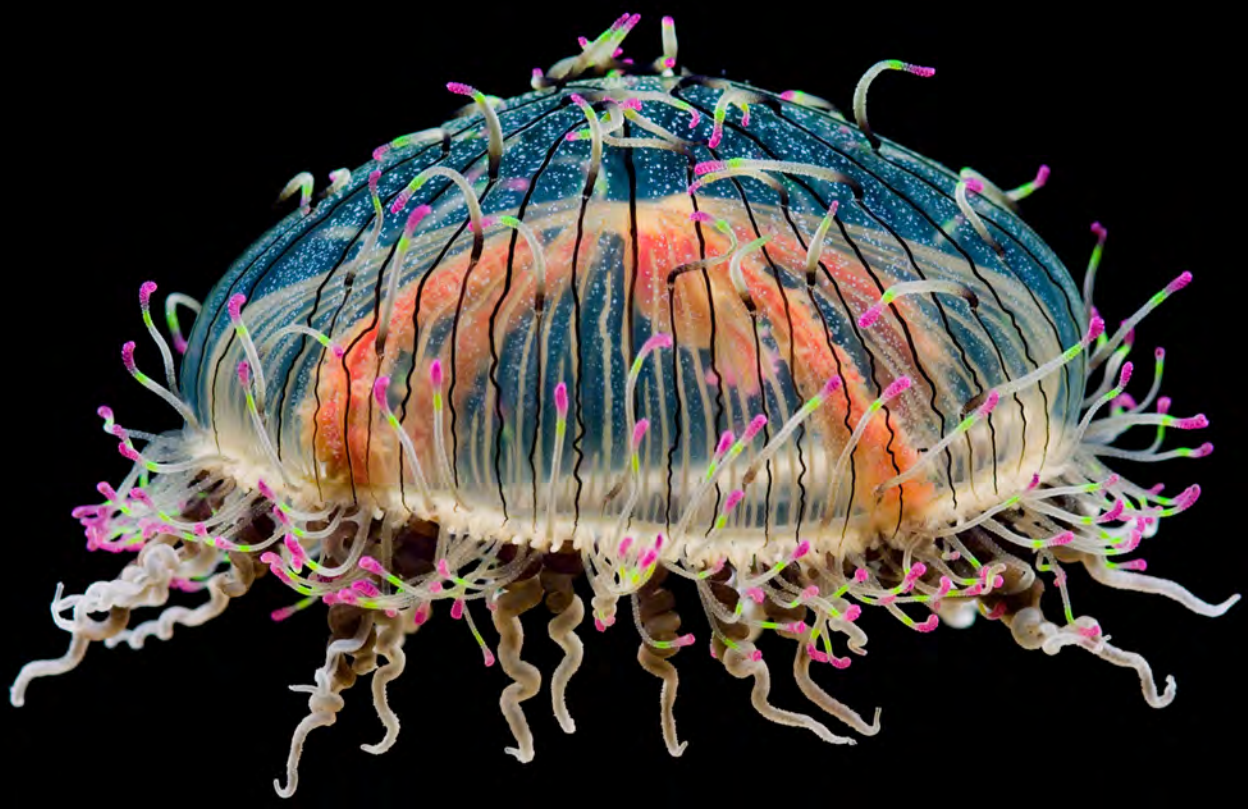
LIFE

A JOURNEY THROUGH TIME

FRANS LANTING

EDUCATOR RESOURCE GUIDE



ANNENBERG SPACE FOR PHOTOGRAPHY

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THE ANNENBERG SPACE FOR PHOTOGRAPHY

HISTORY • EXHIBITS • DESIGN

HISTORY The Annenberg Space for Photography opened to the public on March 27, 2009. It is the first solely photographic cultural destination in the Los Angeles area. The Photography Space is an initiative of the Annenberg Foundation and its board of directors. Its creation builds upon the Foundation's long history of supporting visual arts.

EXHIBITS The Annenberg Space for Photography does not maintain a permanent collection of photographs; instead, exhibitions change every four to six months. The content of each show varies and appeals to a wide variety of audiences.

DESIGN The interior of the Space is influenced by the mechanics of a camera and its lens. The central, circular Digital Gallery is contained within the square building much as a convex lens is contained within a camera. The Digital Gallery's ceiling features an iris-like design reminiscent of the aperture of a lens. The aperture design also enhances the Gallery's acoustics.

The Print Gallery curves around the Digital Gallery, representing the way film scrolls within a camera. The curvature of the ceiling line in the Print Gallery mimics the design of a film canister.


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THE DIGITAL GALLERY
Seamless 13' 4K glass screens display photography with stunning clarity and saturation. The Digital Gallery allows for the display of thousands of images in a comparatively small location. In addition to showing images from the exhibiting photographers, the Digital Gallery screens short documentary films created to accompany the print exhibits.

THE CURRENT EXHIBIT

AGE RECOMMENDATION • OVERVIEW

LIFE
A JOURNEY THROUGH TIME
FRANS LANTING

AGE RECOMMENDATION

LIFE: A Journey Through Time is appropriate and recommended for all ages.

OVERVIEW

LIFE: A Journey Through Time is based on acclaimed *National Geographic* photographer Frans Lanting's epic, multi-year project and features more than 70 images with texts and stories about the works, as well as an innovative timeline of life on our planet. Exclusive to the traveling exhibition's presentation at the Annenberg Space for Photography are an original documentary short film and short videos that explore the human connection to life around us. *LIFE* explores the story of our planet from its earliest beginnings to its present diversity, captured in images that evoke the complex wonder of nature through time.

For The LIFE Project, Lanting set off on a journey of photographic discovery that led him to remote locations such as Western Australia's Shark Bay and Siberia's Kamchatka Peninsula to capture primordial landscapes—and into unique museum collections to explore fossils and microscopic life. The result is a celebration of planet Earth that aims to educate and inspire through images and stories of the incredible biodiversity that surrounds us.

Organized in sections, the exhibition begins with "Elements," to interpret Earth's early history and show interactions among the five classical elements: earth, air, fire, water and space; "Beginnings" traces life from single-celled origins into more complex forms in the sea; "Out of the Sea" evokes the time when life first ventured ashore; "On Land" covers the period when plants and animals colonized solid ground; "Into the Air" highlights the evolutionary innovations of birds and flowering plants, ending with the cataclysmic events that caused the demise of the dinosaurs; "Out of the Dark" portrays the rise of mammals; and the concluding chapter, "Planet of Life," envisions the collective force of life as a sixth element shaping our planet. An outdoor component of the exhibition, "Future of Life," portrays present-day challenges to global biodiversity caused by the impact of humans on the planet in an era many scientists now call the Anthropocene.

An original documentary film commissioned by the Annenberg Space for Photography and produced by award-winning director Steven Kochones and Arclight Productions takes viewers on a journey through time via the remarkable images and story of Lanting's LIFE Project, while recounting Lanting's own evolution from wildlife photographer to visual chronicler of life on Earth. The film includes interviews with Lanting in his Santa Cruz studio; natural history writer, editor, videographer and longtime Lanting partner and collaborator Christine Eckstrom; horseshoe crab expert Dr. Carl Shuster; Harvard University evolutionary biologist Dr. Andrew Knoll; National Geographic Senior Photo Editor Elizabeth Krist; Ecological Research & Development Group President Glenn Gauvry; Jet Propulsion Lab (JPL) geologist Dr. Abigail Allwood; JPL Mars Program Office Chief Scientist Dr. Richard Zurek; pioneering sociobiologist Dr. Edward O. Wilson; UC Santa Cruz Institute of Marine Sciences Director Dr. Gary Griggs; and renowned primatologist and conservationist Dr. Russell Mittermeier.

THE CURRENT EXHIBIT

BIOGRAPHY OF THE FEATURED ARTIST

LIFE
A JOURNEY THROUGH TIME
FRANS LANTING

FRANS LANTING

Frans Lanting's influential work has appeared in books, magazines and exhibitions around the world. Born in Rotterdam, the Netherlands, he earned a master's degree in economics then moved to the United States to study environmental planning. Soon after, he began photographing the natural world. For three decades he has documented wildlife from the Amazon to Antarctica to promote understanding about the Earth and its natural history through images that convey a passion for nature and a sense of wonder about our living planet.

Lanting's work is commissioned frequently by *National Geographic*, where he served as a Photographer-in-Residence. His assignments have ranged from a first look at the fabled bonobos of the Congo to a unique circumnavigation by sailboat of South Georgia Island in the subantarctic. In a remote part of the upper Amazon Basin, he spent weeks on platform towers to obtain rare tree-canopy views of wild macaws. He lived for months with seabirds on isolated atolls in the Pacific Ocean, followed lions through the African night, and camped among giant tortoises inside a volcano in the Galápagos.

Lanting did pioneering work in Madagascar and in Botswana's Okavango Delta, and his photo essays about Borneo's rainforest, emperor penguins in Antarctica and the plight of puffins in the North Atlantic, have been featured in publications around the world. Images from his year-long odyssey to assess global biodiversity at the turn of the millennium filled an issue of *National Geographic*. Lanting's work for the *Geographic* also includes profiles of ecological hot spots, a series of photo essays on American landscapes, and stories about Hawaii's volcanoes, Zambia's wildlife, a global survey of albatrosses and a feature on groundbreaking research with chimpanzees in Senegal that is shedding new light on human evolution. His story about Namibia's new super park featured an image, "Ghost Trees, Namibia," that became an internet sensation when it was published in the June 2011 issue of *National Geographic*.

In 2006, Lanting and his wife and partner, Chris Eckstrom, launched The LIFE Project, a lyrical interpretation of the history of life on Earth, as a book, an exhibition, a website and a multimedia orchestral performance with music by Philip Glass. The LIFE symphony premiered in Santa Cruz, California, that same year, and has been touring North America and Europe ever since. ORIGINS, a new multimedia production based on LIFE, was performed in Geneva, Switzerland, at the official ceremony to inaugurate CERN's Large Hadron Collider, the largest machine ever built to study the origins of the universe. LIFE was performed at the Lincoln Center in New York to launch the World Science Festival and to honor the distinguished biologist Dr. E. O. Wilson, and in London, Marin Alsop conducted the London Symphony Orchestra in a special performance of LIFE at the Barbican.

PRE-VISIT ACTIVITIES

LIFE
A JOURNEY THROUGH TIME
FRANS LANTING

PRE-VISIT ACTIVITY #1 - RECOMMENDED FOR GRADES 6-8

Title: Stromatolites and Sequoias: A Glimpse Back in Time

Connection to the Exhibit:

LIFE: A Journey Through Time is an exhibit that takes visitors through the history of our planet from our primordial beginnings to our present through the use of photography. Even if we can't travel back in time to see life as it first appeared on Earth, we can observe ancient lifeforms to get a glimpse of what life would have been like millions of years ago. Through scientific observation we can draw a link between the events of the past and what we see when we cut open a rock or a tree.

Next Generation Science Standards:

MS-LS2 Ecosystems: Interactions, Energy and Dynamics

LS2.C: ECOSYSTEM DYNAMICS, FUNCTIONING, AND RESILIENCE.

> Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history. [Clarification Statement: Emphasis is on using available evidence within the solar system to reconstruct the early history of Earth, which formed along with the rest of the solar system 4.6 billion years ago. Examples of evidence include the absolute ages of ancient materials (obtained by radiometric dating of meteorites, moon rocks and Earth's oldest minerals), the sizes and compositions of solar system objects, and the impact cratering record of planetary surfaces.]

Disciplinary Core Ideas

4. The History of Planet Earth
5. Earth Materials and Systems

Common Core Standards for English Language Arts 6-12:

College and Career Readiness Anchor Standards for Reading (CCR)

Integration of Knowledge and Ideas:

- Integrate visual information (e.g., in charts, graphs, photographs, videos or maps) with other information in print and digital texts.

Glossary of Relevant Terms and Concepts:

Stromatolites, techtonics, radiometric dating, active geological processes, erosion.

Materials Needed:

- Enlarged copy of Frans Lanting's photograph entitled "Stromatolites at Dawn, Shark Bay, Western Australia" (see Photos section at end of Guide)
- Enlarged photograph of a tree trunk cross-section
- Paper and pencils
- Internet or library access

Large Group Activity:

- Show students an enlarged copy of the Frans Lanting photograph entitled "Stromatolites at Dawn, Shark Bay, Western Australia". Give students a minute or two to look at the photograph and guess as to what this photo shows.
- Display the word "stromatolites" for the students to see, and then break down the words into "stroma" and "lites." "Stroma" is Greek for bed or mattress and "lites" is Greek for rock.
- Introduce students to what stromatolites are: the preserved colonies of bacteria and algae that act as records of the history of life on our planet.
    - o A good website for information on stromatolites is the Shark Bay World Heritage Area's fact sheet page: http://www.sharkbay.org.au/nature-of-shark-bay/fact-sheet
- Pose the following questions to the class:
    - o Why do you think the photographer chose to photograph stromatolites for *LIFE*?
    - o Do you think there is any particular meaning behind the way that he photographed the stromatolites in Shark Bay?

Small Group Activity:

- A cross-section of a stromatolite gives scientists a glimpse as far back as thousands of years ago. Right in our own backyard here in California we have two living organisms that can also help us see what life on our planet was like thousands of years into the past: the California giant sequoias and redwoods.
- Ask students to break into small groups to conduct research on tree trunk cross-sections and the ways that the environment affects the growth of a tree. Ask students to pay particular attention to information on how fire, drought, heavy rainfall and tree growth redirection through imbalance affect the rings on a tree trunk.

Individual Work:

- Instruct students to work independently to draw their own cross-sections of a tree using the fictional tree history provided below. Instead of drawing a line for every year, have students draw a line for every ten years of the tree's life:
    - o 1780 CE – The tree began from seed in Visalia, California.
    - o 1800 CE – A large branch from a nearby tree falls and lands on our little two-foot sapling, causing it to grow curved to the left.
    - o 1818-1820 CE – Visalia experiences record rainfall.
    - o 1829 CE – A massive wildfire rages through this tree's forest. Fortunately, our tree is just scarred and doesn't sustain lethal damage. Surrounding trees are destroyed leaving our tree with more room to grow.
    - o 1896-1902 CE – A six-year dry spell hits Visalia
    - o 1920-1931 CE – Nice, wet winters occur for many years in a row.
    - o 1942 CE – A controlled fire accidentally injures our tree. The aftermath of the fire promotes soil fertility for many years after.
    - o 1984 – A lightning storm hits our tree's forest. A bolt of lightning fells our tree at the ripe age of 204 years old and at nearly 34 feet in diameter.

Individual Work (continued):

- After students create their tree diagrams using the life events listed above, have students research major historical events that occurred during the lifetime of this tree and add that to their tree trunk cross-sections.
- To wrap up the assignment, ask students to reflect in writing on what they've learned about not just stromatolites and sequoias, but also about the age of the planet and what studying these lifeforms can tell us about our past or how the natural world is affected by its surroundings—both manmade and otherwise.

PRE-VISIT ACTIVITY #2 - RECOMMENDED FOR GRADES 6-12

Title: Goodbye, Lonesome George: A Look at the Impact of Humans on Other Species

Connection to the Exhibit:

LIFE: A Journey Through Time is an exhibit rooted in a celebration of planet Earth that aims to educate and inspire through images and stories of the incredible biodiversity that surrounds us. The theme of one of the components of the exhibition is "Future of Life," in which Frans Lanting's camera documents present-day challenges to global biodiversity caused by the impact of humans on the planet. One unfortunate and potentially catastrophic result of this impact is the extinction of species.

Common Core Standards for English Language Arts 6-12:

College and Career Readiness Anchor Standards for Reading (CCR)

Key Ideas and Details

- Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
- Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.

Craft and Structure

- Assess how point of view or purpose shapes the content and style of a text.

Integration of Knowledge and Ideas

- Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.
- Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.

College and Career Readiness Anchor Standards for Writing (CCR)

Text Types and Purposes

- Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and relevant and sufficient evidence.

Production and Distribution of Writing

- Produce clear and coherent writing in which the development, organization and style are appropriate to task, purpose and audience.

College and Career Readiness Anchor Standards for Writing (CCR) - Continued

Research to Build and Present Knowledge

- Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.
- Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
- Draw evidence from literary or informational texts to support analysis, reflection and research.

Glossary of Relevant Terms and Concepts:

Extinction, vulnerable species.

Materials Needed:

Slideshow presentation or large photocopies of the following photos taken by Frans Lanting:

- Giant Tortoises, Galapagos
- Marine Iguanas, Galapagos
- Bonobo, Congo
- Giant Anteater, Brazil
- Flying Fox, Australia
- Horseshoe Crabs, Delaware Bay
- Flower Hat Jelly, California

(See Photos section at end of Guide.)

Large Group Activity:

- Show students Frans Lanting's photographs of the Giant Tortoises of the Galapagos. Introduce the traits of this animal and the environment that it lives in to the class.
- Share with the students the story of Lonesome George, the Pinta Island tortoise that was the last of the giant tortoises on the island.
- Introduce the levels of species threat as designated by the World Wildlife Fund: Extinct, Extinct in the Wild, Critically Endangered, Endangered, Vulnerable, Near Threatened, Least Concerned.
- Inform the students that the Giant Tortoise of Galapagos has been identified as "vulnerable" species by the World Wildlife Fund. Its survival has been threatened by the introduction of non-native species like dogs and cats that prey on young tortoises, as well as cattle that compete with them for grass to graze on. Additionally, the human population of the Galapagos Islands is six times larger than it was in the 1970s which has permanently changed the landscape of the island for these and other native animals.
- Share with students that if the Giant Tortoises of Galapagos become extinct, we will lose an animal that—next to crocodiles—is our closest connection to the dinosaurs and has survived over 200 million years only go extinct in the span of a human's lifetime.

Small Group Activity:

- Ask students to get into groups of seven and give each student two copies of these photographs taken by Frans Lanting: the Marine Iguanas of the Galapagos, the Bonobos of the Congo, the Giant Anteater of Brazil, the Flying Fox of Australia, the Horseshoe Crabs of Delaware Bay and the Flower Hat Jelly.
- Without doing any initial research, ask students to work with their group members to hypothesize in what order these species appeared on our planet and in what order they belong on the spectrum of extinction. Have students place photos in two "timelines", one for each category (age on the planet and extinction designation)
- Ask students to research one of their seven animals to find out the correct order they should be placed in as well as their extinction threat level. Have students adjust their timelines as needed.

Individual Work:

- Have half of the students in your class research the history of the southern sea otter and the other half of the class research the San Joaquin kit fox, both of which are endangered species native to California.
- Ask students to imagine that there is a nonprofit organization ready to give a four million dollar grant to either a sea otter or kit fox research program. Only one of these species will get the grant, and it is the stident's job to write an essay advocating for the protection of his or her assigned animal over the other. Students should use whatever research is at their disposal to persuade the grantors to their side.

PRE-VISIT ACTIVITY #3 - RECOMMENDED FOR GRADES 9-12

Title: The Wisdom of the Nautilus

Connection to the Exhibit:

LIFE: A Journey Through Time gives visitors an opportunity to see science through an artist's eyes. Whether it's in a misty photograph of a waterfall or the hypnotic swirl in a nautilus' shell, Frans Lanting's photography reminds us of the beauty in the biodiversity of the natural world around us and shares with us the stories that these places and creatures hold.

Common Core Standards for English Language Arts 6-12:

College and Career Readiness Anchor Standards for Reading (CCR)

Key Ideas and Details

- Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
- Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
- Analyze how and why individuals, events or ideas develop and interact over the course of a text.

Craft and Structure

- Interpret words and phrases as they are used in a text, including determining technical, connotative and figurative meanings, and analyze how specific word choices shape meaning or tone.

College and Career Readiness Anchor Standards for Reading (CCR) - Continued

Integration of Knowledge and Ideas

- Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.

Range of Reading and Level of Text Complexity

- Read and comprehend complex literary and informational texts independently and proficiently.

Glossary of Relevant Terms and Concepts:

Nautilus, mollusk, chambers, crypt, Triton.

Materials Needed:

Access to Internet or encyclopedias, large photocopy of Frans Lanting "Nautilus Shell" photograph (see Photos section at end of Guide), copies of the poem "The Chambered Nautilus" by Oliver Wendell Holmes.

Large Group Discussion:

- Use the Frans Lanting photo to provoke a discussion of the nautilus with students.
    - o What is a nautilus? Have you ever seen it before?
    - o How does the way this photograph was taken affect your impression of the nautilus?
    - o What words come to mind when you see the nautilus through the lens of Frans Lanting?
- Next, distribute copies of the poem "The Chambered Nautilus" by poet Oliver Wendell Holmes. Have students take turns reading it aloud as a group. While many of the words and phrasing that Mr. Holmes uses in this poem may be unfamiliar to students at first, Mr. Lanting's picture should provide insight.
- As a class, take a first pass at interpreting the poem to determine the meaning behind it.
    - o Is Mr. Holmes only referring to the sea creature, or is he talking about something more?
    - o How does the way he describes the shell of the nautilus remind you of what you see in Mr. Lanting's photograph? What does Mr. Holmes see that you don't see in the photo?

Small Group Activity:

- Now ask students to research the nautilus. Have them keep the poem at their side to reference as they discover more information about the animal so that they can make notes as they draw connections.
- Working in small groups, have the students break the poem into sections and annotate the poem with information about the nautilus and their ideas about the message of the poem.
- Once their small group work is complete, have students present their findings and interpretations to the class as a whole.

Individual Work:

- Ask students to work individually on a piece of reflective, personal writing that relates to the message of the poem. Students should consider the following questions before beginning their writing assignment:
    - What are the major themes that flow throughout this poem?
    - What was the message of the nautilus? What does Mr. Holmes think a nautilus can teach us about life?
    - This poem is over 150 years old; and when he wrote this poem, Oliver Wendell Holmes was almost 50 years old. That being the case, do you find the message and themes of this poem relatable as a high school student in 2015? If so, how? In what ways have you already experienced the message of "The Chambered Nautilus?"
    - How does reading Mr. Holmes' poem change the way you look at Frans Lanting's photography?

EXHIBITION ACTIVITIES

LIFE
A JOURNEY THROUGH TIME
FRANS LANTING

EXHIBITION ACTIVITY #1 - RECOMMENDED FOR GRADES 4-8

The photos in this exhibit show a wide variety of plants, animals and minerals from our planet's many biomes. Biomes are regions of the world with a similar climate made up of a community of lifeforms. There are five biomes on Earth: aquatic (in the water), deserts, forests, grasslands and the tundra (snow and ice).

Take a look at the photos printed below. Find each of these photos within the gallery and write down where that photograph was taken and what chapter the photo can be found under on the lines next to the image. Find a few classmates and work together on this task. When you have completed your assignment, show your work to a member of staff so we can check it.

_____

_____

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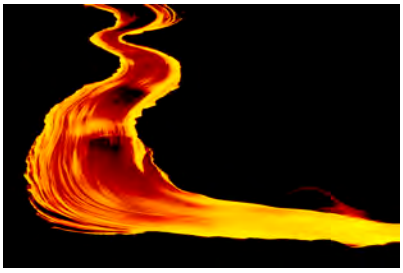


EXHIBITION ACTIVITY #2 - RECOMMENDED FOR GRADES 9-12

The photos in this exhibit show a wide variety of plants, animals and minerals from our planet's many biomes. Biomes are regions of the world with similar a climate made up of a community of lifeforms. There are five biomes on Earth: aquatic (in the water), deserts, forests, grasslands and the tundra (snow and ice).

Unscramble the words below each biome to discover the names of plants, animals or elements from that biome. After you unscramble the names, find a photo of that plant, animal or element, and write down where in the world it can be found on the line beside the scrambled word. Find a few classmates and work together on this task. When you have completed your assignment, show your work to a member of staff so we can check it.

Tundra

- EIRLCAG (Hint: big and cold) _____
- IICSECL (Hint: small and cold) _____

Aquatic

- WREAT LLYI (Hint: floating paths for frogs) _____
- SEHOHSEOR ACBR (Hint: neigh!) _____
- GELBAU _____

Deserts

- RNTOHY EIDVL (Hint: not as evil as its name) _____

Grasslands

- MPAILA (Hint: I run from the guy below) _____
- ETHACHE (Hint: I chase the guy above) _____

Forests

- ITGAN RATNETEA (Hint: I chase the guy above) _____
- OBOONB (Hint: we aren't so different from these guys) _____
- DIRHCO (Hint: lovely flower) _____

POST-VISIT ASSIGNMENTS & WRITING PROMPTS

Common Core Standards for English Language Arts 6-12:

College and Career Readiness Anchor Standards for Writing (CCR)

Text Types and Purposes

- Write narratives to develop real or imagined experiences or event using effective technique, well-chosen details and well-structured event sequences.

Production and Distrobution of Writing

- Produce clear and coherent writing in which the development, organization and style are appropriate to task, purpose and audience.

Research to Build and Present Knowledge

- Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.
- Draw evidence from literary or informational texts to support analysis, reflection and research.

ASSIGNMENT #1 - RECOMMENDED FOR GRADES 4-8

Explore.org's Pearls of the Planet are live cams from around the world that connect people with nature. Many of explore.org's more than 75 live animal cams allow viewers to see animals in their natural habitats.

Once you are back in the classroom, take a few minutes to see what's going on at explore.org's African Watering Hole animal camera (http://explore.org/live-cams/player/african-watering-hole-animal-camera).

Take notes on what you see in a five-minute observational period. How many different kinds of animals do you see? Read some of the comments and observations from visitors who have viewed this live cam in the past few days. Leave a few comments on behalf of your classroom to share your findings.

ASSIGNMENT #2 - RECOMMENDED FOR GRADES 6-12

Among the many photographs of gorgeous landscapes and exotic animals in far off locales, *LIFE: A Journey Through Time* features many photographs taken in Yellowstone National Park, a place Theodore Roosevelt described as one of our "great national playgrounds".

In a 1903 speech in Yellowstone, Theodore Roosevelt asserted that "[t]he only way that the people as a whole can secure to themselves and their children the enjoyment in perpetuity of what the Yellowstone Park has to give is by assuming the ownership in the name of the nation and by jealously safeguarding and preserving the scenery, the forests, and the wild creatures."

Consider that the budget for Yellowstone National Park has been cut by several millions of dollars over the past few years. Write a single-page letter to President Barack Obama asking him to increase funding for National Parks like Yellowstone. To illustrate your point, add references to the Yellowstone National Park photographs included in *LIFE: A Journey Through Time*.

ASSIGNMENT #3 - RECOMMENDED FOR GRADES 9-12

The outdoor component of the exhibition, "Future of Life," portrays present-day challenges to global biodiversity caused by the impact of humans on the planet. In a short writing assignment, write a first-person narrative from the perspective of a future photographer traveling to the following locations visited and photographed by Frans Lanting previously. To prepare for your writing assignment, conduct preliminary research on what impact humans will have on this area of the world. Address the following questions: What do you think will be different in these places 100 years in the future? What impression do you think they will have on the photographer knowing the difference just 100 years makes?

- Icescape, Patriot Hills, Antarctica
- Coral Reefs, Great Barrier Reef, Australia
- Los Padres National Forest, California

ADDITIONAL RESOURCES

Annenberg Learner offers a broad selection of multimedia resources to help teachers increase their expertise and to use with students in the classroom. The information below provides links to Annenberg Learner materials related to the themes of *LIFE: A Journey Through Time*. Visit www.learner.org to see the full library of resources.

Animals

Journey North

http://www.learner.org/jnorth/season/

Journey Nouth explores the interrelated aspects of seasonal change. Changes in sunlight drive all seasonal change. Plants and animals around the globe must respond.

Geology

Interactive: Volcanoes

http://www.learner.org/interactives/volcanoes/entry.html

How they form, various types and how to avoid the risk they pose.

Interactive: Rock Cycle

http://www.learner.org/interactives/rockcycle/index.html

Discover rock secrets through these activities. Create a rock collection as you learn about the three main types of rock, find out how to tell the different rock types apart, and see how rocks change from one type into another.

Environmental Awareness

Essential Lens: Analyzing Photographs Across the Curriculum

Photo collection: Earth, Climate and Change

http://www.learner.org/courses/lens/collections/earth-climate-change/

Forty-two photos for analysis, with background information, essential questions and classroom activities.

The Habitable Planet: A Systems Approach to Environmental Science

http://www.learner.org/courses/envsci/index.html

Related units:

3. Oceans
4. Ecosystems
9. Biodiversity Decline
10. Earth's Changing Climate

Geography

Teaching Geography

http://www.learner.org/workshops/geography/about/summaries.html

This resource for geography teachers looks at economic and resource issues worldwide from a regional perspective. Broad landmasses and urban locations are viewed through a geographer's lens.

Journey North Mystery Class (starts January)

http://www.learner.org/jnorth/mclass/index.html

Mystery Class is a global game of hide-and-seek. Students track seasonal changes in sunlight and then investigate other clues to find ten secret sites around the world.

Biology/Microbiology/Evolution

Essential Lens: Analyzing Photographs Across the Curriculum

Video: "Evidence"

http://www.learner.org/courses/lens/video/evidence/

An image can show us otherwise invisible processes, previously undiscovered life forms and dramatic change over time. This video features three people who offer photographic evidence of the unknown and unseen.

- High school teacher Rima Givot teaches from the Genetics and Bioengineering collection.
- Scientist and photomicrographer Dennis Kunkel talks about the unique and fascinating process of creating photographs of the microscopic world.
- Environmental photographer Gary Braasch reports on his worldwide travels to document the state of the planet through repeat photography.

Rediscovering Biology

Unit 3: Evolution and Phylogenetics

http://www.learner.org/courses/biology/units/compev/index.html

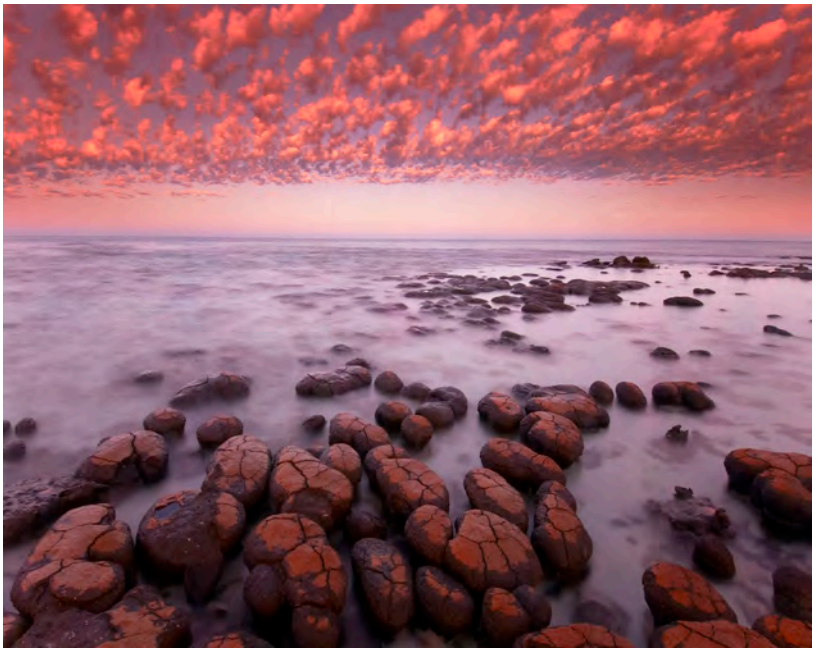
Tells the story of how classification of all living organisms was developed and changed over time as DNA analysis revealed more details about the process of evolution.

Life Science (for teachers of k-8)

http://www.learner.org/courses/essential/life/

Session 1: What Is Life?
Session 2: Classifying Living Things
Session 3: Animal Life Cycles
Session 4: Plant Life Cycles
Session 5: Variation, Adaptation, and Natural Selection
Session 6: Evolution and the Tree of Life
Session 7: Energy Flow in Communities
Session 8: Material Cycles in Ecosystems

PHOTOS



Stromatolites at dawn, Shark Bay, Western Australia
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Giant tortoises in pond, Geochelone nigra, Alcedo Volcano, Galapagos Islands
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Marine iguanas, Amblyrhynchus cristatus, Fernandina Island, Galapagos Islands
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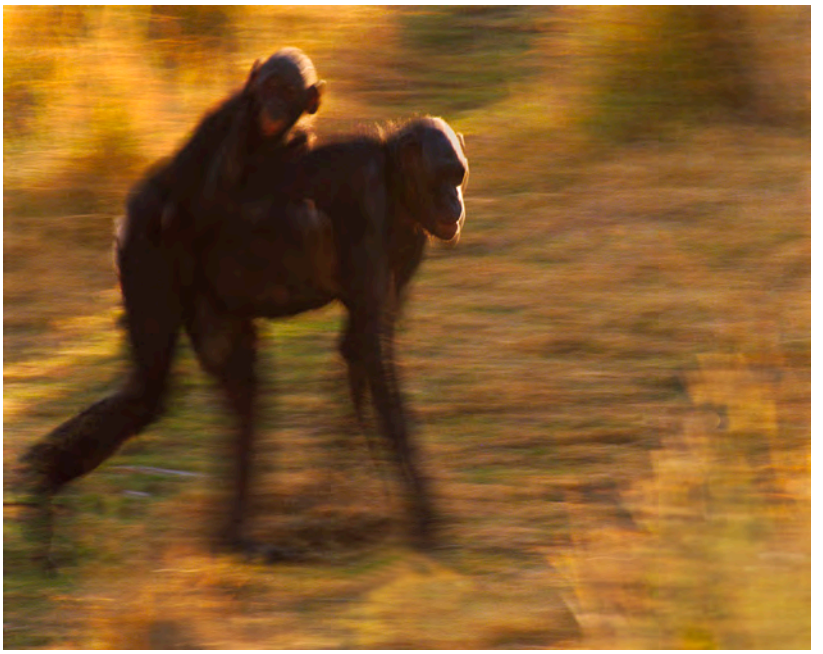

Female bonobo and infant, Pan paniscus, Native to Congo (DRC)
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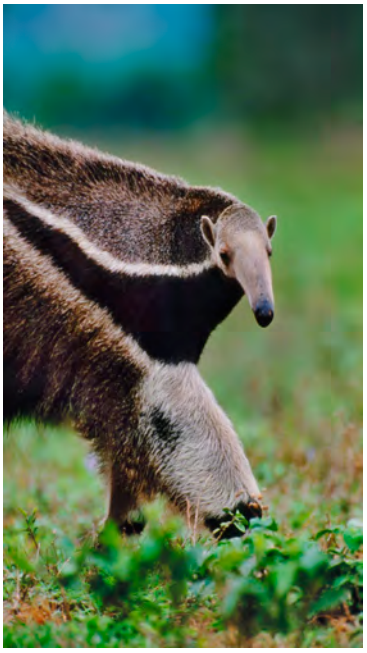

Giant anteater, Myrmecophaga tridactyla, Pantanal, Brazil
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Little red flying fox, Pteropus scapulatus, Daintree National Park, Queensland, Australia
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Horseshoe crabs spawning at dusk, Limulus polyphemus, Delaware Bay, New Jersey
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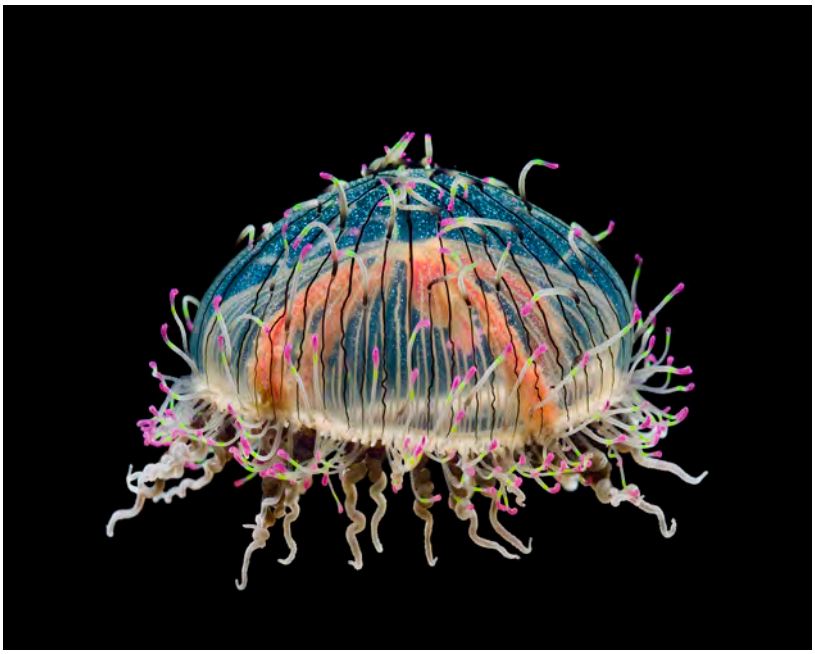

Flower Hat jelly, Olindias formosa, Monterey Bay Aquarium, California
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Nautilus shell, Nautilus sp., South Pacific Ocean
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