The FOSS Food and Nutrition Module was an interesting exploration for our fifth graders at the Walter T. Bergen Middle School. The lessons on the six nutrients and investigations into fats, sugars, and acids helped them increase their knowledge of what they eat and improve their menu choices. I wanted to summarize this learning and give them some real food for thought. After I opened a birthday gift of a beautiful bread machine, a plan quickly began to rise!

In class, we reviewed the bread machine recipes to try and find one that contained all six nutrients outlined in our FOSS lessons. We adapted one of the recipes and investigated nutrition labels on all of...
Bloomingdale continued

the ingredients. We recorded the presence of fat, carbohydrates, protein, vitamins, minerals, and water. Our recipe included protein from eggs, carbohydrates from flour, and fat from canola oil. Different vitamins and minerals were found in the flour and eggs as well as in sugar, salt, and yeast. Water was the liquid that the recipe required. An added bonus was another opportunity to investigate the properties and applications of yeast.

We found the metric equivalents to the standard measurements in the recipe, gathered up our tools, and started baking. The bread machine made the process easy in a classroom with no kitchen facilities, but a portable broiler/baker oven would have served us just as well.

The lessons took on added texture with interdisciplinary connections to language arts, social studies, and technology. We recorded the events in our journals, learned about bread-making throughout history, investigated the pretzel industry in Pennsylvania, and examined the workings of the bread machine. Internet links made the research intense and exciting.

As you can see, the activity generated a great deal of interest. We found it to be a delicious excuse to just loaf around in science class. If you’d like the recipe for our finished product, you can e-mail us at ckeppel@bloomingdale.k12.nj.us.

Submitted By:
Carol Keppel
Fifth-Grade Teacher
Walter T. Bergen Middle School
Bloomingdale, New Jersey
Anyone who has spent a winter in Oregon’s Willamette Valley knows about the rain. FOSS kits developed by our neighbors in sunny California needed to be adapted to survive our rainy winters. Here’s the story of FOSS science kit evolution in response to environmental factors.

In our first year of piloting, we tried out a variety of kits including FOSS. Teachers enthusiastically embraced the FOSS format and lessons. Kits in the physical science and scientific reasoning strands worked well as is; pendulums swing the same (Variables Module) and cardboard crawdads balance the same (Balance and Motion Module) whether in Oregon or in California. It was a much different story for some of the kits in the other strands.

Pilot teachers were the first to encounter problems with live materials. In the Animals Two by Two Module, the directions suggest covering the worm terrarium with plastic wrap to prevent the environment from drying out. Things don’t dry out during the Oregon winters; instead mold grows overnight. A simple change in directions, which suggested allowing more air to flow through the environment, solved that problem.

Besides excess moisture in Oregon, our climate is cool during the winter and that leads to some problems with other critters. The waxworms and milkweed bugs in the Insects Module seem to stop developing during the colder months. Fortunately our partnership with nearby Oregon State University through the Science Education PartnershipS program gives us ready access to local experts. A quick call to two SEPS scientists—a zoologist and an entomologist—saved the day. We are currently trying out their suggestions for keeping the insects warm and the air properly humidified and hope to get some action soon. We would love to try the silkworms in the Insects Module (they really look exciting in the video), but with the only two mulberry trees in town located on private property, that will not be possible. Most of the other organisms have worked out quite well here—especially those water-loving crawdads in Structures of Life and the snails in Animals Two by Two. They’re right at home in the Pacific Northwest!

Our moist climate required a few changes in other kits. We’ve replaced the cardboard anemometer in the Air and Weather Module with a plastic one; soggy cardboard doesn’t spin well. Water doesn’t evaporate very quickly in Oregon humidity and so we have changed the teacher directions in a few kits. In several kits where evaporation is called for (Water; Mixtures and Solutions; Pebbles, Sand and Silt; and Earth Materials), teachers are told to reduce the amount of liquid or schedule the activity to span a weekend. One module was very problematic in our climate: Solar Energy (guess why). Following the suggestions of a SEPS scientist, we did experiment with an infrared heating lamp in the Solar Energy Module, but it proved to be no substitute for the real thing.

(Editor’s Note: Cloudy-day strategies are included in the revised teacher guide for the Solar Energy Module.)

Customizing the FOSS kits to match our local area has involved help from local businesses and scientists. Kindergarten students (and teachers) using the Wood Module have never seen a basswood tree; we are surrounded here in the Willamette Valley by Douglas fir and red alder. Starker Forests Inc., a local forestry business, provided over 500 wood samples from these two local trees cut to the same specifications as the other wood samples in the kit. The U.S. Forest Service supplied beautiful full-color posters of the coniferous and deciduous trees in our area.
Rainy Winters continued

area. With help from an aggregate company, we have river rocks from our own Willamette River and aggregate samples for Pebbles, Sand, and Silt. The Mineral Information Institute has donated reading materials and posters that serve as a basis for natural resource research for the Earth Materials Module. Our local aggregate company has also donated videos of its operation along with an outreach program for all our third-grade students. Even though Mt. Shasta is a beautiful mountain, we needed to make the Landforms Module our own and so we’re working on a model of nearby Mary’s Peak to accompany the local topographic maps we’ve added to the kit.

One thing teachers repeatedly speak about is the quality of the FOSS kits and how they make teaching science easy and exciting. To make teaching even easier, we have endeavored to put everything needed into the kit (which we have transferred to two large plastic tubs). At the suggestion of piloting teachers, we have increased the numbers of some supplies because many activities work better for pairs of students rather than groups of four. We have added some materials to the kit that are listed as “teacher supplied” (for example, napkins and liquid detergent for the Air and Weather Module). In addition to the hands-on activities provided in the modules, we have also added supplementary materials: read-aloud books, computer software, posters, videos, safety goggles, lists of appropriate websites, and small labeled collections and models (e.g., rocks, tree cones). When a teacher checks out a kit, there is no need to spend time gathering teaching materials. Videos from our central collection as well as phone numbers of local scientists and pertinent field trips are listed to quickly put resources in the teacher’s hands. In addition to these extra materials, each teacher guide has tips and suggestions from the piloting teacher as well as an overview that lays out the timeline with a short synopsis of each lesson. The enhanced-customized science kits have nearly everything the teacher needs in the materials kit!

It’s our fourth year of science kit implementation and it has made a huge difference for kids in Corvallis. Our district had made the switch to hands-on kits nine years ago, but interest was flagging. At first we tried to revise the flawed kits, but then we discovered FOSS kits. Our energy shifted from trying to fix an inferior product to implementing an excellent program with a few adaptations. Teachers are very excited about hands-on science in Corvallis. We’ve had a steady increase in kit checkout over the course of the four-year piloting and implementation project. Yes, FOSS kits work throughout the country including the rainy Willamette Valley.

Submitted By:
Gail Gerdemann
K-5 Science Coordinator
Science Education PartnershipS, Oregon State University and Corvallis School District 509J, Corvallis, Oregon
e-mail: gerdemag@ava.bcc.orst.edu

Students record their observations of mineral hardness in The Scratch Test from the Earth Materials Module.
Fabric Module Products from South Carolina

Students in Kindergarten at Westwood Elementary School (Abbeville School District #60) in Abbeville, South Carolina had a great time making collages and a bulletin board while investigating the FOSS Fabric Module. Some of their work is shown in the photos below.
Here’s a question concerning the FOSS Levers and Pulleys Module (grades 5-6) from teachers Jil Brown-Curry and Linda Miller in Cobb County, Georgia.

What is the actual explanation for Graph A being curved vs. Graph B being a straight line? (Activities 1, Levers)

Here’s the answer from Larry Malone of the FOSS staff at the Lawrence Hall of Science.

Ok, here goes...

The force (F) (either the load or the effort) multiplied by the length of the lever arm (d) (distance from the fulcrum to the point at which the force acts) is what tends to rotate a lever on its fulcrum. This is called torque.

If two equal forces are applied on opposite sides of the fulcrum, each the same distance from the fulcrum, the torques will be the same and no motion will occur. Similarly, if one of the forces is moved to a new position half as far from the fulcrum, a force twice as large must be applied at the new position to achieve balance. Force X distance on one side = force X distance on the other side. The trick to achieving balance (no motion of the lever arm) is to get the force times the distance on one side of the fulcrum to exactly equal the force times the distance on the other side.

If you place a load (F_L) at a fixed distance from the fulcrum and apply an effort (F_E) at the same distance on the other side, the beam will balance when the pulling force of the load is exactly equal to the force of the applied effort. But if you move the position at which the effort is applied farther from the fulcrum, and apply the same amount of force, force times distance on the effort side produces more torque than force times distance on the load side. The system is unbalanced; the force applied farther from the fulcrum creates more torque and the system rotates. In order to achieve balance with the effort applied at its new position, a smaller force must be applied.

This is what happens in Experiment A. The load is placed at 10 cm from the fulcrum on one side, where it stays, and the effort is applied at various distances from the fulcrum on the other side. Using a spring scale, we quantify the force (effort) needed to achieve balance at different distances. When the distances are equal (both at 10 cm from the fulcrum), the force of the load (2.4 N) equals the force of the effort (2.4 N). In both cases the torque is 24 N cm. But as the distance at which the effort is applied gets smaller (gets closer to the fulcrum), the amount of force has to increase in order to achieve balance. At a distance of 5 cm, a force of 4.8 N will be needed to produce...
24 N cm of torque to balance the load which has not changed. Now you can see that as the distance at which the effort is applied approaches zero, what must happen to the force to achieve balance? It approaches infinity! That’s why the graph heads off to infinity when we plot lever-arm distance vs. effort.

On the flip side, as the distance at which the effort is applied goes beyond 10 cm, less and less effort is required to achieve balance. So, as the effort distance approaches infinity, the force required to achieve balance approaches zero. Great! An infinitely small force is required to lift the load on the other end! This is why Experiment A gives a graph that has an interesting curve with both ends heading off to infinity in opposite directions. It is also this realization that moved Archimedes to say, “Give me a lever of sufficient length and a place to stand and I shall lift the Earth into heaven.”

Now consider Experiment B. If we apply the effort at a fixed position, say 10 cm from the fulcrum, and move the location of the load around on the opposite side, what happens to the magnitude of the effort required to achieve balance? We already know what happens when the load is placed 10 cm from the fulcrum. 10 cm X 2.4 N = 24 N cm. What happens to the effort needed to lift the load as it is moved toward the fulcrum? As the distance at which the load is positioned gets smaller and smaller, less and less effort is needed on the other side to balance it. (Remember, force X distance = torque.) When the load is moved to zero, the force required to “lift” it is also zero. Our graph of distance of load from the fulcrum (independent variable) versus force required to balance the lever (dependent variable) has its origin at (0,0). As the load moves farther and farther from the fulcrum, the force required to balance the load goes up. This is a linear relationship—as one variable increases, so does the other. The result is a straight line starting at the origin and heading out to the great beyond. As the distance from the fulcrum at which the load acts approaches infinity, so does the effort required to do the job decreases. The relationship in Experiment B is linear. As the distance at which the load is placed increases, so does the effort I need to apply to get the job done.

Now, as to WHY it happens, I don’t have an answer. That’s just the way our local universe is set up. We can understand the laws and principles that govern the behaviors of levers, describing them in words and mathematics, but the reasons for these behaviors lapse into deep philosophical ruminations. The graphs are simply ways we have devised to describe the relationship for all to ponder.

That’s all I know...hope it helps.

Larry Malone
In the Balance and Motion Module, Activity 3 is called Rollers. In the final part of the activity, the class is challenged to construct a system that will allow a marble to roll freely as long as possible. As a FOSS Regional Manager, I must admit that I had not been aware that this group activity existed until the Birmingham Southern Area Convention of the National Science Teachers Association. It was at that convention that a group of us working at the FOSS booth decided to get serious about building a rollercoaster.

At previous NSTA conventions we had always built a roller system with a little loopty loop and gotten plenty of comments from teachers on how to improve our system to make it longer. But at this convention we built quite an elaborate system. Our final rollercoaster had two loopty loops, spots where the marble was barely rolling, and a fantastic finish 15 meters farther along. Needless to say, all of us in the booth were quite excited about our rollercoaster, as were most of the visitors to our booth. I must give credit to the brains of our group, Susan Hardy, Karen Stevens, Lisa Wood, and Randall Stom. I simply crowed the loudest once it was done.

Ok, here’s the Rollers challenge. Our group challenges a class to beat our record of 15 meters. The class with the longest rollercoaster using the FOSS foam runways, wins a special prize and proclamation.

Here are the rules.
- You must use the marble in the FOSS kit; the marble must stay on the runway the entire duration, and may not come to a complete stop.
- The marble must make five successful consecutive runs.
- A picture or video must be accompanied by a narrative explaining how your rollercoaster was constructed, what problems you encountered, etc.
- The contest is restricted to first-, second-, or third-grade classes.

Send all entries to:
Sue Jagoda
FOSS Program
Lawrence Hall of Science
University of California at Berkeley
Berkeley, CA 94720

Teachers from Community School District 16 in Brooklyn hone their rollercoaster construction skills.
Coming Soon!
Revision for Grades 3-6

The revised FOSS modules for grades 3-6 will soon be available. The look is new, the teacher guide has been expanded, and new instructional components have been added to make FOSS better than ever. Conversion packages will be available for educators using the current FOSS program who want to upgrade their FOSS resource.

Here’s what you can expect to see in the revision.

Enhanced teacher guides with improved instructional procedures, more efficient format, and a colorful new design.

FOSS Science Stories are books of original student readings that accompany each module. FOSS now has a reading component to extend and enrich the firsthand experiences.

New embedded assessment tools let teachers monitor student progress continuously throughout each module, and summative assessment tools provide a comprehensive look at overall achievement.

A new FOSS website launches FOSS into the information age, connecting students, families, and FOSS educators with exciting new resources.

FOSS kits of student materials are largely unchanged. Your investment in kits is not devalued as a result of the revision.

Look for detailed information about the FOSS 3-6 revision in the next issue of the FOSS Newsletter.
We can’t wait to show you what we have found!
This past year, the FOSS staff has been busy pouring over the grade 3-6 modules with a sharp revisionist’s eye. The resource lists of books, videos, and software have been scrutinized and we’ve searched the publishing world for fresh, current resources for our modules. There is so much to share that we cannot possibly do it all in one newsletter. Each upcoming newsletter will feature resources for one of the science strands for grades 3-6, with K-2 modules to follow. So, save those newsletters!

As always, we would love to share your recommendations for additional books, videos, software, and current online resources. Check out the back cover for our phone number and e-mail address.

**Scientific Reasoning and Technology Strand**

**Super Solvers Gizmos and Gadgets**  
CD-ROM for Windows and Macintosh  
Phone: 617-761-3000  
*(Variables, Models and Designs)*

Students are challenged to beat the Master of Mischief to build the fastest auto, air, and alternative energy vehicles. They solve science puzzles to gain the needed parts, build and race their vehicles, then head back to the blueprints to investigate the variables and improve their design. Students will love the game-format, while you’ll appreciate the close integration to the FOSS investigations.

**Math Blaster for Ages 9 - 12:**  
**Cruncher Blaster**  
CD-ROM for Windows and Macintosh  
Phone: 800-542-4240  
*(Variables)*

The Cruncher Blaster program, included with the software, helps students build spreadsheets and transform their data into a variety of graphs or charts.
Da Vinci’s Machines: Civil Machines
CD-ROM for Windows
By Dreamware Multimedia Productions.
(Model and Design)
Da Vinci’s Machines is a series that brings the museum to you. The Civil Machine program focuses on Da Vinci’s designs for agricultural, transportation, and civil uses. Classroom go-cart builders will be intrigued with Da Vinci’s design for a self-propelled cart. Each 3-D model can be taken apart, viewed from different angles, and enlarged. An historical perspective is provided through explanations of the machines, his original sketches, and manuscripts.

Science Sleuths Elementary Series: The Little Blimp That Couldn’t
Phone: 800-548-3472
(Model and Design)
Students in your class become part of a team of “Science Sleuths” who are challenged to solve mysteries using their skills of research and experimentation. The mystery is presented, then it is up to the sleuth to decide where to go from there. Students need to conduct simulated experiments, watch mini-videos, and listen to interviews of suspects and experts. In addition, the program provides articles, databases, and excerpts from encyclopedias for students to research. In the classroom, students could tackle the mystery independently, or groups could share the information they find and work collaboratively to develop models and possible solutions.

Widget Workshop
CD-ROM for Windows and Macintosh
Maxis, Walnut Creek, CA (510-933-5630), 1997.
Phone: 800-245-4525
(Ideas and Inventions)
Hands-on science lab lets students put it together, take it apart, plug it in, hook it up, experiment, and explore. Students have fun inventing all sorts of wonderful widgets and discover fundamentals of science, math, and the world around them.

VIDEOS
From the NOVA Video Series: The Light Stuff
Phone: 800-255-9424
(Variables, Models and Design)
NOVA follows the Daedalus team as they develop and test fly a remarkable human-powered aircraft. The variables of aerodynamics, materials, human strength, and weather all must come together in the design process.

Problem Solving in Science
Phone: 800-645-3739
also available in videodisc
(Variables, Models and Design)
An interactive, instructional presentation that introduces students to the scientific method. Historical and current examples are taken from the fields of astronomy, space exploration, medical research, robotics, and meteorology. Duplication masters are provided.

The Great Inventors
United Feature Syndicate, Paramount Pictures (This Is America, Charlie Brown), 1989.
(Ideas and Inventions)
A video for all ages, Charles Schultz’s Peanuts characters salute great inventors Alexander Graham Bell, Thomas Edison, and Henry Ford.

The Wright Brothers
(Ideas and Inventions, Variables)
The thrilling, suspenseful story of the Wright brothers’ trials, frustrations, failures, and perseverance as they made their vision take flight.

The Rocket Men: Robert Goddard and the Adventure of Space Exploration
By Charles Grinker Productions, Inc.
(Model and Design)
The fascinating story of the father of modern rocketry is one of models, designs, frustration, and perseverance. The documentary follows his initial, spare-time attempts at shooting off liquid-fuel rockets from his backyard in Worcester, Massachusetts, to NASA’s successful moon landing. Robert Goddard’s models and designs are shown to be integral to the outcome of World War II, providing a brilliant example of the interconnection of science and society.
FICTION

Almost Famous
Ten-year-old Maxine is determined to become a famous inventor so she can take care of her younger brother’s heart condition. She convinces a troubled classmate to help her.

The Gadget War
Kelly Sparks has 43 inventions to her credit—and she’s only eight years old.

But now, a new kid in her class challenges her status as the gadget wiz, and their rivalry escalates into a full-scale gadget war.

The Marvelous Inventions of Alvin Fernald
Despite the help of the Pest, some amazing inventions, and his best friend Shoie, Alvin still wonders whether even he can solve the Huntley mystery.

Measuring Penny
Lisa learns about the mathematics of measuring by measuring her dog Penny with all sorts of units, including pounds, inches, dog biscuits, and cotton swabs.

Radio Boy
In this fictionalized account of the childhood of Nathan Stubblefield who patented several inventions, the young boy fixes his neighbor’s new telephone.
NONFICTION

100 Make-It-Yourself Science Fair Projects
A useful compilation of project ideas, many of which describe models for devices such as a telescope, solar system orrery, camera, and bridges.

Architecture
Twenty-two hands-on activities and text provide models to explain many designs in ancient and modern architecture. The mathematical investigations may be geared toward a higher age group, but the activities provide many age-appropriate starting points for student projects.

Before the Wright Brothers
The story of the pioneers who dreamed, planned, innovated, and experimented their way into the air.

Brainstorm! The Stories of Twenty American Kid Inventors
An excellent resource about kids whose creativity and imagination led them to invent many useful things.

Eureka! It’s an Automobile
Interesting text and illustrations follow the design developments of the automobile. The book includes clear diagrams of the working parts of the car, a discussion of problems that resulted from cars, and the designs that solved them.

Experiments With Light and Mirrors
Contains experiments that use mirrors and simple materials to investigate various science principles such as light, color, reflection, and symmetry.

Fantastic Flying Paper Toys
A book loaded with directions for making all sorts of flying tubes, spinners, catapult-launched fliers, kites and space-age fliers. From these first designs, students can explore the variables that affect their flight.

Flight
This book of simple projects provides many examples of models that explain the flight of animals, kites, planes, and rockets.

Galileo
In 1633, Galileo was threatened with torture and confined to house arrest for upholding the Copernican model of the universe: that the Earth was not at its center. This beautifully illustrated book describes the life, inspirations, inventions, and theories of Galileo in an engaging story format.

I Want to Be an Engineer
For all students who love puzzles, problem solving, and building things, this book describes various careers in engineering, and the education that is needed.

The Kids’ Invention Book
Profiles eleven inventors between the ages of 8 and 14. Describes the steps involved in inventing a new product, and discusses contests, patents, lawyers, and clubs.

Leonardo Da Vinci
A biography of the Italian Renaissance artist and inventor who, at about age 30, began writing his famous notebooks, which contain the outpourings of his amazing mind.

Math Counts: Length
Photographs and text introduce the concept of length and how to measure it.

Measuring Up! Experiments, Puzzles, and Games Exploring Measurement
Readers are challenged to measure distances, weights, heights, and temperatures by using common household items in not-so-common situations.

Metric System
Photographs and text explain how the metric system is used throughout the world. The book explains the history of the metric system and also contains an index of words pertaining to the metric system.

Mirrors: Finding Out About the Properties of Light
Suggested activities explore how mirrors work and how they demonstrate the properties of light.

Continued on page 14
Wordsmiths continued

Mistakes that Worked

Presents the stories behind 40 things that were invented or named by accident, including aspirin, X-rays, Frisbees, Silly Putty, and Velcro.

Nature Got There First:
Inventions Inspired by Nature

Wonderful illustrations and photographs in this book help draw comparisons between designs found in nature and those of modern technology. Topics include defense mechanisms, moving those of modern technology. Topics include defense mechanisms, moving around, building, and energy.

Paper Airplanes:
Models to Build and Fly

Instructions for making 12 very different paper airplanes are provided. A detailed introduction describes many of the variables involved in flight.

A Pocketful of Goobers: A Story about George Washington Carver

Relates the scientific efforts of George Washington Carver, especially his production of more than 300 uses for the peanut.

Rocket Science: 50 Flying, Floating, Flipping, Spinning Gadgets Kids Create Themselves

A book of projects covering a wide variety of science topics, including mechanics, air and water power, electricity, acoustics, and optics. Many of the projects are models to explain how things work, while other projects provide a springboard into the world of design.

Science to the Rescue

Beginning with the scientific method, the reader is then presented with a number of problems that have challenged scientists, along with the current solution; the “scientific rescue.” Each problem comes with a challenge for the reader and an invitation to “see for yourself” through a simple project.

Sky Pioneer:
A Photobiography of Amelia Earhart

A beautiful book that follows the life and travels of one of the world’s most famous women.

Taking Flight:
My Story by Vicki Van Meter

In 1994, 12-year-old Vicki Van Meter flew across the Atlantic. This is her story of her goals, training, disappointments, and achievements.

Technology Craft Topic Series: Land Transportation

The books in this series look at the design developments, historical events, and provide craft projects for students to design and construct. The projects in this book include a model street and town, a car, a vehicle for polar regions, a train and rails, and a dashboard.

Ships and Shipwrecks

The projects in this book include various models for raising a wreck, a sailboat, and a self-righting craft.

The Spinning Blackboard and Other Dynamic Experiments on Force and Motion

As with other books in the EXPLORATORIUM Science Snackbook Series, this is packed with projects students can construct which model the principles of force and motion. The projects involve simple materials and the text provides advice, hints, ideas, and explanations.

Under Every Roof

An introduction to architecture, including historical buildings, mobile homes, energy-efficient housing, and fantasy homes. The final chapter invites students to identify building styles in their neighborhood, but would also serve to help a student design a model home.

Voyages of Discovery Series: The Story of Flight

The innovations created during the development of flight is presented here with fascinating fold-out illustrations, overlays, and “inside views.”

Weighing and Measuring

Looks at some of the things people weigh and measure and tells about how weighing and measuring tools work. The books contains activities for students to try and a glossary.
Along with all of the new book, video, and software resources we've discovered during the revision process, new websites have also turned up. As always, keep in mind that the World Wide Web is an ever-changing and growing resource. Links you discover today may be gone tomorrow. You can find direct links to all of these web references and more by connecting with the FOSS home page at http://www.lhs.berkeley.edu/FOSS/FOSS.Hotlinks.html.

**Life Science Strand**

**USGS Biological Resources Division**  
http://biology.usgs.gov/  
This site includes a photo gallery, kids' corner, education links, special interest stories, plus other information concerning the Biological Resources Division.

**Environmental Defense Fund/Scorecard**  
http://www.scorecard.org/  
Find out how your community rates on the pollution scorecard. All you need to know is your zip code and you will get a report of the major polluters that affect your area. Students involved in the **Environments Module** might find ideas for projects here.

**Response Time Histogram**  
http://www.explorescience.com/histo.htm  
If your students have completed Investigation 4 in the **Human Body Module**, they might enjoy shockwave response time activity in which data is collected and displayed on a histogram.

**U.S. Department of Agriculture Center for Nutrition Policy and Promotion**  
http://www.usda.gov/cnpp/  
Encourage your students doing the **Food and Nutrition** investigations to get information about the latest policies concerning nutrition and information about dietary guidelines and the food pyramid at this site.

Continued on page 16
Online Connections continued

**Physical Science Strand**

**Machine Home Page**
http://www.ed.uri.edu:80/SMART96/ELEMSC/SMARThomepage.html

This site includes information and activities dealing with simple machines. The site provides links to other sites concerning simple machines which students might use for Levers and Pulleys projects.

**Inventors Toolbox: The Elements of Machines**
http://www.mos.org/sln/Leonardo/InventorsToolbox.html

This site from the Boston Museum of Science includes photographs and information about the various forms of simple machines. After you review the photographs and information, you can travel to the Gadget Anatomy link and try to figure out which simple machines are used in a variety of common tools and gadgets. This is another good supplement to Levers and Pulleys.

**Simple Machines**

The Franklin Institute in Philadelphia maintains this simple machines page which includes images and text describing the various simple machines plus links to other related sites. Students could use this link as they work on projects for the Levers and Pulleys Module.

**CHEM4KIDS**
http://www.chem4kids.com/index.html

This site includes a variety of information, activities, and a glossary relating to chemistry. Encourage your students to check this site out after they have completed the Mixtures and Solutions Module.

**Scientific Reasoning Strand**

**Reading a Min/Max Thermometer**
http://www.explorescience.com/minmax.htm

This shockwave interaction challenges you to read a minimum/maximum thermometer. Have students check out this link after they work with thermometers in the Measurement Module.

**National Institute of Standards and Technology/Metric Program**

This page sponsored by the National Institute of Standards and Technology is a good resource for information about transforming the United States into a “Metric America.” Students might find ideas for projects when they complete the Measurement Module.

**Get a Grip on Robotics/The Tech Museum**
http://www.thetech.org/exhibits_events/online/robots/teaser/

Learn about the components of a robotic arm and how it works through this online tutorial. This site might stimulate project ideas after students complete the Models and Designs Module.

**Earth Science Strand**

**Digital Orthophoto Quadrangles**
EROS Data Center

Search for digitized aerial photographs for your area, using either a map, key word, or latitude and longitude. Once students figure out how to use the site, they can find aerial photographs of most areas in the United States to supplement the Landforms Module.

**Geology Tour of National Parks**
http://www.aqd.nps.gov/grd/tour/index.htm

This site includes information about the geology and other aspects of many U.S. national parks. Students might use this site to develop projects for the Landforms Module.
Solar Energy Module

Q Do you have problems with the weather cooperating while you are trying to do the Sun Tracking activity in the Solar Energy Module?

A Try this idea. Trace the students’ shadows on large, long butcher paper instead of onto the sidewalks directly. Use rocks to mark the placement of the butcher paper so you can put it in the same place each time. Not only will this prevent the erasing of your chalk outlines, but it also allows you to bring the different shadows inside your classroom for in-depth discussions.

Q Are you looking for a social studies connection to FOSS Magnetism and Electricity and Ideas and Inventions modules?

A Tie in Benjamin Franklin and his work not only with electricity and inventions, but also as Postmaster of Philadelphia (1737), then Deputy Postmaster General of British Colonies and later the Postmaster General of the American Nation. Following the discussion of “snail mail,” bring in the invention of the telegraph and its history.

Earth Materials

- Remember when making mock rocks for Investigation 1 of the Earth Materials Module to let them air-dry. Plan ahead because it usually takes a minimum of seven days for the rocks to air-dry (depending on humidity and time of year). Cooking or using a microwave oven makes them too hard for students to break apart. Also, make sure they are not accessible to curious pets. One of my dogs really did eat one of my mock rocks! So he’s not a gourmet, what can I say? Would you be if all you ate was dry dog food?

(= Editor’s Note: You can place the mock rocks in a gas oven turned off to dry by pilot light heat. It takes about 24-36 hours.)

Lab Coats:

- Would you like to help your students feel like professional scientists? See if you can get a nearby hospital or medical office to donate lab coats for your eager scientists to wear while performing their science experiments. It really helps set the mood for science.

Human Body Module

- Ask your doctor or other medical practitioner to donate old x-rays for classroom use when studying the body. Just remember to cut off any indication of the patient’s name or other personal data.

Homemade Seed Tapes

- Materials: white flour, water, thick absorbent paper towels, packet of seeds (flower or vegetable), craft stick

- Mix white flour with water to a consistency thicker than pancake batter. This is your paste. Add a few drops of food coloring to tint the paste. This makes it easier to see on the paper towels. Lay out a few squares of paper towels. Place a small dot of paste on the paper towel and put one seed on each dot. Space the dots evenly per the spacing directions for the packet of seeds. Fold the paper towel strip over to sandwich the seed between two layers of paper towel. Cut the sandwiched seeds into a strip. Allow to dry.

- When dry, place strip in an airtight container or zip lock bag. Label the bag and include the original seed packet for reference. When planting season arrives, plant the strips in the ground at the depth suggested on the original seed packet.
When parts are more then merely parts...make sure you are getting only genuine FOSS™ replacement parts.

Delta Education works very closely with the developers of FOSS. All components for the program have been rigorously tested to insure that they meet the critical specifications of the hands-on science activities. Many of the individual manipulatives are unique and produced specifically for FOSS by Delta Education. A FOSS binder clip may look like the same clip you order through your general supplier. But it’s not. Delta has them specially made to perform in the way the FOSS developers intended. This insures a successful FOSS investigation every time.

Delta Education guarantees not only the quality of their products, but also their successful application in your classroom.

To receive a FOSS Replacement Parts List, call 800-258-1302 or e-mail karen@delta-ed.mv.com.

Plan Ahead!
Order your refill kits for the next school year today!

Refill packages include kit quantities of consumable items (enough for two classes).

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Laugh About it Later...

This story comes to us through Jeff Lorton, FOSS Regional Sales Manager from Minneapolis. The story originates in the Ft. Madison School District, Ft. Madison, Iowa. They have been piloting FOSS this year and will be implementing the program next school year. Janice Burch, their curriculum director, heard this story from one of the pilot teachers. Ft. Madison is a Mississippi River town north of Missouri and across the river from Nauvoo, Illinois.

Teachers in the Ft. Madison Community Schools are using several FOSS kits for the first time this year. There were some big surprises for one teacher and her class. Students in Suzy Ross’ fourth grade were conducting an experiment on evaporation using the Water Module. They encountered some unexpected variables. The experiment involved placing cups of water in various locations and using thermometers to record the water temperatures. One of the locations her class chose was outside on the playground. Before long, however, an associate alerted Mrs. Ross that she was either going to have yellow water or less water as a result of stray dogs roaming the premises. She had observed one dog drinking out of the container. So the students picked it up and placed it on top of a dumpster. But when they went to check the temperature, it was nowhere to be found. Apparently, at some point during the afternoon, the garbage man came, and — you guessed it — dumped it in his truck and hauled it away. Thus Mrs. Ross’ class can tell you that stray dogs and garbage men can become unexpected variables in your science experiments.
FOSS Institutes

Delta Education will host four 2-day Informational Institutes this academic year in conjunction with the NSTA Area and National Conventions. These Institutes are designed for all educators—lead teachers, administrators, curriculum coordinators, university methods instructors, science committee members, and school board members—who are interested in finding out what FOSS is, who developed it, what philosophy of education it supports, and to begin networking with other FOSS users. A lot of time at these Institutes is spent with the program materials, doing activities and engaging in inquiry.

During the summer Delta hosts Implementation/Leadership Institutes. These meetings are designed for educators who have adopted FOSS and are into their implementation process. Some time will be spent working with the FOSS materials, but a greater proportion of time will be spent delving into issues of management, teacher preparation, materials maintenance, and a host of other subjects.

Most Institutes are led by FOSS development staff. There is no charge, but participants must register in advance to attend. Times and locations are listed in the calendar. To secure your spot at the Institute of your choice, call, write, or FAX.

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Phone: 1.800.258.1302, x503
FAX: 603.579.3504
e-mail: pam@delta-ed.mv.com

FOSS NSTA Pre-Convention Informational Institutes

October 19-20, 1999  Detroit, MI
(Tues.-Wed.)

November 16-17, 1999  Tulsa, OK
(Tues.-Wed.)

Nov. 30-Dec. 1, 1999  Reno, NV
(Tues.-Wed.)

April 4-5, 2000  Orlando, FL
(Tues.–Wed.)

☐ Yes! I’m interested in attending a FOSS Informational Institute.
☐ Yes! I’m interested in attending a FOSS Implementation/Leadership Institute.

Please send me registration information for the _______________________________ institute. (Date and Location)

Name _______________________________

School _______________________________ District _______________________________

Title _______________________________

Address _______________________________

City _______________________________ State _______________________________ Zip _______________________________ Daytime Phone _______________________________

☐ I did not receive this FOSS newsletter in the mail. Please add my name to the mailing list.
A very special THANK YOU . . . to all the local and national trial teachers who have helped make FOSS such a great success!

The intent of the FOSS Newsletter is to help FOSS users develop a network of support across the country. Delta Education and LHS will work together to bring you news two times per year, including articles regarding the latest development of modules, tips about management from teachers and administrators, ways to make connections with other teachers and districts, extensions and reading materials to add to modules you are already using, and informative articles about good educational practices.

So, we need your help. If you have a tip that enhances the teaching of FOSS or would like to submit an article (with photos) about exciting activities or school programs, management, implementation projects, etc., please send them in. We would also like to hear from your students, whether they have questions about the content, projects they have done, photos or other images they have created, or insights into how they use the World Wide Web with FOSS. Send your contributions to:

FOSS Newsletter
Lawrence Hall of Science
University of California
Berkeley, CA 94720-5220

The deadline for submissions to the next issue is June 21, 1999. We’re waiting to hear from you.