

**Scott Foresman**  
**SCIENCE**

**Grade 5**

**Equipment Kit  
Guide**

**Unit B**  
Physical Science

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ISBN: 0-673-62763-2

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# Equipment Kits and Teacher's Guide

## Equipment Kit Management

### About Your Kits

The equipment in *Scott Foresman Science* is packaged in sturdy plastic bins for your convenience. The quantities included support eight groups of four students each.

### Unit Kit/ Grade Level Kit

The Unit Kit contains most of the items you will need to conduct hands-on activities with your students. Equipment for each unit is contained in one or two bins. The Unit Kit is designed to be purchased separately. Each bin is clearly labeled with the grade level, bin number, unit name, and contents. A label inside the lid of each bin references the materials by activity. Only activities requiring kit items are listed.

Unit Kits are also available in a Grade Level Kit configuration. In this format, a common bin eliminates items duplicated across the units for cost savings and convenience.

### Demonstration Kit

The Demonstration Kit gives teachers the opportunity to rehearse activities before conducting them in the classroom. Kit-provided materials for each activity are pre-packaged and labeled for easy identification. When used in conjunction with the activity videos, the demonstration kits make it easy to prepare and conduct all investigations and experiments.

### Storage of the Kits

Your equipment is packaged in sturdy, translucent plastic bins and labeled for easy storage and access. Bins may be stacked or stored on shelves or carts. Bins are labeled on all sides for quick identification and location of items. This provides convenient organization of materials before and after use.

### Replacement Materials

Use the Packing List/Replacement Parts Price List to reorder items as needed for the Unit Kit or Grade Level Kit. These order forms are packed in the plastic bins and can be photocopied. Each list provides a column for entering the quantities of items you need to replace. Materials are organized alphabetically and identified as consumable or nonconsumable.

Complete consumable Replacement Kits are available as well. These kits replenish all the consumable materials for each Unit Kit or Grade Level Kit.

### Using the Teacher's Guide

This guide will help you better prepare to conduct the program activities in your classroom. Reviewing the guide while practicing with the activity video and demonstration kit or simply reading the guide upon receiving your classroom kit will make it easy to facilitate an activity with your students.

## **Getting Started**

Familiarize yourself with the kit contents. To make sure your shipment is complete, check the packing statement provided with your kit.

## **Activity Notes**

The Activity Notes in this guide provide comprehensive information to make your activity sessions a success. This information may include:

### **Video Segment**

The video segment number is indicated to help you cue the tape to each Investigate and Experiment activity.

### **Materials**

A materials list for each activity identifies kit-supplied and school-supplied materials. Use this list as a check of your kit contents and as a list for class preparation.

### **Material Substitutions**

For increased flexibility, material substitutions, when appropriate, are indicated.

## **Advance Prep**

These instructions offer preparation guidance as necessary. With these suggestions, you will always be well prepared to conduct activities in your class.

## **Hints and Tips**

Detailed hints and tips help to ensure student success in the classroom. Notes range from how to enhance students' success to increasing your understanding of activity concepts.

## **Safety Notes**

While safety should be practiced at all times for each activity, it may be necessary to consider specific activity concerns. These notes give activity-specific safety tips.

## **Additional Comments**

This section provides extension ideas, alternate activities, and other helpful information.

# Exploring Elements

*Explore Activity (B6)*

## Materials (per group)

Kit Items	School-Supplied Items
aluminum foil hand lens	penny paper clip pencil graphite paper

### Material Substitutions

Other possible sources of elements that may be used in this activity include gold-plated connections on video and stereo equipment, and various pieces of silver or gold jewelry. Other element samples may be ordered from science supply catalogs.

### Hints and Tips

Stress that some of the objects, such as the paper clip and penny, are made of more than one element.

# Investigating Water

*Investigate Activity (B22–B23)*

## Video Segment 1

## Materials (per group)

Kit Items	School-Supplied Items
measuring cup plastic cup, 10 oz plastic spoon baking soda 2 pieces of insulated wire with ends stripped 9-volt battery hand lens	safety goggles water 2 pencils sharpened at both ends metric ruler index card masking tape

### Material Substitutions

Salt or washing soda can be used in place of baking soda. These materials increase the electrical conductivity of the water.

### Advance Prep

- Sharpen pencils at both ends.
- Cut wires to approximately 40 cm and strip both ends of each wire.

### Hints and Tips

- If no bubbles are produced at the submerged graphite points, be sure wire connections are secure at battery terminals and graphite tips of pencils.
- Test the battery to be sure it is charged.
- Have extra sharpened pencils on hand in case graphite pencil tips break.
- Hydrogen is produced at the graphite point connected to the negative terminal of the battery. Oxygen is produced at the graphite point connected to the positive terminal of the battery.

### Safety Note

Tell students that a low-voltage battery is used in this activity and is safe. Stress that it is extremely dangerous to use electrical wires connected to other sources of electricity near water.

## Investigating a Chemical Change

*Investigate Activity (B38–B39)*

### Video Segment 2

#### Materials (per group)

Kit Items	School-Supplied Items
2 balloons (13 in.) funnel plastic spoon baking soda white vinegar	safety goggles paper towel water 2 plastic bottles, 16 oz or 20 oz

#### Hints and Tips

Have students place the baking soda into the funnel a little at a time so that the baking soda does not clog the neck of the funnel. Students should tap the sides of the funnel to free any clogs that may occur.

## Exploring Motion

*Explore Activity (B44)*

#### Materials (per group)

Kit Items	School-Supplied Items
half-meter stick string plastic bobber dominoes	2 desks masking tape

#### Material Substitutions

Another object, such as a large metal washer, may be used in place of the bobber, but students should wear safety goggles to prevent possible eye injury.

## Investigating Force Used to Move Objects

*Investigate Activity (B54–B55)*

### Video Segment 3

#### Materials (per group)

Kit Items	School-Supplied Items
2 pieces of string rubber band (#33)	safety goggles small cardboard box masking tape smooth surface (such as desktop) metric ruler objects of different masses to place in box rough surface (such as carpet square or carpeted area)

#### Advance Prep

For each group, cut a piece of string to a length of 15 cm.

### Hints and Tips

- Have one student pull slowly on the rubber band while another student holds the ruler next to the band to observe the length. Once the box starts moving, it may tend to jerk. Have students repeat the action several times, observing and measuring the length just before motion starts. Students should agree on a value for the length, which may differ slightly in each trial.
- Prior to beginning the activity, you may wish to have students use a balance to measure the mass of the objects.

## Investigating Friction

*Investigate Activity (B60–B61)*

### Video Segment 4

#### Materials (per group)

Kit Items	School-Supplied Items
rectangular board toy car	masking tape desk or other flat surface eraser metric ruler stone coin button

#### Material Substitutions

Other small classroom objects (rubber bands, paper clips, pencils, etc.) may be used in place of or in addition to the objects listed.

#### Hints and Tips

Some objects, such as a rubber eraser, may not actually slide down the board. Instead it may tumble or roll down the board when the end is raised sufficiently. Point out to students that this demonstrates greater friction than is demonstrated by objects that eventually slide. Gravity provides the force needed to overcome the force of friction.

## Experimenting with Balloon Rockets

*Experiment Activity (B69–B71)*

### Video Segment 5

#### Materials (per group)

Kit Items	School-Supplied Items
string plastic straw 3 balloons (18 in.)	safety goggles pencil 3 squares of index card metric ruler marker masking tape

#### Advance Prep

For each group, cut index cards into three 5 cm squares. Cut a string to a length of 8 m.

**Hints and Tips**

- Be sure students try to inflate the balloons to the same degree for each trial, and release each balloon from the same point on the string.
- Students should perform the experiment several times. Students could find average distances traveled for each opening size to increase the reliability of the results. If all groups are using the same-sized openings, they may combine the data.

**Safety Notes**

- Make sure students handle the sharpened end of the pencil with care.
- Remind students not to overinflate balloons.

**Additional Comments**

Students may repeat the experiment using balloons of different shapes and sizes.

## Modeling Roller Coaster Motion

*Explore Activity (B76)*

**Materials (per group)**

Kit Items	School-Supplied Items
marble	masking tape 2 pieces of posterboard flat surface

**Material Substitutions**

You may wish to provide students with lengths of flexible, clear plastic tubing to make models of roller coasters. The tubing must have a diameter large enough for a marble or bearing to roll through. Students can manipulate the tubing into different shapes to experiment with the motion of the marble or bearing. Clear, flexible tubing can be found in hardware stores and home/building materials stores.

**Hints and Tips**

Students may repeat the procedure holding the marble at different heights before releasing it.

## Investigating Potential Energy

*Investigate Activity (B84–B85)*

**Video Segment 6****Materials (per group)**

Kit Items	School-Supplied Items
paper cup, 12 oz marble	scissors paper 2 metric rulers (plastic, with groove) 4 identical textbooks

**Hints and Tips**

Be sure students release the marble from the same point on the ruler for each trial.

# Investigating Radiant Energy

*Investigate Activity (B96–B97)*

## Video Segment 7

### Materials (per group)

Kit Items	School-Supplied Items
plastic pail wax paper clear plastic wrap light-sensitive paper	water scissors construction paper transparent tape clock with a second hand

### Material Substitutions

Dark construction paper can be used in place of light-sensitive paper. If using dark construction paper, expose the materials to sunlight for several hours or more to get visible results. Other opaque, clear, and translucent materials may be used in place of construction paper, plastic wrap, and wax paper.

### Hints and Tips

- Students may have difficulty cutting out shapes from plastic wrap. You may wish to cut these shapes in advance.
- The room must be as dark as possible and still allow students to see what they are doing in steps 3, 4, and 6.

### Safety Note

Students should exercise caution when working in a darkened room.

# Experimenting with Sunscreens

*Experiment Activity (B103–B105)*

## Video Segment 8

### Materials (per group)

Kit Items	School-Supplied Items
clear plastic sheet (acetate) 3 medicine cups, 1 oz (to hold samples of sunscreen lotion) 3 cotton swabs light-sensitive paper plastic pail	metric ruler clear tape marker sunscreen lotion (same brand but with different SPF values, preferably SPF 15, 30, and 45) clock with a second hand water scissors

### Material Substitutions

There is a variety of products (beads, nail polish, etc.) made of light-sensitive materials. Some of these may be suitable to use in place of light-sensitive paper.

### Advance Prep

For each group, cut the clear plastic sheet into quarters and put lotion into medicine cups, using just enough to cover the bottom of each cup. Number the samples and label them with the SPF value.

### Hints and Tips

This activity should be performed on a sunny day. If done indoors through a window, you may need to increase the exposure time. Test the exposure time in advance.

# Exploring Electric Charges

Explore Activity (B110)

## Materials (per group)

Kit Items	School-Supplied Items
wool cloth plastic comb plastic wrap	pencils metric ruler clock with a second hand clear tape

### Material Substitutions

Plastic wrap and tape may vary in composition among brands. This activity may work better if using Saran Wrap™ and Scotch Magic Tape™ brands.

### Hints and Tips

This activity works best in conditions of low humidity. Choose a day on which relative humidity is low, or perform the activity in a humidity-controlled room, such as an air-conditioned room. Plastic or rubber combs may be used in this activity.

# Testing Electrical Conductivity

Investigate Activity (B118–B119)

## Video Segment 9

Kit Items	School-Supplied Items
D-cell battery battery holder 4 pieces of insulated wires with ends stripped (3 pieces about 25 cm each and 1 piece about 5 cm) flashlight bulb and holder plastic straw rubber band aluminum foil strip flat toothpick sandpaper	safety goggles penny paper clips cardboard strip

## Materials (per group)

### Material Substitutions

Other metal and nonmetal objects (various coins, rulers, erasers, paper, etc.) can be used in addition to or in place of the test objects listed.

### Advance Prep

For each group, cut three pieces of insulated wire to 25 cm lengths and another wire to 5 cm. Strip both ends of each wire. The small wire is one of the items to be tested for electrical conductivity.

### Hints and Tips

Make sure that students connect the wires to the battery holder firmly so that a good contact is made.

### Safety Notes

Remind students that it is safe to touch the wires in this activity because the battery produces a small amount of electricity. NEVER touch bare wires connected to other sources of electricity. Have students disconnect their circuits if the circuits feel warm.

## Making a Dimmer Switch

Investigate Activity (B128DB129)

Video Segment 10

Materials (per group)

Kit Items	School-Supplied Items
2 D-cell batteries electrical tape 3 insulated wires with ends stripped (about 20 cm each) flashlight bulb and holder	safety goggles transparent tape graphite in pencil split lengthwise

Advance Prep

¥ For each group, cut wires to lengths of 20 cm and strip insulation from the ends.

¥ Soak the pencils for one or two days to allow the pencil to be split easily. You may need to use a knife to split them. Allow the pencils to dry thoroughly before doing the activity.

Hints and Tips

Be sure that all bulbs and batteries are working and that all connections are complete in the circuit, especially at the taped terminals of the batteries.

Safety Notes

Remind students that it is safe to touch the wires in this activity because the battery produces a small amount of electricity. NEVER touch bare wires connected to other sources of electricity. Have students disconnect their circuits if the circuits feel warm.

## Making a Current Detector

Investigate Activity (B137B137)

Video Segment 11

Materials (per group)

Kit Items	School-Supplied Items
2 pieces of enameled wire with ends stripped (1 piece 4 m long; 1 piece 2 m long) directional compass bar magnet D-cell battery sandpaper	safety goggles metric ruler bathroom tissue tube masking tape

Advance Prep

For each group, cut one wire to a length of 4 m and one wire to a length of 2 m. Strip the ends of the wires by rubbing the wire ends with sandpaper. The thin enamel coating at the end of the wires must be removed completely.

Hints and Tips

If the magnet and coil are held too close to the compass, the compass motion may be due to the proximity of the magnet instead of electric current. Be sure the magnet and coil are placed away from the compass.