light frame for the car by using a piece of poster board or corrugated cardboard about 6 inches long and 3 inches wide.
3. Use one new battery to power the motor. The batteries must be small and lightweight. Common AA and AAA batteries will be strong enough and light enough, but they are harder to hook up. They also wear out more quickly than C-cell or D-cell batteries. C batteries are heavier but easier to hook to the motor. 9-volt batteries are also a good option.
4. Tape a small box or plastic cup to the floor of the roller car to hold the battery and motor.
5. Point the shaft of the motor up.
6. Slit the back of the small box or plastic cup and slip the wires through the slit in the box.
7. Tape over the slit so the motor is firmly held in the box or cup.