



2026-2027 ENRICHMENT DESIGN CHALLENGE

The ZOOMS STEM Design Challenge presented by Flint Hills Resources offers students a chance to develop a solution to a 'real' problem faced by Zookeepers and staff at the Minnesota Zoo. While designing an engaging enrichment for an animal, the problem will challenge students to use the engineering design process while applying their science and math knowledge, creativity, and problem-solving skills to best solve the problem and present a solution.



THE CHALLENGE

At the Minnesota Zoo, our zookeepers provide amazing care for a variety of raptors, including: Wahca the bald eagle; our three great horned owls, Wilbur, Athena, and Cricket; Ripley the red-tailed hawk; and Pippin, The Boss, and Malcolm, the burrowing owls. These ambassadors live across the zoo—from the Minnesota Trail to behind the scenes at the Wings and Things Show and the Treetop Trail.

Every day, our team strives to meet each species' unique needs by encouraging natural hunting instincts and foraging behaviors. Zoo staff are looking for more creative and unique ideas to expand our enrichment program for these birds! Designs should consider the different lifestyles of these birds as some work closely with handlers as stars of our Wings and Things show, while others remain in their habitats year-round. These birds need innovative ways to stay active and engaged enrichment that challenges their sharp minds and talons.



THE TASK

The enrichment design challenge will require students to design a durable and unique enrichment device to engage the Minnesota Zoo's birds of prey species.

Level 1: Design one enrichment device that considers the individual needs of one bird of prey species at the Zoo: bald eagle, red tailed hawk, burrowing owl, or great horned owl.

Level 2 and 3: Choose two different birds of prey species to design an enrichment device (two enrichments total) to meet their individual needs: bald eagle, red tailed hawk, burrowing owl, or great horned owl.

Students will need to make special considerations such as:

- What natural behaviors of the species will be encouraged through this enrichment?
- What is the animal's lifestyle and daily schedule? How does that affect what can be provided?
- How does the animal interact with and respond to new enrichments?
- How can the enrichment be designed with the current exhibit layout in mind?
- How will you expect the animal to interact with the enrichment?
- How will the enrichment be designed to meet zookeeper enrichment goals?
- What materials are most durable and safe to use with the animal?
- How will the animal's individual preferences and needs be considered?
- How can the enrichment be planned to allow Zookeepers to easily offer and clean/store the enrichment efficiently?

A CLOSER LOOK AT ENRICHMENT

Animals in zoos do not have the same opportunities for physical and mental stimulation that wild animals do, so zookeepers provide the animals with objects or changes to their environment that will stimulate the behaviors of healthy wild animals. Enrichment can help to improve animal welfare and reduce stress.

Enrichment gives animals something to think about, encourages exercise, and gives animals a degree of control of their environment by giving them choices. Basically, enrichment helps keep animals active and interested in their environment. Zoos may do this in a variety of ways which can benefit the animals by:

- Encourage use of natural behaviors and abilities.
- Increase their activity levels
- Allow them to make choices
- Gives them new experiences and enrich the senses.
- Animals in a stimulating environment have fewer physical problems, breed more successfully, are better parents and live longer.
- Challenges and stimulation make animal life in captivity more normal, and visitors are more likely to see natural behavior from behaviorally enriched animals.



PROJECT REQUIREMENTS

Level 1: 3rd – 5th Grade Requirements

- ☐ Develop **one enrichment device** that considers individual needs, Zoo lifestyle, and enrichment goals of one bird of prey species at the Zoo: bald eagle, red tailed hawk, burrowing owl, or great horned owl.
 - May be represented in digital form or a 3D prototype.
- ☐ **Prototype Blueprint: Dimensions of Enrichment**
 - Length, width, and height of key features, including dimensions of openings/holes if applicable (English or metric) and suggested materials for real-life design.
 - Optional:
 - Volume: How much food it can hold
 - Area of any openings/holes
 - Area of any key measurable surfaces



Level 2: 6th-8th Grade Requirements

- ☐ Develop **two separate enrichment devices** for choice of two birds of prey species that consider individual needs, Zoo lifestyle, and enrichment goals at the Zoo: bald eagle, red tailed hawk, burrowing owl, or great horned owl.
 - May be represented in digital form or a 3D prototype.
- ☐ **Prototype Blueprint: Metric Dimensions of Enrichments**
 - Length, width, and height of key features and suggested materials for real-life design.
 - If applicable – include measurements for:
 - Volume/amount of food it can hold
 - Circumference of any openings/holes
 - Surface area of sides



Level 3: 9th-12th Grade Requirements

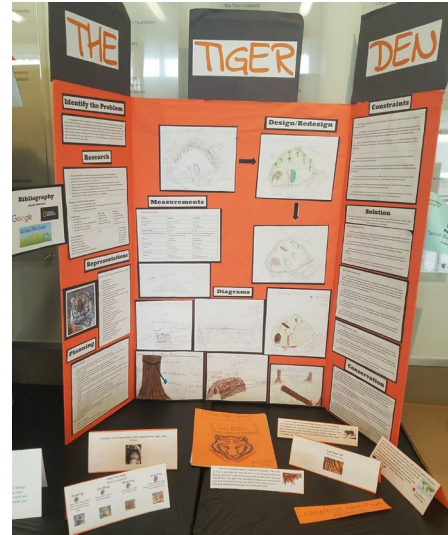
- ☐ Develop **two separate enrichment devices** for choice of two birds of prey species that consider individual needs, Zoo lifestyle, and enrichment goals at the Zoo: Bald Eagle, Red Tailed Hawk, Burrowing Owl, or Great Horned Owl.
 - May be represented in digital form or a 3D prototype.
- ☐ **Prototype Blueprint: Metric Dimensions of Enrichments**
 - Detailed specifications of actual materials to be used (ex: *color, thickness, strength, weight, material, estimated cost if possible*)
 - Dimensions of all enrichment design features
 - Include height and depth measurements for design features
 - If applicable – include measurements for:
 - Volume/amount of food it can hold
 - Circumference of any openings/holes
 - Surface area of sides

ADDITIONAL REQUIREMENTS FOR ALL LEVELS

Presentation of Engineering Process: A visual presentation documenting each step during the design process.

High Tech Presentation Options:	Low Tech Presentation Options:
• Google Slides (preferred) • Power Point	• Tri Fold Board • Poster

☐ *Minimum required written sections for presentation of engineering process (at teacher's discretion). Students should still be prepared to address non-required sections in verbal presentation.*



Problem: Why is this solution needed?

Research: What are the natural behaviors of the animal? How does the species spend its day in the wild? What adaptations and safety considerations are important to know before designing? What are typical enrichments used with the animal? What does the animal like/dislike?

Constraints: What factors restrict a perfect design? Could your solution exist in real life? If the animal was to use your prototype, what might impact a successful use of the enrichment?

Planning: Brainstorm possible ideas. Save sketches, journal notes, and documents created through the process to document evolution and collaboration of ideas.

Final Design: Select the best idea, design it, and then describe it. How does it solve the design challenge?

- How did you modify your final design solution idea along the way?
- What will the design be called?
- What are the main features and real-life materials?
- What are the dimensions/measurements?
- Are there instructions for the zookeeper on how to use and clean it?
- How does it meet the enrichment goals set by the zookeepers?

Conservation Connection: How does designing and using enrichment help the Minnesota Zoo with conservation efforts? How is the animal doing in the wild? What are researchers learning about the species and what are the methods they are using to study them? How can enrichment help encourage visitors to want to act to help protect wildlife?



CONDITIONS

Open to all 3rd-12th grade teachers and their students

- Students must work with students in their grade level range (3-5, 6-8, or 9-12) unless approved by the Zoo.
- Students should work in groups of 2-4 students.
- Teachers must register to participate no later than Friday, November 13th, 2026.
- Field trips are not required to participate, joining ZOOMS STEM Design Challenge is free!
 - *ZOOMS animal species visibility for field trips is never guaranteed due to last animal care needs. Field trips should be planned accordingly in the rare event an animal is off habitat.*

EVALUATION

1. **Presentation Checklist (5 pts):** Visual presentation addresses required sections: Problem, Research, Planning, and Final Design.
2. **Engineering Process (25 pts):** Demonstration of how the engineering design process was used in the development of the enrichment design solution. Evidence of design/redesign.
3. **Solution (30 pts)**
 - a. Does the design meet zookeeper enrichment goals?
 - b. How does the enrichment match the animal as an individual?
 - c. Are the materials and planned location for use safe for the animal using it?
 - d. Does the enrichment encourage the natural behaviors of the species?
 - e. Instructions on the use, cleaning, and implementation of enrichment for zookeeper
 - f. Prototype blueprint includes measurements of key features, openings, dimensions, etc.
4. **Creativity and Conservation (15 pts):** Originality of approach to problem solving and solution. Demonstrates knowledge of conservation as it connects to the project and species, including suggested actions to take or includes purposeful design elements.
5. **Teamwork/Presentation (10 pts)** Effective communication, organized presentation, demonstrates collaboration. The presentation is well organized and follows guidelines of what to include.

ASSESSING PROJECTS TO ADVANCE TO EXHIBITION CONSIDERATION

Teacher Choice

Teachers may evaluate projects individually or host their own Design Challenge Virtual/Classroom showcase at their school.

In Person or Virtual Feedback Session with the MN Zoo Education Staff

**In-person visits are limited to schools 1 hour from Zoo and dependent on staff availability.*

Education staff member(s) may be available to listen to student presentations or provide verbal feedback on design solutions during the planning phase. Appointments for zoo staff to meet virtually with your students must be scheduled 2 weeks in advance. Please contact Kristi.Berg@state.mn.us to arrange.



ZOOMS EXHIBITION

- Teachers can submit up to 20% of their student projects near the end of January to be considered to advance to the in-person ZOOMS Exhibition or Virtual Exhibition (**limited virtual spots*). Select projects will be chosen to present their projects to Zoo staff during ZOOMS Exhibition Week in early March. Teachers planning to submit projects will use a Google submission form link that will be shared on Basecamp in November.
- Submission does not guarantee a spot at the exhibition. Projects will be narrowed by zoo staff and announced in mid-February.
- In person at the Zoo Exhibition and a Limited Virtual Exhibition (pre-recorded or live Zoom presentations) option is available. Schools on spring break during exhibition week or that are more than 2+ hours from the Zoo will be given priority to virtual spots.
- While we do our best to have all schools submitting projects for consideration represented at the exhibition, we are unable to guarantee every school will have a project advance due to the high volume of submissions the Zoo receives.

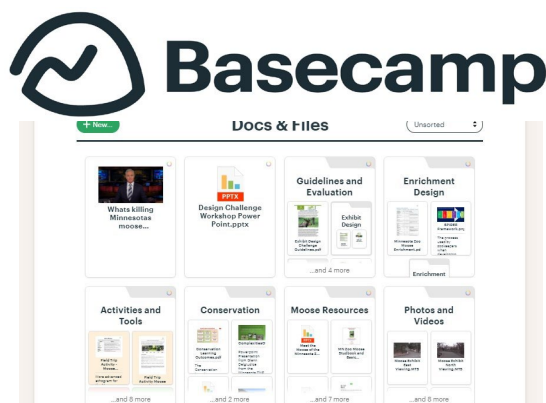
TEACHER TRAINING AND SUPPORT

Teacher and student participation in the ZOOMS Design Challenge is FREE! Teachers will be given access to Basecamp, an online communication portal for teachers to access digital resources to support the implementation of the design challenge with their students.

Participating teachers may also choose to attend the free in-person September ZOOMS teacher training or access a shorter on-demand pre-recorded ZOOMS training (shared in early October). This training overviews the design challenges, shares background info about the animals and exhibit spaces, and highlights resources to assist teachers with planning and implementing the challenge in the classroom. Teachers will also receive ongoing support from zoo staff through Basecamp during the school year to assist in answering student questions, clarifying project requirements, and helping with curriculum planning as needed.

ZOOMS Classroom Sign up: To have your class participate this school year, visit mnzoo.org/stem and click the 'Sign Up Now' link to fill out the form.

ZOOMS Teacher Training Registration: To attend the fall ZOOMS in person training, visit: <https://mnzoo.org/professional-dev/> *Space is limited!





IMPORTANT DATES

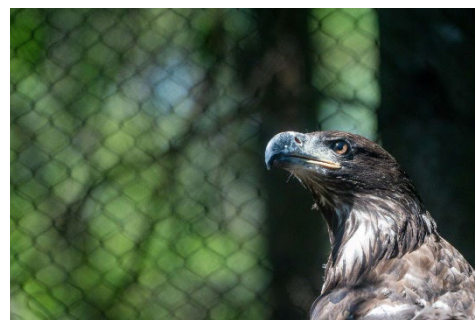
STEM at the Zoo: Intro to the ZOOMS Design Challenge Teacher Training <i>*Recommended for New ZOOMS Teachers!</i>	Thursday, August 6, 2026 9 am – 3 pm <i>*Registration Required - FREE</i>
In Person ZOOMS Design Challenge Teacher Training at Minnesota Zoo (Option 1)	Thursday, September 24, 2026 9 am-3 pm <i>*Registration Required- FREE</i>
ZOOMS Design Challenge On-Demand Teacher Training Recording (Option 2)	<i>*Recording will be available by October 1st and shared on Basecamp.</i>
ZOOMS Challenge Class Registration Closes	Friday, November 13, 2026
Closing Date for Virtual and In-person ZOOMS Exhibition Project Submissions	January 28, 2027 at 12 pm
ZOOMS Exhibition Week (In Person and Virtual)	March 1-5, 2027 Monday –Virtual Exhibition Day (3-5; 6-12) Tuesday – Middle and High School Day Wednesday – Elementary Enrichment Day Thursday – Elementary Exhibit Design Day Friday – Virtual Awards Announced, All Awards shared on Zoo Website

CONTACT

Reach out to STEM Specialist and ZOOMS Challenge Coordinator, Kristi Berg, for further questions and information.

Email: STEM@mnzoo.org

Visit mnzoo.org/stem to learn more!



Thank you to our ZOOMS Sponsor!

