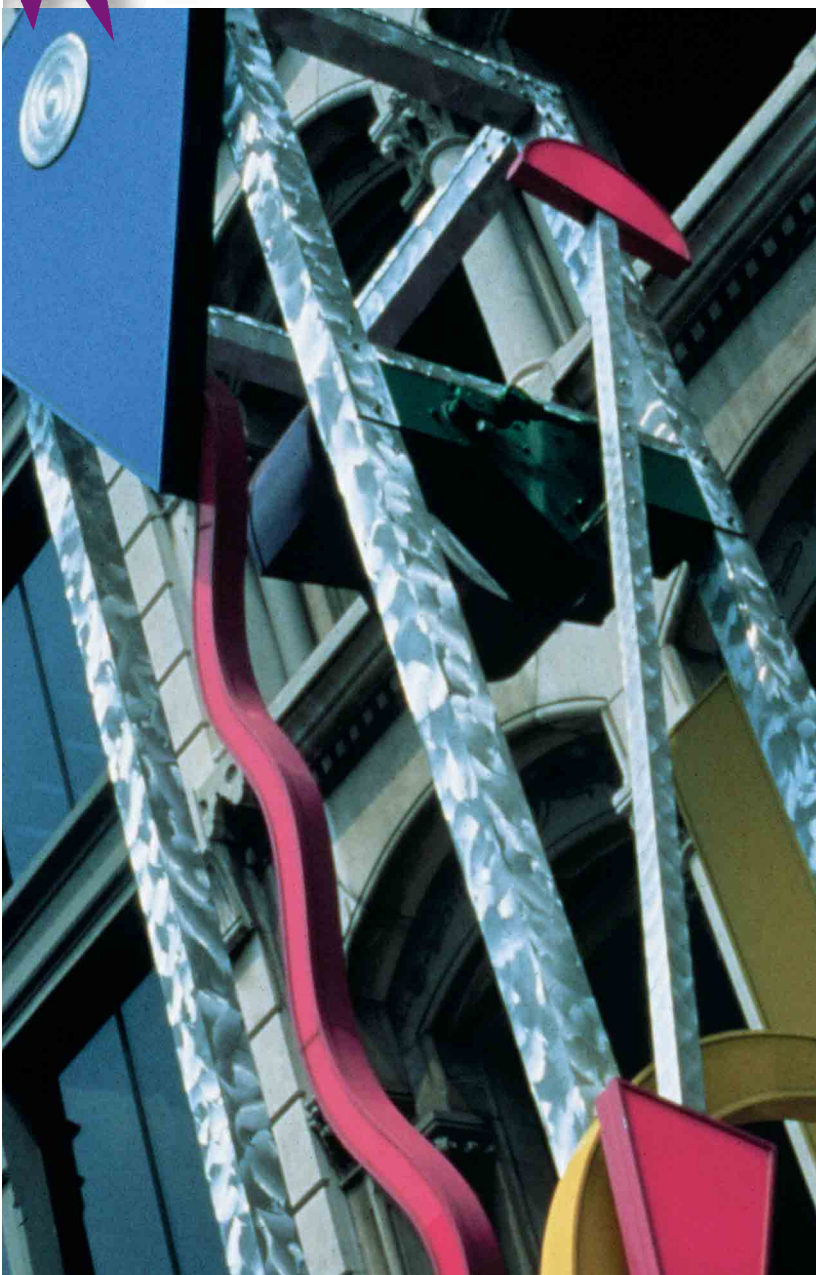
Louisville Science Center

2005-2006 Educator Guide



"Exploring the exhibits and educational programming at the Louisville Science Center helps students build inquiry skills and improve their scientific literacy, nudging them closer to becoming problem solvers and self-motivated learners. And, as a platform for the overarching science concepts embedded in the core content, the Louisville Science Center helps teachers demonstrate the real-life context and the interrelation of those concepts."

—Kentucky Education Commissioner Gene Wilhoit

Science Concepts in Kentucky Core Content for Assessment

1. Structure and Transformation of Matter
2. Motion and Forces
3. The Earth and the Universe
4. Unity and Diversity
5. Biological Change
6. Energy Transformations
7. Interdependence

2005-2006 Educator Guide

Index

Phone Numbers

Field Trip Questions

OPTION ONE: Have Us Plan Your Guided Visit
Contact the School Services Coordinator
(502) 561-6100, ext. 6143 or (800) 591-2203, ext. 6143.

OPTION TWO: Plan Your Own Visit
Customer Service (502) 561-6100, ext. 6111 or
(800) 591-2203, ext. 6111.

School field trips are scheduled Tuesdays through Fridays.

FIELD TRIP OPTIONS

Where can your students operate a piston engine by hand, play virtual volleyball, and learn science? On a field trip to the Louisville Science Center!

Our permanent and temporary exhibits, labs and demonstrations, IMAX® films, and other engaging educational activities will help you teach and reinforce your science curriculum. As your students explore physical sciences in THE WORLD WE CREATE exhibit, health and life sciences in THE WORLD WITHIN US exhibit, and the natural and earth sciences in THE WORLD AROUND US exhibit, they will deepen their understanding of basic science concepts. KidZone provides age-appropriate experiences for children age 7 and younger. And because all activities are connected to Kentucky Core Content for Assessment and the Indiana Accountability System for Assessment, a visit to the Science Center can help you meet your curriculum requirements for the year.

We offer two field trip options with varying degrees of flexibility to fit your needs:

We'll Plan It for You.
This guided visit offers a grade-appropriate, content-based experience that leaves the planning to us. All you have to do is tell us how many students you want to bring and choose a content area. Your choices are: THE WORLD WE CREATE (physical science), which includes a 20-minute demonstration in the *Chemistry Kitchen*; THE WORLD WITHIN US (health and life science), which includes a 50-minute hands-on lab experience (time permitting) or a 20-minute demonstration in the *BioLab*; THE WORLD AROUND US (natural and earth science), which includes a 20-minute demonstration in the

CHART A

ADMISSION RATES

per person for school groups of 10 or more

	IMAX or Exhibits Only	IMAX & Exhibits
Students	$5.00	$6.50
Teachers	Free	Free
Chaperones (1 per 10 students)	$1.00	$1.00
Additional Chaperones/Adults	$5.00	$6.50

School field trips are scheduled Tuesdays through Fridays.
Memberships are not valid for school field trips.

Discovery Gallery; or EARLY CHILDHOOD, which includes an age-appropriate demonstration and a KidZone session. Your visit will include a Science Center escort to guide your class through the exhibits, an IMAX film, and use of the lunchroom. The cost is $10 per student, with a required minimum of 10 students and a maximum of 60. Details are available at www.LouisvilleScience.org. For more information or to schedule a visit, call our School Services Coordinator at (502) 561-6100, ext. 6143 or (800) 591-2203, ext. 6143.

Plan Your Own.
This a la carte option allows you to completely customize your field trip by choosing the activities you want from the chart below. Costs will vary, depending on which activities you choose for your students. There is a required minimum of 10 students (except for home schools) but no maximum. For more information or to schedule a visit, call our Customer Service Representatives at (502) 561-6100, ext. 6111 or (800) 591-2203, ext. 6111.

Some guidelines apply to both field trip options: Payment is accepted by check, credit card, or completed purchase order.

Cancellations must be made at least seven days prior to your visit. If cancellations are not received 7 days prior to your scheduled trip, you will be required to pay the total amount. Cancellations made by phone must be followed immediately by a written confirmation faxed to 502-561-6690, or mailed to the Louisville Science Center, 727 West Main Street, Louisville, KY 40202.

Please note that you are required to bring chaperones on your visit. One chaperone is required per five students for preschool through first grade. One chaperone per 10 students is required for grades 2-12. Costs vary for chaperones and additional adults.

CHART B

ADDITIONAL FEES

per person, which may apply (depending upon activities selected)

	Lunchroom	BioLab or Chemistry Kitchen
Students	$.50	$1.25 plus admission
Teachers	Free	Free
Chaperones (1 per 10 students)	Free	Free
Additional Chaperones/Adults	$.50	Not Admitted

We'll Plan It For You (Best Value)

Student . . . . . .$10.
Chaperone . . . . .$1.
(1 per 10 students)
Each Additional . .$10.

Includes...
- BioLab or Chemistry Kitchen
- Use of Lunchroom
- IMAX film
- Science Center Guide/Escort
- Field Trip Planning

For **Core Content** connections and more information, visit www.LouisvilleScience.org.

IMAX Films

Enjoy educational, entertaining films on our four-story IMAX® screen! Educator guides are available for each film and can be downloaded from our website at www.LouisvilleScience.org or call (502) 561-6100, ext. 6111 or (800) 591-2203, ext. 6111.

FORCES OF NATURE

May 21, 2005 – January 6, 2006

From volcanic eruptions on the island of Montserrat and trembling fault lines in Turkey, to storms ripping through the notorious "Tornado Alley" of America's Midwest, modern-day disasters from around the globe are witnessed in eye-popping enormity on the giant screen. The film captures inspiring and terrifying atmospheric and geological events, then takes audiences behind the disasters with scientists willing to risk their own lives to understand these forces and increase our odds of survival.

Sponsored locally by: WAVE 3

AUSTRALIA: LAND BEYOND TIME

Opening October 1, 2005

It's more like another planet than another country. The "land down under" is undoubtedly one of the most diverse of all countries. Explore how life in this rugged, eroded land has adapted and flourished in a largely arid environment. See how the bounding giant red kangaroo has become more efficient than most athletes and how plants and animals cooperate to maximize their chance of survival.

MYSTERY OF THE NILE

Opening January 7, 2006

On Christmas Day 2003, Pasquale Scaturro and a team of explorers set out on an epic quest to become the first to complete a full descent of the world's greatest river, from source to sea. Four months later, on April 28, Pasquale and his expedition partner, Gordon Brown, reached the mouth of the Nile at the Mediterranean Sea, becoming the first in history to complete this 3,250-mile journey. MYSTERY OF THE NILE tells the story of this emotional and historic expedition while also exploring the cultural and environmental links between the Ethiopian, Sudanese and Egyptian civilizations.

Temporary **Exhibits**

MONEYVILLE

May 28, 2005 – August, 2005

In this colorful and vibrant city, explore how money is made, spent, saved, earned, and traded at the money factory, bank, anti-counterfeiting lab, stock market, shopping district, and international port. Through a variety of fun hands-on activities, explore the history, science, and culture behind money and come away with valuable math and economic skills for everyday life.

Sponsored locally by:

CHASE

INVENTION AT PLAY

October 1, 2005 – January 1, 2006

Enjoy a fresh perspective to the topic of invention, exploring the similarities between the way children play and the creative processes used by innovators in science and technology. INVENTION AT PLAY was developed by the Lemelson Center at the Smithsonian's National Museum of American History in partnership with the Science Museum of Minnesota and with the generous support of The Lemelson Foundation and the National Science Foundation.

The temporary exhibit schedule was incomplete at time of printing. Please call (502) 561-6100 or (800) 591-2203 or visit www.LouisvilleScience.org for updated information. Dates are subject to change.

For **Core Content** connections and more information, visit www.LouisvilleScience.org.

Early **Childhood** Education

For more information, call (502) 561-6100, ext. 6111 or (800) 591-2203, ext. 6111.

KidZone

The real world is a mighty big place when you are tiny. But in *KidZone*, your students age 7 and younger can explore a world that's just their size. This special exhibit area for young children and their caregivers features six activity zones: *Hop On!* an ambulance and a mass transit bus; *Take Off!* on an airplane; *Blast Off!* inside a lunar module; *Explore!* a padded moonscape for babies; *Let's Build!* a construction site; and *Splash!* in a water table. *KidZone* encourages children to figure out how things work, solve problems, use their imagination, and learn new words and ideas.

KidZone is free with Science Center admission, but your group must have a reservation to enter. Maximum capacity for groups is 60 people, including children and adults. One chaperone per 5 students is required. Times vary, and the 45-minute sessions must begin on time. Call our Customer Service Representatives at (502) 561-6100, ext. 6111 or (800) 591-2203, ext. 6111 for information or to schedule a visit.

KinderScience Mornings

Science isn't just for big kids! Little kids like it, too. That's what KinderScience Mornings are all about. Several times a year, young students have the Science Center all to themselves. From 9:30 a.m. to 1 p.m., admission is restricted to children age 7 and younger, who are treated to special "early learner" demonstrations (on such topics as states of matter, the human body, and the International Space Station), modified exhibit experiences in THE WORLD WE CREATE, THE WORLD WITHIN US, and THE WORLD AROUND US, specially selected IMAX films, and a *KidZone* session.

Science, Literacy and Numeracy Outcomes:
KinderScience Mornings encourage students to develop skills in questioning, recognizing patterns, sequencing, observing, comparing, predicting, counting, explaining, and using tools.

Teachers benefit from KinderScience Mornings, too. You will experience research-based pedagogical methods in action through our open-ended inquiry approach to science, mathematics, technology, and literacy.

KinderScience Mornings for the 2005-2006 school year are: October 26, November 16, February 8, and March 15. There is a per-child fee. Plan your own KinderScience Morning field trip by using the cost chart on page 2. Call our Customer Service Representatives at (502) 561-6100, ext. 6111 or (800) 591-2203, ext. 6111 for information or to schedule a visit.

Professional Development
"Doing science" comes naturally to young children. They are very curious creatures who observe, investigate and question everything. But they need guidance to understand what they discover. Our professional development workshops for early childhood educators give teachers fresh ideas for helping children age 3 to 8 interpret the science of the world around them.

Four different sessions, all taught by a certified trainer, focus on content areas such as organisms, environments, plants, art and scientific inquiry. Each qualifies for 6 hours of professional development credit through the Cabinet for Health and Family Services. Workshop activities coordinate with Indiana's Academic Standards and the Kentucky Core Content for Assessment and Early Childhood Standards for 3- and 4-year-olds, and they are designed to translate later into hands-on activities for students. And, all materials used in the workshops are inexpensive and easily obtained, so teachers can reproduce the activities in the classroom.

Professional development workshops are scheduled for these dates during the 2005-2006 school year: November 12, January 28, February 25, and March 25. The cost is $30 per person. To register, call our Early Childhood Education Coordinator at (502) 560-7166 or (800) 591-2203, ext. 6575.

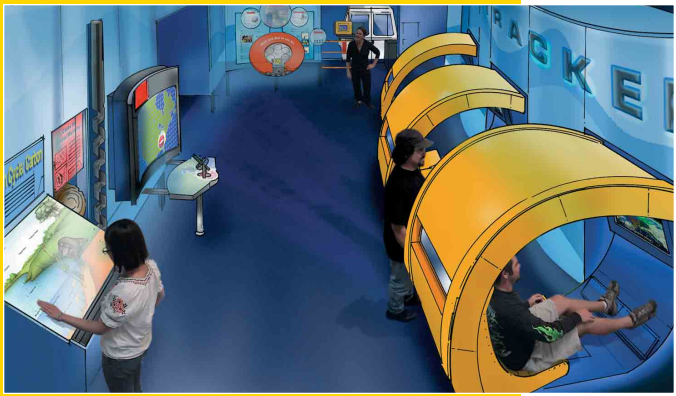
INVENTION AT PLAY in the Temporary Exhibit Gallery is especially suitable to early childhood age groups. See page 5.

For **Core Content** connections and more information, visit www.LouisvilleScience.org.

THE WORLD AROUND US

Home to the Discovery Gallery

For more information, call (502) 561-6100, ext. 6111 or (800) 591-2203, ext. 6111.



THE WORLD AROUND US, the Science Center's newest permanent exhibit, opens in late September 2005. In this 8,000 square-foot natural and earth sciences exhibit, your students will gain a deeper understanding of and greater respect for the region's natural resources in surroundings that enhance curiosity, stimulate a desire to learn, and engage them in the scientific process of discovery.

Center Stage, where students learn about regional ecosystems, is a gateway to three major ecological galleries – *AtmoSphere: Air That Surrounds Us, AquaSphere: Water That Sustains Us,* and *TerraSphere: Environments That Support Us.* As they interact with 40 hands-on exhibits in these galleries, students will gain a deepened understanding of environmental issues.

At **Sky Tracker** in *AtmoSphere,* students explore the layers of the atmosphere by participating in guided "missions." One of their missions may take them to the stratosphere, where they will measure the hole in the ozone layer and learn that this layer filters out DNA-damaging ultraviolet radiation from the sun.

Go H_2O in *AquaSphere* is a pinball-type exhibit that teaches students about the water cycle. As they manipulate the amount of rainfall and direct the flow of

THE **WORLD** AROUND **US**

Science, Literacy and Numeracy

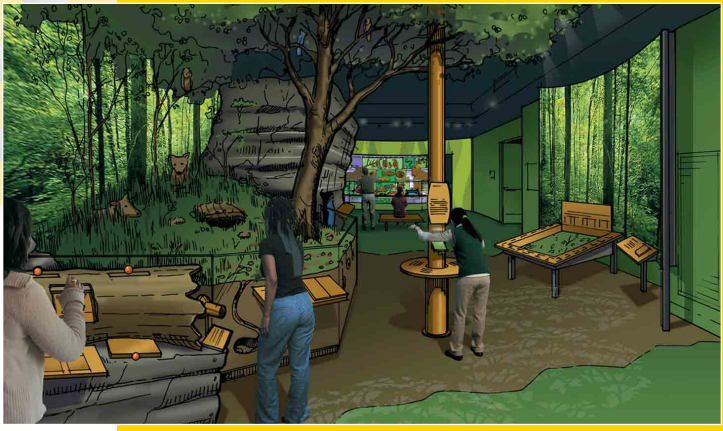
Outcomes: Experiences in THE WORLD AROUND US will enhance students' critical thinking and decision-making skills. Through manipulating objects or performing scientific tasks in the exhibits, students will develop the skills of a scientist, such as noting details, predicting, sequencing, linking cause and effect, making inferences, and drawing conclusions.

water through riverbeds and streams, students learn about watersheds, flood control, and river habitats.

In **TerraSphere**, students can take a virtual shopping trip in the *Check-out Your Choices* exhibit, where they must complete a shopping trip on time and in budget, with the challenge of selecting items that have minimal environmental impact. Or they can crawl through a model of a limestone cave and explore a forest habitat.

The **Discovery Gallery** offers students a quiet space to view natural history artifacts, including such Science Center favorites as the mummy and the polar bears. *Investigation Stations* afford students a close-up view and examination of artifacts.

THE WORLD AROUND US and the Discovery Gallery are funded in part by the National Science Foundation and the Institute of Museum and Library Services, Museums for America.



For a complete listing of Discovery Gallery offerings, visit www.LouisvilleScience.org.

THE **WORLD** WE **CREATE**

Home to the Chemistry Kitchen and Tech Forum

For more information, call (502) 561-6100, ext. 6111 or (800) 591-2203, ext. 6111.

THE WORLD WE CREATE is a celebration of the creative thinking that makes scientific advancements possible. In this permanent exhibit, which covers 12,500 square feet and includes over 40 learning stations, students will discover the principles of chemistry and physics as they explore *Think Tank, Inventor's Garage, Tech Works, Construction Site, Transit Hub, and the LouieNet Lounge.* The hands-on, interactive exhibits in THE WORLD WE CREATE foster teamwork as students work together to construct an arch from foam blocks and other challenges.

In the **Chemistry Kitchen**, students can watch demonstrations* on force and motion, states of matter, luminescence, energy, and other physical science concepts. They may try to predict what will happen when Science Center educators dip a balloon into liquid nitrogen, or they may sit in black light and observe how various chemicals react in fire.

The **Tech Forum** is a theater-style learning space that serves a dual purpose at the Science Center. During a *Tech Forum* demonstration*, your students can learn about living and working in space, the work being done on the International Space Station, and how sports gear keeps us safe by absorbing energy. Through the Kentucky TeleLinking Network, the *Tech Forum* becomes a classroom for distance learning programs.

**A demonstration at the Louisville Science Center is a 20-minute educational presentation that focuses on specific scientific principles. Demonstrations are not always designed for hands-on student participation.*

THE **WORLD** WE **CREATE**

Science, Literacy and Numeracy

Outcomes: Through their natural curiosity about everyday phenomena, students derive questions about THE WORLD WE CREATE. By using what they already know, students can experiment, make predictions, evaluate data, and find answers. Communicating their results to their peers and teachers allows them to speak as scientists. Inquiry skills enhanced by exhibit interaction are noting details, comparing and contrasting, predicting, sequencing, linking cause and effect, making inferences, and drawing conclusions.

THE WORLD WE CREATE is funded in part by the National Science Foundation.

For a complete listing of Chemistry Kitchen offerings, visit www.LouisvilleScience.org.

THE **WORLD** WITHIN **US**

Home to the BioLab

For more information, call (502) 561-6100, ext. 6111 or (800) 591-2203, ext. 6111.

THE WORLD WITHIN US explores the wonders of the human body. As your students investigate the three galleries of this permanent exhibit covering 10,500 square feet and encompassing more than 60 hands-on interactive stations, they will learn principles of health and life science.

The **BodyWatch Gallery** features seven systems of the body: circulatory, digestive, immune, musculoskeletal, nervous, reproductive, and respiratory. In *Synchro Beat,* students work together to contract the four chambers of a giant heart. They can view real organ specimens, exercise with a skeleton, play a video game about germs, or follow a meal through the 26-foot *Gut-o-Meter.*

Kentucky science heroes are the focus in the **Breakthrough Gallery**. Here students will learn about science careers and cutting-edge research performed by real-life regional scientists. The Kentucky Health Education Rural Outreach Scientists (KY – H.E.R.O.S.) for 2005 - 2007 are: **Dr. Denis Kinane** from the University of Louisville Dental School, whose research area is gum disease and its relation to systemic disease; **Dr. Jody Clasey** of the University of Kentucky and **Dr. Kent Adams** of the University of Louisville, whose research area is obesity and its relation to physical inactivity; and **Dr. Henry Kaplan** of the Kentucky Lions Eye Center at the University of Louisville, whose research area is macular degeneration and its relation to blindness.

TimeZone explores human development from birth through old age. Exhibits such as *It's Up to You* encourage healthy decision-making, while others, such as *Tune Into Life,* urge kids to develop hobbies and engage in physical exercise.

THE **WORLD** WITHIN **US**

Science, Literacy and Numeracy

Outcomes: Experiences in THE WORLD WITHIN US will enhance student understanding of genetic patterns, use of scientific tools, and the inherent connection between structure and function. By doing the work of scientists, students will further develop inquiry skills such as questioning, predicting, evaluating data, distinguishing fact from fiction, linking words with precise meanings, and communicating the results of their experiments.

Students can get a real laboratory experience in the **BioLab**. This wet lab is the site of demonstrations and labs* that teach students about anatomy, forensic science, disease prevention, and healthy lifestyles. The *BioLab* is also equipped with teleconferencing equipment for Distance Learning programs.

**A demonstration at the Louisville Science Center is a 20-minute educational presentation that focuses on specific scientific principles. Demonstrations are not always designed for hands-on student participation. A BioLab is a 50-minute educational presentation that involves hands-on participation.*

The Kentucky Health Education Rural Outreach Scientists (KY–H.E.R.O.S.) program is supported by a Science Education Partnership Award (SEPA) from the National Center of Research Resources (NCRR) at the National Institutes of Health (NIH). The Breakthrough Gallery, BioLabs and health science Distance Learning labs are components of the KY–H.E.R.O.S. educational programming.

For a complete listing of BioLab offerings, visit www.LouisvilleScience.org.

DISTANCE LEARNING AND **TRAVELING** EXHIBIT

For more information, call our School Services Coordinator at (502) 561-6100, ext. 6111 or (800) 591-2203, ext. 6111.

When you can't bring your students to the Louisville Science Center, we bring the Science Center to you! Our Distance Learning programs and **THE WORLD WE CREATE** Traveling Exhibit can bring our unique science education experiences as close as a TV monitor or your school fieldhouse.

Distance Learning

Send your students on a virtual visit to the Louisville Science Center by scheduling one of several hour-long Distance Learning programs offered via the Kentucky TeleLinking Network (KTLN). Each is designed to support National Science Standards in science, mathematics, and technology for grades 2 through 12. Students have the opportunity to perform experiments while participating in a live, interactive video conference link. **Each program includes an equipment kit of supplies, pre-lab and post-lab activities, and suggestions for expanding the learning experience. Choose from several science topics, including physics, space, practical living, and chemistry**.

Professional Development is also offered through Distance Learning. Schedule a session at your school.

Dates and times of Distance Learning programs are scheduled by request. Prices vary.

Traveling Exhibit

If your school or community is more than 100 miles from Louisville, you can arrange for THE WORLD WE CREATE Traveling Exhibit to be rented by you. In this mobile version of our popular permanent exhibit, three unique zones – *Construction Zone, Transit Hub,* and *Tech Works* – focus on specific themes of engineering and manufacturing. Ten interactive stations offer grade K-12 students a broad sampling of invention and ingenuity. An educator from the Science Center will come to your site to provide teacher and volunteer training. The traveling exhibit meets the same academic expectations as the permanent exhibit. We also provide marketing support and exhibit installation and dismantling support.

The exhibit can be rented for three-week periods, year-round. Site requirements include: a proper location, such as a school gymnasium, with 2,500 square feet of space, 8-foot ceilings, and five 110V power outlets; a storage area for crates; unloading access; set-up and take-down personnel; security; and a community liaison.

The Kentucky Health Education Rural Outreach Scientists (KY–H.E.R.O.S.) program is supported by a Science Education Partnership Award (SEPA) from the National Center of Research Resources (NCRR) at the National Institutes of Health (NIH). The Breakthrough Gallery, BioLabs and health science Distance Learning labs are components of the KY–H.E.R.O.S. educational programming.

FAMILY FUN NIGHTS

Family Fun Nights are held Monday through Thursday from 5:30 to 8:30 p.m. Students and their families are given exclusive use of the Science Center for three hours, which includes an IMAX film and exhibits. There also are science demonstrations throughout the galleries! KidZone, an exhibit area for children 7 and younger and their caregivers, is available upon request.

Available dates for 2005-2006 are October 19, November 16, January 19, February 22, March 9, March 15, April 20, and May 10. For more information, call the School Services Coordinator at (502) 561-6100, ext. 6143 or (800) 591-2203, ext. 6143.

GIFT SHOP

The Gift Shop carries a large range of science educational items that enhance the exhibits and IMAX films currently at the Science Center. For your convenience, you can fill out our Gift Shop Order Form, included in your pre-visit packet, before you arrive. Upon arrival, give the form to our Customer Service Representatives and, while you are visiting the Science Center, your order will be filled and ready to pick up when you leave. The shop also carries a large selection of classroom resource materials, and teachers receive a 10% discount on merchandise for classroom use. Just present your school ID or paycheck stub.

For more information, call (800) 591-2203 or (502) 561-6100, ext 6148. Merchandise also is available online at www.LouisvilleScience.org.

MIDNIGHT MAGIC CAMP-INS

Want to know what inspired the invention of Velcro®? How many taste buds you have on your tongue? The name and home state of the first female mechanical engineer in the world?*

To find out, bring your students to a Midnight Magic Camp-in at the Louisville Science Center. During our overnight adventures, campers answer these and many other intriguing science questions. Camp-in participants explore Science Center exhibits, experience hands-on science activities, view an IMAX film, take part in a flashlight scavenger hunt, and sleep in the exhibit galleries. Offered from fall to spring, Camp-ins are a great way to provide children with a fun learning experience!

A maximum of 200 attendees can be accommodated per Camp-in, and a minimum of 100 is required. The Science Center requires a 1:8 ratio of adult chaperones to children. Cost, subject to change, is $27 per child and $20 per adult chaperone. Check-in is at 5 p.m., with check-out at 9 a.m. Themes vary yearly, depending on the current temporary exhibit and IMAX films, so repeat campers can have a new experience each year.

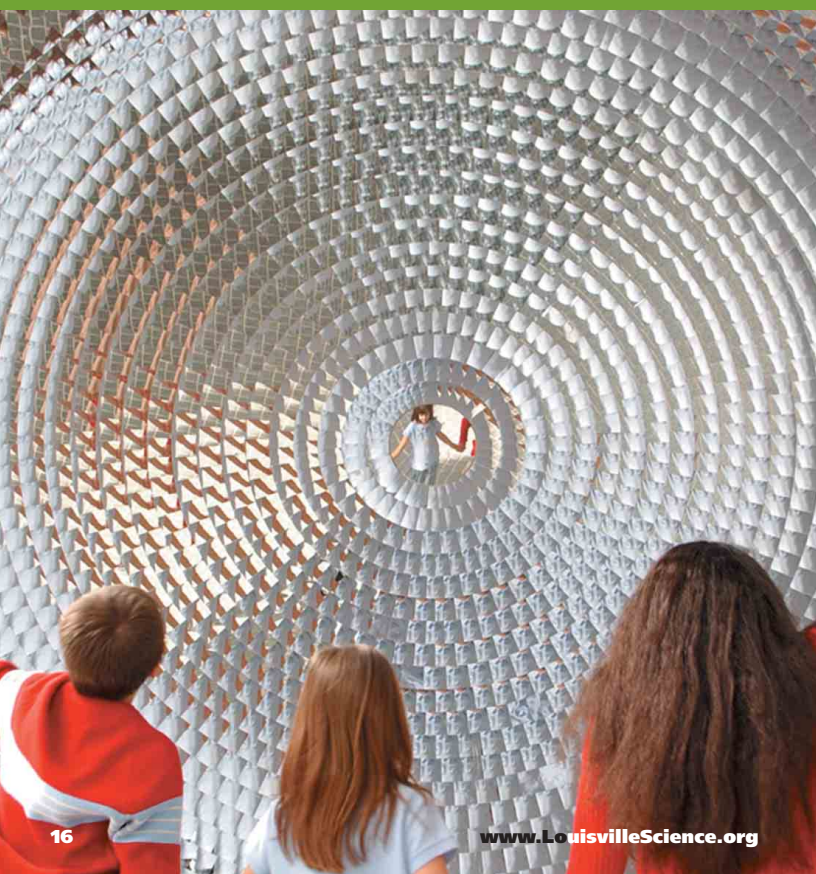
**Answers: cockleburs; 10,000; and Margaret Ingels of Paris, KY.*

At the **Louisville Science Center,** we leave no child behind!

The skills essential to literacy are also essential to science! In literacy and science, students should be able to observe and ask questions about the world in which they live, and have the necessary skills to derive answers to those questions. A literate student can describe, explain, make predictions, communicate complex thoughts, and form opinions based in reason. A student who develops the skills of scientific inquiry – the ability to note detail, compare and contrast, predict, sequence, link cause and effect, make inferences, and draw conclusions – will become a literate adult.

Start at the Louisville Science Center! Our exhibits are based on the National Education Standards, and provide insight into both conspicuous and little known science careers. Encourage your students' curiosity as they generate questions about the natural and technological phenomena in our exhibits. Then take their questions back to your classroom and have your students design experiments and communicate their findings.

Join us and empower your students to speak the language of scientists.



PLAN IT YOURSELF

Field Trip Suggestions

If you want to plan your own Science Center field trip, the following grade-specific pages will enhance your classroom curriculum with **pre-visit options** while preparing your students for their trip with **"while you're here" suggestions**. **Post-activity suggestions** also are included, for **classroom wrap-up.**

Each option is directly connected to **Kentucky's Core Content for Assessment** and **Indiana's Academic Standards.**

School field trips are scheduled Tuesdays through Fridays.

SPACE EXPLORATION: LIVING ON DIFFERENT WORLDS

How and why do astronauts live and work aboard the International Space Station? What does the future hold for deep space discovery?

GRADES K - 2

BEFORE YOU VISIT, role-play astronauts and conduct the *Sponge Activity* included in your pre-visit packet.

WHILE YOU'RE HERE, visit KidZone and see the exhibit *Blast Off!* Climb aboard the Gemini Trainer in the *Discovery Gallery*, visit the International Space Station model, located in *AtmoSphere* in THE WORLD AROUND US, and view the demonstration *Living in Space*.

AFTER YOU VISIT, follow up with the *Planet Painting* activity found in your pre-visit packet. Discuss atmospheres on other planets.

This experience connects to Kentucky's Core Content for Assessment, SC-E-2.2.2, and AH-E-3.1.41, 3.1.35, 4.1.37, and Indiana's Science Standards, K.1.1, 1.3.5, ES.1.6.

GRADES 3 - 5

BEFORE YOU VISIT, conduct the *Puffy Face Bird Leg Syndrome* Activity included in your pre-visit packet.

WHILE YOU'RE HERE, Visit the International Space Station model located in *AtmoSphere* in THE WORLD AROUND US, *Musculoskeletal System* Analogy Table, Circulatory System Analogy Table and *Muscles in Motion* in THE WORLD AROUND US. Suggested demonstration – *Living in Space*.

AFTER YOU VISIT, follow up with the *Back Pack* activity found in your pre-visit packet. Discuss the effects of microgravity on the human body.

This experience connects to Kentucky's Core Content for Assessment, SC-M-3.2.1 and PL-E-4.4.1, and Indiana's Science Standards, ES.1.6 and SE.5.4.5.

Grades 6 - 8

BEFORE YOU VISIT, Conduct the *Work in Space vs. Work on Earth* Activity included in your pre-visit packet.

WHILE YOU'RE HERE, Visit the *International Space Station* model located in *AtmoSphere* in THE WORLD AROUND US, *Space Suits* in the *Discovery Gallery*, the *Space Freighter* in THE WORLD WE CREATE and attend the demonstration, *Astronauts on the Job*.

AFTER YOU VISIT, follow up with the *Gravitational Pull* activity found in your pre-visit packet. Discuss the differences of forces on earth vs. forces in space.

This experience connects to Kentucky's Core Content for Assessment, SC-M-1.2.2, 2.3.2, and 2.3.3, and Indiana's Science Standards, 6.3.17, 7.3.17, 8.3.16, and ES.1.6.

OTHER VISIT SUGGESTIONS

Participate in a distance learning program with NASA, free with your paid admission to the Science Center. Students can be a part of a video conference with NASA educators on a variety of subjects, including space science, earth science and technology. Space is limited to groups of 35.

Look for the NASA logo on selected exhibits for information on NASA spin-offs, NASA technology and NASA space exploration.

PROCESS SKILLS: DEVELOPING FUTURE SCIENTISTS

How do I study science?

Encourage your kindergarteners to develop the skills of scientists. Observe! Test ideas! Interact! Communicate!

BEFORE YOU VISIT, conduct the *Balloon-a-Phone* activity included in your pre-visit packet.

WHILE YOU'RE HERE, see the exhibits *Splash!, Let's Build!, Be in a Bubble, Touch Tank, Gravitram*, and *Invention at Play* (Fall 2005).

AFTER YOU VISIT, follow up with the *Bubble Exploration* activity found in your pre-visit packet.

This experience aligns with Kentucky's Early Childhood Standards for Science, Benchmarks 1.1 and 1.2.

OTHER OPTIONS

EARTH MATERIALS

Exhibits: *Limestone Cliff, Life of a Log, Slice of Life, Scenic Forest*
KY Core Content: SC-E-2.1.1
IN Standard: Science: K.1.1

BASIC NEEDS OF PLANTS AND ANIMALS

Exhibits: *Tree Scope, Life of a Log, Diversity Dilemma*
KY Core Content: SC-E-3.1.2
IN Standards: Science: K.4.1, K.4.2

CHOICES FOR HEALTH VS. DISEASES

Demo: *Bacteria Battles*
Exhibit: *Germ Hunter Kitchen*
KY Core Content: PL-E-1.3.2
IN Standards: Health: K.1.6, K.3.5

PROPERTIES OF OBJECTS AND MATERIALS

Demo: *What's the Matter?*
Exhibit: *Materials Wall, Toppling Towers, Splash!, Let's Build!*
KY Core Content: SC-E-1.1.3
IN Standards: Science: K.3.1, K.3.2, K.6.1

For descriptions of Chemistry Kitchen, Discovery Gallery and BioLab offerings and Archdiocese of Louisville content guidelines, visit www.LouisvilleScience.org.

1 GRADE 1

PROPERTIES OF MATTER: MOVING TO THEIR OWN BEAT

How is a liquid molecule different from a solid molecule?

Explore the differences between solids and liquids through our interactive exhibits and a demonstration in the Chemistry Kitchen. Reinforce your students' learning through real-world connections.

BEFORE YOU VISIT, get students to role-play in the kinesthetic activity "Water in a Jar," included in your pre-visit packet.

WHILE YOU'RE HERE, focus on the exhibits *Splash!, Materials Wall*, and *Work Physics Box*, and attend *What's the Matter?* in the *Chemistry Kitchen.*

AFTER YOU VISIT, reinforce your students' learning with *Ice Balloons,* also included in your pre-visit packet.

This experience connects to Kentucky's Core Content for Assessment, SC-E-1.1.3, and Indiana's Science Standard 1.3.1.

OTHER OPTIONS

ORGANISMS AND THEIR ENVIRONMENT

IMAX: AUSTRALIA
Demo: *Lean on Me*
Exhibits: *Scenic Forest, Cave Crawl, Tree Scope*
KY Core Content: SC-E-3.3.2
IN Standard: Science: 1.1.3

NUTRITION AND FOOD PYRAMID

Demo: *Stuffee*
Lab: *What's on Your Plate?*
Exhibits: *LouieNet's* Meal Mania Game, *Check Out Your Choices*
KY Core Content: SC-E-3.1.1; PL-E-1.4.1
IN Standards: Health: 1.1.4, 1.4.1

POSITION AND MOTION OF OBJECTS

Demos: *Start Your Engines, Bounce*
KY Core Content: SC-E-1.2.1
IN Standard: Science: 1.3.4

For descriptions of Chemistry Kitchen, Discovery Gallery and BioLab offerings and Archdiocese of Louisville content guidelines, visit www.LouisvilleScience.org.

SUPER SOIL SCIENCE
Why do we need it?

Enhance your unit on soil with a visit to the Science Center's newest exhibit, THE WORLD AROUND US.

BEFORE YOU VISIT, complete the activity *Dig It: Soil Sampling at School,* included in your pre-visit packet.

WHILE YOU'RE HERE, experience the brand new exhibits *Life of a Log, Slice of Life,* and *Scenic Forest,* and participate in the demonstration *The Dirty Truth about Soil.*

AFTER YOU VISIT, reinforce your students' learning with the activity *Grow a Plant* and the literature recommended in your pre-visit packet.

This experience connects to Kentucky's Core Content for Assessment, SC-E-2.1.1 and Indiana's Science Standard 2.3.3.

OTHER OPTIONS

ORGANISMS AND THEIR ENVIRONMENT
IMAX: AUSTRALIA
Demo: *Lean on Me*
Exhibits: *Scenic Forest, Cave Crawl, Tree Scope*
KY Core Content: SC-E-3.3.2

NUTRITION AND FOOD PYRAMID
Demo: *You Are What You Eat*
Lab: *What's On Your Plate?*
Exhibits: *LouieNet's* Meal Mania Game, *Check Out Your Choices*
KY Core Content: PL-E-1.4.1, PL-E-1.4.2
IN Standards: Health: 2.1.2, 2.1.9

PHYSICAL PROPERTIES AND CHANGES OF MATTER
IMAX: FORCES OF NATURE
Demo: *What's the Matter?*
Exhibits: *Materials Wall, Work Physics Box*
KY Core Content: SC-E-1.1.2, SC-E-1.1.3
IN Standards: Science: 2.3.5

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3 GRADE 3

PROPERTIES OF LIGHT, HEAT, ELECTRICITY, AND SOUND: THE STUFF THAT SCIENCE IS MADE OF!

What are the differences and similarities between these forms of energy?

Shine some light on your energy unit! Students can turn their own potential energy into electricity to light up a light bulb and bask in the glow of the resulting light energy! Next, they can explore the science of the Theramin, a musical instrument that transfers the body's slight electrical charge into sound energy. Then, students can manipulate objects to explore ultraviolet light, X-rays, microwaves, lasers, and even televisions!

BEFORE YOU VISIT, complete the *Bulb in a Box* activity with your students.

WHILE YOU'RE HERE, view the IMAX film FORCES OF NATURE and participate in the C*hemistry Kitchen* demonstration *Lights Out!* In the exhibits, focus on the *Light Physics Box, Energy Physics Box,* and the *Theramin*.

AFTER YOU VISIT, conduct the *Measuring Heat from Sunlight* activity in your pre-visit packet to reinforce your students' learning.

This experience connects to Kentucky's Core Content for Assessment, SC-E-1.3.1 and SC-E-1.3.2, and Indiana's Science Standard 3.3.9.

OTHER OPTIONS

EARTH MATERIALS

IMAX: FORCES OF NATURE. MYSTERY OF THE NILE
Demo: *The Dirty Truth About Soil*
Exhibits: *Life of a Log, Slice of Life, Scenic Forest*
KY Core Content: SC-E-2.1.1
IN Standard: Science: 3.3.5

HEALTH BENEFITS OF EXERCISE AND FITNESS

IMAX: TO THE LIMIT (scheduled by request only)
Demo: *You Are What You Eat*
Lab: *Rate Your Heart*
Exhibit: *Pulse of Life*
KY Core Content: PL-E-1.4.1, PL-E-1.3.1
IN Standards: Science: 3.4.7; Health: 3.3.4

For descriptions of Chemistry Kitchen, Discovery Gallery and BioLab offerings and Archdiocese of Louisville content guidelines, visit www.LouisvilleScience.org.

WEATHER WIZARDS

What do changes in weather and climate mean to me?

Engage your students in learning about the effects of weather on the world around them. Build weather instruments and learn how meteorologists use them to predict the weather.

BEFORE YOU VISIT, lead your students through the *Observe Your World* and *Instrumentation Box* activities in your pre-visit packet.

WHILE YOU'RE HERE, see the IMAX film FORCES OF NATURE, participate in the demonstration *Stormy Weather*, and focus on the exhibits *Go H_2O, Sky Tracker,* and *What's Up with Climate Change?*

AFTER YOU VISIT, reinforce your students' learning with the *Build Your Own Weather Station* activity and literature suggested in your pre-visit packet.

This experience connects with Kentucky's Core Content for Assessment, SC-E-2.3.2, and Indiana's Science Standard 4.3.2.

OTHER OPTIONS

ORGANISMS AND THEIR ENVIRONMENT

IMAX: AUSTRALIA, MYSTERY OF THE NILE
Demo: *Lean on Me*
Exhibits: *Diversity Dilemma, Slice of Life, Eco-Explorer, Weather Watch*
KY Core Content: SC-E-3.3.2
IN Standards: Science: 4.4.2, 4.4.6

HEALTH BENEFITS OF EXERCISE AND FITNESS

IMAX: TO THE LIMIT (scheduled by request only)
Demo: *You Are What You Eat*
Lab: *Work It Out!*
Exhibit: *Bone Gym*
KY Core Content: PL-E-1.3.4, PL-E-1.4.1
IN Standards: Science: 4.4.9; Physical Education: 4.3.1, 4.4.3

POSITION AND MOTION

IMAX: FORCES OF NATURE
Demo: *Bounce*
Exhibit: *Foucault Pendulum, Inventor's Challenge*
KY Core Content: SC-E-1.2.2, SC-E-1.2.3

ELECTRICITY AND MAGNETISM

IMAX: FORCES OF NATURE
Demo: *Zap!*
Exhibits: *Energy Physics Box, Build It Up, Light Physics Box*
KY Core Content: SC-E-1.3.3, SC-E-1.3.4
IN Standard: Science: 4.3.16

For descriptions of Chemistry Kitchen, Discovery Gallery and BioLab offerings and Archdiocese of Louisville content guidelines, visit www.LouisvilleScience.org.

5 GRADE 5

SOLAR ENERGY: ENERGY TO THE MAX

How does solar energy affect our planet?

Explore a hot topic! Study the science of the sun, from its affect on the climate to its use as a sustainable energy resource.

BEFORE YOU VISIT, prepare your students for their visit by completing the *Warm Planet/Cold Planet* or *Reflection & Absorption* activities in your pre-visit packet.

WHILE YOU'RE HERE, view the IMAX film FORCES OF NATURE, attend the demonstration *Great Ball of Fire!*, and interact with the *Light Physics Box* and the International Space Station model.

AFTER YOU VISIT, complete the *Solar Oven* or *Reflection & Absorption* activities in your pre-visit packet.

This experience connects to Kentucky's Core Content for Assessment, SC-M-1.3.2, SC-M-1.3.4.

OTHER OPTIONS

EARTH'S HYDROSPHERE AND ATMOSPHERE

IMAX: FORCES OF NATURE, MYSTERY OF THE NILE
Demo: *Stormy Weather*
Exhibit: *Watt's the Score?*
KY Core Content: SC-M-2.1.7
IN Standards: Science: 5.3.4, 5.3.5

STRUCTURE AND FUNCTION IN LIVING SYSTEMS

Demo: *Have a Heart*
Lab: *Microscope Magic*
Exhibit: Specimens throughout the *BodyWatch Gallery*
KY Core Content: SC-E-3.1.1, SC-E-3.1.3
IN Standards: Science: 5.4.2, 5.4.3, 5.6.1; Health: 5.1.4

ELECTRICAL ENERGY

IMAX: FORCES OF NATURE
Demo: *Zap!*
Exhibits: *Energy Physics Box*
KY Core Content: SC-M-1.3.1, SC-M-1.3.5

For descriptions of Chemistry Kitchen, Discovery Gallery and BioLab offerings and Archdiocese of Louisville content guidelines, visit www.LouisvilleScience.org.

NEWTON'S LAWS
How do Newton's Laws of Motion affect our daily lives?

Enhance your unit on Newton's Laws with a trip to the Louisville Science Center. Students will extend their classroom learning with fun connections to the everyday world.

BEFORE YOU VISIT, complete the *Design a Pendulum* or *Design a Roller Coaster* activity in your pre-visit packet.

WHILE YOU'RE HERE, view the IMAX film FORCES OF NATURE, participate in the demonstration *Start Your Engines*, and focus on the exhibits *Getting from Here to There,* and the *Piston Engine.*

AFTER YOU VISIT, reinforce students' learning by building and experimenting with the *Mouse Trap Car* activity explained in your pre-visit packet.

This experience connects to Kentucky's Core Content for Assessment, SC-M-1.2.2 and SC-M-1.2.3.

OTHER OPTIONS

ANIMALS
IMAX: AUSTRALIA, MYSTERY OF THE NILE
Demo: *Lean on Me*
Exhibits: *Diversity Dilemma, Counting Bugs, Discovery Gallery*
KY Core Content: SC-M-3.5.2
IN Standards: Science: 6.4.4, 6.4.9

PHYSICAL WELLNESS
Demo: *Have a Heart*
Lab: *Go With the Flow*
Exhibit: *Circulatory System*
KY Core Content: SC-M-3.1.1; PL-M-1.3.1, 1.3.3
IN Standards: Science: 6.4.11; Health: 3.1.2, 6.1.4

REFLECTION, REFRACTION, AND ABSORPTION OF LIGHT
Demo: *Great Ball of Fire!*
Exhibit: *Light Physics Box*
KY Core Content: SC-M-1.3.3
IN Standards: 6.3.17, 6.3.21

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7 GRADE 7

EFFECTS OF HYDROSPHERE AND ATMOSPHERE ON WEATHER CLIMATE

How does an understanding of the hydrosphere and atmosphere help me predict the weather?

Learn the skills of scientists! Develop an understanding of how meteorologists use conditions in the hydrosphere and atmosphere to predict weather changes.

BEFORE YOU VISIT, complete the *Highs and Lows* activity in your pre-visit packet.

WHILE YOU'RE HERE, experience the IMAX film FORCES OF NATURE, participate in the demonstration *Stormy Weather*, and focus on the exhibits *Go H_2O, Weather Watch* and *What's Up with Climate Change?*

AFTER YOU VISIT, extend your students' learning by completing the *Build a Weather Station* and *Weather Prediction Journaling* activities and reading the literature suggested in your packet.

This experience connects to Kentucky's Core Content for Assessment, SC-M-2.1.7.

OTHER OPTIONS

SOIL IDENTIFICATION AND COMPOSITION
Demo: *The Dirty Truth About Soil*
Exhibits: *Life of a Log, Slice of Life*
KY Core Content: SC-M-2.1.4

ASEXUAL AND SEXUAL REPRODUCTION
Demo: *Strands of Life*
Lab: *Split & Double Split*
Exhibit: *Double Split*
KY Core Content: SC-M-3.3.1, SC-M-3.3.2
IN Standards: Science:7.4.3

HEREDITY
Demo: *Strands of Life*
Lab: *DNA Construction Zone Level 1*
Exhibit: *Reproductive System*
KY Core Content: SC-M-3.3.2
IN Standards: Science: 7.4.3

HEAT ENERGY OR ELECTRICITY
IMAX: FORCES OF NATURE
Demo: *Zap!* or *Great Ball of Fire!*
Exhibits: *Energy Physics Box, Light Physics Box*
KY Core Content: SC-M-1.3.2, SC-M-1.3.5
IN Standards: Science: 7.3.14, 7.3.15

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COMMUNICABLE AND NON-COMMUNICABLE DISEASES

How are epidemics transmitted? How can you track their origin?

Use a Louisville Science Center visit to give students the knowledge and skills they need to protect themselves from diseases.

BEFORE YOU VISIT, learn how far germs can travel with the *Anatomy of a Sneeze* activity in your pre-visit packet.

WHILE YOU'RE HERE, attend the demonstration *Antibiotics in Action* or participate in the lab *Transmission Tracker*. Concentrate on the exhibit *Usual Suspects*.

AFTER YOU VISIT, reinforce your students' learning by encouraging them to further explore the epidemics or diseases they find most relevant to their lives.

This experience connects to Kentucky's Core Content for Assessment, PL-M-1.3.2, 1.3.3, 1.3.4, 1.7.2; and Indiana's Academic Standards, Health: 8.1.1; Mathematics: 8.1.5

OTHER OPTIONS

CONSUMERISM
Exhibits: *Check Out Your Choices, Take Out the Trash, Watt's the Score?*
KY Core Content: PL-M-3.1.2

EFFECTS OF HYDROSPHERE AND ATMOSPHERE ON WEATHER AND CLIMATE
IMAX: FORCES OF NATURE
Demo: *Stormy Weather*
Exhibits: *Go H_2O, What's Up with Climate Change?*
KY Core Content: SC-M-2.1.7

REPRODUCTION AND SEXUALITY
Demo: *Strands of Life*
Lab: *Protect Yourself* (abstinence stressed)
Exhibit: *Protect Yourself*
KY Core Content: PL-M-1.2.2, 1.2.3, 1.3.2, 1.7.2; SC-M-3.3.2
IN Standards: Health: 8.1.2, 8.1.6

NUTRITION
Demo: *Have a Heart*
Lab: *What's on Your Plate?*
Exhibit: *Digestive System*
KY Core Content: PL-M-1.3.1, PL-M-1.4.2
IN Standards: Health: 8.1.1, 8.1.2

OBSERVATIONS AND INFERENCES
Exhibits: *Light Physics Box, Energy Physics Box, Toppling Towers*
KY Program of Studies: S-8-AC-2
IN Standards: Science: 8.2.3, 8.2.9

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BioLabs

Bring your students to the Louisville Science Center to perform laboratory science using professional tools.

50-minute programs

"Whose DNA Was Left Behind?"

Analyze simulated DNA samples obtained from a hypothetical crime scene and two suspects to determine who committed the crime. Learn to use a micropipettor for transferring liquids and separate a dye specimen into its component colors by performing gel electrophoresis.

Prerequisite: Basic knowledge of DNA structure.
Double Lab Session: Lasts 1 hour, 40 minutes
KY Core Content: SC-H-1.2.6, 1.4.3, 1.5.2, 3.3.1
IN Standards: Science: B.1.2, B.1.4, B.1.27, CP.1.1

"The Eyes Have It"

Work with a scalpel to dissect a real cow eyeball! Learn about the parts of the eye and the sense of sight. Lab safety will be stressed. Must be booked at least three weeks in advance.
KY Core Content: SC-H-3.1.6, 3.2.1; PL-H-1.3.1
IN Standards: Science: AS.3.14

OTHER OPTIONS

"Go With the Flow"
Explore a dissected sheep heart to learn how blood flows through the heart and lungs.
KY Core Content: PL-H-1.3.3
IN Standards: Science: AS.3.1, AS.3.16; Health: 9.1.2, 9.1.4

"Name That Type"
Build antigen/antibody models of blood types and learn to type simulated blood samples.
KY Core Content: SC-H-3.1.1
IN Standards: Science: AS.3.37

"NeuroLab"
Work with a real sheep brain to learn about the parts of your brain and how the brain functions to control your body.
KY Core Content: SC-H-3.1.6, 3.2.1; PL-H-1.3.1
IN Standards: Science: AS.3.12, AS.3.13, AS.3.14

"DNA Construction Zone, Level 2"
Prerequisite: Basic understanding of cell and DNA structure.
Learn the processes of transcription and translation by building models of the mRNA and polypeptide coded within a given strand of DNA.
KY Core Content: SC-H-3.1.3, 3.3.1, 3.3.3
IN Standards: Science: B.1.3, B.1.4, B.1.21, B.1.26

"Protect Yourself"
Test and expand your knowledge of STDs and HIV. Learn about methods of transmission, symptoms, and treatments. Discuss methods of "safer" sex and ways to keep yourself safe. Abstinence is stressed.
KY Core Content: PL-H-1.2.2, 1.3.2, 1.7.2, 1.7.4
IN Standards: Health: 9.1.1, 9.1.4

"Split and Double Split"
Explore the differences between meiosis and mitosis using a hands-on activity. Observe the differences between typical and atypical karyotypes.
KY Core Content: SC-H-3.3.2; PL-H-1.2.1
IN Standards: Science: B.1.8, B.1.28, AS.2.24, AS.4.2

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The Kentucky Health Education Rural Outreach Scientists (KY–H.E.R.O.S.) program is supported by a Science Education Partnership Award (SEPA) from the National Center of Research Resources (NCRR) at the National Institutes of Health (NIH). The Breakthrough Gallery, BioLabs and health science Distance Learning labs are components of the KY–H.E.R.O.S. educational programming.

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PERMIT NO. 901

Louisville Science Center 2005-2006 Educator Guide

MUS3UMS ON MAIN!

Three fantastic museums. Louisville Science Center, Louisville Slugger Museum, and the Frazier Historical Arms Museum have joined forces to offer your students a great field trip! Choose two of the three museums to visit, and we'll give you a free space for a brown bag lunch and free bus parking! The package price is $10 per student. For more information, call (502) 561-6100.