



Proven Science Programs

APPLIED
SCIENCE
KITS & MODULES
CATALOG

20
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THE LAWRENCE
HALL OF SCIENCE
UNIVERSITY OF CALIFORNIA, BERKELEY



We've never been "just kits."

Hands-on learning is more than playing with science equipment.

When students are authentically engaged in a task, they are actively doing, actively thinking, and actively discussing. While hands are engaged, minds are questioning, sorting through input, and making connections. All of our programs — from 1-2 day kits, month long modules, and full-year curricula — are lessons, materials, and teacher supports designed to engage both the hands and the minds of students.





**Science lessons for a day,
a week, or the whole year.**

	Activities	Instructional Time	Components
Kit	1-3	1-3 days	materials student sheets teacher's guide
Module	6-20	8-30 days	materials curriculum teacher's guide assessment
Unit	15-23	4-10 weeks	materials curriculum teacher's guide ancillaries assessment system*
Full Year	customizable by district	customizable by district	materials curriculum teacher's guide ancillaries assessment system*

Proven Science Programs

* see pages 44-45 on curriculum side

Lab-aIDS®**SEPUP®**
Issue-Oriented Science**THE LAWRENCE
HALL OF SCIENCE**
UNIVERSITY OF CALIFORNIA, BERKELEY**EDC** Learning
transforms
lives.**KEY TO ICONS****AG** – popular with AgSci teachers**ADD A GROUP** – material packs available that accommodate one additional group**LITERACY** – meets our criteria for supporting literacy**NONCONSUMABLE** – contains no consumable materials**REFILLABLE** – refills for consumable items are available (-RC indicates a discounted refill pack)**SPANISH** – comes with two sets of student sheets, one in English, one in Spanish**STEM** – meets our stringent STEM criteria

LIGHT: THE VISIBLE SPECTRUM

Kit #P104-S01

Students use diffraction gratings then build a spectroscope to investigate the spectra of different light sources. They gather evidence showing, and learn the science to explain, that if different light sources and colored filters are used, the appearance of objects can change.

Accommodates unlimited classes, each with 1 group of four students.

Kit No. P104-S01

\$172.75

LITERACY
NONCONSUMABLE



DENSITY: UNDERSTANDING THROUGH EXPERIMENTAL DESIGN

Kit #P610

This kit helps students understand density as an intrinsic quality of matter that remains the same regardless of sample attributes such as size, shape, and color. Equally important, students also practice the fundamentals of inquiry and experimental design.

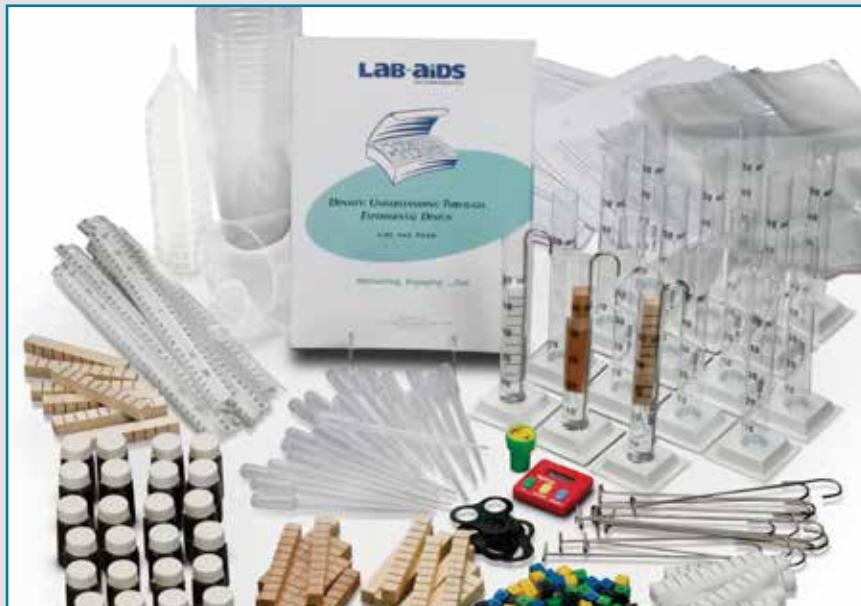
These experiences help prepare students for common topics found in classroom and statewide assessments. Students first reveal their preconceptions about several aspects of density that are often misunderstood. Each of these aspects is then examined through student-designed experiments which provide evidence for students to use when they revisit and revise their initial preconceptions. Unique equipment designed by Lab-Aids allows students to easily and accurately collect, compare, and analyze data from various materials. Eight activities approximately 15 minutes each.

A comprehensive Teacher's Guide includes performance criteria and both multiple choice and constructed response assessment items.

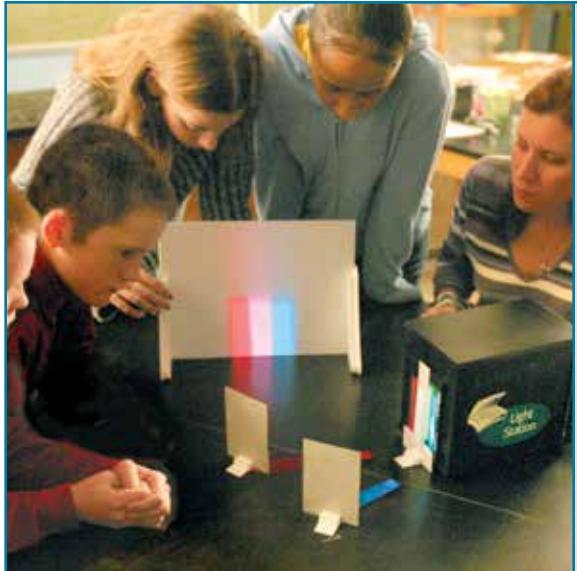
Accommodates unlimited classes, each with 8 groups of four students.

Kit No. P610

\$586.05



AG LITERACY STEM
NONCONSUMABLE



LIGHT: COLORS AND ENERGY

Kit #P104-S02

Students compare and contrast the effects of different combinations of colored filters and different combinations of colored light. Students then explore the energy contained in different colors of light in both pre-designed and self designed investigations.

Accommodates unlimited classes, each with 1 group of four students.

Kit No. P104-S02

\$167.00

STEM LITERACY
NONCONSUMABLE



INVESTIGATING LIGHT

Kit #P110

The six activities in this module allow students to explore light's interactions with matter and the straight line nature of light. Working with light beams, students quantify the size of a shadow and use shadows to mathematically determine the sizes of objects. The

activities in this module (and in the related P120 and P130 modules) include materials designed for seamless use with Lab-Aids® Light Stations (p. 113).

LIGHT STATIONS NOT INCLUDED.

Accommodates unlimited classes, each with 8 groups of four students.

Kit No. P110

\$428.40

LITERACY NONCONSUMABLE

COLOR AND SPECTRUM

Kit #P120

During the seven activities in this module, students use diffraction gratings and make a spectroscope to separate, describe, and understand the spectrum of light from a variety of sources. They also study how light interacts with color filters, how colored light can change the “color” of objects and how combining different colored light produces other colors, including “white.” Using luminescent material, students also study absorption, emission and conservation of energy. The activities in this module (and in the related P110 and P130 modules) include materials designed for seamless use with Lab-Aids® Light Stations (p. 113).



LIGHT STATIONS NOT INCLUDED.

If you have the P110 Investigating Light Module, the P120A extension package supplies all additional materials needed and avoids duplicates.

Accommodates unlimited classes, each with 8 groups of four students.

Kit No. P120 \$840.75
Extension Materials P120A \$714.05

LITERACY NONCONSUMABLE

REFLECTION AND REFRACTION

Kit #P130

The nine activities in this module have students explore images formed by plane and curved mirrors and discover the rule for reflection of light. They also use lenses to study light refraction, measure focal length, make a simple camera, and observe how focused light energy is converted to heat energy. The activities in this module (and in the related P110 and P120 modules) include materials designed for seamless use with Lab-Aids® Light Stations (p. 113).



LIGHT STATIONS NOT INCLUDED.

If you have the P110 Investigating Light Module, the P130A extension package supplies all additional materials needed and avoids duplicates.

Accommodates unlimited classes, each with 8 groups of four students.

Kit No. P130 \$748.05
Extension Materials P130A \$598.90

LITERACY NONCONSUMABLE



FORCE AND MOTION

Kit #P210

Over the course of this module's nine activities students learn about all three of Newton's laws of motion through concrete, inquiry-based experiences. Students accurately measure time intervals and force, they design a procedure to investigate

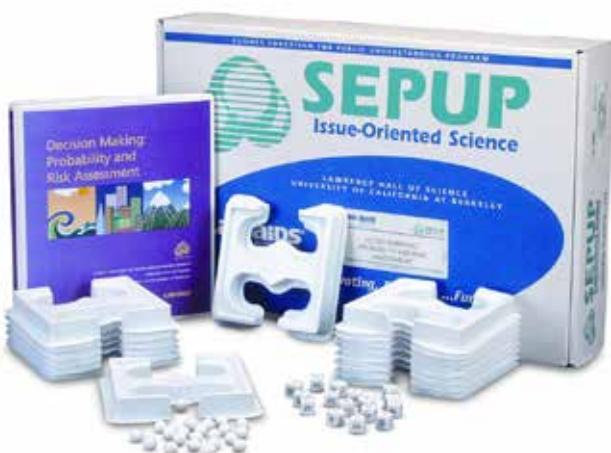
the motion of a ball, create velocity/distance vs. time graphs, and use a simple accelerometer to investigate acceleration, including orbiting systems.

Accommodates unlimited classes, each with 8 groups of four students.

Kit No. P210

\$748.05

LITERACY NONCONSUMABLE



DECISION MAKING: PROBABILITY AND RISK ASSESSMENT

Module #DM-2

Developed by SEPUP

This module is an outstanding teaching tool for helping students develop a greater understanding of how mathematical reasoning can be used to make decisions in everyday life. Marble-rolling activities, number cubes, and coin tosses are used to introduce probability. After reading several historical case studies, students are presented with a hypothetical life-or-death decision involving an epidemic disease. They are asked to make recommendations about ways to reduce the risks associated with local emergency or disaster situations that could be either natural or human-caused. The assessment emphasis is placed on student understanding of trade-offs and decisions.

A Teacher's Guide is included.
Accommodates five classes, each with 8 groups of four students.

Number of activities

11

Approximate length

14-19 sessions

Module No. (includes Teachers Guide) DM-2

\$96.35

Additional Teachers Guide DM-2PM

\$68.25

INVESTIGATING ENVIRONMENTAL HEALTH RISKS

Module #EHR-2

Developed by SEPUP

In this module, students explore some basic concepts associated with environmental health risks. In addition to the risks associated with familiar activities, they explore risks associated with clean up of the Superfund (toxic waste) sites. Through hands-on activities, students explore concepts necessary for understanding and

comparing environmental health risks due to the presence of chemicals. The concepts include: sampling, testing for contaminants, parts per million, and acute vs. chronic toxicity. They also investigate epidemiological methods that can be used to investigate risks from biological or chemical agents. The module ends with an activity in which students read about and apply their knowledge in evaluating evidence related to two environmental health risks.

A Teacher's Guide is included. Sixteen SEPUP Trays are needed but not included.

Accommodates five classes, each with 8 groups of four students.

Number of activities

8

Approximate length

10 -16 sessions

Module No. EHR-2

\$349.25

SEPUP Trays, pkg of 16 SP-1CT

\$84.50

Additional Teachers Guide EHR-2PM

\$68.25

LITERACY STEM AG
REFILLABLE



ENVIRONMENTAL IMPACT: COMPARING INDUSTRIES

Module #EI-2

Developed by SEPUP

Having an industry in your community can lead to both positive and negative outcomes. In this module, students investigate the possible outcomes through a scenario, in which they role-play being residents of an island who are asked to vote to allow a factory to be built. Students engage in hands-on explorations of two industries; mining and chemical manufacturing. They read about two others; food processing and gasoline production. These explorations provide the students with an understanding that all industries have common needs: obtaining raw materials, manufacturing a product, and safely disposing of wastes. The embedded assessment system focuses on the students' ability to use evidence and identify trade-offs.

A Teacher's Guide is included. Sixteen SEPUP Trays are needed but not included.

Accommodates five classes, each with 8 groups of four students.

Number of activities

8

Approximate length

12-16 sessions

Module No. EI-2

\$467.65

16 SEPUP Trays SP-1CT

\$84.50

Additional Teacher's Guide EI-2PM

\$68.25

LITERACY STEM AG
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INVESTIGATING ENERGY FROM THE SUN

Module #ES-2

Developed by SEPUP

Most of the energy the earth receives from the Sun is in the form of electromagnetic energy. In this module, students explore the physical properties of electromagnetic waves given off by the Sun. The physical properties of infrared, visible and ultraviolet radiation are explored using the concepts of selective transmission, reflection and absorption.

absorption. Through an established storyline, students use evidence to establish a relationship between the physical properties of ultraviolet waves and their associated health risks of cataracts and skin cancer. Students then discuss ways to reduce the overall risks associated with ultraviolet exposure. The embedded assessment system focuses on student ability to analyze data.

A Teacher's Guide is included.

Accommodates five classes, each with 8 groups of four students.

Number of activities

7

Approximate length

12-18 sessions

Module No. ES-2

\$597.10

Additional Teachers Guide ES-2PM

\$68.25

LITERACY STEM AG

REFILLABLE



INVESTIGATING FOOD SAFETY

Module #FS-2

Developed by SEPUP

Consumers' concerns over food safety are broad. They range from worries over the possibility of Salmonella poisoning to questions about pesticide residues on produce. This module introduces some of the issues associated with food safety. Students first explore food-borne illness as they investigate the growth of yeast, a common fungus that is used to model other effects of pathogenic microorganisms. They examine the different chemical additives, and their use in preventing microbial growth. Students then explore how chemical additives can be used to slow the oxidation of fresh fruit and to enhance the nutrient content of foods. They also learn how foods can be tested for the presence of chemical residues, such as pesticides. Finally, the students evaluate the use of different food preservation techniques, which are intended to improve food safety. The embedded assessment system focuses on students' ability to use evidence and identify trade-offs.

A Teacher's Guide is included. Sixteen SEPUP Trays are needed but not included.

Accommodates five classes, each with 8 groups of four students.

Number of activities

8

Approximate length

10-15 sessions

Module No. FS-2

\$467.65

SEPUP Trays, pkg of 16 SP-1CT

\$84.50

Additional Teachers Guide FS-2PM

\$68.25

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GROUNDWATER CONTAMINATION: TROUBLE IN FRUITVALE

Module #FV-2

Developed by SEPUP

Exploring Earth science concepts such as the water cycle, map-making and interpretation, and groundwater pollution is the objective of this module. These concepts are used in an investigation of groundwater contamination in the fictional city of Fruitvale.



Students design and carry out a plan for testing water from different parts of the city to determine the contamination's source, severity, extent, and rate of travel. The data is then used to analyze the risk to Fruitvale's water supply. Finally, the students read about several clean-up options and participate in a role-play of a town meeting to decide which cleanup option to use.

A Teacher's Guide is included.

Accommodates five classes, each with 8 groups of four students.

Number of activities	12
Approximate length	14-22 sessions
Module No. FV-2	\$467.65
Additional Teachers Guide FV-2PM	\$68.25

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HOUSEHOLD CHEMICALS: BETTER BY DESIGN

Module #HC-2

Developed by SEPUP

Many different types of chemicals are used by industries to produce products. These products are advertised using strategies designed to create consumer demand. Can we believe the claims of the manufacturer? How should the product be used safely?

In this module, students explore their knowledge and attitudes about chemicals and chemical use. They use chemicals to produce a common household product (i.e. cleaners, food products, and toys), then test their product in various ways. The students come "full circle" by creating ads for their products. The ads are examined for accuracy and appropriateness. This module provides many opportunities for students to design their investigations using an open-ended inquiry model. Students are assessed in a variety of ways that measure their ability to design and conduct independent investigations.

A Teacher's Guide is included. Sixteen SEPUP Trays are needed but not included.
Accommodates five classes, each with 8 groups of four students.



Number of activities	11
Approximate length	23-28 sessions
Module No. HC-2	\$586.05
SEPUP Trays, pkg of 16 SP-1CT	\$84.50
Additional Teachers Guide HC-2PM	\$68.25

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HAZARDOUS MATERIALS INVESTIGATION: THE BARREL MYSTERY

Module #HM-2

Developed by SEPUP

In this module, students explore some basic concepts associated with environmental health risks. In addition to the risks associated with familiar activities, they explore risks associated with clean up of the Superfund (toxic waste) sites. Through hands-on

activities, students explore concepts necessary for understanding and comparing environmental health risks due to the presence of chemicals. The concepts include; sampling, testing for contaminants, parts per million, and acute vs. chronic toxicity. They also investigate epidemiological methods that can be used to investigate risks from biological or chemical agents. The module ends with an activity in which students read about and apply their knowledge in evaluating evidence related to two environmental health risks.

A Teacher's Guide is included. Sixteen SEPUP Trays are needed but not included.

Accommodates five classes, each with 8 groups of four students.

Number of activities

8

Approximate length

10-16 sessions

Module No. HM-2

\$471.25

SEPUP Trays, pkg of 16 SP-1CT

\$84.50

Additional Teachers Guide HM-2PM

\$68.25

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LIVING WITH PLASTICS

Module #PL-2

Developed by SEPUP

There are many different types of materials used to produce the same product. Which is best? What are the trade-offs in selecting one material over another? In this module, students address these questions by focusing on the development and use of plastic. They investigate the properties of different plastics and read about the history of plastics development. The students are then

introduced to the basics of polymer chemistry and model the effect of crosslinking on polymer properties. They also explore the properties of natural polymers and relate these properties to their everyday uses. In the final activity, students apply their knowledge of plastics to evaluating competing claims about the usefulness of plastics. The embedded assessment system focuses on students' ability to use evidence and identify trade-offs.

A Teacher's Guide is included.

Accommodates five classes, each with 8 groups of four students.

Number of activities

8

Approximate length

14-16 sessions

Module No. PL-2

\$471.25

Additional Teachers Guide PL-2PM

\$68.25

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INVESTIGATING WASTEWATER: SOLUTIONS AND POLLUTION

Module #SP-2

Developed by SEPUP

The central focus of this foundation module is the vital role chemicals play in our lives. Our opinions about chemicals are based on knowledge and attitudes. What do we really know about chemicals and what are the factors that affect our attitudes toward them? In the opening sequence, survey research techniques are used to help students analyze what they know and think about chemicals and their chemical use. Next, they examine the unique properties of water that make it such a useful solvent. Students then apply basic concepts such as acid/base properties and neutralization, as they devise a plan to treat a solution of dilute acid rinse wastes from an electroplating plant.

A Teacher's Guide is included. Sixteen SEPUP Trays are needed but not included.

Accommodates five classes, each with 8 groups of four students.

Number of activities

10

Approximate length

17-21 sessions

Module No. SP-2

\$708.00

SEPUP Trays, pkg of 16 SP-1CT

\$84.50

Additional Teachers Guide SP-2PM

\$68.25

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THRESHOLDS AND TOXICOLOGY

Module #TT-2

Developed by SEPUP

Obtaining governmental approval for new drugs and medicines is no easy task. Years of research, testing, and data collection are needed to make sure the product is safe for society as a whole. In this module, students examine the historical development of the regulation process, and consider a modern day example using "lily juice," a hypothetical herbal remedy promoted to increase intelligence. Simulated rat toxicity

testing provides data that can be analyzed to decide whether the product should be allowed. Acute and chronic health effects are considered in the final decision.

A Teacher's Guide is included. Sixteen SEPUP Trays are needed but not included.

Accommodates five classes, each with 8 groups of four students.

Number of activities

10

Approximate length

14-21 sessions

Module No. TT-2

\$503.20

SEPUP Trays, pkg of 16 SP-1CT

\$84.50

Additional Teachers Guide TT-2PM

\$68.25

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WASTE DISPOSAL: COMPUTERS AND THE ENVIRONMENT

Module #WD-2

Developed by SEPUP

Management of the waste produced throughout the life cycle of electronic products is extremely complex and challenging. In this module, students learn about the toxic and non-toxic waste issues associated with the manufacturing and disposal of computers. In a series of activities, students simulate the production of circuit boards and the disposal of the resulting liquid toxic waste.

Students then investigate a variety of options for handling obsolete computer waste and learn about integrated waste management. Finally, they use their understanding of the waste issues and disposal options to recommend a computer company to purchase computers from. The module provides many opportunities for students to develop their skills in using evidence and weighing trade-offs to make decisions.

A Teacher's Guide is included. Sixteen SEPUP Trays are needed but not included.

Accommodates five classes, each with 8 groups of four students.

Number of activities	8
Approximate length	12-15 sessions
Module No. (includes Teachers Guide) WD-2	\$586.05
SEPUP Trays, pkg of 16 SP-1CT	\$84.50
Additional Teachers Guide WD-2PM	\$68.25

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INVESTIGATING ALTERNATIVE ENERGY: HYDROGEN AND FUEL CELLS

Kit #P310 Developed by SEPUP

This six-activity module focuses on hydrogen fuel cell technology as one potential solution to energy concerns. Students first consider trade-offs of using various fuels for powering vehicles then use an electrolyzer to produce hydrogen and oxygen gas from water. Using these gases to generate electricity with a proton exchange membrane (PEM) fuel cell students observe the consumption of gases and the motion of an electric propeller. They also measure the voltage

and the current and are introduced to oxidation reduction reactions and half-reactions.

To further their understanding of the chemistry involved, they use both a computer simulation and a manipulative model of a PEM fuel cell. To end the unit, students use the ΔG of the reaction to compute the efficiency of the fuel cell in converting the energy in H₂ to electricity then identify the advantages of and the challenges facing fuel cell powered vehicles. This kit features access to a free library of online videos and simulations.

A Teacher's Guide is included. Accommodates five classes, each with 1 group of four students.

Kit No. P310	\$337.45 (Complete Module)
Kit No. P310A	\$209.85 (Lab-Aids® Electrolyzer and fuel cell only)
Add a Group No. P310EL	\$259.90
Discount given when purchasing multiple Kit No. P310 and Add A Group No. P310EL.	

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REFILLABLE ADD A GROUP