ZooMS! Exhibit Design Challenge

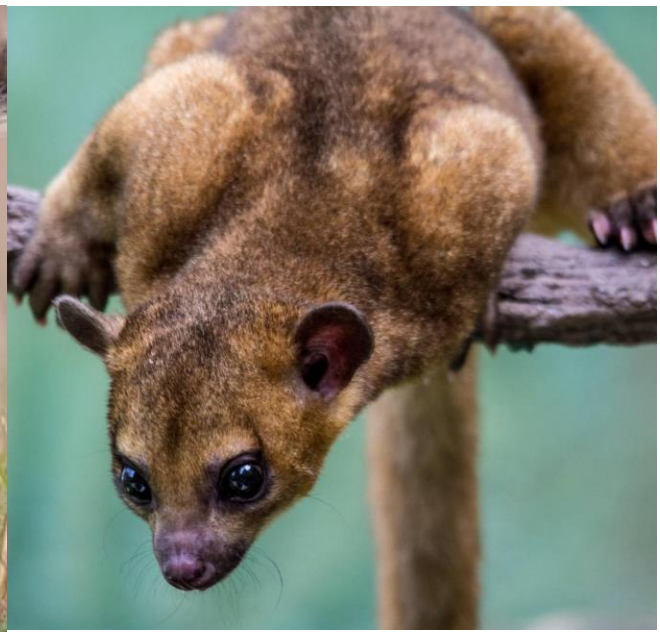
Minnesota Zoo

2015-2016

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The ZooMS design challenge offers students a chance to develop a solution to a 'real' problem faced by zoo keepers and staff at the Minnesota Zoo. From designing an enrichment, to engineering a model of a renovated animal exhibit, the problem will challenge students to use their science and math knowledge, creativity, problem solving, and research skills during the engineering design process in order to best solve the problem and present a solution. Selected students will then be invited to showcase their design challenge solution in the ZooMS Design Exhibition in March at the Minnesota Zoo for a chance to win a backstage pass experience with our animals!





The Challenge

With possible plans for the red panda to be moved to the Northern Trail to allow its habitat to better match its Himalayan home, exhibit designers are now in the early stages of planning to renovate the Tropics Trail exhibit to prepare for the arrival of a new species. However, the decision of what species will use the space is still unclear. The current exhibit falls in the South American section of the Minnesota Zoo's tropics trail, therefore zoo leaders hope to choose an animal that is found in a tropical or subtropical climate in South America. Currently, the list is narrowed to the South American Coati and the Kinkajou. During this renovation, exhibit designers hope to redesign the space to include more engaging interpretation as well as additional up close viewing opportunities for visitors, including looking in from above the tall exhibit. Keepers would also like more environmental enrichment built in for the new species as well as a unique way to provide food enrichment without climbing into the exhibit.

The Task

The Exhibit Design Challenge will require students to redesign the current Red Panda exhibit to meet the needs either the Brown Nosed Coati (South American Coati) or the Kinkajou. Students will need to make special such as:

- ☐ Which animals species would best fit the space? What will need to be changed/added to meet its needs?
- ☐ How many animals should the Minnesota Zoo include in the exhibit? How can the space be used to provide more environmental enrichment opportunities?
- ☐ Can your new renovation improve the quality of the visitors experience with more viewing angles and interpretation?
- ☐ How can the new design better allow keepers to provide enrichment quickly to the animals?
- ☐ In what ways can the design encourage the new species to position itself closer to visitors for up close interaction?

The Solution Requirements

This year, each design challenge will offer two levels of competition to allow classrooms to choose between the enrichment challenge and exhibit design challenge.

Level 1: 3rd – 5th Grade Additional Requirements

- Exhibit design must meet house either the **Kinkajou or the South American Coati**
- **Profile drawing** of the exhibit (See Figure 1 or Figure 2)
  - ☐ Draw in all possible viewing angles
  - ☐ Include **measurements/dimensions of key exhibit features** (tree height, barrier height)
  - ☐ If applicable to design, include substrate or water feature depth.

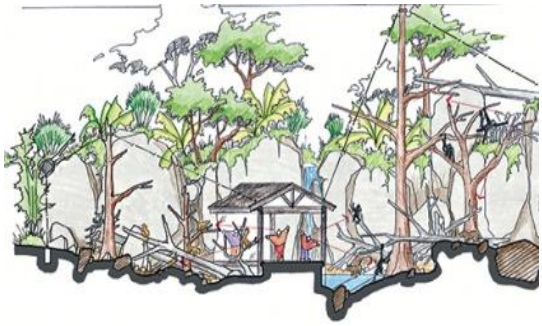


Figure 1

Profile drawing of an exhibit.

Level 2: 6th– 8th Grade Additional Requirements

- **Add a species to share the exhibit!** The tropics trail is home to many multi-species exhibits. Choose one more South American species that could safely share the exhibit and also benefit from the design and environmental enrichment planned. Design the space to fit both species (one being either a **Kinkajou or Coati)**
- **Detailed blueprint:** include **labeled features** and measurements as well as the **scale being used**.
  - ☐ Total length of viewing space for visitors
  - ☐ Identify all of viewing angles from each key visitor location. (*see Figure 1 or 2*)
  - ☐ Total square ft. of the enclosure.
  - ☐ Measurements of key exhibit features (trees, ramps, enclosure barriers)
    -If applicable to design include water and/or substrate depth.
- **Profile drawing** of the exhibit (See Figure 1 or Figure 2)
  Identify all of viewing angles from each key visitor location.

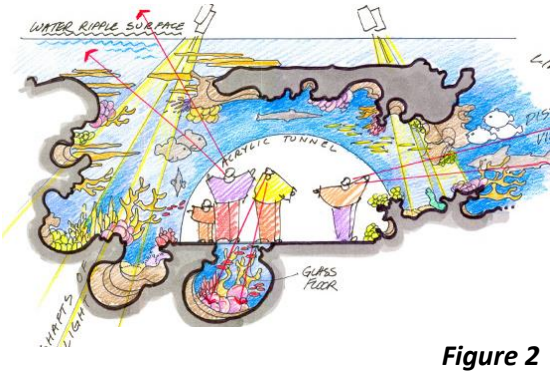


Figure 2

Viewing angles drawn in a profile drawing of an exhibit.

ALL Levels of student submissions for the enrichment challenge will need to include:

- ☐ **3D Exhibit**: Hand built scale model of renovated Red Panda space.
- ☐ **Poster Tri-Fold**: A visual presentation documenting the following:
    - ***Research*:** Does the exhibit design demonstrate knowledge of the animals it serves and their environment? Were natural behaviors of the species and common zoo husbandry practices considered when determining materials and exhibit features? How many animals of the chosen species can live in the space?
    - ❖ ***Design Process:*** Prototype sketches and redesign changes made throughout the design process. How did your design change along the way? Save sketches and documents created along the way
    - ❖ ***Prototype Description*:** What are the main features of the exhibit? What are the measurements/dimensions? How will animals, keepers, and visitors interact with the space? How does it differ from the current space?
    - ❖ ***Constraints*:** What factors prevented a perfect design? Could your solution exist in real life? What issues might you encounter if your plan was chosen to build?
    - ❖ ***Solution**:* How does the exhibit design act a solution to the problems mentioned in the challenge?
        - Does the exhibit include opportunities for environmental enrichment?
        - Is the space functional, safe, and does it mimic the animal's natural habitat?
        - Does the space include engaging interpretation and a creative use of space for viewing opportunities, above and below the exhibit for visitors?

The Evaluation

Renovation designs will be evaluated based on the following criteria:

1. Does the proposed design address a solution that addresses the needs of various parties mentioned? (Zookeepers, animal and visitors)
2. How well is the exhibit space used? Could the design exist in real life?
3. Did the steps to arrive at a solution clearly demonstrate the engineering process?
4. Does the exhibit space show evidence of thorough husbandry research regarding exhibit enclosure?

Advancing to the ZooMS Exhibition

Students will be selected to participate for the ZooMS Design Exhibition in one of two ways depending on the classroom teacher's decision of the following options:

Option 1: Host an Exhibition Event at your school attended by Minnesota Zoo Staff

One or two education staff members may be available to assist in informally evaluating or listening to student presentations. Because of staff time constraints and the number of student participants, education staff are not able be the sole evaluator. We ask teachers to be responsible for determining which projects advance to the zoo for consideration. Appointments for zoo staff to attend your school's Exhibition Event must be scheduled 2 weeks in advance and no later than February 19th. We cannot guarantee availability to attend. Please contact Kristi.Berg@state.mn.us to arrange.

Option 2: Create a Classroom Showcase

Teachers may use the evaluation criteria rubric and host their own Design Challenge Showcase with the teacher submitting the top student designs to the Minnesota Zoo before February 19th to be involved in the Design Exhibition. Contact Kristi.Berg@state.mn.us for exhibition registration of school wide winning designs.

- **Number of ZooMS Exhibition Submissions**
  - Each teacher may submit up to ¼ of the number of projects created**.**
    Example: 15 total projects = 3 to 4 project submissions
  - All teachers can submit a minimum of one project

- **Top Project Submissions to Design Challenge Exhibition must include:**
  - Online Submission Form (Available in January 2016)
    - Names of team members
    - Teacher and school name
    - Grade
    - Written description of the solution and how it met design requirements
  - 1-2 Photos of Tri-Fold Board
  - 1-2 Photos of Students with 3D Model
  - Signed Media Release Form (Available in January 2016)

Conditions

- ☐ Open to all 3rd-8th graders
- ☐ Students may work individual or in a maximum group of four.
- ☐ All application forms need to be submitted to the Minnesota Zoo by September 19th.

2014-2015 Teacher Application Form

Participation is FREE! Apply online by clicking on the **APPLY NOW** link. The first 10 elementary teacher and 10 middle school teacher applications reviewed will receive a $200 stipend upon completion of the following:

- ☐ Attendance to one of the ZooMS Design Challenge Workshops offered
- ☐ Participate in periodic ZooMS program assessment surveys
- ☐ Implement the ZooMS design challenge in to your classroom
- ☐ Submit student projects to be considered for the ZooMS Design Challenge Exhibition in March.

Both new and former ZooMS Challenge teachers are eligible! You will be notified by email if you are one of the first 10 teachers to apply.

Important Dates

Closing Date for Application Forms	Friday, September 19th.
ZooMS: Design Challenge Workshop **Attend one*	Thurs., September 25th or Sat. September 26th
**Design Challenge Implementation Support -*Optional*	Saturday, October 24th, 2015
	Saturday, January 23, 2015
Closing Date for Design Challenge Winner Submissions	Wednesday, February 17th
Projects Advancing to MN Zoo ZooMS Exhibition Notified	Friday, February 19th
Elementary ZooMS Design Challenge Exhibition	Tuesday, March 8th
Middle School ZooMS Design Challenge Exhibition	Thursday, March 10th

** A zoo classroom will be reserved and available to serve as an open ended Design Challenge Implementation Support space for teachers to come to the zoo to work with the ZooMS coordinator, collaborate with other teachers, or work independently anytime between 9 am and 4 pm.

Contact

Contact Kristi Berg for further questions and information

Email: STEM@mnzoo.org Phone: 952-431-9243