

# SOUND AND LIGHT — *Materials*



## Contents

Introduction .....	53
Kit Inventory List .....	54
Materials Supplied by the Teacher .....	56
Preparing a New Kit .....	58
Preparing the Kit for Your Classroom .....	60
Care, Reuse, and Recycling ....	63

## INTRODUCTION

The Sound and Light kit contains

- *Teacher Toolkit: Sound and Light*
  - 1 *Investigations Guide: Sound and Light*
  - 1 *Teacher Resources: Sound and Light*
  - 1 *FOSS Science Resources: Sound and Light*
- *FOSS Science Resources: Sound and Light* (1 big book and class set of student books)
- Permanent equipment for one class of 32 students
- Consumable equipment for three classes of 32 students

FOSS modules use central materials distribution. You organize all the materials for an investigation on a single table called the materials station. As the investigation progresses, one member of each group gets materials as they are needed, and another returns the materials when the investigation is completed. You place items at the station—students do the rest.

Individual photos of each piece of FOSS equipment are available online for printing. For updates to information on materials used in this module and access to the Safety Data Sheets (SDS), go to [www.FOSSweb.com](http://www.FOSSweb.com). Links to replacement-part lists and customer service are also available on FOSSweb.

### ► NOTE

To see how all of the materials in the module are set up and used, view the teacher preparation video on FOSSweb.



### ► NOTE

Delta Education Customer Service can be reached at 1-800-258-1302.



## KIT INVENTORY *List*

### Drawer 1 of 2

Equipment  
Condition

★ The student books, if included in your purchase, are shipped separately.

#### Print Materials

- |                                                                                                                                                                 | Equipment Condition |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| 1 <i>Teacher Toolkit: Sound and Light</i> (1 <i>Investigations Guide</i> , 1 <i>Teacher Resources</i> , and 1 <i>FOSS Science Resources: Sound and Light</i> )★ |                     |
| 1 Poster set, <i>Conservation</i> , 4/set                                                                                                                       |                     |
| 2 Posters, <i>FOSS Science Safety</i> and <i>FOSS Outdoor Safety</i>                                                                                            |                     |

#### Items for Investigations 1 and 2

- |                                             |  |
|---------------------------------------------|--|
| 8 Balls, table-tennis                       |  |
| 2 Basins                                    |  |
| 8 Blocks, wood                              |  |
| 5 Container lids (for half-liter container) |  |
| 1 Cord with bead                            |  |
| 75 Cups, plastic, 250 mL (9 oz.)            |  |
| 8 Drop chambers, tagboard                   |  |
| 8 Drop-chamber vision barriers, cardboard   |  |
| 8 Foam pieces                               |  |
| 2 Kalimba bases                             |  |
| 2 Kalimba bars, flat, steel, sets, 3/set    |  |
| 8 Mallets                                   |  |
| 2 Megaphones                                |  |
| 1 Meter tape                                |  |
| 100 Paper clips, regular, box               |  |
| 100 Paper fasteners, #4                     |  |
| 1 Phillips-head screwdriver                 |  |
| 100 Rubber bands, #33                       |  |
| 1 Sound cards set, 39/set                   |  |
| 50 Sticks, craft                            |  |
| 1 Tape, masking, roll ☆                     |  |
| 1 Tone generator with 9V battery ☆          |  |

#### ► NOTE

The teacher toolkit is shipped separately. However, there is space in drawer 1 to store your toolkit.

☆ These items might occasionally need replacement.

	Equipment Condition
100 Tongue depressors	
8 Tuning forks, set	
8 Xylophone tubes, set, 5/set	
20 Zip bags, 4 L	

## Drawer 2 of 2

### Print Materials

- 1 FOSS Science Resources: *Sound and Light*, big book

### Consumable Items

- 100 Cups, paper, 150 mL (5 oz.)
- 1 String, thin, ball, 292 m (960')/ball
- 200 Self-stick notes, large

### Items for Investigations 3 and 4

- 16 Boxes, cardboard, with hole
- 32 AA cells ★
- 10 Color-card sheets
- 16 Sets of drop objects, 8/set
- 16 Flashlights
- 36 Mirrors
- 36 Mirror clips
- 100 Paper clips, jumbo, box
- 32 Spoons, metal
- 1 Tape, painters, blue, roll ★
- 1 Waxed paper, roll

### ▶ NOTE

This module includes access to FOSSweb, which includes the streaming videos and online activities used throughout the module.

★ These items might occasionally need replacement.

## ► NOTE

Throughout the *Investigations Guide*, we refer to materials not provided in the kit as “teacher-supplied.” These materials are generally common or consumable items that schools and/or classrooms already have, such as rulers, paper towels, and computers. If your school/classroom does not have these items, they can be provided by teachers, schools, districts, or materials centers (if applicable). You can also borrow the items from other departments or classrooms, or request these items as community donations.

## **MATERIALS** *Supplied by the Teacher*

Each part of each investigation has a Materials section that describes the materials required for that part. It lists materials needed for each student or group of students and for the class.

Be aware that you must supply some items. These are indicated with an asterisk (\*) in the Materials list for each part of the investigation. Here is a summary list of those items by investigation.

### **For all investigations**

- Chart paper and marking pen
- 1 Computer with Internet access
- Drawing utensils (pencils, crayons, colored pencils, marking pens)
- Glue sticks
- 1 Projection system
- Science notebooks (composition books)

### **For outdoor investigations**

- 1 Bag for carrying materials
- 32 Clipboards (optional)
  - Pencils
- 1 Whistle or bell

### **Investigation 1: Sound and Vibrations**

- 32 Books, hardcover
  - Clay, modeling (optional)
- 8 Index cards
- 16 Pencils
- 16 Pennies
- 1 Pencil or pen
  - Rice grains
  - Pinch of salt
- 1 Scissors
- 1 Long table or door with a knob
  - Transparent tape

### **Investigation 2: Changing Sounds**

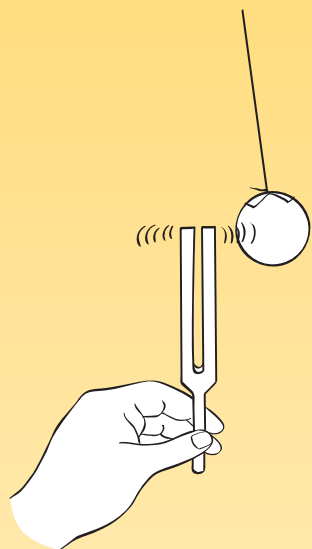
- Paper cups of different sizes
- 1 Musical instrument (optional)
- 8 Pencils
- Scissors
- String of different kinds
- 1 Long table or door with a knob

### **Investigation 3: Light and Shadows**

- 16 Pennies
- 16 Pencils
- 16 Marking pens, large, that stand on base
- 1 Piece of white paper
- 1 Zip bag, 1 L

### **Investigation 4: Light and Mirrors**

- 16 Books
- 1 Scissors



## PREPARING a New Kit

If you are preparing a new kit for classroom use, you can do several things initially that will save time during routine preparation for instruction.

### 1. Prepare table-tennis balls

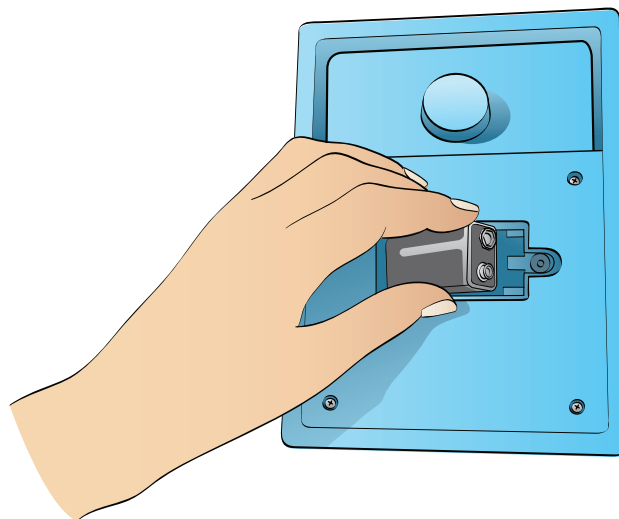
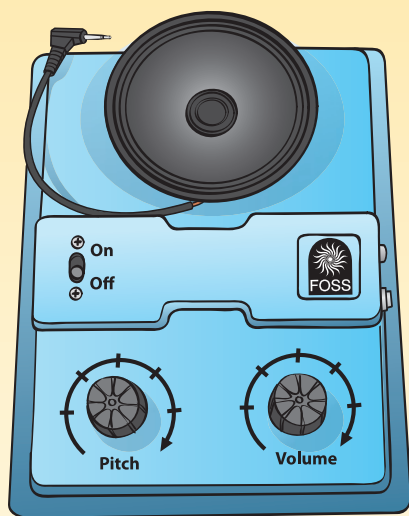
For investigation 1, tape a 30 cm piece of string to each of eight table-tennis balls. Put all of the balls in one 4 L zip bag.

### 2. Prepare tone generator

Install a 9-V battery in the tone generator. You will need a small- or medium-sized Phillips-head screwdriver to remove the screw securing the cover of the battery compartment (one is provided in the module kit). Once you have the cover off, press the battery firmly into the plastic housing.

Before replacing the battery compartment cover, plug in the speaker wire and turn on the tone generator to make sure the battery works. The battery-compartment cover is not essential to the functioning of the tone generator.

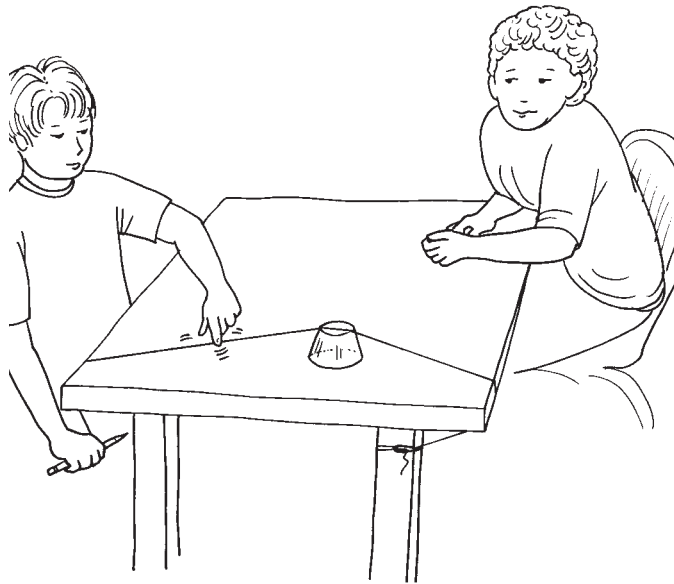
Note that the Phillips-head screw can be very difficult to remove. It may be necessary to use a flat screwdriver to pry the compartment cover open. You can reclose the compartment cover with a small piece of tape. That might make it easier to change the battery when necessary.



### 3. Assemble one-string guitars

For Investigation 2, prepare eight one-string guitars.

- a. Tie one end of a 250 centimeter (cm) string to a paper clip, and the other end to a pencil. Tape the string in the middle of the pencil.
- b. Put the pencil with string and a plastic cup in each of eight 4-liter (L) zip bags and label them “One-string guitars.”



### 4. Organize kalimba bases and bars

There are two kalimba bases in the kit. Put each kalimba base with one set of three bars in a 4 L zip bag. These instruments are used in the performance assessment in Investigation 2.

### 5. Mirrors

The mirrors come with a protective plastic film covering the reflective surface. Remove the plastic film before using the mirrors. The film can be thrown away. Stack the mirrors carefully in the plastic storage bags so they don't scratch each other. These are used in Investigation 4.

## **PREPARING** *the Kit for Your Classroom*

Some preparation is required each time you use the kit. Doing these things before beginning the module will make daily setup easier.

### **1. Check consumable materials**

A number of items in the kit are listed as consumable. Some of these items will be used up during the investigations (string, self-stick notes), and others will wear out (paper clips, paper cups). Items that cannot be reused for a particular FOSS investigation may be usable in another part of the curriculum. Before throwing items out, consider ways to recycle them and get your students involved in this process.

### **2. Check drop-object sets**

Check the drop-object sets to make sure all the pieces are present. Each bag should have identical sets of objects. The minimum set consists of these eight objects.

- 1 Aluminum-foil ball
- 1 Cardboard piece
- 1 Clothespin
- 1 Paper cup
- 1 Plastic spoon
- 1 Plastic chip
- 1 Craft stick
- 1 Washer

### **3. Check tagboard pieces**

Check tagboard megaphones and drop chambers to ensure that the holes for the paper fasteners are intact. Repair with transparent tape if necessary. If the tagboard pieces were rolled tightly during storage, flatten the pieces with books after unrolling them, so the paper relaxes.

### **4. Check tone generator**

Test the condition of the 9V battery for the tone generator.

### **5. Check flashlight and cells**

Put two AA cells in each flashlight and make sure the switch turns on and off. Replace cells as necessary.



## 6. Gather musical instruments

Gather musical instruments that can stay in your classroom for students to use during their sound investigations.

## 7. Inventory sound cards

There is one set of 39 sound cards for the class. Each card displays a photograph of an object or animal with its name. Inventory the cards. Go to FOSSweb to hear the sound associated with each card.

## 8. Inventory xylophone tubes

There are eight sets of xylophone tubes in the kit. Each set consists of five bars of different lengths. Inventory the bars and make sure that each set has the correct tubes. Use the 4 L zip bags in the kit for storing each set. You can also add a mallet to each of the tube-set bags.

## 9. Plan use of basins

There are two plastic basins included in the equipment kit. These will be useful when distributing and collecting items like bags of drop objects, mirrors and clips, flashlights, and other objects.

## 10. Print or photocopy notebook sheets

You will need to print or make copies of science notebook sheets before each investigation. See Getting Ready for Investigation 1, Part 1, for ways to organize the notebook sheets for this module. If you use a projection system, you can download electronic copies of the sheets from [www.FOSSweb.com](http://www.FOSSweb.com).

## 11. Plan for word wall and pocket charts

As the module progresses, you will add new vocabulary words to a word wall or pocket chart and model writing and responding to focus questions. See Investigation 1, Part 1, for suggestions about how to do this in your classroom.

## 12. Consider safety issues indoors and outdoors

Two safety posters are included in the kit—*FOSS Science Safety* and *FOSS Outdoor Safety*. You should review the guidelines with students and post the posters in the room as a reminder. Getting Ready for Investigation 1, Part 1, offers suggestions for this discussion. Emphasize that materials do not go in mouths, ears, noses, or eyes. Encourage responsible actions toward other students. Also be aware of any allergies that students in your class might have. Students with latex allergies should not handle rubber bands.

### EL NOTE

**You may want to print out the FOSS equipment photo cards (from FOSSweb) to add to your word wall to help students with vocabulary**



## ► NOTE

The *Letter to Family* and *Home/School Connections* are also available electronically on FOSSweb.



### 13. Plan for letter home and home/school connections

Teacher master 1, *Letter to Family*, is a letter you can use to inform families about this module. The letter states the goals of the module and suggests some home experiences that can contribute to students' learning.

There is a home/school connection for all the investigations. Check the last page of each investigation for details, and plan when to print or make copies and send them home with students. Review the extensions in this section for more ways to involve families.

### 14. Gather books from library

Check your local library for books related to this module. Visit FOSSweb for a list of appropriate trade books that relate to this module.

### 15. Check FOSSweb for resources

Go to FOSSweb, register as a FOSS teacher, and review the print and digital resources available for this module, including the eGuide, eBook, Resources by Investigation, and *Teacher Resources*. Be sure to check FOSSweb often for updates and new resources.

## **CARE, Reuse, and Recycling**

When you finish teaching the module, inventory the kit carefully. Note the items that were used up, lost, or broken, and immediately arrange to replace the items. Use a photocopy of the Kit Inventory List and put your marks in the “Equipment Condition” column. Refill packages and replacement parts are available for FOSS by calling Delta Education at 1-800-258-1302 or by using the online replacement-part catalog ([www.DeltaEducation.com/RefillCenter](http://www.DeltaEducation.com/RefillCenter)).

Standard refill packages of consumable items are available from Delta Education. A refill package for a module includes sufficient quantities of all consumable materials (except those provided by the teacher) to use the kit with three classes of 32 students.

Here are a few tips on storing the equipment after use.

- Sort and inventory all items and secure them in plastic bags. Extra 4 L zip bags are included for storage purposes.
- Carefully bag the mirrors so they don't scratch each other.
- Remove the AA cells from the flashlights and store them separately.
- Disassemble the drop chambers. Store the vision barriers flat on the bottom of the box. Stack the eight rectangular tagboard pieces and roll them loosely; secure the roll with a rubber band. Disassemble and roll the tagboard megaphones in a similar fashion. The roll of megaphones can slip inside rolled drop chamber pieces.

The items in the kit have been selected for their ease of use and durability. Small items should be inventoried (a good job for students under your supervision) and put into zip bags for storage. Any items that are no longer useful for science should be properly recycled.

