

Scott Foresman
SCIENCE

Grade 4
Equipment Kit
Guide

Unit B
Physical Science

Contents

Equipment Kits and Teacher’s Guide	i
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Activity Notes for Unit B Physical Science

Exploring Matter (B6)	1
Describing and Measuring Matter (B20–B21)	1
Exploring Changes in Motion (B34)	2
Reducing Friction (B40–B41)	2
Changing Forms of Energy (B46–B47)	3
Experimenting with Pulleys (B55–B57)	3
Exploring Electric Charge (B62)	4
Comparing Series and Parallel Circuits (B72–B73)	4
Making an Electromagnet (B78–B79)	5
Experimenting with Electromagnets (B85–B87)	5
Exploring Colors in Light (B92)	6
Observing Light Through Different Materials (B104–B105)	6
Classifying Sounds (B114–B115)	7

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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 Matter

Explore Activity (B6)

Materials (per group)

Kit Items	School-Supplied Items
aluminum foil 3 plastic cups, 10 oz vegetable oil modeling clay	container of water (30 mL) syrup (30 mL) celery raisin

Material Substitutions

Students can test other objects, such as bits of sponge, small slices of carrot or potato, a marble, small stone, or piece of marshmallow.

Advance Prep

Cut 5 cm x 5 cm squares of aluminum foil, a 2 cm cube of modeling clay, and a 2 cm length of celery for each group ahead of time.

Hints and Tips

The aluminum foil may float or sink depending upon how tightly compressed it is.

Safety Note

Students should not be allowed to taste any of the liquids or foods being used in this activity.

Describing and Measuring Matter

Investigate Activity (B20–B21)

Video Segment 1

Materials (per group)

Kit Items	School-Supplied Items
balance steel ball cork measuring cup 2 plastic cups, 10 oz graduated cylinder, 50 mL interlocking gram cubes solid rubber stopper	water paper towels pencil masking tape

Hints and Tips

Be sure that students have properly attached the plastic cups to the balance scale with masking tape.

Safety Notes

Instruct students to carefully place objects in the graduated cylinder to avoid splashing. Have students wipe up any spills immediately.

Exploring Changes in Motion

Explore Activity (B34)

Materials (per group)

Kit Items	School-Supplied Items
table tennis ball plastic cup, 10 oz	safety goggles index card (3 in. x 5 in.) quarter

Material Substitutions

Other small, flat objects may be used in place of the quarter.

Hints and Tips

Students may need to practice a few times before they get the quarter to land in the cup after flicking the card away.

Safety Note

Students should wear safety goggles during this activity.

Reducing Friction

Investigate Activity (B40–B41)

Video Segment 2

Materials (per group)

Kit Items	School-Supplied Items
balloon (13 in.) half-meter stick lead sinker wood spool	safety goggles cardboard circle (23 cm in diameter) glue masking tape smooth surface

Material Substitutions

Metal washers (2 in. diameter) are provided as alternate materials in the Equipment Kit for this unit. You can use these washers instead of sinkers as weights for this activity.

Advance Prep

Cut cardboard circles 23 cm in diameter and poke a hole in the center of each circle. A large coffee can may serve as a template.

Hints and Tips

- Make sure the balloon is centered over the hole of the spool.
- The balloon must be large enough for this activity to work.
- A smooth, level surface is best for the cardboard circle to move properly.

Safety Notes

- If students are using lead sinkers, remind them not to touch their eyes or mouths while handling the sinkers and to wash their hands thoroughly after completing the activity.
- Tell students not to overinflate the balloon or inhale while inflating the balloon.

Changing Forms of Energy

Investigate Activity (B46–B47)

Video Segment 3

Materials (per group)

Kit Items	School-Supplied Items
half-meter stick 2 rubber bands (5") lead sinker	safety goggles masking tape (1 m long) oatmeal container or other cylindrical box with plastic lid scissors

Material Substitutions

- You may use other types of cylindrical cans for this activity. Make sure you use shorter rubber bands for containers smaller than an oatmeal box and longer, thicker rubber bands for larger containers.
- Metal washers (2 in. diameter) are provided as alternate materials in the Equipment Kit for this unit. These washers can be used instead of sinkers in this activity. If a washer is used, students should thread the rubber bands through the washer and tie a knot to fasten the washer to the rubber bands. Like the sinker in Photo B on page B46, the washer should be located at the center of the rubber bands.

Advance Prep

- Punch two holes in the lid and bottom of each box. Make holes large enough for the ends of large rubber bands to easily pass through.
- To keep the holes from tearing, reinforce the lids and bottoms with masking tape before punching.

Hints and Tips

If the rubber bands are not pulled tightly enough, the sinker may rub against the box and cause it to roll erratically. To correct the problem, untie the rubber bands, pull them tighter, and then retie them.

Safety Notes

- If students are using lead sinkers, remind them not to touch their eyes or mouths while handling the sinkers and to wash their hands thoroughly after completing the activity.
- Remind students to exercise caution when working with stretched rubber bands.

Experimenting with Pulleys

Experiment Activity (B55–B57)

Video Segment 4

Materials (per group)

Kit Items	School-Supplied Items
wood dowel (1/2 in. in diameter) modeling clay spring scale nylon string measuring cup	metric ruler 64 oz plastic bottle (with handle) water (200 mL) masking tape desks (2)

Hints and Tips

Students may need to add a little more water, or remove some water, depending on the range of the spring scale.

Safety Note

Have students wipe up any spills immediately.

Exploring Electric Charge

Explore Activity (B62)

Materials (per group)

Kit Items	School-Supplied Items
balloon wool cloth unflavored gelatin powder string	safety goggles dark construction paper

Hints and Tips

- Damp conditions may affect the success of this activity. If the climate is excessively damp, you may wish to conduct the activity on a different day, or in a dehumidified room.
- After touching the surface of the balloon, a small charge may still be present, but students should notice the charge is not as strong. Students may set the balloon aside for several minutes, touch it again (avoiding contact with clothing or hair) and see if the charge has been reduced.

Safety Note

Students should be careful not to overinflate the balloons.

Comparing Series and Parallel Circuits

Investigate Activity (B72–B73)

Video Segment 5

Materials (per group)

Kit Items	School-Supplied Items
battery holder D-cell battery 2 miniature light sockets 2 miniature lamps (flashlight bulbs) insulated wire, 22 gauge	safety goggles

Advance Prep

- Cut 25 cm lengths of insulated wire and strip the insulated ends. Each group should have four pieces of wire.
- Test to see that the light bulbs and batteries are in working condition.

Hints and Tips

Have students study the photographs of the circuits carefully to construct their own circuits.

Safety Note

If the circuits get warm, tell students to disconnect the battery.

Additional Comments

Students may experiment with other ways to arrange wires and bulbs in order to light the bulb. You may wish to supply more bulbs and batteries for groups to experiment with. Students should determine the path electricity takes through each of the circuits they build and determine whether each circuit is a series or a parallel circuit.

Making an Electromagnet

Investigate Activity (B78–B79)

Video Segment 6

Materials (per group)

Kit Items	School-Supplied Items
battery holder D-cell alkaline battery bolt, 4 in. directional compass insulated wire, 22 gauge	safety goggles metric ruler large paper clip

Advance Prep

Cut 120 cm lengths of insulated wire and strip the ends.

Hints and Tips

Students may save the constructed electromagnets for later use.

Safety Note

If bolts and batteries begin to feel warm, have students disconnect the batteries and allow them to cool.

Additional Comments

Students may test other materials to see if other objects are attracted to an electromagnet. They may test other objects besides a steel bolt to see if they can be used to make an electromagnet.

Experimenting with Electromagnets

Experiment Activity (B85–B87)

Video Segment 7

Materials (per group)

Kit Items	School-Supplied Items
battery holder D-cell alkaline battery bolt, 4 in. insulated wire	safety goggles masking tape 25 large paper clips metric ruler

Advance Prep

If students have not saved the electromagnets they made in the previous activity, measure, cut and strip ends of wires.

Hints and Tips

- Be sure students do not hang the hook over the end of the bolt. Students should merely touch the clip to the electromagnet in order to pick the clip up.
- If the electromagnet is too weak to pick up large paper clips, you may need to use small paper clips, increase the number of coils around the bolt, or use new batteries in constructing the electromagnet.

Safety Note

If bolts and batteries begin to feel warm, have students disconnect the batteries and allow them to cool.

Exploring Colors in Light

Explore Activity (B92)

Materials (per group)

Kit Items	School-Supplied Items
prism	white paper area in direct sunlight colored pencils

Hints and Tips

- Students may need some practice to aim the reflected spectrum of colors onto the white paper.
- If a direct source of sunlight is not available, use a projector as a light source.

Safety Note

Instruct students not to look directly into the sun.

Observing Light Through Different Materials

Investigate Activity (B104–B105)

Video Segment 8

Materials (per group)

Kit Items	School-Supplied Items
acetate sheet (clear plastic sheet) aluminum foil 2 D-cell batteries flashlight wax paper	small object to cast shadow textbook sheet of white construction paper

Material Substitutions

Plastic wrap can be used in place of acetate.

Advance Prep

Cut sheets of aluminum foil and wax paper.

Safety Note

Remind students not to shine the flashlight in the eyes of other students.

Classifying Sounds

Investigate Activity (B114–B115)

Video Segment 9

Materials (per group)

Kit Items	School-Supplied Items
plastic cup, 10 oz plastic cup, 2 oz rubber band (#33) rubber band (5") aluminum foil	small paper clip large paper clip coins, small and large metric ruler

Material Substitutions

Other common objects, such as plastic straws cut to different lengths and plastic bottles of different sizes, could be used in place of or in addition to the materials listed above.

Advance Prep

Cut a 10 cm square and a 30 cm square of aluminum foil for each group. Students will use these squares to make aluminum foil balls.

Hints and Tips

- Students may need to repeat their observations several times to check their rankings of pitch and volume.
- Results may vary based on students' perceptions.