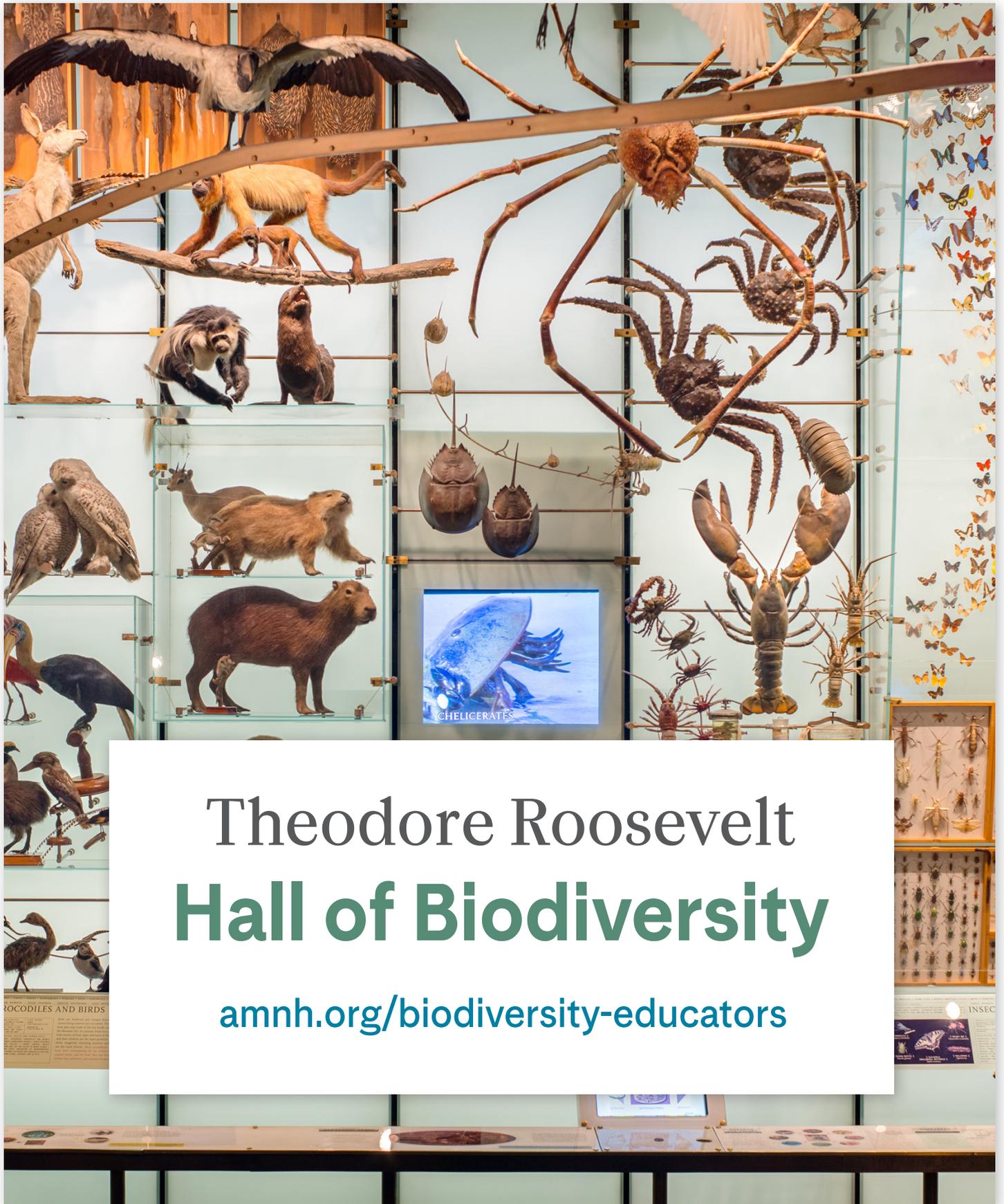


American Museum of Natural History

# EDUCATOR'S GUIDE



## Theodore Roosevelt Hall of Biodiversity

[amnh.org/biodiversity-educators](http://amnh.org/biodiversity-educators)

# Map of the Hall

The Theodore Roosevelt Hall of Biodiversity addresses the variety and interdependence of all living things. It celebrates the beauty, diversity, and abundance of life on Earth while warning of the threats posed by human activity.

## The hall explores:

- What is biodiversity?
- Why is biodiversity important?
- What are the threats to biodiversity?
- What can be done to protect biodiversity?



1. Spectrum of Life Wall



2. Crisis Zone



3. Habitat Wall



4. Rainforest Diorama



5. Transformation of the Biosphere Wall



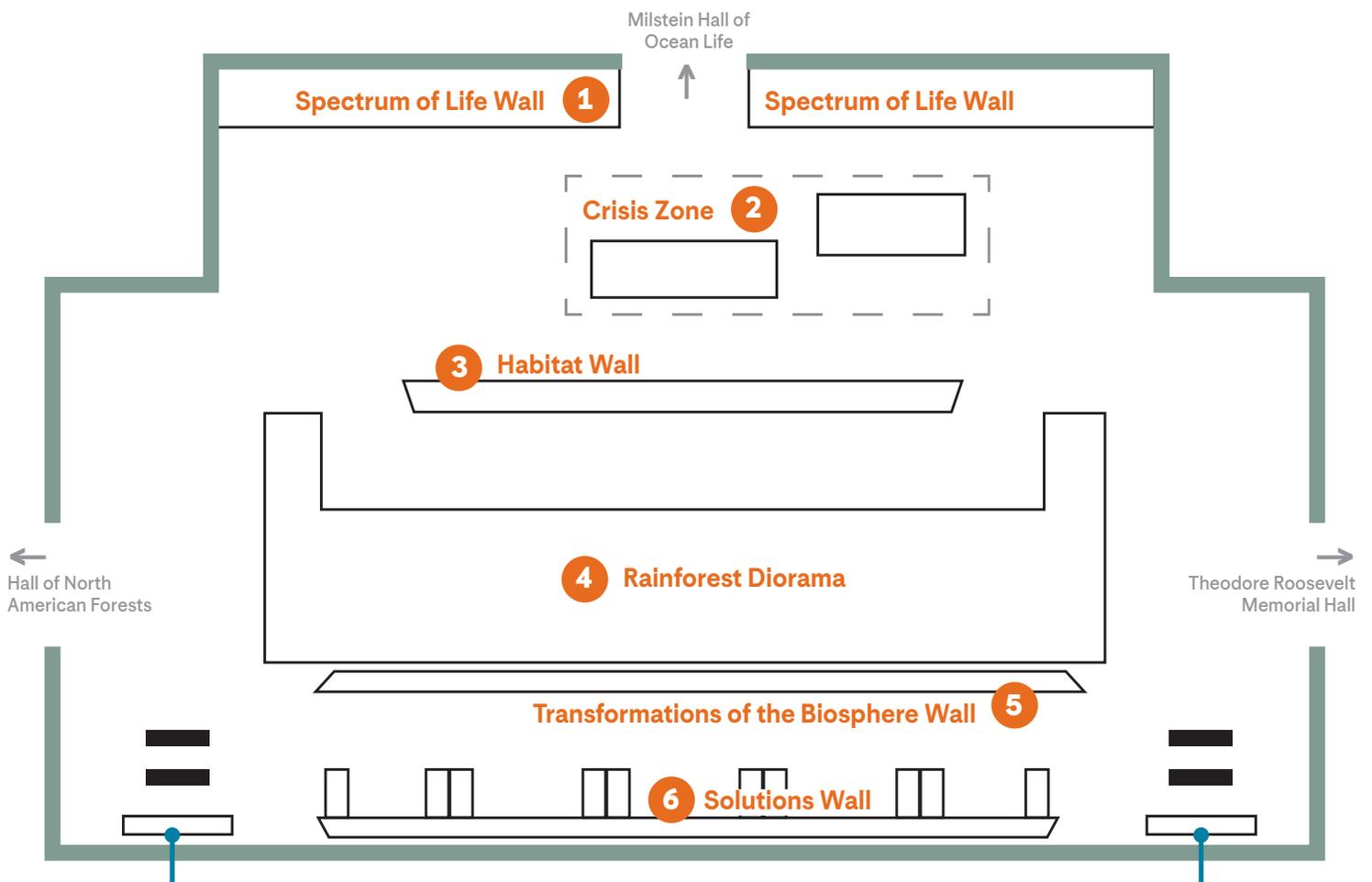
6. Solutions Wall



Introductory Video: What is Biodiversity?



BioBulletins Video



## Bio Bulletin Video

Short documentaries about ongoing research related to biology and conservation.

## Introductory Video

An eight-minute film of the main concepts featured in the hall.

# 1. Spectrum of Life Wall

The Spectrum of Life Wall highlights the wealth and diversity of life on Earth. Along the wall and overhead are displayed 1,500 specimens and models—ranging from microorganisms to large terrestrial and aquatic organisms, including bacteria, plants, fish, mammals, and insects. The specimens are presented in the form of a **cladogram**, a graphic chart that reconstructs the evolutionary history of a group of organisms. This cladogram shows the 28 living groups that make up all life on Earth.



## Curriculum Connections

**Ecosystems/Habitats:** Text panels describe the value and benefits provided by ecosystems to humans—such as the production of oxygen through photosynthesis, or the purification of water.

**Evolution:** Many of the approximately 200 scientists working at the Museum carry out research in systematics, the area of biology that describes living and extinct species, some already discovered and some formerly unknown to science. These systematists study the diversity of species by arranging organisms into groups that share an evolutionary history and classifying species according to characters, or distinctive features. Systematists display this information in a branching diagram called a cladogram. The organisms in each group, or clade, that branches off the cladogram share characters inherited from a common ancestor. Each of the 28 groups represented on the Spectrum of Life Wall makes up one clade. Combined, these 28 clades constitute a giant cladogram that contains all life on Earth: almost 1.75 million species have already been described, but there are millions more. Estimates range from 5–100 million. The complete cladogram is shown on the text panel in front of the interactive computer stations. Use these stations to identify specimens on the wall. Text panels provide information about and examples of species within each clade—including the characteristic features used to define them—and, in some cases, the threats they face.

## Exploration Ideas

Ask students to work with a partner. Allocate one clade, or animal or plant evolutionary group, from the wall to each pair of students, who should:

- Choose three specimens from their clade. Draw these in close detail. Include labels to describe features and colors. Why are these specimens in the same clade? Use the computer interactives to find and record further information on the specimens and the clade.
- Closely study the labels in front of the clade. Make notes and drawings on areas of interest for further research back in the classroom.

Younger students may choose favorite specimens, make drawings, then look for their specimens on the computer interactives. Older students may focus on one area of the panel text, e.g. human benefits, rather than on individual clades.

## 2. Crisis Zone

Embedded in the floor in front of the Spectrum of Life Wall is a timeline of the five previous major **extinction events**—periods of unusually high levels of extinction—with fossils from these periods. Two columns flanking the timeline provide an overview of the causes of the present, or sixth extinction, an event different from previous extinctions because it is caused by human activity. A glass display case nearby contains examples of, and information about, endangered and extinct animals.

### Curriculum Connections

**Human Effects on the Environment:** Human activity is now causing the sixth known mass extinction in our planet's history. The expansion of agriculture and industry, particularly in the last 400 years, has resulted in a loss of habitat, pollution, overexploitation by hunting and fishing, and the introduction of non-native species—species from other ecosystems—on large scales and in many parts of the globe. A glass display case contains animals that are either extinct or under serious threat because of human activity.

**Evolution:** Extinction is as much a part of the evolutionary cycle as the origin and diversification of new species. Scientists estimate that more than 99% of all species that have existed at some time on Earth are now extinct. Evidence of five previous periods of global mass extinctions is found in the fossil record—the form, variety and distribution of all fossils in time and space. The display case in the floor identifies these events.



## 3. Habitat Wall

This exhibit provides a global tour of nine **ecosystems**, communities of interacting organisms and their physical environments. Texts and maps show distributions and threats to each ecosystem.



### Curriculum Connections

**Ecosystems/Habitats:** Large images of nine different ecosystems are shown along with maps of their global distribution. Panels provide the following information on each ecosystem: detailed description, benefits provided to humans, percentage of Earth's surface covered, global distribution.

**Human Effects on the Environment:** Specific threats to each ecosystem are described in hot pink beside the distribution map and superimposed on video screens.

## 4. Rainforest Diorama

The Rain Forest Diorama, representing a section of the Dzanga Ndoki rainforest from the Dzanga-Sangha Forest Preserve in the Central African Republic, features more than 160 flora and fauna **species**. The rain forest is shown in progressive states of disturbance. An interpretative railing provides details in text and graphics. Through video interviews, local people, government officials, and World Wildlife Fund representatives tell their stories about the forest.



### Curriculum Connections

**Ecosystems/Habitats:** Visitors can observe the interaction of species within this diverse ecosystem as well as their interactions within micro-habitats, such as a stream, a tree branch, or a dungheap. Disturbances caused by natural forces such as running water and elephants are evident. The text provides information about tropical forest ecology.

**Human Effects on the Environment:** Foreign timber and mining concessions drain natural resources from the region, while local people clear land for agriculture and use the forest for other basic needs. The government of the Central African Republic established the Dzanga-Ndoki National Park and the Dzanga-Sangha Dense Forest Reserve to protect this ecosystem. The national park is protected from human impacts, while the forest reserve allows limited extraction of the local flora and fauna. Dzanga-Sangha is an example of a conservation effort designed to conserve biodiversity by enlisting local people as partners in the management of a protected area.

**Evolution:** In tropical rain forests the interaction of abiotic, or non-living, elements such as heat, light, and water, results in the highest terrestrial rates of species diversity. This re-creation of the Dzanga-Sangha rainforest in the Central African Republic shows the rich biodiversity present in this ecosystem. Field guides on the rail identify the hundreds of species that live there.

### Exploration Ideas

Ask students to sit, closely observe, and listen to the diorama. Draw their attention to the three different levels of the rainforest.

- forest floor
- understory (area at eye level)
- canopy (sit back on the benches and look up)

Ask questions that encourage students to focus on the interactions they see in each layer and to record their observations in drawings and writing.

To help them focus closely, younger students may bring flashlights, or create observational tools (such as binoculars) before their visit. Older students may use panel text or the field guides to make more detailed notes.

## 5. Transformation of the Biosphere Wall

In text, graphics, and on video, the Transformation of the Biosphere Wall presents dramatic case studies of changes to the **biosphere**—all living things on Earth and their habitats.

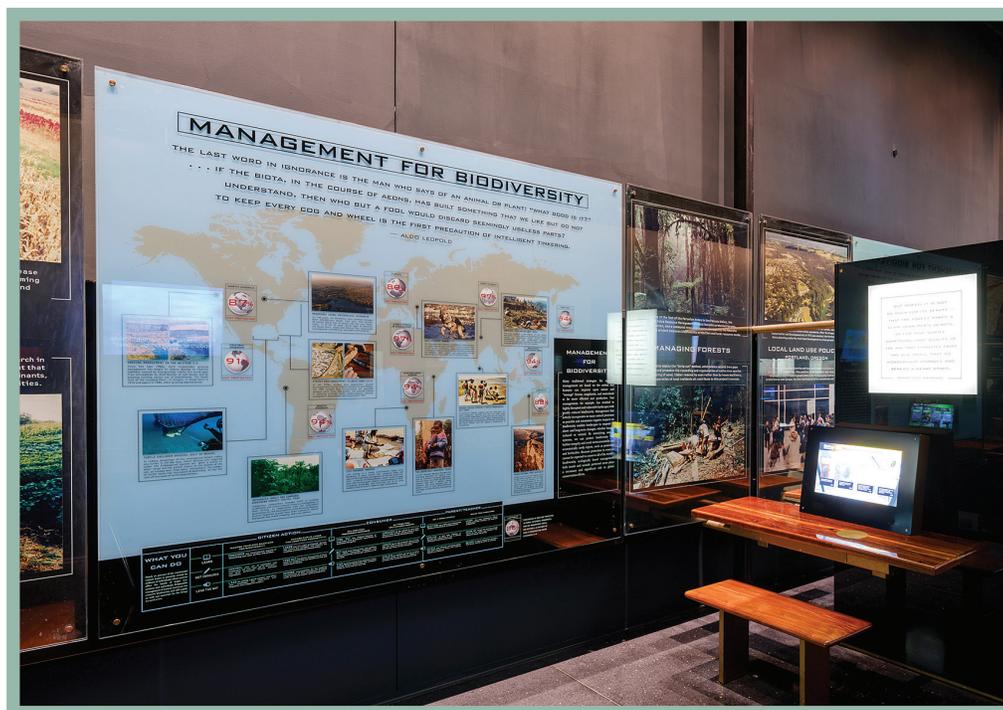
### Curriculum Connections

**Human Effects on the Environment:** This wall examines the root causes of biodiversity loss—population growth and overconsumption. Panel text, graphics, and video presentations provide detailed information as well as showing global impacts.



## 6. Solutions Wall

Case studies on the Solutions Wall suggest possible remedies to the **biodiversity crisis**. Between these two walls, 10 computer kiosks offer access to websites, a bibliography, names of conservation organizations, and a searchable video archive.



### Curriculum Connections

**Human Effects on the Environment:** Case studies on this wall provide examples of conservation in action. Attempts to solve complex ecological problems are described, and suggestions of ways that visitors themselves can make a difference are offered.

## Come Prepared Checklist

- **Plan your visit.** For information and videos about reservations, transportation, lunchrooms, and everything else you need to prepare for your day at the Museum, visit [amnh.org/feld-trips](http://amnh.org/feld-trips).
- **Review the Map and the Teaching in the Hall section** for an advance look at what your class will encounter.
- **Decide how your class will explore the hall:**
  - You and your chaperones can facilitate the visit using the Teaching in the Hall section.
  - Students can use the Map to explore the hall on their own or in small groups.

## Connections to Standards

### Next Generation Science Standards

**Disciplinary Core Ideas** ▪ ESS3.A: Natural resources ▪ ESS3.C: Human impacts on Earth systems ▪ LS1.A: Structure and function ▪ LS1.B: Growth and development of organisms ▪ LS2.A: Interdependent relationships in ecosystems ▪ LS2.B: Cycles of matter and energy transfer in ecosystems ▪ LS2.C: Ecosystem dynamics, functioning, and resilience ▪ LS3.A: Inheritance of traits ▪ LS3.B: Variation of traits ▪ LS4.A: Evidence of common ancestry and diversity ▪ LS4.C: Adaptation ▪ LS4.D: Biodiversity and humans

**Crosscutting Concepts** ▪ 1. Patterns ▪ 2. Cause and effect: mechanism and explanation ▪ 3. Scale, proportion, and quantity ▪ 5. Energy and matter: flows, cycles, and conservation ▪ 6. Structure and function ▪ 7. Stability and change

**Scientific & Engineering Practices** ▪ 1. Asking questions ▪ 2. Developing and using models ▪ 6. Constructing explanations (for science) ▪ 7. Engaging in argument from evidence ▪ 8. Obtaining, evaluating, and communicating information

## Connections to the Museum

### Ecosystems and Habitats

The Museum's world renowned dioramas show a wide range of ecosystems.

#### Compare and contrast mammal and bird habitats and adaptations by studying the dioramas in:

- Akeley Hall of African Mammals
- Bernard Family Hall of North American Mammals
- Hall of Small Mammals
- Stanford Hall of North American Birds
- Hall of Birds of the World

#### Compare different ecosystems:

- Rainforest Diorama in the Theodore Roosevelt Hall of Biodiversity with the Olympic Rain Forest Diorama, Giant Cactus Forest, and Forest Floor Diorama in the Hall of North American Forests
- Rainforest Diorama in the Theodore Roosevelt Hall of Biodiversity with local ecosystems and microhabitats in the Warburg Hall of New York State Environment
- Leonard C. Stanford Hall of North American Birds with Hall of Reptiles and Amphibians

### Evolution

Discover the birth of life on Earth in the Hall of the Universe. In the Hall of Planet Earth, find evidence of a recently discovered ecosystem—hydrothermal vents, sulfur chimneys on the ocean floor. The Fourth Floor Halls tell the history of vertebrate evolution using cladograms. Make connections with our own evolutionary history in the Anne and Bernard Spitzer Hall of Human Origins.

### Human Effects on the Environment

The Warburg Hall of New York State and the Hall of Reptiles and Amphibians have exhibits that highlight habitat loss due to human activity.

## CREDITS

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