



LESSON OBJECTIVE

- Students will research, design, and construct an optimal habitat for an animal at the zoo

GRADE

- 7

STANDARDS

- Science
- ELA

TIME REQUIRED

- 3-5 days
- 45-60 min each

VOCABULARY

- Habitat
- AZA – the Association of Zoos and Aquariums
- Conspecific
- Substrate

MATERIALS

- Access to the AZA website and ability to open pdfs
- Graph paper
- Natural construction materials

RECOMMENDED ASSESSMENT

- Student-produced models and presentation thereof

Introduction

Students will be choosing an animal from the list of available Animal Care Manuals on the AZA website and designing and building a model of an optimal habitat for it at the zoo. Students will have the option to submit their designs to zoo staff for feedback.

State Standards

MS-ETS1-1, MS-ETS1-2: Engineering design

7.W.1, 7.W.4, 7.W.5: Researching and writing assignments

7.ML.1: Critically analyze information found in electronic, print, and mass media

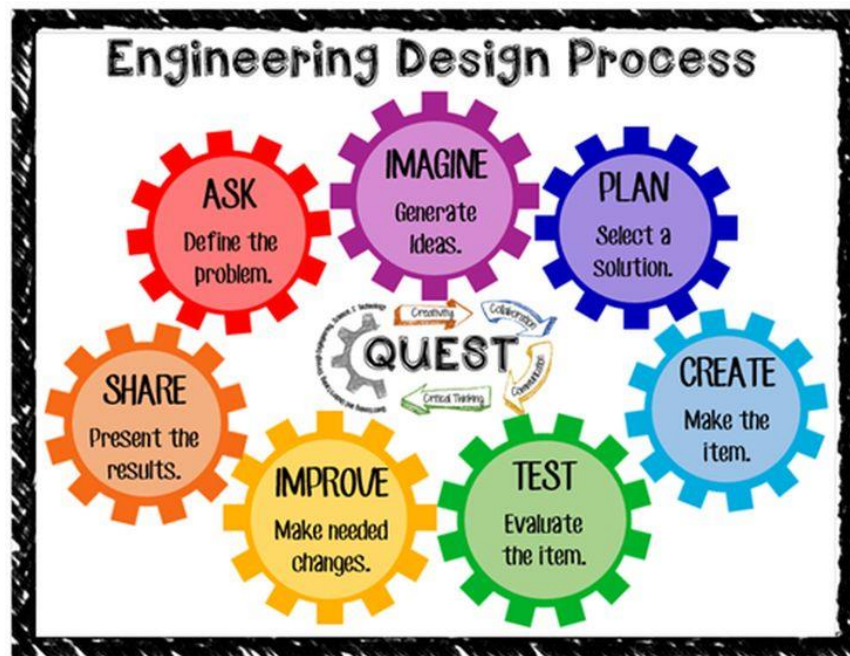
7.RN.1, 7.RN.2.1, 7.RN.2.2 Reading, analyzing, citing, and providing summaries of technical writings

7.SL.4.1, 7.SL.4.2: Presenting claims and findings

Lesson Plan

Background Knowledge –

Students should review the engineering design process:



- *Conspecifics*: other animals that belong to the same species
- *Substrate*: the ground cover (example: grass, dirt, etc.)



Activity –

1. Students will need to research their animals by reading the Animal Care Manual and any additional resources. They should be able to answer the questions posed on the student worksheet. The Animal Care Manuals are available here: <http://www.aza.org/animal-care-manuals?locale=en>.
2. Having multiple students choose the same species but do different designs will help with reading and understanding the technical writing. Students could also work in groups on their designs depending on the time constraints of the class.
3. Students should use the table of contents to find the relevant information, as some care manuals are over 80 pages in length. Look at the table of contents for the section of the manual called “Habitat Design and Containment”***. This is where you’ll want to focus your efforts (usually less than 4 pages long). Students may also need to read through the “Ambient Environment” section. We recommend choosing one of these specific animals, as the care manuals will be easier to read:
 - a. Penguins (pages 12-14)
 - b. Tigers (pages 11-13)
 - c. Lions (pages 18-22)
 - d. Indigo Snake (pages 11-13)
 - e. Giant Pacific Octopus (22-26)
 - f. Polar Bear (pages 12-14)
 - g. Owl (pages 18-20)
 - h. Gorilla (pages 13-18)

***Tips for finding specific information in the “Habitat Design” section of the manual:

- i. Look for a chart that lists “minimum space requirements” or “exhibit size”.
- ii. There is usually a section that will talk about “enclosure design” or “enclosure substrate” and those should help you answer the rest of the questions!
- iii. Suggested page numbers to find this information are listed above!

4. Some vocabulary words that the students may need to know when reading this “technical” writing:
 - **Conspecifics** – other animals that belong to the same species
 - **Substrate** – the ground cover (example: grass, dirt, etc.)
5. They will fill out the worksheets with the specific requirements needed for their chosen species.
6. Students will design a zoo habitat for their species and then construct a model to present to the class. Designs should be to scale and should include dimensions of the major elements. Graph paper is perfect for sketching out the plans before construction. Make sure all drawings include a scale bar. Some examples (created by professionals) are included to give kids an idea of what their habitats can look like.

7. Construction materials depends on what animal the student has chosen, but we would recommend utilizing a shoebox and natural materials like sticks and rocks. Burlap makes a good “fence” or “net” material, hemp string is great for vines, and recycled plastic from a bottle can make a good “glass” material. Students should be creative in their construction but when feasible, strive to make it look as natural as possible. Students are welcome to use whatever building supplies they have on hand at your discretion.
8. Have students present their completed models to the class and discuss why each habitat looks the way that it does. What are the specific animal needs they are meeting? Is this an ideal habitat for their species?
9. Drawn designs, as well as photos of models, can be submitted to the zoo for feedback from staff. Tag us on social media by using the hashtag #fwkidszoo.

Post Activity – Questions for Discussion

Did your habitat meet all your animal’s needs?
What did you like about your classmates’ designs?
Is there anything you would do differently next time?

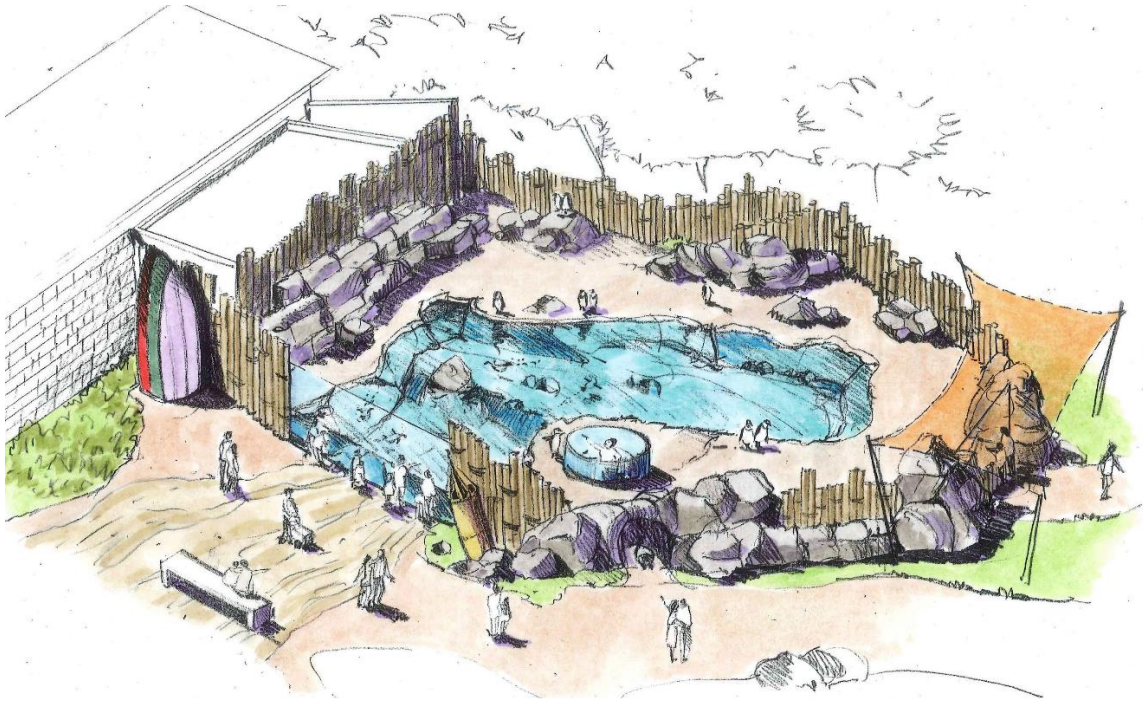
Discover Further

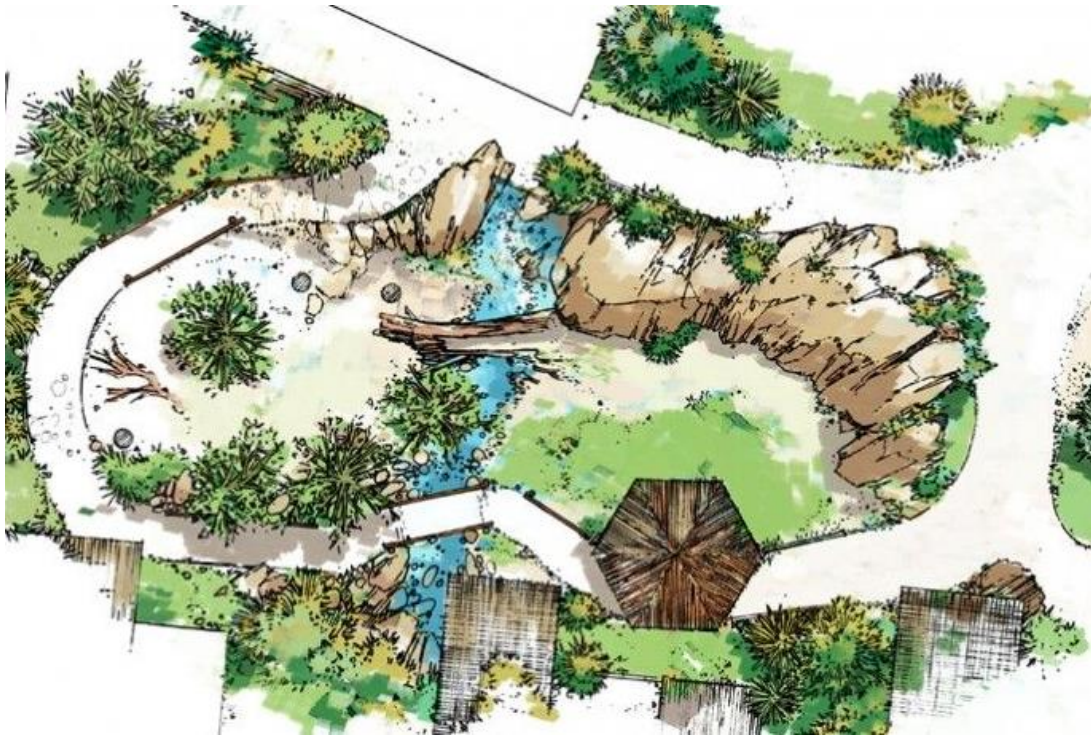
Extending the Lesson –

This activity can take as many days as you see fit depending on the level of specificity you require and the engagement of the students. You can choose to do this activity in groups, construct larger models, or have the whole class design an entire zoo with some groups of students working on various related sections (think how the Fort Wayne Children’s Zoo is organized: we have sections based on regions of the world, with multiple animals in each section). Did students choose animals that come from the same region of the world that they could build a section together?

Learn More –

The zoo is always working on construction of new habitats. Come and see our new Red Panda Ridge this summer and ask our interpreters about the project and the work that went into it.





Connecting kids and animals, strengthening families, and inspiring people to care.



Name: _____

Student planning worksheet

A LOT goes into planning a new zoo habitat. Use this worksheet as your starting point for your designs!

1. What species are you designing a habitat for?
2. Does it need to live by itself or in a group?
3. How many animals will you have? How big will your enclosure need to be?
4. You want your habitat to represent the natural habitat of the animal. What elements will it have? Water? Trees? Rocks? [Remember that we want our animals to be able to exhibit natural behaviors like climbing, digging, running, or swimming. What does your animal like to do? What does your habitat need to have for that to be possible?]



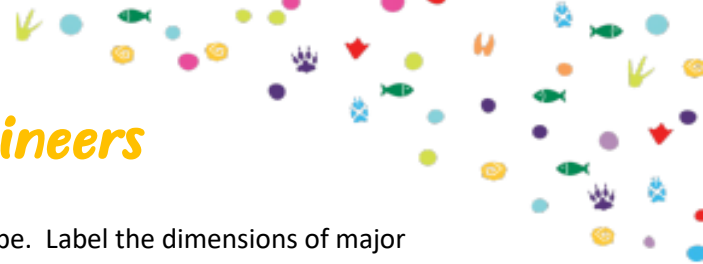
5. All habitats should have an animal “bedroom” where the animal can go when it doesn’t want to be seen by people and where zoo staff can bring the animal when it needs to be “off-exhibit”, such as during a thunderstorm. Where is your animal bedroom/zookeeper space going to be? How can you hide it so that it looks natural? (Look at the teacher examples for ideas.)

6. What parts of the habitat will be in the sun and in the shade? What does your animal require, knowing that this habitat will be built right here in Indiana with hot summers and cold winters? (Does it need to be indoors? Does it need a heated rock or a pool of water to cool off?)

7. The habitat should also be designed so that people visiting the zoo get to see a beautiful space. Here are some general rules we follow when designing zoo habitats:
 - a. Think about where guests will view the animals from (where will the paths be?). A good rule is that guests shouldn’t be able to see the entire habitat from one spot. What sight barriers can you include? Will your habitat have hills, large rocks, trees, a waterfall, or educational signs?

 - b. Wildlife habitat areas and barriers should be designed in such a way that the cross views of other people are avoided. When people can look into a habitat and see people on the other side also looking in, that might ruin the magic and make it feel like the animal has no place to hide. Does your habitat have room for the animal to hide?

8. You will sketch a map view of your design onto graph paper. What is your scale? How many feet are represented by each square? Write the scale on your graph paper so viewers of your



drawing will know how big everything is supposed to be. Label the dimensions of major elements. [3 goals: sketch, scale bar, dimensions of major elements.]

9. Sources (at least 2):

10. Additional things needed for your habitat (pond, heaters, water filters, tall fencing, glass viewing windows, perches, netting, vines, hollow logs, etc.):