

# FOSS<sup>®</sup> AT HOME

## PHYSICS OF SOUND

The FOSS<sup>®</sup> (Full Option Science System<sup>™</sup>) program offers a number of ways to get parents involved in their child's science education. Included here are short descriptions of several ways to bridge from classroom to home.

**Letter to Parents.** The letter to parents can be sent home at the start of a new science module. The letter describes what children will be learning and ways that parents can enrich the science-learning experience.

**FOSS Science Stories.** *FOSS Science Stories* is a series of original books developed to accompany and enrich the FOSS modules. The books include a variety of articles written in a number of styles, including narrative tales, expository articles, technical readings, and historical accounts.

Here are some suggestions for using *FOSS Science Stories* at home.

- **Expository and Historical/Biographical Readings.** The expository and historical/biographical readings provide excellent opportunities for students and parents to discuss the science content students are learning in the module. Specific articles include *Highs and Lows* and *Energy*.
- **Technical Readings.** The technical readings provide good opportunities for students to do a science activity at home with their families or follow instructions for a science project. For example, students could do the activities outlined in *Sound Off!* as homework or as their end-of-module project.
- **"Questions to Explore."** Students can read the article in class and then answer the "Questions to Explore" at home in their science notebooks. You might consider this strategy after students read *Your Source and Receiver* or *Moving Along*.
- **After the Story.** See the Science Stories folio in the Teacher Guide for suggestions on how to extend the stories at home. For example, after students read *Grandmother's Hearing Test*, you might have students conduct further research at the library or on the Internet relating to hearing aids, decibel levels, and sign language. Students can then practice sign language with their family.

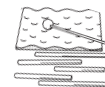
### LETTER TO PARENTS

*Cut here and paste onto school letterhead before making copies.*

#### SCIENCE NEWS

Dear Parents,

Our class is beginning a new science unit using the FOSS **Physics of Sound Module**. In this unit your child will investigate the fundamental principles of sound generation, how sound travels, and some of the physical characteristics of the energy form we call sound. This is an exciting unit for students. Over the next 4 to 8 weeks they will engage in active investigations of vibrating systems and musical instruments to see what they can find out about pitch and volume, and how to control or modify systems to control the sounds they make. This is the basic premise of music.



Your child's interest in sounds, sound sources, and sound receivers can be increased by asking about the investigations at school and by providing additional experiences at home. Do you have a musical instrument at home? Study its design and figure out together how it makes sound, what is vibrating, and how the player controls the rate of vibration to create different pitches. Or you might want to make musical instruments by assembling a pot-and-pan orchestra, some kind of strung (or rubber band) instrument, or something you know. Another activity that is fun for the whole family is listening to the sounds of silence—finding a quiet location and identifying the sounds that invade even the quietest places.

Watch for the Home/School Connections sheets I will be sending home with your child from time to time. These suggest even more ways for the whole family to tune up and tune in to the vibrations in the everyday environment that we know as sound.

We are looking forward to many weeks of investigations with our Physics of Sound Module. If you have any questions or comments, or have expertise you would like to share with the class, please drop me a note.

Comments \_\_\_\_\_

\_\_\_\_\_

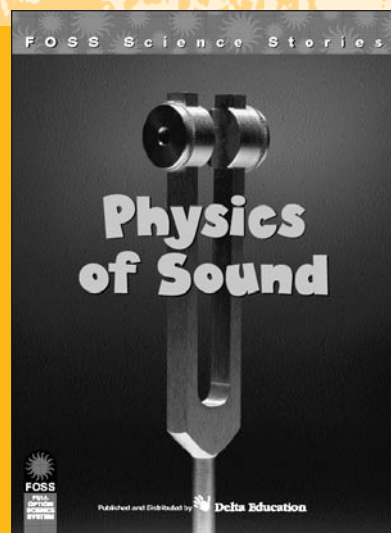
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FOSS: Physics of Sound Module  
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Can be duplicated for classroom or workshop use.

Investigation 1: Dropping It  
No. 1—Teacher Sheet

### No. 1—Teacher Sheet



Name \_\_\_\_\_  
Date \_\_\_\_\_

**HOME/SCHOOL CONNECTION**  
**INVESTIGATION 1: DROPPING IN**

**PART 1: THE SOUNDS OF SILENCE**  
Find the quietest place you can. It might be in a room at home, in your yard, or in front of your home, or someplace else. Sit back-to-back with a partner and listen. How quiet is the quietest place you can find?

**PART 2: NAME THAT SOURCE**  
Find a noisy place. Call paper and pencils for each partner. Write down the sounds that you hear in 5 minutes. Compare notes. Did you both hear the same things? What was the source of each sound? Was something vibrating there? What do you think it was?

**PART 3: MODIFIED HEARING**  
Does a family member or friend have to modify their hearing in some way to do their job effectively and safely? Some people work in noisy places and use protective devices to prevent damage to hearing. Other people use hearing aids or stethoscopes to make sounds louder. Can you find any examples of hearing modification among your family or friends? How do the devices they use work?

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Home/School Connection  
No. 33—Student Sheet

## No. 33—Student Sheet

Name \_\_\_\_\_  
Date \_\_\_\_\_

**MATH EXTENSION—PROBLEM OF THE WEEK**  
**INVESTIGATION 3: HOW SOUND TRAVELS**

Ms. Trujillo's class is making string telephones, miniguitabuckets, and FOSS-ules for a sound and music festival. All 24 students will be playing miniguitabuckets and FOSS-ules or listening on the string telephone at the same time. These are the instruments that Ms. Trujillo's students chose.

- Eight students playing FOSS-ules. (Remember, two students work with each FOSS-ule.)
- Eight students playing miniguitabuckets. (Remember, one student works with each miniguitabucket.)
- Eight students listening with string phones. (Remember, two students work with each string telephone.)

Here are the materials lists for the instruments.

FOSS-ule	Miniguitabucket	String Telephone
1 String, 2 meters long	1 String, 1.5 meters long	1 String, 4 meters long
1 Cup	1 Cup	2 Cups
1 Paper clip	1 Paper clip	2 Paper clips
1 Pencil		

- How much string is needed to make the instruments for the festival?
- How many cups are needed to make the instruments?
- How many paper clips are needed to make the instruments?
- How many pencils are needed to make the instruments?
- Sixteen students from Mr. Olsen's class want to join the festival. The students looked to see what materials they still had to make additional instruments. They found plenty of cups, pencils, and paper clips, but they weren't sure if they had enough string. They had only the remains of the original ball of string, which had 52 meters when it was new. Can 16 more students join the fun? If so, what instruments should they make?

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Problem of the Week  
No. 31—Student Sheet

## No. 31—Student Sheet

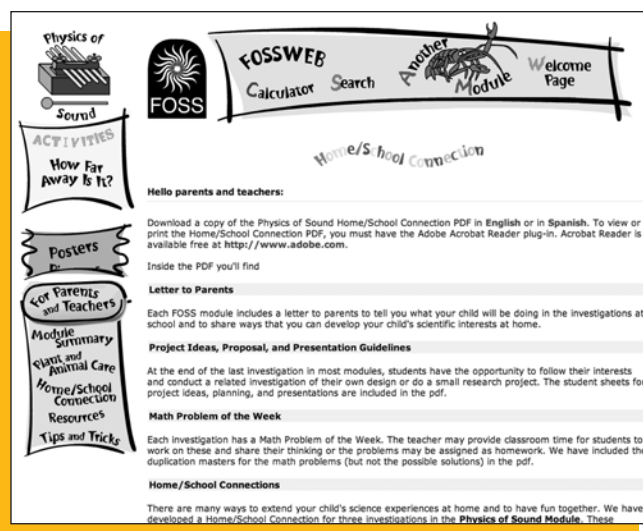
**NOTE:** All student sheets, including the Letter to Parents, Home/School Connection, and Math Problems of the Week, are available in FOSS Teacher Guides and online at [www.fossweb.com](http://www.fossweb.com). They are also available in Spanish. See For Parents and Teachers: Home/School Connection on page 4 of this folio.

**Student Sheets.** Throughout the module, students complete various recording and response sheets. Students should bring the sheets and/or their science notebooks home for families to review and discuss. For example, student sheet number 13, *Sounds through Air*, is a good opportunity for students to explain and review with parents that sounds must travel through a medium, such as air or water.

**Home/School Connections.** Home/School Connections are activities developed specifically for the whole family to enjoy at home. For example, in Investigation 1 (student sheet number 33), students explore their homes to find the quietest and the noisiest locations. They listen to the sounds in each location and attempt to identify the sources of the sounds.

**Interdisciplinary Extensions.** Each investigation has suggestions for art, language, math, social studies, and science extensions. These are good family activities. For example, after Investigation 4 students can list ways hearing is important to them throughout the day and then brainstorm with families what skills they might develop if they couldn't rely on their sense of hearing. They might also do the *Math Problem of the Week* at home.

**FOSSweb ([www.fossweb.com](http://www.fossweb.com)).** FOSSweb is an interactive website where families can find instructional activities and interactive simulations specifically designed for each FOSS module.



Physics of Sound

FOSSWEB  
Calculator Search Another Module Welcome Page

ACT VITIES  
How Far Away Is It?

Posters

For Parents and Teachers  
Module Summary  
Plant and Animal Care  
Home/School Connection  
Resources  
Tips and Tricks

Hello parents and teachers:  
Download a copy of the Physics of Sound Home/School Connection PDF in English or in Spanish. To view or print the Home/School Connection PDF, you must have the Adobe Acrobat Reader plug-in. Acrobat Reader is available free at <http://www.adobe.com>.

Inside the PDF you'll find

**Letter to Parents**  
Each FOSS module includes a letter to parents to tell you what your child will be doing in the investigations at school and to share ways that you can develop your child's scientific interests at home.

**Project Ideas, Proposal, and Presentation Guidelines**  
At the end of the last investigation in most modules, students have the opportunity to follow their interests and conduct a related investigation of their own design or do a small research project. The student sheets for project ideas, planning, and presentations are included in the pdf.

**Math Problem of the Week**  
Each investigation has a Math Problem of the Week. The teacher may provide classroom time for students to work on these and share their thinking or the problems may be assigned as homework. We have included the duplication masters for the math problems (but not the possible solutions) in the pdf.

**Home/School Connections**  
There are many ways to extend your child's science experiences at home and to have fun together. We have developed a Home/School Connection for three investigations in the *Physics of Sound Module*. These

**NOTE:** Pages 3 and 4 of this folio can be photocopied and sent home for parents to read. Those pages provide information on the resources for students and their families on FOSSweb.

## FOSSWEB (WWW.FOSSWEB.COM)

The FOSS program maintains a resource-rich website for students and their families and friends. To explore the resources available for the **Physics of Sound Module**, first enter [www.fossweb.com](http://www.fossweb.com) in your browser.

The FOSS website requires plug-ins for your browser. We recommend that you click the “Test Your Browser” link at the bottom of the home page before you begin to ensure your computer has the minimum requirements.

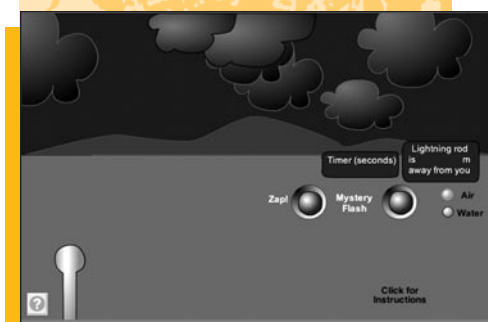
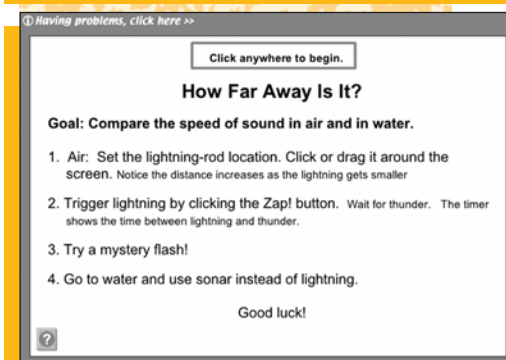
Click the grades 3–6 icon to get a menu that links to each of the 3–6 modules. There you can choose **Physics of Sound** and travel to a wealth of information and activities specific to this module.

### ACTIVITIES

In the **Physics of Sound Module**, you’ll find an activity called *How Far Away Is It?* This activity should be introduced after students have completed Investigation 3: *How Sound Travels*. Children compare the speed of sound in air and in water. You might ask,

- *What did we find out about how sound travels in air, water, and solids?*
- *How does the speed of sound change when it travels through these materials?*

Show children the introductory screen and explain that they will find out about the speed of sound in air by listening for thunder and in water by listening for sonar from a submarine. Click the cursor on the screen to get into the activity. Demonstrate how to move the lightning rod around the screen by clicking and holding the mouse. Note how the distance changes in the box on the horizon. Choose a location for the rod, note the distance, and click Zap! The timer begins when lightning hits the lightning rod. The timer stops when you hear thunder. Challenge children to set up a chart to record their data for how long it takes to hear the thunder at different distances. Explain that they should conduct several trials before trying the Mystery Flash. They can use their data to compute an answer for the distance of the Mystery Flash. They record their answer in the Lightning Rod box at the right.





## MOVIES

The Movies section includes animations of how sound reaches your ears and movies of people playing different musical instruments.

## PICTURES

In the Pictures section, you can view images of different musical instruments. Students may want to do further research on these devices for their end-of-module project.

## WEBSITES

The Websites section includes links to sites that can extend and enrich children's experiences with the **Physics of Sound Module**.

## VOCABULARY

In the Vocabulary section, you will find the glossary words and definitions used in the **Physics of Sound Module**. They are provided in English and Spanish.

## BOOKS/SOFTWARE

This section includes an annotated list of books, videos, and software recommended for the **Physics of Sound Module**. You should be able to find many of these titles at your local library.

## FOR PARENTS AND TEACHERS: HOME/SCHOOL CONNECTION

The For Parents and Teachers section includes the Home/School Connection that describes ways for families to do science together. For example, in Investigation 2, families assemble a homemade band with pots, pans, and bottles. Then they attempt to make a diatonic scale and play some tunes. Look in this section for other resources included in a downloadable PDF file, including a general letter introducing the module, student projects, and math problems that relate to the science investigations.

