

SCIENCE DEPARTMENT- DISTANCE LEARNING PROGRAMS

Anatomy/Physiology/Genetics -Distance Learning Programs

Camden's Children's Garden

1. Genetics: Mendel's Peas

Discover dominant and recessive traits among yourselves, then study peas. Figure it all out on a Punnett Square.

Center for Agricultural Science & Heritage

1. Agricultural Biotechnology

Participants join in an overview of the history of biotechnology followed by an in-depth investigation of what transgenic crops now are in America's fields. The where, when, what, and how of biotech will be answered with a glimpse into our future. Participants will be encouraged to discuss candidly their feeling on ethics regarding genetically modified organisms. Designed for grades 6 - 12.

2. Celebrating Agriculture and the Good Earth

Grade(s): 6, 7, 8, 9, 10, 11, 12, *Public Library:* Library Patrons

Join the center for a lively discussion of current issues in agriculture. The program is designed for a point-counter point discussion that will include the controversial use of fertilizers and pesticides as well as the cultivation of *GMO* (Genetically Modified Organism) crops

Discovery Center of Springfield

1. Birds of a Feather

This class focuses on how birds evolved the ability to fly and how this evolution changed the entire animal world. They will be introduced to moderate levels of bird anatomy, ecology, and diversity as well as seeing some live examples of wild birds. This class is intended for high school classes only.

2. The Gene Scene

Students investigate cell processes and genetics using innovative DNA activities developed by the National Human Genome Research Institute. DNA- see it, build it, touch it!

Health Space Cleveland

1. Genetic Revolution

The changing worlds of genetics and health

Human Biology & Anatomy

Genetic engineering? The Human Genome Project? DNA testing. Find out how genetic information is changing the field of health care. Learn the basics of DNA structure and function and participate in a group investigation using DNA evidence.

Hooks Discovery & Learning

1. In The News - Forensic Life Science

Forensic life science principles are at the center of many mysteries being solved by scientists. From bioarcheologist looking for clues to the past in human and animal bones, to entomologists studying insects in order to better understand decomposition of animal tissue. Students will be exposed to the lab techniques and procedures that are helping to solve many of the world's scientific mysteries. Current issues in the news will guide our discussion and debate of the topic.

2. In The News - Genetically Modified Foods

9th - 12th Grade

Genetically modified foods have been on our tables for years, but what does that really mean? This program will give a better understanding of the science behind the term "genetically modified".

Current issues in the news will guide our discussion and debate of the topic. Through this link we will

begin to have a better understand why scientists have developed these techniques, how they are being used in the world today, and the effects on our daily lives.

By Request Program is 45 minutes in length with a 15 minute test period

3. IN THE NEWS: Cloning and Stem Cells

Grade(s): 9, 10, 11, 12

Cloning is a hot topic in the news every day. We will begin by helping participants understand the science behind stem cell and cloning research. From there, we will learn how scientists are using these principles to develop techniques to improve the quality of life for humans.

4. IN THE NEWS: Genetically Modified Organisms

Grade(s): 9, 10, 11, 12

We have been genetically modifying organisms for years, but what does that really mean? This program will give a better understanding of the science behind the term "genetically modified". Current issues in the news will guide our discussion and debate of the topic.

Indiana State Museum

1. 2025: A Genetic Odyssey

Grade(s): 9, 10, 11, 12

See how your vote could influence the future! Experience an interactive presentation exploring the impact of genetic research on our lives. Meet the Caldwell's -- a futuristic family who in the year 2025 are facing issues about cloning, genetic engineering, and crop modification.

IUPUI

1. People and Pineapples: Genes, Traits and the Human Genome Project

INTERACTIVE ONLY! On the surface, people and pineapples seem to be worlds apart. And those differences ultimately are coded in the genes that govern the development of all organisms. But we share a surprising amount of genetic information with the humble pineapple. Genetic researchers recently completed one stage of the Human Genome Project - identifying and cataloguing the billions of bits of genetic material in human beings. Their work has led to intriguing observations and has created vast, significant opportunities for new research into genetic therapies and "tools" for health and medicine that will affect us for years to come. In this one-hour videoconference, genetics research faculty at Indiana University Schools of Dentistry and Medicine will explore with students how basic genetic concepts - traits, genes, inheritance, pedigrees, and DNA - relate to the Human Genome Project. Students will be introduced to important, publicly available resources associated with the HGP and how to use them. Objectives: Following this session, students should be able to explain how their own uniquenesses are due to a collection of traits that each individual inherited from both of their parents; estimate the frequencies of traits and genes within populations; use pedigree research to gain an appreciation of heredity; describe the hurdles that geneticists face in conducting genetics research and appreciate the impact of these obstacles on research and therapy; generally describe how patterns of inheritance are expressed by genetic mechanisms; explain what the Human Genome Project is and why it is important; list the steps that lead one from a trait to identifying its gene or genes. For additional information on this event, please contact Jonathan Barclay, IU School of Medicine, 317-274-5187 (jbarclay@iupui.edu).

2. Proteins and Privacy: Exploring the Human Genome

INTERACTIVE ONLY! During this one-hour videoconference, genetics research faculty will facilitate an interactive exploration of the kinds of information that the Human Genome Project offers researchers and students alike. Examples of how genetics and disease are linked will be explored, and students will be introduced to the principles and practice of gene therapy. The significant privacy and ethical implications of genetics research and therapy will also be introduced. Pre-activities are included. Proteins and Privacy is the second in a series (see also "People and Pineapples"), and may be taken by schools singly or as the series. Objectives - Following this session, students should be able to: Appreciate the scope of genetic information organized by the Human Genome Project;

Characterize the kinds of questions the Human Genome Project can be used to answer; Use Internet resources associated with the Human Genome Project to gather information about the biology and structure of genetic material. Summarize ethical concerns and issues raised by the sequencing of the human genome, genetic manipulation, and current research activity, such as: A. Should we and how should we safeguard an individual's "genetic privacy" and why is this important? B. How should resources be prioritized for research into congenital diseases and their therapies or cures? For additional information on this event, please contact Jonathan Barclay, IU School of Medicine, 317-274-5187 (jbarclay@iupui.edu).

Biology- Distance Learning Programs

Acquatic Research Interactive

1. Diving Into Biology - Live Virtual Dive

Viewers join SCUBA divers in a coastal lagoon on the shores of Lake Michigan. During this live dive, viewers see and investigate the many fish and creatures, both native and foreign that reside in the fourth largest lake in the world.

Adler Planetarium

1. Bone-A-Fied Facts"

We'll provide "bone-a-fied" facts about the muscular and skeletal systems of the body. Discover what our bones are made of, how muscles help us move, and what happens when we break our bones. A close-up view of real bones, artificial joints, and other skeleton and muscle demonstrations make for an exciting and informative adventure into the human body! Designed for grades K - 12.

COSI Columbus

1. Fire and Forest Ecology (This program is scheduled for: October 29, '04 @ 10:30 AM ET)

Applicable subjects: Ecology, biology, plant biology, resource management

Students should have prior understanding of: Ecology, plant biology

Dr. Ralph Boerner will discuss fire as a naturally occurring force in most of the ecosystems of North America. Fire is important in maintaining biological diversity at levels from species to landscapes and sustaining a forest's ability to supply clean water and air. He will also describe on-going experiments designed to evaluate the use of prescribed fire in restoring forest ecosystems in Ohio and other parts of the US. Dr. Boerner is a Professor and Chair of the Department of Evolution, Ecology and Organismal Biology at The Ohio State University. Students should prepare questions in advance, based on the information packet sent to the teacher.

2. Paleontology of Early Life

Applicable Subjects: Paleontology, Evolution, Biology

Students should have prior understanding of: Fossils, single-celled organisms, the origin and definition of life

3. The Autopsy and Forensic Medicine

Applicable subjects: Biology, Life Science, Anatomy/Physiology, Civics, Government

Students should have prior understanding of: General vertebrate anatomy; organisms as being composed of organs and tissues, which have functions; alterations in organs can be related to change in their function.

Dr. Larry Tate will present information on forensic pathology and performing autopsies to determine cause of death. Using data and photos from real autopsies, Dr. Tate will discuss the variety of signs pathologists look for and the important information to be gained from autopsies. Dr. Tate has 33 years experience performing autopsies and is currently a Clinical Associate Professor of Pathology at Ohio State University. Students should prepare questions in advance, based on information packet

sent to the teacher. Students will also be able to identify abnormal anatomical features that may have contributed to cause of death.

4. Ecology

Grade(s): 7, 8, 9, 10, 11, 12

A project-based program based on an ecological monitoring of the Killbuck Wildlife Area in Wayne County, Ohio! Learn about biological diversity, endangered species and interactions between species. Use science process and math skills on a real world problem!

COSI Toledo

1. Journey Inward: Exploring the Human Body

Grade(s): 6, 7, 8, 9, 10, 11, 12, Curriculum Director, Gifted and Talented Coordinator, Title One Coordinator, Teacher, Paraprofessional, Parent, *Public Library*: Library Patrons, Adult, corporate
Journey Inward describes how the basic units of our bodies work together to form the internal working systems of the body.

2. The Healthy Heart

Grade(s): 7, 8, 9, 10, 11, 12, Curriculum Director, Gifted and Talented Coordinator, Title One Coordinator, Teacher, Paraprofessional, Parent, *Public Library*: Library Patrons, Adults, Corporate
The human heart can beat an average of 2.5 billion times in our lifetime. By using a real sheep's heart students will find out what makes our heart "tick."

Eli Lilly & Co.

1. How Animals are Used in Research

Grade(s): 6, 7, 8, 9, 10, 11, 12

Students will learn the when, how, and why a pharmaceutical company like Lilly uses animals in its research, and the challenges and benefits of animal research. Intertwined in the discussion students will also better understand the process of discovering and developing new medicines. The session will include common equipment, animal models, and prepared slides

2. Ask the Scientist about Viruses

Grade(s): 6, 7, 8, 9, 10, 11, 12, *Public Library*: Library Patrons

Dr. Elcira Villarreal, immunologist and expert in infectious diseases, will discuss the scientifically interesting yet threatening world of viruses. Dr. Villarreal is excellent with young people, and is open to all questions, from the science behind threats like Ebola and bioterrorism to the realities of tattooing, piercing, STDs, and drug use.

3. Keeping Your Brain Healthy: Use it or Lose it

Grade(s): 9, 10, 11, 12, OASIS, *Public Library*: Library Patrons, Retirement Community

This program is the second in a two part series. Amy Chappell, M.D., child neurologist, and Medical Fellow on the Duloxetine Product Team at Lilly, and experienced distance learning presenter brings this interactive program to your classroom. Participants will learn about keeping the brain healthy and about neurological disorders, such as Alzheimer's, epilepsy, strokes, etc. Participants will also learn what research has been done in regards to some of these disorders.

4. Keeping Your Brain Healthy: Memory and Learning

Grade(s): 9, 10, 11, 12, OASIS, *Public Library*: Library Patrons, Retirement Community

Amy Chappell, M.D., child neurologist, and Medical Fellow on the Duloxetine Product Team at Lilly, and experienced distance learning presenter, brings this interactive two-part series to your classroom. Portions of this program is based on the Brainlink® Memory and Learning module. This is a fun hands-on program designed to provide information about the nervous system, and healthy brain behaviors. Participants will learn how memory is stored in the brain and how individuals learn. This event provides the fundamentals for the second program in this series, which will focus on healthy habits for keeping the brain well and neurological disorders.

Health Space Cleveland

1. Genetic Revolution

The changing worlds of genetics and health
Human Biology & Anatomy

Genetic engineering? The Human Genome Project? DNA testing. Find out how genetic information is changing the field of health care. Learn the basics of DNA structure and function and participate in a group investigation using DNA evidence.

Preparation: All programs include a teacher's guide, pre-activities and post-activities that can be downloaded from the website, emailed or faxed. For an effective Distance Learning program we ask that students do the pre-activity and bring all required materials with them the day of the event. To insure an interactive videoconference it is essential that students do the pre-activity and have all materials for the videoconference

2. Proteins and Privacy: Exploring the Human Genome

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By Request Program is 45 minutes in length with a 15-minute test period

3. IN THE NEWS: Epidemiology

Grade(s): 9, 10, 11, 12

The Centers for Disease Control provide health and life saving information about epidemics that may concern our nation and citizens. By starting with the basics of life and learning more about some of the microscopic organisms that affect our cities and well-being, we will become more knowledgeable citizens.

Howard Hughes Medical Institute

1. Biological Clocks

Wonder why you feel sleepy as night approaches, or how bears know when to hibernate, or why some flowers open and close their petals depending on the time of day? Welcome to the world of biological clocks.

Liberty Science Center

1. Design an Ecosystem

E-Trails invite students to explore LCS's exhibits in depth, gathering information to complete a fun design challenge. Teacher packet includes a pre-visit activity, suggestions for completing the challenge and extensions for further study. Have them write about it, draw it, or build it. You decide. They can even present their completed challenges to LSC.

It's Biology class and you are discussing ecosystems. As the discussion goes on, your mind starts to wander into a forest and the next thing you know the bell is ringing. Where were you? What were you doing? Who or what was around you? Does it exist? To understand an ecosystem, you need to understand the components of an ecosystem and of how these components interact. Both biotic (living) and abiotic (nonliving) materials, along with the ever-changing environment that is influenced by natural or human activities, needs to be carefully evaluated. Will your ecosystem involve all life forms or be void of human existence? Since human beings occupy a major part of our environment, how can some of our destructive behaviors possibly be changed or recycled to enhance or benefit an ecosystem? Your Challenge is to design an ecosystem.

2. Artist's Perception, The

E-Connections are science explorations based on a LSC exhibit area.

Objectives:

- To understand how human beings perceive the world around them.
- To understand how humans see in 3D.
- To understand how shapes, sizes, and colors help people examine objects differently.

Exhibit Description:

LSC's Perception Alley allows our guests to explore perception using mirrors, optical illusions, and interactive exhibits. Guests will gain a conceptual understanding of how different art forms are perceived by the eye.

3. Dancer's Tool, The

E-Connections are science explorations based on a LSC exhibit area.

Objectives:

- To understand the form and function of the skeletal system.
- To explore how the shape of bones effects movement.
- To analyze a dancer's plie and appraise their own.

Exhibit Description:

LSC's exhibit area "A Closer Look at Your Skeleton" has several models and manipulatives that allow our guests the chance to explore the components and functions of the human skeletal system.

4. Human Body: Bio-mechanics

E-Connections are science explorations based on a LSC exhibit area.

Objectives:

- To explore how the nervous, muscular, and skeletal systems function together to allow body movement.
- To experience how the principles of physics apply to the human body in movement.

Exhibit Description:

LSC's Living Room is dedicated to the study of the human body. Guests gain a deeper understanding of why we are built the way we are and how the human body does so many amazing things.

5. Human Body: Circulatory System

E-Connections are science explorations based on a LSC exhibit area.

Objectives:

- To understand the process of respiration.
- To comprehend lung vital capacity.
- To experience diaphragmatic breathing and explore the variables that affect lung vital capacity.

Exhibit Description:

LSC has two sets of human lungs on display, one from a non-smoker and one from a smoker. Guests use this exhibit to compare and contrast differences and similarities.

6. Human Body: Medical Imaging

E-Connections are science explorations based on a LSC exhibit area.

Objectives:

To investigate different types of imaging technologies used in the medical field.

- To examine authentic medical images.
- To determine what type of medical imaging is used in different applications.

Exhibit Description:

LSC's Health Floor is home to several medical imaging technologies. Some of the technologies available for our guests to explore are MRI imaging, an angiogram, thermography, and x-rays.

7. Human Body, The: Respiration

E-Connections are science explorations based on a LSC exhibit area.

Objectives:

- To understand the process of respiration.
- To comprehend lung vital capacity.
- To experience diaphragmatic breathing and explore the variables that affect lung vital capacity.

Exhibit Description:

LSC has two sets of human lungs on display, one from a non-smoker and one from a smoker. Guests use this exhibit to compare and contrast differences and similarities.

8. Human Body: Senses

E-Connections are science explorations based on a LSC exhibit area.

Objectives:

- To understand how human beings, as well as other animals, perceive their environment.
- To comprehend the function of hearing, tasting, touching, smelling, and seeing.

Exhibit Description:

LSC's Perception Alley enables our guests to explore perception through interaction with mirrors, optical illusions, and exhibits. Guests also gain new understandings about how different art forms are perceived by the human eye.

9. Human Body: Skeletal System

E-Connections are science explorations based on a LSC exhibit area.

Objectives:

- To explore how and why the body relies on the skeletal system for shape, support and protection.

Exhibit Description:

LSC's exhibit area, A Closer Look at Your Skeleton, has several models and manipulatives that enable our guests to explore the components and functions of the human skeletal system.

10. Insects: Camouflage

E-Connections are science explorations based on a LSC exhibit area.

Objectives:

- To observe insects, their morphology and behavior.
- To compare adaptations of closely related forms.
- To examine how color, shape, pattern and behavior help provide camouflage for organisms in a variety of environments.

Exhibit Description:

LSC's Insect Collection allows a close-up observation of bugs such as cockroaches, walking sticks, millipedes and spiders.

11. Insects: Ecosystem

E-Connections are science explorations based on a LSC exhibit area.

Objectives:

- To observe insects, their morphology and behavior.
- To compare adaptations of closely related forms.
- To understand the relationship between the environment and an insect's adaptations.

Exhibit Description:

LSC's Insect Collection allows a close-up observation of bugs such as cockroaches, walking sticks, millipedes and spiders.

Please have globes available in the classroom.

12. Insects: Habitat

E-Connections are science explorations based on a LSC exhibit area.

Objectives:

- To observe insects, their morphology and behavior.
- To compare adaptations of closely related forms.
- To understand the relationship between the environment and an insect's adaptations.

Exhibit Description:

LSC's Insect Collection allows a close-up observation of bugs such as cockroaches, walking sticks, millipedes and spiders.

Please have globes available in the classroom.

13. Micro Worlds

E-Connections are science explorations based on a LSC exhibit area.

Objectives:

- To examine the capabilities of the video light and electron microscopes.
- To observe specimens under each type of microscope.
- To determine what type of microscopy is best for a particular specimen and understand the advantages and disadvantages of each type.

Exhibit Description:

LSC's Video Light (VLM) and Scanning Electron Microscope (SEM) are used by LSC staff to help guests understand the different ways to image the microscopic world. Various specimens will be used and may include several types of protozoa and insects.

14. Microscopy

E-Connections are science explorations based on a LSC exhibit area.

Objectives:

- To examine the differences between light and electron microscopy.
- To observe specimens under each type of microscope.
- To determine what type of microscopy is best for a particular specimen and understand the advantages and disadvantages of each type.

Exhibit Description:

LSC's Video Light (VLM) and Scanning Electron Microscope (SEM) are used by LSC staff to help guests understand the different ways to image the microscopic world. Various specimens will be used and may include several types of protozoa and insects.

15. Reptiles: Adaptations

E-Connections are science explorations based on a LSC exhibit area.

Objectives:

- To observe reptiles, their morphology and behavior.
- To compare adaptations of closely related forms.
- To understand the relationship between the environment and adaptations.

Exhibit Description:

LSC's Green House contains reptiles from all over the world and enables guests to closely observe such reptiles as snakes, monitors, uromastix and anoles.

16. Reptiles: Camouflage

E-Connections are science explorations based on a LSC exhibit area.

Objectives:

- To distinguish and understand different types of ecosystems.
- To explore interrelationships between a reptile and its environment.
- To examine how color, shape, pattern and behavior help provide camouflage for reptiles in a variety of environments.

Exhibit Description:

LSC's Green House contains reptiles from all over the world and enables guests to closely observe such reptiles as snakes, monitors, uromastix and anoles.

17. Reptiles: Habitat

E-Connections are science explorations based on a LSC exhibit area.

Objectives:

- To distinguish and understand different types of ecosystems.
- To comprehend the interrelationships that occur between a reptile and its environment.

Exhibit Description:

LSC's Green House contains reptiles from all over the world and enables guests to closely observe such reptiles as snakes, monitors, uromastix and anoles.

Milwaukee Public Museum

1. Pearls: Iridescent Irritant (available after January 3, 2005)

(Grades 4-Adult)

From a grain of sand to one of the most precious and rare gems of the world, a pearl grows inside a mollusk to dazzle humans with its beauty. Explore how a pearl is made naturally and through human intervention. Learn about the **biology and chemistry** of this resplendent gift of the natural world.

Minnetrista Cultural Center

1. Monarch Mania

Using the monarch butterfly (*Danaus plexippus*), we'll explore the exciting worlds of science, biology and entomology. Migration, anatomy, life cycle, habitat, and tagging techniques will be covered. We will discuss everything from milkweed as a host plant to the Monarchs' annual migration to Mexico. For additional information on this event, please contact Christy Wauzzinski, Minnetrista Cultural Center, 765-213-3540, x 128 (cwauzzinski@eciheritage.net).

National Museums Liverpool

1. The National Museums Liverpool is a large multi-disciplinary organization covering art, history, and science. Experiments with the use of video conferencing have been very successful and proposals are welcome from around the world. Programs are now available from the Natural History Centre's activity room with over 20,000 specimens available for examination. Powerful video-microscopes in the Centre can be connected to the video conferencing system to reveal the smallest details on a wide diversity of insects, fossil, mineral and plant material.

Smithsonian Environmental Research Center

1. Science in Action: Research at the Smithsonian Environmental Research Center

Located outside Washington, DC, along the Chesapeake Bay is the Smithsonian Environmental Research Center (SERC). The scientists and educators here explore the biological and physical processes that sustain life on Earth. Since 1965, SERC scientists have researched the aquatic, terrestrial, and atmospheric components of complex ecosystems and applied this knowledge for the improved stewardship of the biosphere. Explore these processes and components by exploring the science laboratories of SERC. Interactive demonstrations recreate SERC science in the classroom. Students

will also discover potential careers in science.

Botany- Distance Learning Programs

Cincinnati Zoo & Botanical Gardens

1. Radiant Rainforests

Students will learn about the remarkable biodiversity of two rainforest types - tropical and temperate. Focusing on the tropical rainforests of South America and the temperate rainforest of the Pacific Northwest in terms of climate, flora, and fauna. This program is also available as a two-part series. Concepts of biodiversity and rainforest layers are introduced first through exploration of the tropical rainforests, and the comparison with the temperate rainforest follows in Part II. Designed for grades 6 - 12.

Indianapolis Zoo

1. Amazing Amazon!

Grade(s): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

Tropical rainforests are the most biologically diverse places on Earth. Join us from our own Amazon rainforest exhibit as we move, layer by layer, through this amazing environment and meet several of its inhabitants. You'll see yellow and gold macaws, emerald tree boas, and red-bellied piranhas, to name a few!

Minnesota Zoo

1. Healing Power of Plants

For hundreds of years, plants were our main source of medicines. The healing powers of certain plants affected those plants' lore, names, and even distribution. Discover also how those old time remedies influenced today's medicines. Designed for grades 4 - 12.

National Museums Liverpool

1. The National Museums Liverpool is a large multi-disciplinary organization covering art, history, and science. Experiments with the use of video conferencing have been very successful and proposals are welcome from around the world. Programs are now available from the Natural History Centre's activity room with over 20,000 specimens available for examination. Powerful video-microscopes in the Centre can be connected to the video conferencing system to reveal the smallest details on a wide diversity of insects, fossil, mineral and plant material.

Chemistry- Distance Learning Programs

Aquatic Research Interactive

1. Diving Into Physics

Students learn how the ABC's of Physics and Chemistry (Archimedes' Principle, Boyle's Law and Charles' Law) work and are applied not only on land but also underwater.

Camdens Childrens Garden

1. Naturally Nutritious

What happens to body chemistry on an unbalanced diet? Learn why an apple a day keeps the doctor away.

Cleveland Museum of Art

1. Chemistry of Art Series

Grade(s): 9, 10, 11, 12

The Cleveland Museum of Art is currently offering a problem-based learning class taught by the

Museum's Conservation staff. Each distance learning session focuses on a real-life conservation problem related to experiments conducted by high school students in their own classrooms

COSI Columbus

1. Science of the Senses: Food Chemistry and Interpretation by the Brain

Applicable subjects: physiology, psychology and sensory science

Students should have prior understanding of: the anatomy of the nose, throat and mouth region; basic knowledge of neurons and sensory receptors.

Jeannine F. Delwiche will define taste, smell and flavor, and discuss some the challenges involved in measuring them. Using visual illusions, she will demonstrate the importance on interpretation by the brain and explain why the brain sometimes makes a "mistake." Finally, she will describe how the measurement of perception is used by industries. Dr. Delwiche is an assistant professor at The Ohio State University Department of Food Science and Technology. Students should prepare questions in advance, based on the packet of information sent to the teacher.

COSI Toledo

1. Fill'er Up: Nutritional Chemistry to Fuel Your Bodies

Using foods like marshmallows, cereal, and Jell-O, this session explores how food provides our bodies with essential nutrients they need to build and maintain themselves.

Fill'er Up takes a closer look at nutrition and the body using six group explorations: S'mores, Hidden Taste, Itsy-Bitsy Pieces, How Much Is Enough?, Seasoned to Perfection, and An Unlikely Combo.

* S'mores explores how the body breaks food down into chemicals that it can use to maintain itself or use for fuel.

* Hidden Taste demonstrates the connection between taste and smell when we eat food and how digestion begins in our mouth.

* Itsy-Bitsy Pieces explores how our bodies digest food and how our stomach will break food down to digest it more quickly.

* How Much Is Enough? explores the nutritional values of food and how to understand nutritional labels.

* Seasoned to Perfection simulates water concentration in and around our cells.

* An Unlikely Combo explores how our stomach breaks down proteins and why it is important to know the best way to prepare foods to make them more nutritious.

Eli Lilly & Co.

1. Chemistry is a Blast!

This is an exciting program of chemical demonstrations including explosions, colors, foams, fogs, and light. Your students will enjoy the demos as they observe and learn about the chemistry of combustion, phase changes, heat transfer, polymers, and many other topics.

Louisville Science Center

1. Chemistry Roots

Chemistry runs in your family! Take a hands-on approach to learning about the history of chemistry and industry in this region. From soap making to distillation, fried chicken to coal, explore Kentucky's rich heritage through hands-on chemistry.

New York Hall of Science

1. Molecules and Energy

Investigate the shared chemistry of living things by learning what we have in common with plants, bacteria and marine mammals. Calculate how many molecules compose your body, determine how to measure calories and observe what heat emitted from a person's body looks like on an infrared camera.

New York Institute of Technology Culinary Arts Center

1. Food Chemistry

Testing various foods for basic nutrients and an exploration of how foods impact their health.

Earth/Space Science- Distance Learning Programs

Aquatic Research Interactive

1. Diving into Space - Living & Working in Space

Venture underwater and then into space with NASA's Johnson Space Center. Learn how humans adapt to living and working in environments where they can not breathe, where normal body movements are not possible and how we modify our earthly tools to work in both inner and outer space.

COSI Toledo

1. 20/20 Science

Light, Lasers, and Optical Illusions are used to describe the journey light takes from formation until it becomes an image in our brains.

20/20 Science takes a closer look at the principles of light and how they affect us every day using four group explorations: Sources of Light, Baby Powder Beam, Rainbow in a Dish, and Bent Pencils.

* Sources of Light contains four separate experiments demonstrating the different ways to produce light-incandescence, fluorescence, chemiluminescence, and triboluminescence.

* Baby Powder Beam explores reflection, absorption, and transmission. Students then discover how each property plays a part in the way we see everything around us.

* Rainbow in a Dish explores white light and the range of wavelengths producing the spectrum of color. This activity also demonstrates how rainbows are formed in reference to the principles of dispersion and refraction of light.

* Bent Pencils demonstrates how light can travel at a different speed through different mediums. This activity emphasizes the principles of refraction and a material's refractive index.

2. Science Rocks

Takes a closer look at the different properties of rocks and minerals using two group explorations: Properties and Edible Minerals.

4. The Never-ending Chain: Polymer Science

Monomers, cross linking, and super absorbent polymers are examined in this session about the importance of Polymers in our everyday life.

Carnegie Museum of Natural History

1. Looking for Life with a Rover

This series of six videoconferences (Sept. 15th, 20th, Oct. 4th, 6th, 8th, and 12th, 2004), hosted by members of CMU's EventScope lab, focuses on in-depth coverage of the NASA-sponsored, CMU-led Life in the Atacama 2004 Robotic Astrobiology mission to the Atacama Desert in Chile. Topics covered include biology in extreme environments, and robotic exploration. The video conferences take place during the the two weeks of science operations, and students will have the opportunity to interact with live scientific data using tools similar to those used by the science team. The science will be brought to life via EventScope, an interactive, 3D remote experience program. There is also potential for interaction with the Science Team and a small chance for actually controlling the robot. Grades 6-12

Center for Educational Technologies - Challenger Learning Center

1. Space Station Alpha

During e-Mission: Space Station Alpha, students help Mission Control guide the Astronauts through a dangerous solar storm. The Space Station's electrical systems, life-support systems, and communications systems are jeopardized. The Astronauts live are threatened. Will the student Mission Specialists successfully manage the Space Station's technology and protect the Astronauts?

e-Mission "Space Station Alpha" is an innovative way to engage students with math and science in real-life situations. During the mission, students connect live with a flight director at the Challenger Learning Center in Wheeling, WV. With the help of computers, the Internet and a small video camera, students interact with Mission Control to track the solar storm, monitor orbital position, predict radiation levels, study oxygen levels and divert power to life support systems.

Students assisting the Space Station astronauts join one of four teams:

- STORM Team: Solar Tracking and Orbital Monitoring
- Radiation Team: Radiation monitoring and shielding
- Life Support: Environmental monitoring and astronaut health
- Mission Operations: Electronics systems and power generation

COSI Toledo

1. Atmospheric Adventures

Grade(s): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, Curriculum Director, Gifted and Talented Coordinator, Title One Coordinator, Teacher, Paraprofessional, Parent, *Public Library*: Library Patrons, Adult, Corporate
Atmospheric Adventures covers the definition of weather, air pressure, lighting, seasons, and cloud formation.

Indianapolis Musuem of Art

1. Eye Wonder - The Art of Science

Students will play with scientific questions that artists such as Monet, Seurat, and some of the 1960s Op artists have asked themselves about the connection between what the eye senses and what it perceives

Indiana State Museum

1. Formation of the Earth

Grade(s): 7, 8, 9, 10, 11, 12

Join us as we broadcast directly from the Birth of the Earth gallery to discuss the theories and processes that shaped the Earth. In addition to using the interactives and items found within the gallery, we will use video footage and visuals to assist in the explanation of earthquakes, volcanoes, and plate tectonics. This program is sure to answer and raise important questions that the students may

have about how the Earth became a planet full of life, how planets formed, and how continents shift.

Liberty Science Center

1. Alternate Forms of Energy

E-Connections are science explorations based on a LSC exhibit area.

Objectives:

- To understand how human beings perceive the world around them.
- To understand how humans see in 3D.
- To understand how shapes, sizes, and colors help people examine objects differently.

Exhibit Description:

LSC's E-Quest exhibit offers guests the opportunity to explore and experiment with a variety of earth's energy sources. The different areas that may be visited are the bio-stored station, the surface station, the geothermal station, the ocean station and the nuclear station.

2. Solar Energy

E-Connections are science explorations based on a LSC exhibit area.

Objectives:

- To explore the concept solar energy.
- To examine energy consumption.
- To investigate different methods of harnessing the sun's energy.

Exhibit Description:

LSC's E-Quest exhibit offers guests the opportunity to explore and experiment with a variety of earth's energy sources. During this connection we will concentrate on the surface station which includes solar energy.

3. Wind Energy

E-Connections are science explorations based on a LSC exhibit area.

Objectives:

- To explore the concept of energy and energy consumption.
- To investigate how wind energy can produce electricity.

Exhibit Description:

LSC's E-Quest exhibit offer guests the opportunity to explore and experiment with a variety of earth's energy sources. During this connection we will concentrate on the surface station which includes wind energy. LSC's Wind Turbine, located on our side lawn, can produce 10,000 watts of power, enough to power an average-size home

4. Forces that Shape the Earth: Earthquakes

E-Connections are science explorations based on a LSC exhibit area.

Objectives:

- To understand that earthquakes are waves of energy that move through the earth.
- To explore and experiment with the variables that have an effect on damage that occurs during an earthquake.

Exhibit Description: The Torsional Wave spans the four floors of LSC's center atrium, a total of seventy feet. This exhibit encourages guests to experiment with wave behavior. Our Earthquake Simulator supports interactive examination of the effects of earthquakes on different types of structures. After entering variables into the computer, guests can test the outcome.

5. Forces that Shape the Earth: Erosion

E-Connections are science explorations based on a LSC exhibit area.

Objectives:

- To understand that earthquakes are waves of energy that move through the earth.
- To explore and experiment with the variables that have an effect on damage that occurs during an earthquake.

Exhibit Description:

The Torsional Wave spans the four floors of LSC's center atrium, a total of seventy feet. This exhibit

encourages guests to experiment with wave behavior. Our Earthquake Simulator supports interactive examination of the effects of earthquakes on different types of structures. After entering variables into the computer, guests can test the outcome.

6. Forces that Shape the Earth: Wind

E-Connections are science explorations based on a LSC exhibit area.

Objectives:

- To examine the variables that effect the erosive power of the wind.
- To construct a model to show how wind causes erosion.
- To investigate the design of measuring instruments used in meteorology.
- To look closely at instruments that measure characteristics of wind.

Exhibit Description:

Within LSC's Atmosphere area, exhibits like the fluvial storm and kalliroscope let our guests explore the phenomena of wind and air currents.

7. Heat Transference - Thermography

E-Connections are science explorations based on a LSC exhibit area.

Objectives:

- To examine the concept and principles of heat.
- To explore materials with regard to their insulating and conducting properties.

Exhibit Description:

LSC's Thermography exhibit features an infrared camera that creates a thermal image (an image depicting heat patterns). Heat levels that differ as little as .1 degree Celsius are detected. With this camera, the hotter an object or person, the redder the image appears on the monitor.

8. Sunspots / Our Sun

E-Connections are science explorations based on a LSC exhibit area.

Objectives:

- To examine the Sun and the phenomena of sunspots.
- To observe sunspots through the solar telescope.
- To explore the characteristics of a variety of telescopes.
- To experiment with concepts of distance and size in space.

Exhibit Description:

LSC's Solar Telescope allows guests to observe the surface of the sun with no fear of eye damage.

NASA Glenn Research Institute

1. Mars

This workshop allows participants to become aware of the conditions that exist on Mars. It also allows participants to demonstrate/work with the scientific method in exobiology as it pertains to Mars.

2. The STAR (Science Through ARTs) Project is a new, innovative, year-long project. We would be delighted to have you participate in this exciting new adventure!

During our time together, you will learn about Earth's moon via Internet research, videoconferencing with NASA and the Cleveland Museum of Art, and videoconferencing with other STAR participants. You will be able to learn about writing science fiction through videoconferences with published science fiction writers. A safe, collaborative online environment will be furnished through ePALS to many STAR participants. You will be able to put together a mission to the Moon, based on today's scientific knowledge and outfitted to acquire new information.

You will then turn to art to make your mission come to life. Writing, drawing, music, acting, and more could become part of this enriching experience. Within the guidelines that you have been given and the compass of the mission that you have developed, you will ask what might happen if something goes wrong or the unexpected occurs. You will choose the unexpected element, keeping in mind that it must seem realistic and possible. You will then work through the combined media of science and art toward a likely (or unlikely) outcome.

3. Apollo Moon Landings - Fact, Not Fiction

Since the airing of a program on national television called "Conspiracy Theory: Did We Land on the Moon?" many questions about the legitimacy of the Apollo Moon landings between 1969 and 1972 have resurfaced. The Science@NASA Web site responded immediately by posting an excellent Web page outlining in detail the evidence that Apollo was exactly what NASA said it was.

One subject not raised at all in the program was the more than 800 pounds of lunar rocks that astronauts brought back to Earth. Geologists have been examining these samples for 30 years, and from them we have learned much about the formation of the moon. An in-depth discussion of the analysis of Apollo lunar samples is available from the Lunar and Planetary Institute Web site.

This videoconferencing session gives participants an opportunity to discuss their questions about the landings on the Moon with a panel of NASA researchers. The presentation can be geared to all grade levels.

Suggested post-conference activities:

For grades 2-8, students are asked to send an e-mail to NASA and copy their friends with their opinion on whether or not NASA landed men on the Moon. In the message, students should explain their opinions.

Complete the grades 9-12 and lifelong learners Conclusions and Extensions sections of the NASA Treasure Hunt. A worksheet is provided.

4. Comets: Visitors from the Unknown!

This interactive lesson focuses on what happened to all of the debris that was left behind after the initial formation of our solar system. Students are guided into discovering that rocky debris fell onto the newly formed planets, causing craters in solid surfaces, while icy debris was swept out of the solar system by the solar wind. The icy debris orbits our sun in an enormous cloud midway between our sun and the next closest stars! These condensed clots of ice, stone, and dust (dirty snowballs) are comets, according to the theoretical work of Jan Oort. We see comets when they fall inward toward the sun. Throughout time, the solar system seems to have undergone periods of unusually heavy meteoric bombardment followed by long periods of quiet. Fossil records show that periodic mass extinctions occurred every several hundred million years or so on earth. The meteoric material may have come from great showers of comets that periodically made group excursions toward the sun. The reason for this periodic behavior is an important question in modern science. Students are challenged to arrive at the conclusion that our sun may actually have a dark companion star that passes into and out of the Oort Cloud, causing major disruptions, and sending large numbers of comets falling toward the sun. Next, the students explore the appearance of comets in our skies and identify various cometary features. A comet is followed along its journey from deep space, around the sun, and back out to deep space again, showing changes that occur in its structure and appearance. The students are then challenged to recognize the connection between periodic meteor showers and the orbits of periodic comets.

Finally, the Age of Dinosaurs is revisited at about 65 million years ago, when a massive object struck the Yucatan Peninsula and caused the most recent mass extinction. Louis and Walter Alvarez are introduced, and their ground-breaking work with the Yucatan object is briefly discussed. (Students who have seen or read "Jurassic Park" will be familiar with the KT boundary.)

Questions and comments are welcomed throughout the session. Pre- and post-conference activities are available and their use encouraged.

5. Energy from the Sun

This presentation focuses on the sun as a source of energy. The solar constant is introduced, and the audience is led through a series of calculations that demonstrate the sun's energy output.

The discussion includes:

harnessing the sun's energy

the solar cell as an energy transducer

basics of solar cell science

materials used in manufacturing solar cells

macroscopic characteristics such as efficiency load lines

a basic pictorial explanation of how to solve a simple circuit with a nonlinear power-producing element the wide ranging use of solar cells on Earth and in space.

Mr. Kolecki has worked with NASA for over 30 years, during which he has studied Earth orbital space, the Moon, and the Martian surface. He was a participating scientist in the recent Pathfinder mission. Currently, he is a member of the Learning Technologies Project at NASA Glenn where he hopes to reach out to audiences everywhere with a story of hope for the future and a call to reflect back upon our own basic humanity in an unprecedented time of technological growth.

6. Space Science

The Space Science workshop allows participants to become aware of the exciting discoveries made through space exploration and research. Teams develop products in hands-on, minds-on activities related to Space Science. When possible, participants use the Internet to access NASA's online resources related to Space Science or they watch demonstrations on how to access NASA's Internet resources

NASA Johnson Space Center

1. BIO: Bodies in Orbit Expedition (Effects of Space on the Human Body)"

The human body is designed for and functions best in the presence of Earth's gravity. In space, astronauts enter an environment we call microgravity, which affects the body in many ways, including changes to the cardiovascular, musculoskeletal, and neurovestibular systems. As humans explore further into space, it is vitally important that we understand the effects of spaceflight on the human body and prevent or mitigate the adverse effects so that astronauts can spend longer periods of time in space.

2. Caution: Falling EVERYTHING! (Microgravity)"

Join us on an expedition to the world of microgravity. Often misperceived as weightlessness or zero gravity, microgravity is the unique gravitational environment astronauts experience on a spacecraft orbiting the earth. It is a condition that challenges humans who work and live in space, and that benefits many types of scientific research by freeing it from restrictions imposed by Earth's gravity for thousands of years. Once students are familiar with the basics of microgravity, they will connect to the NASA Johnson Space Center for a live interactive video teleconference. During the video conference, students will learn through real-time interactive demonstrations how certain scientific principles are altered in the microgravity environment. They will learn how the microgravity of space will be exploited aboard the International Space Station to open a new era of scientific discovery that will have important implications for life on Earth.

3. Earth According to WOLF Expedition (Imagery from Space)

Many of us have seen photos of the Earth taken from the Space Shuttle and have marveled at their beautiful vistas. Such imagery will continue to be collected as the International Space Station becomes operational, providing a permanent platform for remote sensing. At NASA's Johnson Space Center in Houston, Texas, Earth scientists study images of Earth from geographic and scientific points of view, and their investigations reveal telling facts about our planet and its processes. Data acquired by astronauts and made available on the internet by NASA help the general public, city officials, etc. to make decisions about where to live, how to vote, where to build our communities, how to plan our future and much, much more. Scientists at the Johnson Space Center bring geography to life, giving it meaning beyond the rote memorization of countries and states and their capitals.

4. Our Solar Neighborhood

Our solar system is comprised of nine distinctive planets orbiting one massive star, our sun. We hope that you will join us for a journey of discovery about our unique solar system. If you are up for the challenge you will learn the qualities of each planet that set it apart from the others, along with the relationship they all share. Join us and let the discovery begin!

5. Space Basics 101

You have just been accepted into NASA's Astronaut Training Program! Be prepared to share some of your unique qualifications, attend a preview of your training and flight expectations, and propose an

experiment to be flown aboard the shuttle or ISS before you arrive at the home of the Astronaut Corps in Houston, Texas!

6. Space Farming Expedition

Plants are an important component for space-based and extraterrestrial life support systems. Just as they do on Earth, plants in a regenerative life support system can take carbon dioxide from the atmosphere and produce breathable oxygen through a process called photosynthesis. Through another process, called evapotranspiration, plants can produce clean, potable water. Of course, plants are also a source of food. So, in theory, plants could provide three essential elements needed for humans to live in space: oxygen to breathe, water to drink, and food to eat. Before plants can deliver these essentials, however, NASA must learn how to grow plants in space, and how to incorporate them and other biological components into life support system research facilities, here on Earth.

7. Space Food

Everyone knows that people on Earth need food in order to stay alive. If we are in space, does that requirement change? The answer is no. Astronauts need food in order to live in space just as when they are on Earth. The trick is that they cannot run to the grocery store before launch because there are several requirements the food must meet to make it aboard the Space Shuttle.

8. X-Flights Expedition (Aeronautics Xperimental Spacecraft)

Astronauts who live and work aboard the International Space Station must have a means to return to Earth in case an emergency arises when the Space Shuttle is not present. To meet that need, an integrated team of designers, technicians, and engineers developed the X-38 as the "emergency lifeboat" for the International Space Station. As a spacecraft, the X-38 is both evolutionary and revolutionary. It is cleverly designed using older technology, off-the-shelf technology, and new technologies. Students will get a glimpse of the technical challenges faced by the X-38's designers and the solutions they found.

Neil Armstrong Air & Space Museum

1. The Moon: Our Companion in Space

Students learn about the Earth's moon during this interactive program. Students act out the motion of the moon compared to Earth and complete worksheets. A museum staff member discusses the phases of the moon, and the Apollo missions to the moon. Students will also have time to ask questions about the moon and other space topics. This program is appropriate for science and social studies units.

Marine Biology- Distance Learning Programs

Columbus Zoo & Aquarium

1. Marine Biology

Dive into the coral reef exhibit at the Columbus Zoo as we explore ocean habitats through interdisciplinary activities.

Delaware Bay Schooner Project

1. Habitats, watershed, adaptations and biology of estuarine species

Description: An estuary is an area where fresh water draining off the land mixes with the ocean tides. The Delaware Estuary is one of the largest estuaries in the United States receiving water from its watershed in Delaware, New Jersey, New York and Pennsylvania. In this unique habitat, only very adaptable creatures can survive as many factors can change their habitat, such as precipitation levels, industries and pollution.

In general, all animals have certain adaptations, which allow them to live in a particular niche within their habitat. Organisms such as blue crabs (*Callinectes sapidus*), hogchokers (*Trinectes maculatus*), a type of bottom-dwelling fish, and oyster toadfish (*Opsanus tau*) have all developed certain characteristics, which allow them to survive in the challenging environment of the estuary.

Examples of estuarine flora and fauna can be displayed including seahorses, pipefish, puffer fish, oysters, killifish, mummichogs, cusk eels, spotted hake, *Enteromorpha intestinalis* and *Ulva lactuca* (green algae), as well as the three animals mentioned above. Habitats, watershed, adaptations, biology and lifestyles of animals (e.g. what they eat, where they live, how they mate, etc.) can all be discussed with varying detail and difficulty.

Lessons can be tailored to the needs of the classroom teacher and students. A meeting through teleconferencing or a phone conversation can be arranged with the Bayshore Discovery Project's Education Department to determine pertinent curriculum.

2. Subject: history of Delaware Bay, biology of oysters, habitats, environmental indicators

Description: In 1876, the railroad came to the Maurice River and triggered a huge expansion of the oyster industry in Delaware Bay. A fleet of sailing vessels grew to about 500 by the turn of the century. Most of these boats were built in New Jersey on the Maurice and Cohansey Rivers, Leesburg, Dorchester, and Greenwich in Cumberland County. The AJ MEERWALD, built in 1928 at Dorchester, is a prime example of oystering boats from this era. Oystering in the Delaware Bay was a thriving business until 1957 when the bay was hit with a disease called MSX (Multi-nucleated sphere unknown), which decimated 90-95% of the oysters in a two-year period.

Oysters like to live in shallow, salty or brackish water, which is why the Delaware Bay is a perfect environment for them. They tend to grow in piles, which forms a habitat in which other creatures like to live. Very young oysters attach themselves down to larger oysters or oyster shells to create oyster beds. Oysters eat phytoplankton, or plant plankton, which they gather through filter feeding. Oysters filter water through their shells to facilitate feeding and breathing. As they do this, these animals also clean the water. Unfortunately, this filtering causes metals and toxins to be accumulated in the bodies of the oysters. Therefore oysters can be used as environmental indicators. Oysters have several predators such as oyster drills, moon snails, starfish, worms, oyster catchers, and humans.

Great Barrier Reef in Australia

1. Reef HQ is the Education Centre for the Great Barrier Reef. It gives students of all ages and learning abilities a unique environment to experience and learn about the Great Barrier Reef. Reef HQ's innovative education programs are age-specific and allow students to work towards objectives outlined in syllabus documents.

Supported by a team of qualified educators, you and your students will:

observe more than 5000 live sea creatures;

experience the habitats, ecosystems and behaviour of reef creatures;

analyse the interactions that exist between reef creatures;

appreciate the requirements for a healthy ecosystem;

discover the latest in reef research; and

take actions that will protect the future of the Great Barrier Reef.

Wherever you are in the world, experience the Reef with Reef Videoconferencing. During this underwater fact-finding mission, your classroom will be transported to the Coral Reef and Predator exhibits at Reef HQ (the world's largest living reef aquarium). State-of-the-art technology unlocks unique teaching and learning experiences, including information delivered live by a scuba diver. Reef Videoconferences are supported by comprehensive teaching materials, and educate students about a range of marine issues.

The Reef Videoconferencing program is very flexible. Therefore if there are any specific topics that you want covered during the session please let us know. Reef HQ has multi point capabilities so schools can split the cost if they wish to undertake a Reef Videoconference together.

Indianapolis Zoo

1. Shark Dive

Grade(s): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

Do you think of "Jaws" whenever sharks are mentioned? Join us tank-side at our shark exhibit while

we talk with a diver and learn more about these mysterious predators of the deep.

John Shedd Aquarium

1. Sea Turtle Rescue

The Shedd Aquarium needs your help! Three baby hawksbill sea turtles have just arrive from Florida and they need a home. As creators of a new aquarium, your students have been given a mission to build an enriching, educational habitat for these three sea turtles. During this 4-week program your students will work in cooperative groups to conduct research then use their findings to create a habitat model along with educational and conservational programming for their new exhibit. With help from our experts here at Shedd, your students will be exposed to the many different aspects involved in creating a successful exhibit while exploring the different careers available at an aquarium including water quality, animal husbandry, conservation education and design. Join us in helping to save these endangered animals.

A breakdown of the four weeks includes:

Week one we will explore the innovative design that went into Amazon Rising, one of our newest exhibits here at the Shedd.

Week two will see your students will speak one-on-one with our experts from the Shedd while conducting their own research into sea turtles.

Weeks 3 and 4 your students will present their exhibits to our "Board of Experts" and an award for most innovative design will be presented to one of the groups."

Liberty Science Center

1. Aquatic Creatures: Adaptations

E-Connections are science explorations based on a LSC exhibit area.

Objectives:

- To observe the adaptations of different aquatic creatures.
- To understand the reasons and causes of adaptations.
- To examine the effects of certain adaptations and choice of related habitats.

Exhibit Description:

Most of LSC's aquatic tanks reflect what is right outside our window, the Hudson River Estuary. Some of the creatures we might be able to observe are American eel, toadfish, flounder and spider crab.

2. Aquatic Creatures: Camouflage

E-Connections are science explorations based on a LSC exhibit area.

Objectives:

- To observe aquatic creatures, their morphology and behavior.
- To compare adaptations of closely related forms.
- To examine how color, shape, pattern and behavior help provide camouflage for organisms in a variety of environments.

Exhibit Description:

Most of LSC's aquatic tanks reflect what is right outside our window, the Hudson River Estuary. Some of the creatures we might be able to observe are American eel, toadfish, flounder and spider crab.

3. Aquatic Creatures: Habitats

E-Connections are science explorations based on a LSC exhibit area.

Objectives:

- To observe aquatic creatures, their morphology and behavior.
- To compare adaptations of closely related forms.
- To examine how color, shape, pattern and behavior help provide camouflage for organisms in a variety of environments.

Exhibit Description:

Most of LSC's aquatic tanks reflect what is right outside our window, the Hudson River Estuary. Some of the creatures we might be able to observe are American eel, toadfish, flounder and spider crab.

4. Aquatic Ecosystems - Estuaries

E-Connections are science explorations based on a LSC exhibit area.

Objectives:

- To observe aquatic creatures, their habitat and behavior.
- To explore the characteristics of an estuary and understand how it is the most productive ecosystem in the world.

Description of Exhibit:

Most of LSC's aquatic tanks reflect what is right outside our window, the Hudson River Estuary. Some of the creatures we might be able to observe are American eel, toadfish, flounder and spider crab.

5. Wave Behavior

E-Connections are science explorations based on a LSC exhibit area.

Objectives:

- To understand the behavior of waves.
- To experiment with variables that alter wave behavior.

Exhibit Description:

LSC's Torsional Wave spans the four floor, seventy foot high center atrium. This exhibit encourages guests to experiment with wave behavior.

Melbourne Zoo, Australia

1. Something Fishy

Find out more about our Australian Fur Seals and our programs about Marine Entanglement, "Diving through Debris" and "Seal Pool Chemistry".

Minnesota Zoo

1. Wetland Wonders

May is National Wetlands Month. During this month, the goal is to help the public recognize and appreciate the importance of our wetlands. Minnetrista would like to help your students to do just that. Wetlands are valuable resources. They sustain more life than almost any other habitat. At least 1/3 of the nation's threatened or endangered species live in wetland areas. The productivity of wetlands, their cleansing ability, and their water storage capacity make them a resource to be highly cherished. Join us and we will discuss and define wetlands, types of wetlands, benefits of wetlands, and the plants and animals that live in wetlands. Designed for grades K - 12.

Ocean Institute

1. Careers in Marine Science: Marine Biology

How do you become a marine biologist? How does the work of a marine biologist affect our everyday life? What techniques do marine biologists use in field research? During this videoconference, students will observe tools and techniques used by marine biologists when working in the field. They will also have the opportunity to ask Ocean Institute biologists about their educational background, their experiences in the field, and their projections for the future. Designed for grades 7 - 12.

2. Safari Into the Intertidal Zone

What causes the tides? How is a shore crab adapted to survive in this harsh but beautiful ecosystem? How do scientists monitor population in the intertidal ecosystem? During this videoconference, students will become marine biologists as they study the Dana Point Marine Life Refuge. They will discover the causes and effects of tides, identify animals in the wild, discuss animal adaptations for survival in the intertidal ecosystem, and learn how scientists monitor animal population in a biological community. Designed for grades K - 12.

3. The Mysterious Whale

How are the magnificent mammals adapted to survive in the marine environment? How do scientists identify whales in the wild? Are whales underwater poets? During this videoconference, students will

explore methods scientists use to study whales in the wild. They will learn to identify different species of whales, observe whale behavior and record their field observations, and identify whales by making sound maps. Designed for grades K - 12.

Smithsonian Environmental Research Center

1. Blue Crab Biology

Examine the fascinating life and role of the blue crab, an important link in the Chesapeake Bay food web. The video conference will focus on blue crab research conducted in the Bay, and what this research tells us about the state of the Bay and its watershed.

Preparation: Each informative videoconference lasts between thirty and sixty minutes, during which time conduct hands-on science demonstrations and interact with SERC staff.

2. Science in Action: Research at the Smithsonian Environmental Research Center

Located outside Washington, DC, along the Chesapeake Bay is the Smithsonian Environmental Research Center (SERC). The scientists and educators here explore the biological and physical processes that sustain life on Earth. Since 1965, SERC scientists have researched the aquatic, terrestrial, and atmospheric components of complex ecosystems and applied this knowledge for the improved stewardship of the biosphere. Explore these processes and components by exploring the science laboratories of SERC. Interactive demonstrations recreate SERC science in the classroom. Students will also discover potential careers in science.

3. The Chesapeake Bay

An introduction to and overview of the Chesapeake Bay, its watershed, and the Smithsonian Environmental Research Center (SERC). Explore the unique characteristics of the nation's largest estuary and learn about some of its inhabitants. This videoconference is a great first introduction to estuaries and Chesapeake Bay ecology. Designed for grades 2 - 12

University of Georgia Marine Extension Service

1. No Wetlands = No Seafood

What do things like tides and salt marshes have to do with ordering blackened redfish at your favorite seafood restaurant? Join Marine Resource Specialist Paul Christian to discover the intricacies of life in a Georgia estuary. Designed for grades 9 - 12.

2. Coastal Reptiles

In this program students will discover just what it takes to be a reptile. They will see slides, video, and live specimens of our native reptiles, and hear about their unique life histories. They will also learn how to identify the few species of dangerous reptiles living in Georgia. After our program students will have new understanding on how these important animals fit into our ecosystem. Designed for grades 5 - 12.

3. Coastal Wading Birds

Georgia's coastal zone includes nearly 500,000 acres of salt marsh wetlands which provide habitat for countless invertebrate and vertebrate organisms. Join photographer and naturalist Robert Overman for a look at the wading birds which live in, and utilize, these rich resources. For grades 9 - 12.

Ward - Mellville Heritage Organization

1. Electronic Explorations: The Salt Marsh Ecosystem

Students who participate in this program can study a marine environment without ever leaving the classroom. This distance learning program utilizes two-way video conferencing and wireless technology to enable students outside our locale to "visit" and study the temperate salt marsh.

With the help of a qualified naturalist, students explore the plants and animals native to the marsh and their respective roles in the marsh food web. Students consider the essential question "Why is it important not to interfere with the balance of an ecosystem?" Broadcast in real-time from the Marine Conservation Center in WMHO's 88-acre wetlands preserve, the program is offered in cooperation with the University at Stony Brook's Marine Sciences Research Center.

Wearing a wireless camera set in a specially-equipped pair of eyeglasses, and a vest which transmits two-way audio, the naturalist teaches right from the water's edge. Students are able to see the live specimens the naturalist uncovers, ask questions and converse with him or her in real time.

Wetlands Institute

1. Adaptations

The salt marsh is a habitat that is different than any other habitat in the United States. Learn what defines a habitat and then learn how the unique animals of the marsh have adapted to the conditions. Animals examined could include sea stars (not star fish, which will be explained), terrapins (the salt marsh turtle), osprey, and horseshoe crabs. Designed for lower elementary students.

2. Wetlands Ecology

There are many different types of wetlands found throughout New Jersey and the United States. But they have not always been appreciated. Between 1900 and 2000, we have destroyed over 53% of the lower 48's wetlands. Learn what is a wetland, why they are important to all people, and about some of our efforts to help promote student participation in saving wetlands. Designed for middle and upper school students.

3. Terrapin Conservation Program

Terrapins are the only reptiles of the salt marsh. While most people like turtles, the terrapin has been having great trouble with humans. Learn about those troubles (cars, crab traps, over-development, turtle soup) and how the Institute and local children have been helping these interesting animals. Designed for lower and middle elementary students, but can be adapted for secondary schools.

Science Career Speaker- Distance Learning Programs

Cincinnati Zoo and Botanical Gardens

1. Zoo Careers

This single-episode program uses a problem-based inquiry method focusing on a real-world project undertaken by the zoo. For example: The Asian elephant is pregnant. We want to facilitate a successful birth and prepare for the care and public viewing of the new baby. Using this project context, students discover a variety of jobs needed to run the Zoo by working their way through the work tasks that would be needed to accomplish the project. For each step, via videotape, students meet Zoo employees who would do the work and hear about what else the worker does day-to-day, what education and skills are needed to get that kind of job, and how academic school subjects are applied in the workplace. This program is aimed at middle and high school students.

Columbus Zoo & Aquarium

1. I Want to Work at a Zoo

Students will explore the career opportunities that a Zoo has to offer and will participate in activities that will help to prepare them for finding a job in today's world. Teachers can choose from two program options:

Option 1: Career Preparation Emphasis-students will be introduced to a variety of zoo careers through hands-on activities and will take part in a mock interview process with the Zoo instructor.

Option 2: Animal Keeper Emphasis-students will be introduced to a variety of zoo careers through hands-on activities and will have the opportunity to engage in a question and answer session with an animal keeper.

Eli Lilly & Co.

1. Life Sciences & Engineering Career Panel

Grade(s): 7, 8, 9, 10, 11, 12

Interactive; Lilly chemists, engineers, computer experts (IT), and female scientists/engineers will

share their backgrounds and experiences with students. Diverse professionals from entry level to doctoral level will be represented. The majority of the program will be open to questions from students. You will receive more information on the specific presenters at least a week prior to the program to help you prepare your students.

Indianapolis Zoo

1. Zoo Career Series: Animal Keeper

Grade(s): 6, 7, 8, 9, 10, 11, 12

What does it take to work in a Zoo? Why don't you ask someone who does? Your students can have their career questions answered personally by a member of the Zoo's Collections or Vet staff and learn what a day in the life of an IZS worker is really like.

2. Zoo Career Series: Horticulturalist

Grade(s): 6, 7, 8, 9, 10, 11, 12

What does it take to work in a Zoo? Why don't you ask someone who does? Your students can have their career questions answered personally by a member of the Zoo's Collections or Vet staff and learn what a day in the life of an IZS worker is really like.

3. Zoo Career Series: Veterinarian

Grade(s): 6, 7, 8, 9, 10, 11, 12

What does it take to work in a Zoo? Why don't you ask someone who does? Your students can have their career questions answered personally by a member of the Zoo's Collections or Vet staff and learn what a day in the life of an IZS worker is really like.

IUPUI

1. Careers in Science

Science faculty prepares an in depth presentation about career opportunities in different fields of studies in the sciences. This is an hour of interactive learning opportunities for middle and high school students who want to ask the scientists about the education levels required for careers in a number of employment settings. The emerging job opportunities in health care, law, business, computer, and biotechnology will be discussed.

Liberty Science Center

1. Careers at LSC

E-Connections are science explorations based on a LSC exhibit area.

Objectives:

- To introduce the skills that are needed in different careers.
- To examine the tools of different occupations.
- To explore possibilities for career choices.

Exhibit Description:

During this connection we will introduce you to people who work at LSC. Some of the people you might be able to interact with are involved in engineering, the store, exhibit design, animal maintenance and the telephone system. They will share their tools of the trade and take you places our guests never get to go.

NASA Live

1. Career Choices Apply Here

Growing up is not always easy neither is choosing a career. But, it is never too early to start thinking and planning just what you'll become. To help you unlock your potential, discover the science, mathematics, engineering, and technology all around you. In the process, educators and students will

learn what it takes to work at NASA as well as get a forecast of tomorrow's job market. This is an opportunity for educators and students to learn about the importance of earning good grades, applying for internships, and choosing the right courses. Since jobs of the past are not the only jobs of the future, NASA may just be the place for you.

New Jersey State Aquarium

1. Aquarium Interview

Have you ever thought about a career in marine science? Take advantage of this unique opportunity to conduct a live interview with the biologist of your choice - aquarist, marine science educator, penguin keeper, marine mammal trainer, veterinary technician or SCUBA diver.

Northern Michigan University

1. Laboratory Clinical Sciences: Join the Director of Clinical Lab Sciences at Northern Michigan University, Lucille Contois; the Laboratory Technical Service Representative at Marquette General Health Systems, Corey Blight; along with a student currently enrolled at NMU, in a 50 minute presentation on Medical Lab Sciences. The program will preview NMU's programs and facilities, academic requirements, salaries, projected demand, job requirements, CLS career choices, and professional challenges and rewards, while stressing the relationship between NMU and MGH. This program is part of Northern Michigan University's Career Pathway outreach and is appropriate for grades 7 -12.

Smithsonian Environmental Research Center

1. Science in Action: Research at the Smithsonian Environmental Research Center

Located outside Washington, DC, along the Chesapeake Bay is the Smithsonian Environmental Research Center (SERC). The scientists and educators here explore the biological and physical processes that sustain life on Earth. Since 1965, SERC scientists have researched the aquatic, terrestrial, and atmospheric components of complex ecosystems and applied this knowledge for the improved stewardship of the biosphere. Explore these processes and components by exploring the science laboratories of SERC. Interactive demonstrations recreate SERC science in the classroom. Students will also discover potential careers in science.

Zoology- Distance Learning Programs

Bronx Zoo/Wildlife Conservation Society

1. Gorillas, Gentle Giants in Crisis

Grades 7 - 12, 1 hour

Remote live-cams bring your students right into the Bronx Zoo's Congo Gorilla Forest exhibit! The class will be fascinated by the behaviors of our western lowland gorillas as our instructor challenges students to consider the predicament of this critically threatened rainforest species. Students discover the ways in which human activities impact the African Congo rainforest ecosystem, how the conservation process works, and the social priorities that foster or impede conservation programs.

Buffalo Zoo

1. Animal Enrichment

Let your students become scientists as they learn about animal behavior and animal enrichment in zoos! As the highlight of the program, students learn how to make specific enrichment items for designated species of animals at the Buffalo Zoo. This two-session experience culminates in a free trip to the Zoo where students get the opportunity to give their enrichment items to the animals and observe their behavior (non-local schools receive a "virtual field trip" to culminate program). Recommended for grades K - 12.

2. Conservation Connection

Why are all animals important to an ecosystem, even cockroaches and poison dart frogs? During this experience students explore the interconnectedness of the natural world by discussing food webs, endangered species, and zoo conservation. Students will study animals that are locally and globally endangered and will be encouraged to start a conservation project of their own. Recommended for grades 4 - 12.

3. Gorilla Quest

Did you know that gorillas are peaceful primates? In this program students will embark on a Gorilla Quest to learn about gorillas and their behavior, discover behind-the-scenes requirements and missions of modern zoos, and unearth reasons why gorillas and other animals are endangered. This cross-curricular program was developed with a team of middle school teachers, and includes a comprehensive teacher's guide to use in the classroom. Recommended for grades 5 - 12.

Cincinnati Zoo and Botanical Gardens

1. Animal Adaptations

Students will learn about physical and behavioral characteristics that help animals survive in their specific habitats. Students will meet animals that are adapted to different climates, eat different foods, and have different strategies for defending themselves. They will observe "up-close" the physical characteristics that help these animals meet their needs in differing environments, and they will create adaptations for a new animal, based on its climate, diet, and defense needs.

2. Endangered Species I - The Hippo Dilemma

Students will learn the five main causes of the decline and endangerment of animal populations. The program is designed for grades 4 - 12, with the sophistication of discussion adapted according to grade level. Hands-on activities for young students help them follow along and stay engaged. With older students, active discussion of tough environmental issues can lead to lively debate.

3. Endangered Species II - The Elephant Solution

This sequel to Endangered Species presents the solutions to the problems of declining animal populations. Discussion builds upon the concepts presented in the Endangered Species program, and includes global and local strategies and action needed to protect species from extinction.

4. Nobody Likes Me

Students will encounter frogs and toads, bats, bugs, and snakes. They will learn why these animals are important ecologically and what makes them interesting or beautiful. Students will have a chance to share their thoughts and emotions about these animals, and negative myths will be dispelled. As they watch, listen, and participate, older students will create an adopt-an-animal ad for each animal, to provide a hands-on, kinesthetic component to the program. Younger students will discuss what they might say in their ad and can complete the hands-on work as follow-up. Designed for grades K - 5, adaptable for 6 - 12.

5. The Wonderful World of Bugs

Insects are the most numerous and diverse group of animals on earth. In this program, students will see a variety of insects and other arthropods (insect relatives) and learn about their important ecological services, life cycles, and interesting and sometimes bizarre features. This program capitalizes on the Cincinnati Zoo's nationally renowned insectarium, which has one of the largest collections of exotic invertebrates in the country. Note: Some of the content of this program is repeated from the bugs section of Nobody likes Me, with a more in-depth focus.

6. Classification

Students will learn the hierarchy of the Linnean classification system and the key characteristics of either vertebrates or invertebrates at the class level. By participating in a "20 Questions" style guessing game, students build an understanding of asking key questions in a particular order to determine to which group a specimen belongs. This sets the stage for using and creating dichotomous keys.

Columbus Zoo & Aquarium

1. Our Changing World

Humans impact the earth in many ways. This videoconference will discuss how we can make a change for the better and conserve wildlife and wild places for many years to come.

2. Animals in Jeopardy

This program will discuss the reasons why animals become endangered, focusing on those most directly related to human activities.

Cranbrook Institute of Science

1. Bats and Nocturnal Animals

Explore the fascinating world of the night and unravel the mystery of how nocturnal animals are adapted to hunt and survive in darkness. Experience the tremendous diversity of the only mammals that can fly: bats. Cranbrook Institute of Science is the headquarters for the Organization for Bat Conservation (OBC), a nationally renowned group devoted to the study and preservation of bats and conservation of their environment. In this 45-minute program, OBC experts present live bats which range from small microbats to large flying foxes.

Indianapolis Zoo

1. Endangered Species

Grade(s): 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

It's sad, but true: entire species of plants and animals vanish from our planet everyday. In this program, we'll explore some of the causes of extinction, talk about some success stories of survival, and learn how you can do your part to help save our endangered species.

2. Habitat Design

Grade(s): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

With over 350 different kinds of animals at our Zoo, how do we make them all feel at home? Learn about animal habitats, both out in the wild and here in Indianapolis.

3. Animal Enrichment

What is it? It's how we keep our animals entertained, happy, and healthy. How do we do it? Find out as we explore the many ways of creating playtimes that are fun for animals and people alike!

Recommended for grades 3 - 12. Offered Sept. 20th, Feb. 9th at 9 AM, 10 AM, 11 AM, 1 PM.

4. Primates

Are lemurs, baboons, and gibbons all monkeys? No, but they are all primates. Using activities and observational skills, students will learn the difference between prosimians, monkeys, and apes, and the special ways each animal survives in its environment. Recommended for grades K - 12. Available by request.

IUPUI

1. Elephant Ancestors in Indiana

Can You Dig It? This program has not yet been evaluated.

Audience: *Education:* Grade(s): 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, *Business/Community:* Community Member

Description: The program introduces the concept of earth science evolution. The audience will learn about Indiana's Ice Age, the process of identifying pre-historic animals, and the actual discovery of a Mastodon in Indiana. Historical perspectives are described through the evolutionary process that shapes the land of the State of Indiana.

Lee Richardson Zoo

1. Animal Adaptations

Seeing in the dark, smelling with their tongues, or even becoming invisible - animals have some very special ways of surviving in their habitats. Come meet some remarkable real-life survivors.

2. Tropical Treasures

Travel with us to the rainforests as we encounter carnivorous plants, lizards that look like leaves, and much more. Discover why rainforests are so important to our planet, and find out what you can do to help save these tropical treasures.

3. Wonders Down Under

From wombats to wallabies, Australia is home to some amazing animals! Join us as we explore the wild world down under.

4. Kansas Animals

More than just buffalo roam here! Come learn all about the wonderful wildlife right here on our own Great Plains.

5. Going, Going, Gone: Vanishing Species

Meet some rare animals and discover why they are disappearing so quickly, what zoos are doing to conserve them, and what you can do to help these vanishing species.

6. Creepy Creatures

Are snakes really slimy? Can toads give you warts? Learn the truth about some of nature's less popular animals. These creatures might not be as creepy as you think!

7. Bird Buddies

Soaring, singing, or preening - the more you know about birds, the more fun they are! Visit the zoo to learn all about this special group of animals and meet some of our own feathered friends.

8. Awesome Amphibians

From their love song serenades to their role as barometers of environmental quality, amphibians are fascinating animals! We'll explore their unique adaptations for survival, and how they are playing an important role in the latest medical advances.

9. Radical Reptiles

Snakes, geckos, and even dragons - reptiles are some of the most misunderstood animals in the world! Join us for a close-up look at these animals, and find out what makes reptiles so radical.

10. Create-Your-Own-Topic

Is your class studying mammals, habitats, or another nature-related topic? We can design a program to fit your curriculum! Contact the zoo to discuss programming options.

Liberty Science Center

1. Aquatic Creatures: Adaptations

E-Connections are science explorations based on a LSC exhibit area.

Objectives:

- To observe the adaptations of different aquatic creatures.
- To understand the reasons and causes of adaptations.
- To examine the effects of certain adaptations and choice of related habitats.

Exhibit Description:

Most of LSC's aquatic tanks reflect what is right outside our window, the Hudson River Estuary. Some of the creatures we might be able to observe are American eel, toadfish, flounder and spider crab.

2. Aquatic Creatures: Camouflage

E-Connections are science explorations based on a LSC exhibit area.

Objectives:

- To observe aquatic creatures, their morphology and behavior.
- To compare adaptations of closely related forms.
- To examine how color, shape, pattern and behavior help provide camouflage for organisms in a variety of environments.

Exhibit Description:

Most of LSC's aquatic tanks reflect what is right outside our window, the Hudson River Estuary. Some of the creatures we might be able to observe are American eel, toadfish, flounder and spider crab.

3. Aquatic Creatures: Habitats

E-Connections are science explorations based on a LSC exhibit area.

Objectives:

- To observe aquatic creatures, their morphology and behavior.
- To compare adaptations of closely related forms.
- To examine how color, shape, pattern and behavior help provide camouflage for organisms in a variety of environments.

Exhibit Description:

Most of LSC's aquatic tanks reflect what is right outside our window, the Hudson River Estuary. Some of the creatures we might be able to observe are American eel, toadfish, flounder and spider crab.

4. Aquatic Ecosystems - Estuaries

E-Connections are science explorations based on a LSC exhibit area.

Objectives:

- To observe aquatic creatures, their habitat and behavior.
- To explore the characteristics of an estuary and understand how it is the most productive ecosystem in the world.

Description of Exhibit:

Most of LSC's aquatic tanks reflect what is right outside our window, the Hudson River Estuary. Some of the creatures we might be able to observe are American eel, toadfish, flounder and spider crab.

5. Insects: Camouflage

E-Connections are science explorations based on a LSC exhibit area.

Objectives:

- To observe insects, their morphology and behavior.
- To compare adaptations of closely related forms.
- To examine how color, shape, pattern and behavior help provide camouflage for organisms in a variety of environments.

Exhibit Description:

LSC's Insect Collection allows a close-up observation of bugs such as cockroaches, walking sticks, millipedes and spiders.

6. Insects: Ecosystem

E-Connections are science explorations based on a LSC exhibit area.

Objectives:

- To observe insects, their morphology and behavior.
- To compare adaptations of closely related forms.
- To understand the relationship between the environment and an insect's adaptations.

Exhibit Description:

LSC's Insect Collection allows a close-up observation of bugs such as cockroaches, walking sticks, millipedes and spiders.

Please have globes available in the classroom.

7. Insects: Habitat

E-Connections are science explorations based on a LSC exhibit area.

Objectives:

- To observe insects, their morphology and behavior.
- To compare adaptations of closely related forms.
- To understand the relationship between the environment and an insect's adaptations.

Exhibit Description:

LSC's Insect Collection allows a close-up observation of bugs such as cockroaches, walking sticks, millipedes and spiders.

Please have globes available in the classroom.

Melbourne Zoo in Australia

1. Threatened Species

Discover a range of species under the threat of extinction. You will find out about our captive breeding programs. This videoconference supports our zoo-based program "All But Lost".

2. Animal Antics

Would you like to meet a primate at the Zoo today? You will have the opportunity to observe and record the adaptations and behaviour of the Hamadryas Baboon. The focus of the presentation will include the adaptations of a variety of species. This compliments our zoo-based "Animal Behaviour" program.

3. Skulls and Bones

Explore the skulls and bones of a variety of animals to discover how they move, what they eat and how big they are. This videoconference compliments our zoo-based programs "A Touch of Class" and "Diet and Dentition".

4. Feet, Hands and Flippers

Have you ever wondered why a peacock's tail feathers fall out in the summer or why a Satin Bower bird collects blue objects? Join us to explore the many wonderful adaptations that make animals so well suited to their environment. This videoconference compliments our zoo-based program "Animal Amble".

Miami Museum of Science and Space Transit Planetarium

1. When Animals Talk

The Virtual Field Trip Expedition offers an opportunity for your class to participate in a close-up, two-way videoconference with science educators at the Miami Museum of Science to explore science in a new and unique way. Your Virtual Field Trip Expedition includes pre- and post-conference teaching materials that support National Science Education Standards and provide a total learning experience for your students.

When Animals Talk is a Scientific Adventure where you will interact with wildlife researchers from the Museum as they take you through the scientific inquiry process of actual work being conducted through the Museum in Florida Bay. Take a behind-the-scenes tour of the Museum's veterinary hospital and its birds of prey rehabilitation center and learn about the scientific research supported at the Museum. Supports National Science Education Standards at all grade levels.

National Aviary

1. Brave New World

From the Amazon Basin to our own backyards, the New World contains a dazzling array of habitats and bird species. Tiny chickadees, long-legged flamingoes, and mysterious Spectacled Owls are just some of the birds we may encounter as we wind our way through Costa Rican rainforests, subtropical wetlands, and suburban backyards. We'll cover topics like habitat loss, endangered species conservation, and attracting wildlife your own garden as we visit with birds from North and South America and the islands of the Caribbean.

2. Old World Walkabout

Visit the Old World as we wander through some of the most historic exhibits at the National Aviary. Steamy jungles, African deserts, and tropical Pacific islands are all on the itinerary for our Old World Walkabout. Discover increasingly rare Great Indian Hornbills, elfin Pearl-spotted Owlets, and beautiful Victoria Crowned Pigeons, the world's largest living pigeon species. Mystery and discovery await as we discuss avian adaptations, convergent evolution, and some of the world's most unusual nesting behavior.

3. Bill of Fare

Hérons, and spoonbills, and ducks, oh my! It's feeding time at the National Aviary and the birds are hungry. We insure that every bird gets his or her fair share at the Aviary, but how do these birds avoid competition in the wild? Visit the Wetlands of the Americas as we examine ibis, cormorants,

terns, and many other wetland birds. Pull up a chair and see what's on the menu. Learn how all these birds find a place at a crowded dinner table, and how we humans have tools of our own that parallel the "natural utensils" of these amazing wetland birds.

4. Vanishing Wings

It's too late to save the Passenger Pigeon, Carolina Parakeet, Dodo, and numerous other extinct species. Unfortunately, there are still many other existing birds in peril that face a number of human-created problems. We've had to learn a hard lesson about extinction, but it is possible to save what we have left. The National Aviary is working to preserve such critically endangered species such as Bald Eagles, Red-Crowned Cranes, and Thick-billed Parrots. Learn about extinct and endangered species, the birds of the Species Survival Plan, what humans have done to impact rare birds, and what is being done to bring them back from the brink of extinction.

National Museums Liverpool

1. The National Museums Liverpool is a large multi-disciplinary organization covering art, history, and science. Experiments with the use of video conferencing have been very successful and proposals are welcome from around the world. Programs are now available from the Natural History Centre's activity room with over 20,000 specimens available for examination. Powerful video-microscopes in the Centre can be connected to the video conferencing system to reveal the smallest details on a wide diversity of insects, fossil, mineral and plant material.

San Diego Zoo

1. Animal Adaptations

How do an animal's body parts and behaviors help it survive in its environment?

2. Animal Classifications

What makes an animal, a bird, mammal, reptile, or insect?

3. Endangered Species

How does an animal become endangered, and what can students do to help?

Tennessee Aquarium

Currently offer videoconferences on animals that can be brought to the camera. All sessions feature an Aquarium Educator interacting with the students and answering questions about the topic.

Animals that may be featured include: Ornate Box Turtle, Chilean Rose Hair Tarantula, Cornsnake, Emperor Scorpion, Giant Marine Toad, Leopard Gecko, Madagascar Hissing Cockroach, Tomato Frog, Dumeril's Ground Boa, Ornated Horned Toad.

1. But I Want It

Have you ever wished for an exotic fur coat or a pair of alligator boots? What about a tortoise shell barrette or an ivory bracelet? Ever wanted an exotic cat or a rare reptile for a pet? All of these are animals or products made from animals that are becoming endangered due to illegal trade and capture. Through slides, video and actual confiscated items, students are introduced to the problems faced by "valuable" wildlife. Designed for grades 9-12

Toledo Zoo

1. Animal Classification

Students will discuss the variety of living organisms and why we name and group them. They will also learn who created binomial nomenclature, why the world of science needed it, and why we have to learn all that Latin! A few basic Latin root words used in classification will be introduced. Younger students will see carnivore and herbivore skulls (and learn about omnivores) and then discuss how animals can be grouped according to the foods they eat. Older students will learn the word "taxonomy" and the divisions of kingdom, phylum, class, order, family, genus, and species. Working in groups, students will create mnemonic devices to remember these divisions. Games and sorting strategies will be employed to see how science uses differences and similarities to form groups. Students will classify live animals

to test what they've learned

2. Animal Coverings

Explore the differences and similarities among animal coverings through puppets, animal biofacts and live animals. Children will also observe "inside/outside" skeletons and play simple sorting games using beanie animals, foodstuffs, etc. Puppets will introduce the different groups, and then live animals from different classes will visit to show off their covers. The concepts of "camouflage" and "mimicry" will be introduced. Designed for grades K - 12.

3. Arctic Animals

Live from the Zoo's Arctic Encounter exhibit, students will learn the basic geography and physical characteristics of the Arctic. Students will also have the opportunity to learn more about our polar bears and seals. Special adaptations that help animals and peoples to survive the harsh climate and circumstances in the Arctic will be emphasized to illustrate how life persists there. Designed for grades K - 12.

4. Endangered Species

Students of all ages will learn about the plight of endangered animals with a basic overview of what (who) has caused this dilemma and what we can do about it. Using live animals and biofacts, children will see some of the products and ornaments that animals are used for and see how zoos are working to promote awareness, appreciation and conservation of animals.

Grades K - 2 will learn the meanings of "endangered," "extinct," and "habitat." Children will discover how we are all part of the problem but can also work to be part of the solutions, e.g., recycling, reducing, re-using, protecting and creating habitats, and being smart consumers. Grades 3 - 8 will look at some specific problems causing endangerment, i.e., poaching, over-harvesting, pet trade, habitat destruction, and pollution. Grades 9 - 12 will look in-depth at some of the complex issues surrounding conservation, i.e., jobs, politics, money needed, space needed, preparing the wild for re-introduction, and considerations for genetic diversity. Students will play a game of "In Jeopardy" with Alexa Treesback and determine if they have the knowledge to help win the most important game of all! Designed for grades K - 12.

5. Animal Adaptations

What is an adaptation, how do adaptations happen, and what do they mean to animals and the natural world? Students will review all this and much more as they begin to explore how an adaptation aids survival. Simulations and experiments will help students become better skilled at observing and recognizing adaptations and how they help animals to succeed in their niches. Older students can gain knowledge about natural selection and explore both physical and behavioral adaptations on a more complex level. Designed for grades K - 12.

University of Texas Institute of Texan Cultures at San Antonio

1. Dinosaurs and Prehistoric Earth

What was a dinosaur? Did some dinosaurs eat grass? How were they like crocodiles, turtles, snakes, lizards, and birds? Are dinosaurs still alive today? What is an aquifer? Discover the fascinating and sometimes surprising answers to these questions and much more. Fossils, models, and graphics are used to show what and how science tells us about a world that existed millions of years ago. Resource Guide Available. All ages