

Scott Foresman
SCIENCE

Grade 6

**Equipment Kit
Guide**

Unit A
Life Science

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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 Magnification

Explore Activity (A6)

Materials (per group)

Kit Items	School-Supplied Items
bare copper wire, 22 gauge plastic cup, 10 oz	safety goggles sharpened pencil water newspaper

Advance Prep

Cut the wire to 10 cm pieces for each group.

Safety Notes

Students should exercise caution when handling the wire and the sharpened pencil. Have students wipe up any spills immediately.

Additional Comments

Another way for students to view the magnifying properties of water is to place a sheet of plastic wrap over newsprint and place a drop of water on the plastic wrap. Carefully raise the plastic wrap from the paper. The image viewed through the drop should be magnified.

Investigating Cells

Investigate Activity (A14–A15)

Video Segment 1

Materials (per group)

Kit Items	School-Supplied Items
microscope prepared slide of animal cells (buccal mucosa) live coupon, elodea plastic forceps microscope slide cover slip plastic dropper	scissors water

Advance Prep

Order the elodea plants at least 2 weeks in advance.

Hints and Tips

- This activity can be divided into parts. In one session, introduce students to the proper use and handling of a microscope. Point out the parts of the microscope, including the light source, the eyepiece, and the objective lens. Students should practice focusing light through the microscope and focusing the microscope using a small piece of newsprint, threads from a cloth, or other small objects. In the second session, have students use a microscope to examine plant and animal cells.
- If students have difficulty locating the cells under the microscope, tell them to check the mirror to make certain that it is reflecting light through the opening in the microscope stage.
- Leaf tips from the growing end of the elodea plant work best. If students use older, thicker leaves, the image may be too dark because there is not enough light transmitted through the leaf.

Safety Notes

- Remind students not to lower the objective lens while looking through the eyepiece.
- Remind students not to focus direct sunlight through the microscope.
- Instruct students to handle slides and coverslips carefully. Students should wash their hands at the end of the activity.

Investigating Pigments

Investigate Activity (A24–A25)

Video Segment 2

Materials (per group)

Kit Items	School-Supplied Items
6 plastic cups, 10 oz plastic dropper 3 plastic spoons 3 flat toothpicks 3 filter paper strips (cut from coffee filters; each strip measuring 1/2 in. x 3 in.)	safety goggles isopropyl alcohol (10 mL) fresh parsley leaves scissors tape 3 pencils 2 fresh mushrooms fresh beet leaves (2 oz) paper towel

Advance Prep

- Separate the mushroom heads from the stems and the parsley and beet leaves from their stems.
- Cut the filters into strips measuring 1/2 in. x 3 in. each.

Hints and Tips

- If the filter paper is too long, students can trim the paper to the desired length before adding the drops of solution to the paper.
- You may want to prepare the mixtures for students in advance.
- Allowing the leaves/mushrooms to soak in the alcohol for an hour or two will result in a more highly concentrated solution and will yield better results.
- Students may need to apply additional applications of the solution to the filter to create a dark enough spot.
- An alternate way to perform the paper chromatography is to suspend the filter paper directly in the colored solution rather than dabbing solution on the filter strip. This may require more than 10 mL of alcohol to be added to the leaves.
- Other possible test items include red cabbage or red maple leaves.

Safety Notes

- Have students wipe up any spills immediately.
- Remind students not to taste or drink the liquids.

Experimenting with Membranes

Experiment Activity (A31–A33)

Video Segment 3

Materials (per group)

Kit Items	School-Supplied Items
6 graduated plastic cups, 10 oz sugar (glucose) test strips with key plastic dropper iodine solution sugar solution (3 spoonfuls of corn syrup in 250 mL of water) starch solution (3 spoonfuls of liquid starch in 250 mL of water) dialysis tubing (36 cm) 6 pieces of string (10 cm each) funnel	clock with a second hand masking tape marker scissors water metric ruler paper towel

Advance Prep

- Prepare the sugar and starch solutions based on the above specifications.
- Cut the string into lengths of 10 cm.

Hints and Tips

- Dialysis tubing will not open unless it is wet.
- Students will use the observations recorded in Steps 2 and 3 to determine the presence or absence of starch or sugar in Step 9.

Safety Notes

- Remind students to wipe up any spills immediately. Students should exercise caution when handling iodine solution.
- For additional protection, students can wear safety goggles.

Exploring Variation in Species

Explore Activity (A38)

Materials (per group)

Kit Items	School-Supplied Items
grid paper (graph paper)	10 peanuts in the shell metric ruler

Material Substitutions

Pea pods may be used as a substitute for peanuts in the shell.

Safety Note

Before beginning this activity, check for student allergies to peanuts.

Investigating DNA

Investigate Activity (A60–A61)

Video Segment 4

Materials (per group)

Kit Items	School-Supplied Items
funnel graduated plastic cup, 10 oz coffee filter flat toothpick meat tenderizer	safety goggles onion cell mixture, 1 cup (see materials and instructions in Advance Prep below) dark construction paper (1 sheet) isopropyl (rubbing) alcohol

Advance Prep

Following are instructions for preparing the onion cell mixture for one group. Adjust the amounts of the ingredients to prepare onion cell mixtures for the number of groups in your class.

Materials: blender, large plastic container, 2 medium onions, 1 tsp. salt, 120 mL (1/2 cup) warm water, 120 mL (1/2 cup) clear dishwashing detergent

1. Dissolve salt in warm water.
2. Chop onions. Put onions in blender; add enough salt water to cover onions.
3. Blend about 10 seconds. Small bits of onion should be left.
4. Pour the mixture into the plastic container; add detergent.
5. Pour 120 mL of the onion-detergent mixture into a plastic cup.

Hints and Tips

- The amount of water may need to be adjusted depending on the amount of onion used. The resulting mixture should be thin enough to go through the filter paper but not so watery that it rushes through.
- DNA will begin to rise to the top of the watery mixture after the alcohol is added. DNA has a string-like, or mucus-like appearance. Students may be able to collect some of the DNA on the end of the toothpick.
- The detergent in the activity acts to break down the cell membrane and nuclear membrane. The meat tenderizer contains enzymes that help to break up proteins that keep the DNA strand tightly coiled. This releases the DNA for easier collection and observation. DNA is not soluble in the rubbing alcohol, so it precipitates out of the solution and becomes visible when alcohol is added. The salt added to the prepared mixture provides a favorable environment for DNA.

Safety Notes

- Instruct students not to drink or taste the onion cell mixture, alcohol, or meat tenderizer.
- Have students wipe up any spills immediately.

Additional Comments

You may have some groups extract DNA from an animal source such as a piece of liver. If you do this, students should pour the thicker liver liquid through a wire strainer to obtain the liver cell mixture.

Investigating Variation in Seedlings

Investigate Activity (A68–A69)

Video Segment 5

Materials (per group)

Kit Items	School-Supplied Items
15 corn seeds (including albino corn seeds) hand lens aluminum foil pan seed starter mix plastic wrap	marker masking tape metric ruler water source of light

Hints and Tips

- For every four seeds planted, approximately three will produce green seedlings and one will produce white seedlings. To ensure that both green and white seedlings emerge, use the genetic seed mix provided in the kit.
- Remind students to keep the soil moist, but not wet, at all times.
- Students may tape their charts next to their seedlings for quick comparisons.
- To obtain a more reliable and accurate ratio of green and white plants, have students combine the data from all groups onto a class data sheet.

Safety Note

Remind students to wash their hands after handling seeds and seed starter mix.

Exploring Feeding Adaptations

Explore Activity (A74)

Materials (per group)

Kit Items	School-Supplied Items
none	envelopes, size 10 model feeding stations (popcorn in bowl, raisins in bowl of water, candy worms in bowl) feeding tools (paper clips, clothespins, spoons,

Advance Prep

Set up model feeding stations.

Safety Note

Remind students not to eat any of the foods used in this activity.

Additional Comments

Invite students to experiment with other feeding tools such as kitchen strainers or ladles that may represent animal feeding techniques.

Observing the Effects of Salt Water on Cells

Investigate Activity (A98–A99)

Video Segment 6

Materials (per group)

Kit Items	School-Supplied Items
coverslips plastic forceps microscope microscope slide non-iodized salt plastic dropper	red onion paper towel water

Advance Prep

- To prepare a 10% salt solution, use a balance to measure 10 g salt (about 2 teaspoons). Add the salt to 100 mL warm water and stir until salt is dissolved. You may want to demonstrate Steps 5 and 6 in which you use a paper towel to draw the salt water under the cover slip.
- Cut red onions into small pieces.

Hints and Tips

- You may have students practice focusing light through the microscope and focusing the microscope using a small piece of newsprint, threads from a cloth, or other small objects.
- If there is difficulty in obtaining a thin layer of cells from the onion, you may wish to use a single-sided razor blade to carefully scrape the thin, red, outer layer of a section of the onion. Try to slice a single layer of cells from the onion.
- Students may have to move the slide around on the stage of the microscope to find a clear layer of cells to view. Students may try observing the edge of the slice where a single layer may be easier to see.

Safety Note

Remind students not to focus direct sunlight through the microscope.

Investigating How Plants React to Light

Investigate Activity (A106–A107)

Video Segment 7

Materials (per group)

Kit Items	School-Supplied Items
small bean plant (pinto bean seeds, plastic cup, 9 oz, seed starter mix)	large shoe box with lid marker cardboard pieces or index cards scissors masking tape light source

Advance Prep

Grow small bean plants 1 to 2 weeks before beginning the activity. Place seed starter mix in plastic cups and moisten with water. Mix thoroughly, then plant bean seeds. Bean plants need to be small enough to fit inside a closed shoe box.

Hints and Tips

- Allow students to design their own mazes, but they should not have too many barriers for the plant to grow around. Some students may wish to make horizontal mazes instead of vertical mazes. Some of the mazes may not work because the bean plant receives so little light that it will not survive. Place the closed boxes in bright sunlight with the opening oriented toward the light.
- Remind students not to overwater the plants.
- The hole in the shoe box should be at least 2 inches in diameter to allow enough light to reach the plant.

Safety Note

Have students wash their hands after working with plants.

Exploring a Water Ecosystem

Explore Activity (A112)

Materials (per group)

Kit Items	School-Supplied Items
pebbles live coupon, elodea	masking tape 2 L plastic bottle (with top portion removed) metric ruler aquarium water (about 250–300 mL) marker

Material Substitutions

Water that has been allowed to stand for 1 to 2 days may be used in place of aquarium water.

Advance Prep

- Order the elodea plants at least 2 weeks in advance.
- Remove tops of plastic bottles. Keep the tops for use in the Investigate Activity on textbook pages A122–A123.

Hints and Tips

Have students save the water ecosystems for use in the Investigate Activity on textbook pages A122–A123.

Safety Notes

Remind students to handle the cut bottles carefully. The edges may be sharp. Have students wipe up any spills immediately.

Additional Comments

You may have students make additional observations. Students could observe changes in the ecosystem over time, experiment with the effects of light and dark on the ecosystem, or cover the opening with plastic wrap to form an enclosed ecosystem.

Observing a Bottle Ecosystem

Investigate Activity (A122–A123)

Video Segment 8

Materials (per group)

Kit Items	School-Supplied Items
cheesecloth (gauze) pebbles 2 plastic graduated cups, 10 oz potting soil grass seed plastic wrap	water 2 L plastic bottle water ecosystem (from Explore Activity, textbook page A112) metric ruler

Advance Prep

- Your students should make the water ecosystem from Explore Activity “Exploring a Water Ecosystem” on textbook page A112 before doing this activity.
- For each group, cut the top of a two-liter plastic bottle 2 cm below the shoulder. Set aside. Cut the top 1/3 from the remaining bottom portion of the bottle. Use masking tape to cover all the cut edges. Make a hole in the cap using a nail and hammer. The hole should be large enough for a folded strip of cheesecloth to pass through. If there is an opaque base on the bottle, remove it.
- Cut a piece of cheesecloth for each group.

Safety Note

Remind students to wash their hands after completing this activity.

Investigating Soils

Investigate Activity (A146–A147)

Video Segment 9

Materials (per group)

Kit Items	School-Supplied Items
plastic cup, 10 oz plastic spoon blue litmus paper	soil sample distilled water clock with a second hand

Advance Prep

- Gather samples from various areas of your city or town. Try to include areas that might be cultivated for gardens as well as those by malls or industrial areas. Be sure to get permission to gather the samples before doing so. Have students test each sample and compare the results.
- You may wish to have each student collect a sample of soil from home or the schoolyard and bring it to class. Students should record a description of the conditions of the area from which they obtain soil samples.

Hints and Tips

Show how to use litmus paper to test for acidity.

Safety Note

- Have students wipe up any spills immediately.
- Have students wash their hands after handling soil.