Omaha's Henry Doorly Zoo & Aquarium

Robert B. Daugherty Education Center

Omaha, Nebraska

Association For Learning Environments
LEsolutions Planning and Design Awards
2018 James D. MacConnell Award Submission

> “Omaha’s Henry Doorly Zoo & Aquarium’s mission is to inspire, educate, and engage its millions of visitors to serve as life-long stewards for animals, their habitats, and their conservation. We’ve taken our mission one step further by providing unique science-related courses for students in the greater Omaha area.”
>
> -**Dr. Elizabeth Mulkerrin**, Vice President of Education at Omaha’s Henry Doorly Zoo & Aquarium

Executive Summary

Connecting Students to the Natural World

Kids are inherently curious creatures who learn by observing and interacting with their surroundings. They are intrinsically drawn to animals, watching carefully as animals play, relate, and move throughout nature. When a child's educational experience includes daily interaction with animals, learning is elevated.

In Omaha, Nebraska, what started as a partnership between Omaha Public Schools, Papillion La Vista Community Schools, and the world-renowned Omaha's Henry Doorly Zoo & Aquarium, has blossomed into a genuine learning environment that combines outdoor exploration with hands-on educational opportunities. In simplest terms, it's a school within a Zoo.

Within a world filled with technology, Omaha's Henry Doorly Zoo & Aquarium's Robert B. Daugherty Education Center offers a space for students to connect with the natural world through "adventure education" that enhances their understanding of and relationship with the animals and ecosystems around them. Offering unique educational opportunities to more than 9,000 students annually, the programs offered include the Zoo's full-time high school, kindergarten, preschool, after school programs, and day camps. The Education Center exemplifies the Zoo's education mission to enhance the public knowledge in all areas relating to the natural world. Distractions are encouraged, and come not from smart phones, but from the sounds and movements of nearby animals.

The design provides a wide range of spacial types to meet the unique needs of active learners. The Education Center presents a strong indoor/outdoor connection, with panoramic views to the Zoo grounds. A large outdoor adventure area offers multiple play centers, each designed to look like a natural habitat where children can observe and mimic different animal actions. Hands-on, interactive learning is facilitated in a multipurpose, high bay laboratory that bridges the preschool/kindergarten environment with that of grades 11 and 12 . The transparency of the design allows Zoo visitors to observe and be inspired by the students' learning.

School & Community Engagement

Evolution of the Zoo Academy

When the initial program launched in 1996, Omaha Public Schools provided a full-time biology instructor to teach zoology on-site at the Zoo. In return, the Zoo provided classroom space for the course. After 10 years, Zoo staff and administrators from Omaha Public Schools and Papillion La Vista Community Schools enhanced the program to create a full-day Zoo Academy, which now features Zoo-specific curriculum, internships at the Zoo, and opportunities to conduct research projects.

The original zoology classroom, located in the basement of the Lied Jungle facility, provided a basic space for students to engage with the curriculum, but it was not conducive to Next-Generation learning. Building upon the success of the Zoo Academy, Zoo and district officials determined a new facility was necessary to enhance the educational environment for students and enable them to expand the program to accommodate additional learners and age groups.

In 2014, the Zoo commissioned the Robert B. Daugherty Education Center, a 42,000 SF multi-use, flexible education building that consolidates educational facilities and conservation offices, which were previously dispersed throughout the Zoo campus. The new Education Center supports four distinct programs, ranging from Pre-K to High School, offering Science, Technology, Engineering, and Math (STEM) education.

The first year of occupancy proved to be an overwhelming success as students excelled and word spread. As a result, the high school program expanded exponentially affording more than three times the number of school districts in the Omaha area access to the Education Center. The resulting expansion promotes inclusion and creates a unique opportunity for every student in the community.

Stakeholders

Omaha's Henry Doorly Zoo & Aquarium

School districts
- Omaha Public Schools
- Papillion La Vista Community Schools
- Westside Community Schools
- Bellevue Public Schools
- Millard Public Schools
- Duchesne Academy of the Sacred Heart

Project Donors

Leaders of Conservation Education

Community

- Two Million Annual Visitors
- Zoo Academy Students
- Summer Day Campers
- Lifelong Learners
- Other Educational Programs

School & Community Engagement

Value of Process

The first step in understanding the needs of the new Education Center was understanding the existing. The designers and engineers spent time with Zoo employees walking through the Zoo campus, discussing where there were deficiencies, and gaining a deeper insight into the hopes and dreams for the future of the space. Guiding objectives were established as key characteristics the new facility should offer or include. These goals, including active distractions, playful learning, and nature immersion, drove the design for the new Education Center.

To broaden the understanding of the built environment, the designers joined Zoo educators and administrators on tours of other innovative buildings. This activity strengthened the engagement between Zoo staff and designers and enabled the group to think beyond what they already knew. Conversations delved into a variety of topics and encouraged exploration of the depth of possibility for what learning and working could look like in the new Education Center.

The designers led a charrette promoting collaboration and shared goals between designers and Zoo representatives. The processes began by looking at the project scope and goals, and then opened up to a creative environment encouraging thinking among educators and administrators. Everyone had the opportunity to ask questions and share their point of view. Designers consolidated all ideas into conceptual designs, facilitated group discussions, and allowed user groups to vote on what would work best for the vision of the Education Center.

2010 2011 2012 2013 2014 2015 2016 2017 2018

JUNE 2010
Zoo Master Plan includes Education Center & Adventure Trails

MARCH 2014
Education Building Design Charrette

Adventure Trails Design Charrette

APRIL 2014
Work Place Tour

Adventure Play Virtual Tours Around World

AUG. 2014
Fundraising Begins

SEP. 2014
Learning by Play Specialist Workshop

DEC. 2014
Schematic Design Completed

MAY 2015
Design Development Completed

JUNE 2015
Construction Documents Completed

FEB. 2016
Groundbreaking

JUNE 2016
Under Construction

JUNE 2017
Ribbon Cutting

AUG. 2017
First Day of School

JAN. 2018
Research Projects Initiated

Affiliated with Higher Education Institution & Design Firm

School & Community Engagement

Challenges

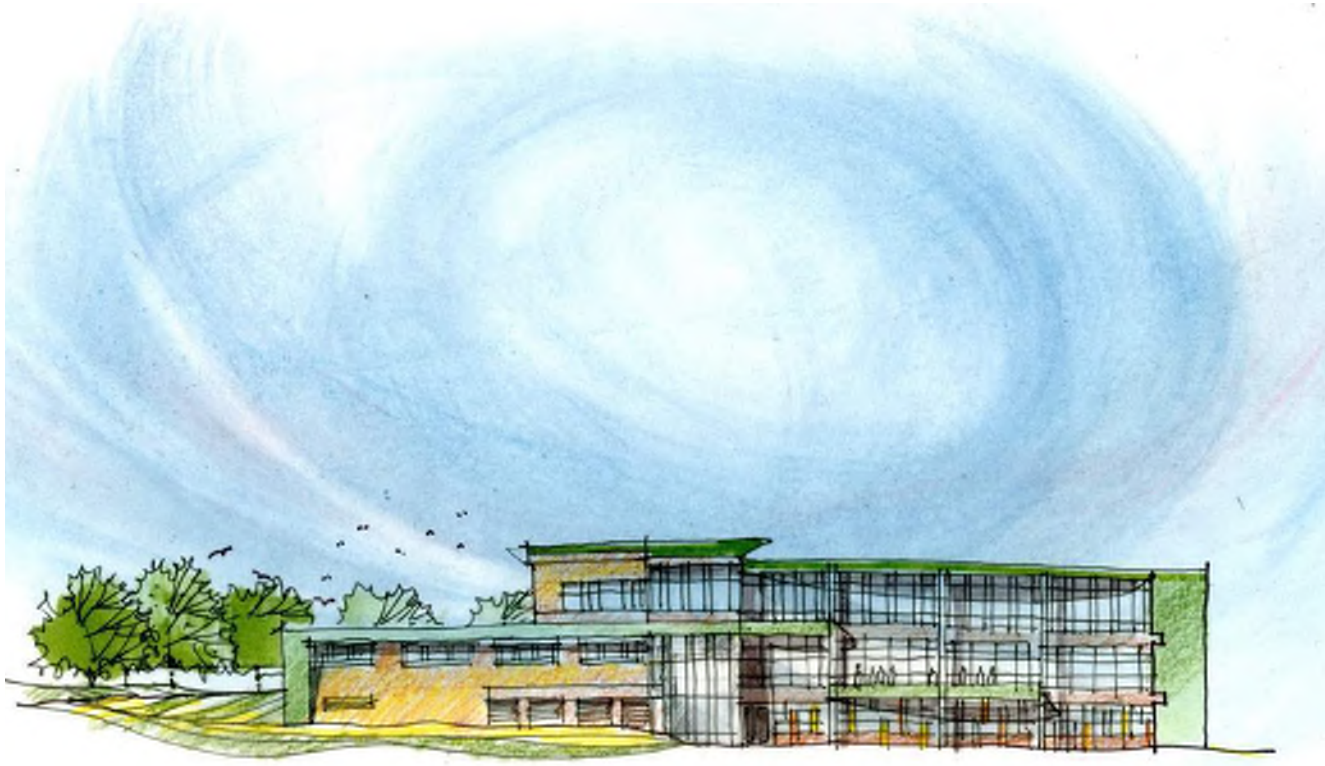
As the first of its kind, the Robert B. Daugherty Education Center faced various obstacles in the process of its design and construction. Without the example of a similar project, designers had to start from scratch to come up with the best fit for the client and students. Creating an environment where students of all ages can experience effective and valuable learning was a top priority. Each issue and goal had to be resolved and align with the mission of the Omaha's Henry Doorly Zoo & Aquarium, and the firm worked closely with the client to integrate each into the design.

Assets

Learners are provided countless assets at the Robert B. Daugherty Education Center. With the entire Zoo at their fingertips, students can not only explore all of its offerings; the flexibility of the Education Center allows the Zoo to be brought into their classroom. Its position as one of the top-ranked Zoos in the country with an average of two million annual visitors exemplifies the uniqueness of the opportunity for students to learn at such an esteemed venue. No schools like it exist. Throughout the design process, Zoo education and administration staff met weekly with the design team, collaborating with learn-by-play specialists to ensure that the Zoo itself would be utilized in the design and make it adaptable to the needs of every type of learner.

Values

Students at the Robert B. Daugherty Education Center have the opportunity to engage with the community of Zoo visitors beyond the Zoo's full-time high school, kindergarten, preschool, and after-school programs. They can learn from each other's observations and those of the community members visiting the Zoo. The rapidly growing field of Conservation Education motivates students to become more aware of the world around them and the effect humans have on the planet, and learn that their role in the conversation starts in their own community. The initial success of the program and design inspired the Education Center to open the high school program to all other school districts in the area, promoting inclusiveness in the community.



Result of Process & Project

The goals of the Robert B. Daugherty Education were identified as a team, carried out as a team, and achieved as a team. It bridges facility and nature; learning and play; students and community. The educational goals of the facility were met with the students' ability to use the Zoo as a tool in their learning both inside and outside of the classroom. School districts' expectations were exceeded, which resulted in the Education Center opening the high school program to include all area school districts. The community now not only values the Zoo as a national symbol of conservation, but also as a national symbol of conservation education, where students can engage with the Zoo community as they learn. The Education Center plans to continue this valuable engagement and is working with the design firm, as well as a higher education institution, on several research projects with the students. The Education Center offers opportunities to students that are not available in any traditional school.

Omaha's Henry Doorly Zoo & Aquarium

> "This is not a traditional school environment in a good way. Everywhere is the classroom. This place gets kids excited about learning."
>
> -**Pat Purkhiser,** Science and Zoology teacher at the Zoo Academy High School

Omaha's Henry Doorly Zoo & Aquarium Totals:

130
Acres

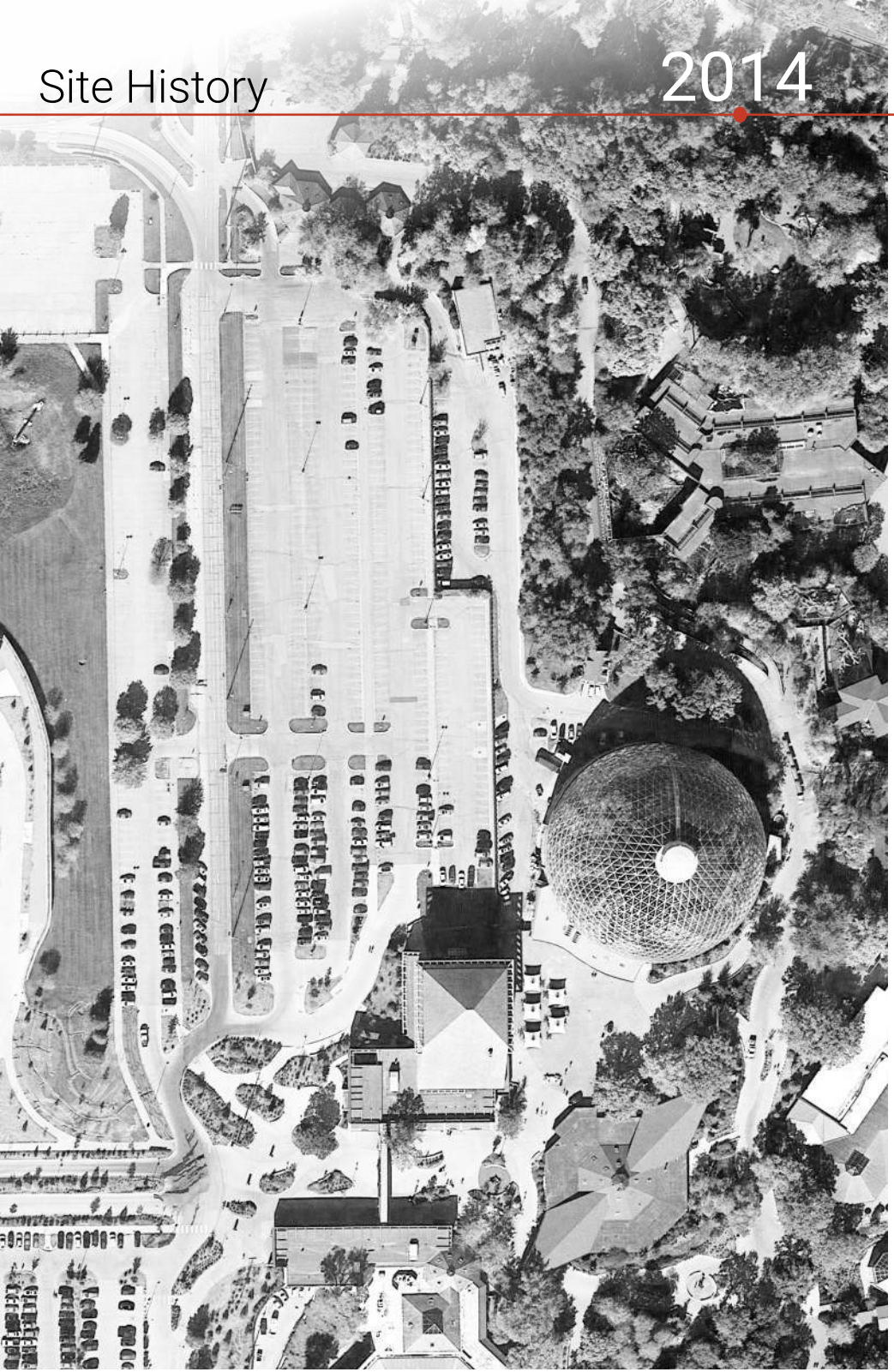
17,000
Animals

962
Different Species

Omaha's Henry Doorly Zoo & Aquarium Site

Site History

2014



Scope of Work

Zoo Academy Students Served

- **120** Zoo Academy High School Students
- **40** Zoo Academy Middle School Students
- **50** Zoo Kindergarten Students
- **60** Little Lions Preschool and Pre-K Students

- **250** After School Program Students
- **1,500** Summer Day Camp Students
- **7,000** Community Education Program Students

Education & Conservation Offices

- **30** Education Offices
- **36** Conservation Offices
  - Accounting
  - Administration
  - Animal Curator
  - Foundation
  - Guest Services
  - Human Resources
  - Information Technology
  - Marketing

Budget

50,500
Total Project Square Feet

8,500
Square Feet Animal Support & Auxiliary Buildings

$29.3 Million
Total Project Cost

$11.4 Million
Construction of Robert B. Daugherty Education Center

$17.9 Million
Construction of Outdoor Learning & Animal Support/Auxiliary Buildings

> “The kids really work hard to have the opportunity to come here. We don’t accept all applicants, so they truly want to be here just as much as I do, which is rewarding as a teacher.”
>
> **-Pat Purkhiser,** Science and Zoology teacher at the Zoo Academy High School

Classrooms for Learning Today, Tomorrow, and Beyond

The new Education Center, which opened in 2017, features classrooms and labs, breakout spaces, huddle rooms, educator and conservation offices, and multipurpose spaces that connect learning with the natural surroundings of the Zoo campus, including:

- The Zoo Academy High School is open to junior and senior students from Bellevue Public Schools, Omaha Public Schools, Papillion La Vista Community Schools, Westside Community Schools, Millard Public Schools, and Duchesne Academy of the Sacred Heart. Students attend this school full-time and work alongside Zoo staff, learning through hands-on care for animals.

- Students in the Zoo Academy Middle School are part of the Omaha Public Schools’ King Science and Technology Magnet and attend Zoology and Zoo Architecture classes two to three times per week. The entire Zoo is their classroom, which provides a unique experience unlike any other traditional middle school.

- Zoo Kindergarten is a partnership with the Zoo’s adopt-a-school, Bancroft Elementary School. The Kindergarten classrooms are next to the Bay Family Children’s Adventure Trails, an interactive exhibit that promotes learning through play and nature. Students in this program participate in walk-abouts on Zoo grounds multiple times per week.

- Little Lions Preschool and Pre-K nurture children’s desire to explore and discover as they interact with the animals in their natural habitat in both half-day and full-day sessions. These students also participate in daily walk-abouts on Zoo grounds.

To be eligible for the high school, students must have completed their sophomore year and be on track for graduation, ensuring they have a basic understanding of science. The application process includes a student essay, parent letter of support, teacher recommendations, and a panel interview.

Educational & Physical Environment

Vision & Goals for the Education Center

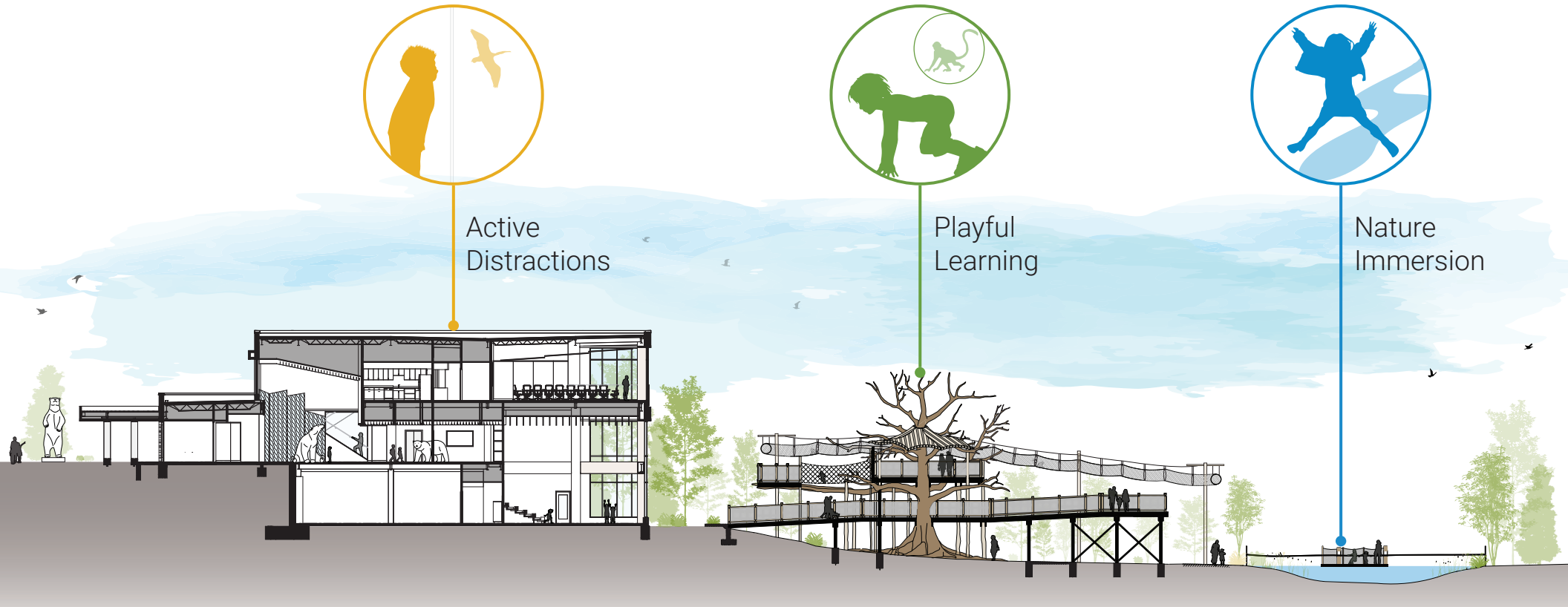
Nature Adventure, Education, and Research
- Opportunities for discovery that address nature deficiencies in young people
- Constant interactions with animals
- Animal-related play structure & environments

The Front Door for Conservation Education
- No mistake that this is a school
- The Zoo is THE place to go for conservation education
- A model for other Zoo schools

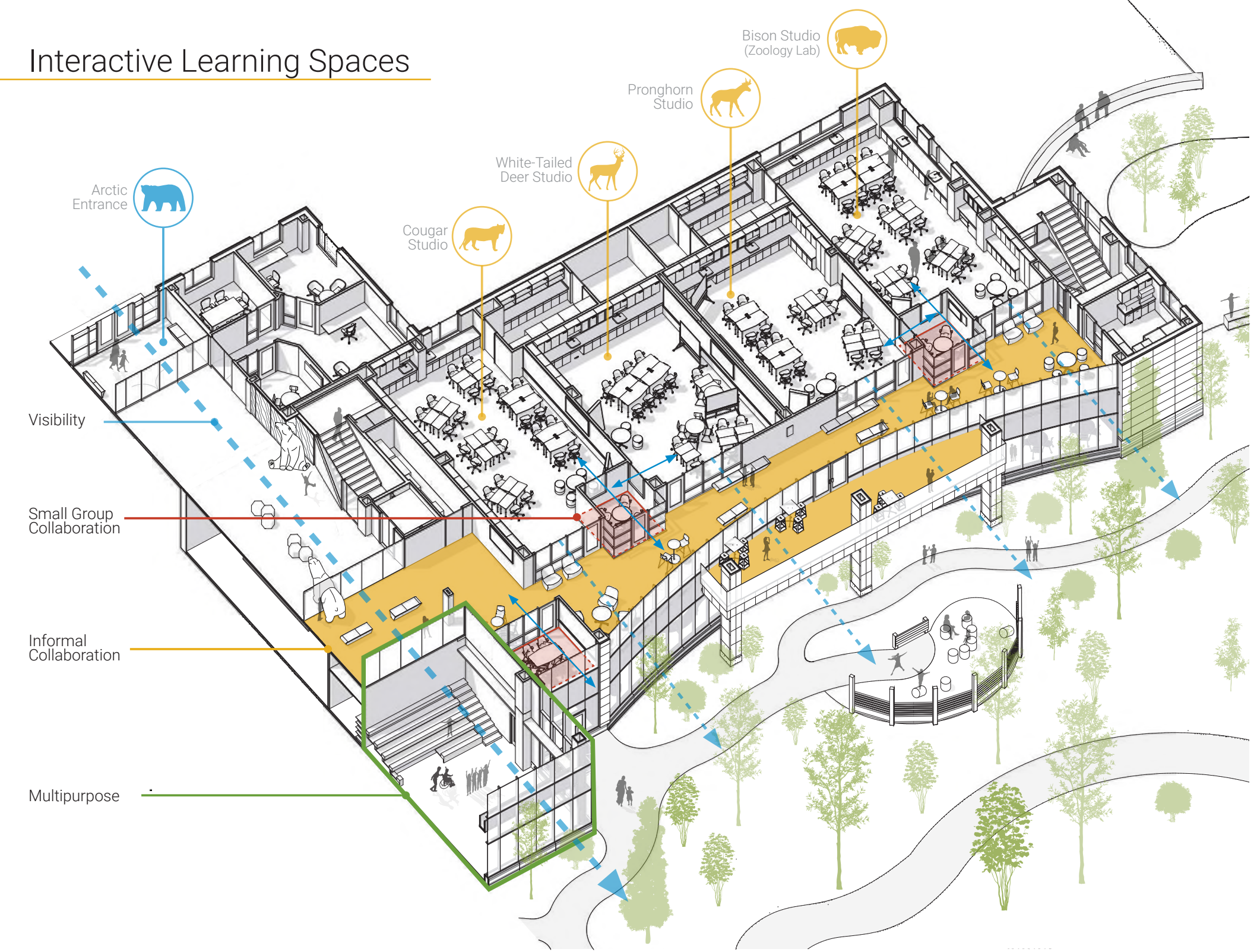
Multi-purpose, Flexible, Adaptable
- Hands-on, interactive learning, and collaboration
- Day and Night Settings
- Pre-K– High School
- After school/weekend educational uses

Transparency across spaces to encourage observation
- Indoor/Outdoor connections that welcome animal distractions
- Abundant natural light
- Education that is visible to Zoo visitors

Sustainable design that encourages conservation
- Energy Efficient, LEED-like
- Wildlife Habitats, Recycling & Rain Water Collection



Interactive Learning Spaces



Visibility

Arctic Entrance

Dynamic Northern Lights inspire students to learn about natural environments

Life-size polar bears enhance the user experience by demonstrating the relationship of scale between humans and animals

Main Level

Flexible furniture supports an adaptive learning/circulation space

Transparency connects views to the Bay Family Children's Adventure Trails

Digital monitor display offers flexibility to support curricular activities

Visibility

Sustainable Design with Birds in Mind

Besides natural daylighting, abundant windows fulfill two main objectives: first, windows shape views to and from the learning environment; and second, they provide additional instructional opportunities. Because of the large number of windows, the designers researched the amount of frit that could safely be applied, while still protecting surrounding birds by eliminating potential bird strikes.

The results are decorative window screens that feature 53 species native to Nebraska, offering a fun way to learn about local species while also redirecting birds from flying into panes of glass.

53
Total Native Nebraskan Species in Frit Pattern Design

22
Mammals

9
Insects

7
Reptiles & Amphibians

13
Birds

2
Fish

100%
Glazing is Fritted

30%
Frit Coverage

0
Bird Strikes

> “The whole place has a modern, updated feel unlike other schools. I like the window glass design because the windows are unique and bird-safe.”
>
> **-Aleyse,** 11th grader at the Zoo Academy High School

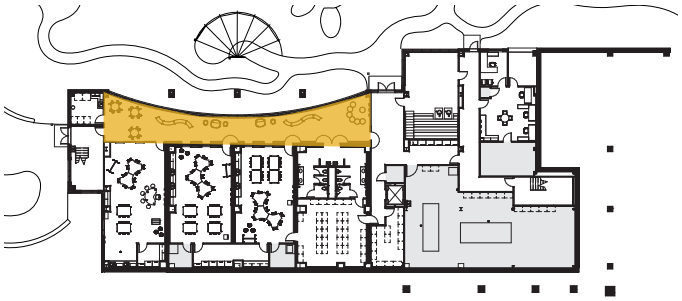
Informal Collaboration

Acoustical ceiling panels and floor deck above help reduce noise to enhance the use of informal collaboration space

FEMA-rated storm shelter ensures student safety with respect to being located in Tornado Alley

Curved, fritted glazing allows openness of north light while also addressing summer morning/evening sun angles and reducing mechanical loads

Flexible furniture supports a variety of learning and teaching styles



Lower Level

Informal Collaboration

The third level balcony offers the highest view of the Bay Family Children's Adventure Trails and provides the opportunity to view bird flights from the Education Center to the Holland Meadowlark Amphitheater

The seamless indoor/outdoor connection of the balconies on the second and third levels invite users to work outdoors

Direct access to Adventure Trails inspires students and educators to explore various learning and teaching styles

Main Level

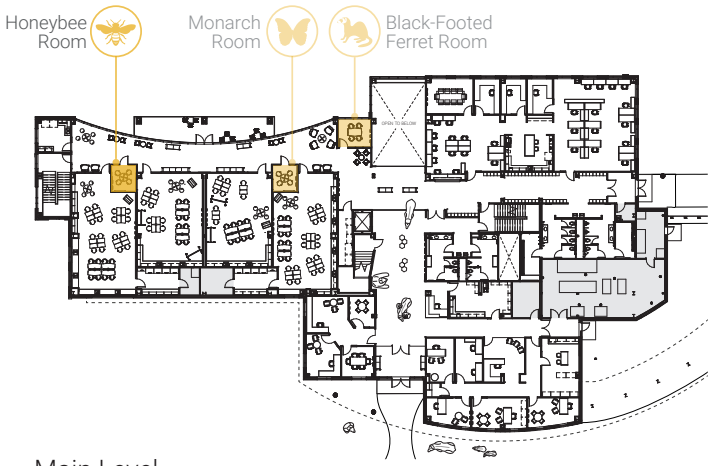
Small Group Collaboration

The Honeybee Room supports small group and/or independent study space

Visual connection into neighboring classrooms and informal collaboration spaces

Flexible furniture supports a variety of collaborative learning and teaching styles

Furniture adapts to different forms of technology

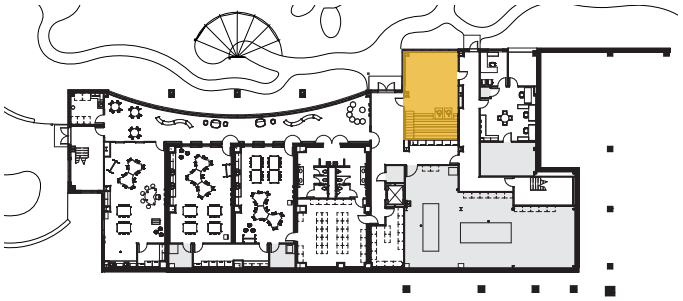


Main Level

Multipurpose

Zoo officials and educators wanted the ability to simulate both daytime and nighttime conditions in a controlled interior space. The design team answered with a flexible, technology-rich multipurpose room that can be used for educational purposes, night camps, summer workshops, and group presentations. Electronic shades darken the room to enhance nighttime experience simulations, and retractable seating allows staff to reconfigure the room to accommodate a variety of activities. Preschool and young students use this space to simulate campfires and learn about nocturnal animals, while older students use the space for large lectures or group presentations.

> “The multipurpose room is unlike any other multipurpose space in an educational facility. It’s fully-equipped with electronic shades, retractable seating, and a robust A/V system, affording students the opportunity to experience the kind of lifelike nature simulations they might not otherwise be able to observe.”
>
> -Design Architect



Lower Level

Multipurpose

Active Distractions

Transparency and connectivity between the indoors and outdoors are the two main drivers behind the design. Traditional students experience what Zoo officials call “nature deficiency,” meaning they learn solely in indoor environments without access to wildlife or conservation. The Education Center’s design successfully maximized exposure to nature and animals, by featuring organic connections between indoor and outdoor educational areas through massive windows, outdoor balconies, and open spaces.

In addition, a two-story curtain wall visible from the front entrance puts learning on full display and gives visitors uninterrupted views from front entrance, through a multipurpose room, and out to the Bay Family Children’s Adventure Trails.

> “Our design celebrates learning by allowing visitors and students to see in and see out. The Education Center is the backdrop to the Adventure Trails, where students learn through play. We successfully captured panoramic views to emphasize the activity and energy of the Trails.”
>
> -Design Architect

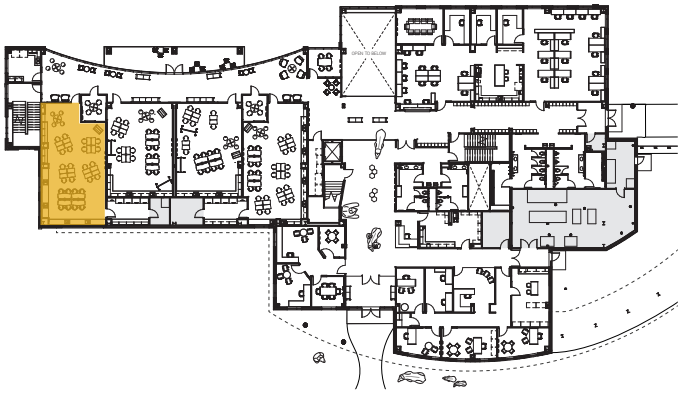
Green Vine Snake

Tarantula

Adventure Education

> “The Zoology lab is my favorite. It’s set up so the kids can interact with the things they are learning about. It’s one thing to learn from a book, but when you can have it right in front of you, it’s that much better. They take responsibility for each of the animals in there and have to log everything they do. These types of responsibilities apply to the real world in a lot of ways.”

-Pat Purkhiser, Science and Zoology teacher at the Zoo Academy High School



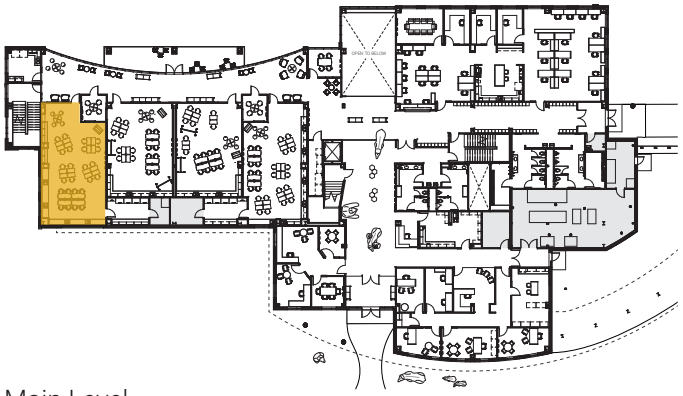
Main Level

Adventure Education

A Treasure of Artifacts

The Zoology lab that is different from most traditional high school labs. Here, students handle thousands of artifacts and animal samples from around the world, including antlers, hooves, hides, and bug collections. These sacred objects are stored below ground in a secure vault when not being used, a space that is easily accessible via an adjacent elevator.

One recent project involved students developing a collecting tool that could move endangered Salt Creek tiger beetle larvae into separate incubation cylinders that increase the number of beetles surviving to adulthood. Together, Academy students and Zoo staff used engineering practices to successfully develop a "fishing tool" and the "larvae fishing technique," which mimics the natural behavior of the beetle larvae and helps the larvae survive the moving process. Alongside Zoo professionals, academy students applied the eight Next Generation Science Standard (NGSS) science and engineering practices by actively engaging in the research and development of the project, testing several different tools to determine the most successful moving technique. When the mature beetles were released into the wild, the tool and technique the Zoo Academy team developed resulting in a doubling of the population of the endangered species.



Main Level

"It's a really enjoyable school because you don't actually feel like you're at school, but you're definitely learning."

-**Aleyse,** 11th grader at the Zoo Academy High School

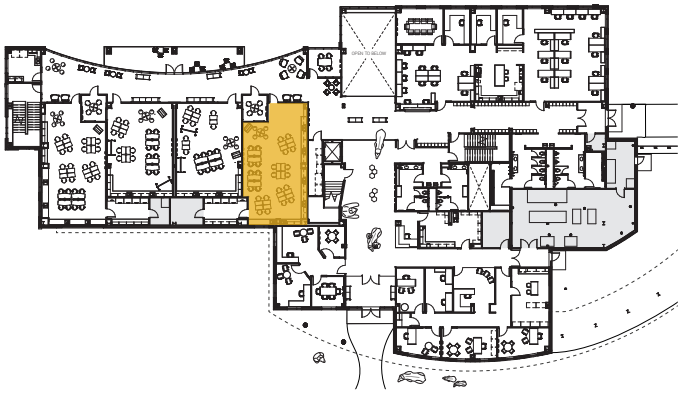
Adventure Education

STEM to Real-World

Students who attend the Zoo Academy High School have the ability to explore a variety of career pathways to determine their advanced course of study and future career choice. They participate in hands-on exercises with the animals and assist in research projects to create new and efficient ways to simulate natural habitats to benefit the health and well-being of the animals. Plus, they enjoy spending time with animals, which is a win-win for students and the Zoo

This nontraditional high school program approaches education from the student perspective. Teachers guide students through active scientific inquiries where they can apply STEM lessons to real-world practices. For instance, students in the Veterinary Science course make connections between their classroom learning and practical application by hands-on routine physicals with the animals. They hold and lift animals, listen to heartbeats, take temperatures, and monitor blood pressures while receiving feedback and instruction on best practices from Zoo staff.

Students also have direct access from this lab to the Zoo grounds where they observe the animals and participate in procedures and feedings with Zoo professionals.



Main Level

> “Everything here is related to what I want to do in the future. I grew up with horses and want to go to college to become a large-animal veterinarian, so this is the perfect place for me to learn. I grew up on a farm and would like to work with exotic animals someday, so the Zoo Academy is a great fit for me.”

-Aleyse, 11th grader at the Zoo Academy High School

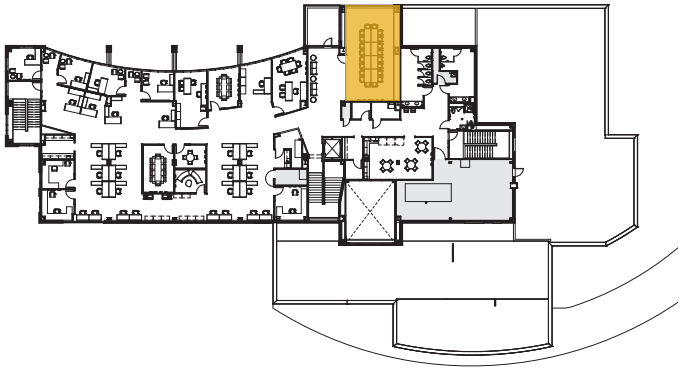
Education & Conservation Offices

Fritted glazing invites in north light while also addressing summer morning/evening sun angles and increasing energy efficiency

Imagery illustrates the Zoo's mission to visiting professionals

Flexible seating allows professionals to collaborate easily

Transparency connects views to the Bay Family Children's Adventure Trails



Upper Level

Playful Learning

Learning by Play

The tree house exhibit in the Bay Family Children's Adventure Trails encourages kids to crawl through a bridge parallel to a secure area where squirrel monkeys are playing, giving kids the freedom to be creative and mimic the monkeys in their natural environment. In another exhibit, students crawl through tunnels with bubble skylights that allow students to safely be within inches of prairie dogs and observe their natural behaviors.

Nature Immersion

Educational & School District Results

The Robert B. Daugherty Education Center achieves the school districts' educational goals by providing an avenue to rethink the educational environment and reinvent it in a nontraditional setting. It provides a one-of-a-kind educational space to more than 9,000 students annually, including the Zoo's full-time high school, kindergarten, preschool, and after school programs. It gives students from Omaha and surrounding communities a home base on a campus that comprises a 130-acre Zoo. With 17,000 animals of the 962 species on location for activities, students are preparing themselves for STEM-related careers of the future, and having fun in the process. Students have the opportunity to regularly interact with Zoo creatures, such as in a recent research project involving Salt Creek tiger beetle larvae. Academy students and Zoo staff worked together to mimic the natural behavior of the beetle larvae, which actively engaged students and inspired their learning. Due to the overwhelming success of the Education Center's first year of occupancy, the Zoo more than tripled the number of area school districts able to participate in the Zoo Academy program.

Community Results

The Education Center champions the heart of the Omaha's Henry Doorly Zoo & Aquarium's education mission by providing unique classroom experiences, play zones, and other "adventure education" elements. The transparency integrated into the design puts learning on display to let visitors know the importance of education and the Zoo's level of commitment to it. By combining outdoor adventure with hands-on educational opportunities for the two million annual visitors of the Zoo, the genuine learning environment achieves the goals of the community.

> “The academy is very student-driven. We want the kids to get outside of their comfort zones in a good way. They come here knowing they’re technically going to a school at a Zoo, and we challenge them.”

-Dr. Elizabeth Mulkerrin, Vice President of Education at Omaha’s Henry Doorly Zoo & Aquarium