

DESIGN CHALLENGE: ANIMAL HOUSE CHALLENGE

ANIMAL HOUSE CHALLENGE:
Can you design a house or toy for a live animal to enjoy?

GOAL:

Working in small teams, students design, build and test a house or toy for an animal

TIME:

30 minutes for activity plus 10 minutes for set up and 10 minutes for clean up.

Materials:

Cardboard boxes
Varying sizes, with tape removed, non-glossy, plain brown are best
Cardboard Tubes
Cardboard Egg Cartons
Paper Bags

Tools:

Scissors
Tape Measure
Books and other resources on animal natural history

DIRECTIONS

- 1 ASK:** Divide students into small design teams of three to four students. Explain the challenge to them from the student worksheet, and provide each team with books and information on the classroom or school pet.

Introduce the term **animal enrichment**. Animal Enrichment is the process of “providing stimulating environments and objects for captive animals in order for them to demonstrate their species-typical behavior, to allow them exercise control or choice over their environment, and to enhance their well-being.” [Definition courtesy of the Smithsonian National Zoological Park] Have students think of times they have been to a zoo or aquarium and noticed the animals playing with toys or living in habitats that have been designed to mimic their habitats in the wild. What kinds of toys have they noticed zoo animals playing with?

- 2 IMAGINE:** Ask each team to research their animals natural habitat and behaviors. What kinds of toys and houses would your animal most enjoy? Have students list possible design elements for their animal house or toy.

Allow students to explore the available materials as they begin to brainstorm possible designs. Have students keep in mind that these are the only materials available. No tape or staples will be allowed since they may be harmful to the animal.

ANIMAL HOUSE CHALLENGE: DIRECTIONS CONTINUED

- 3 PLAN:** Once each team has explored the available materials, provide them with the measurements of the animal, and the measurements of the animals' cage or tank. Ask them to design a house or toy keeping in mind these design constraints. Each team should sketch their design, labeling dimensions and identifying key features. Upon completing their sketch, provide them with their building materials.
- 4 CREATE:** After receiving their materials, students should construct their house or toy according to their design. Students should make sure that the openings in their house are large enough for their animal to enter, and that their toys are large enough so the animal cannot accidentally swallow them.

Once the houses and toys are constructed, ask students to describe how they think their animal will use their design. Make sure to point out parts of the house that may not support the weight of the animal, or parts that the animal may not fit into. From this feedback, have students make any changes necessary to their design.

- 5 IMPROVE:** Students may redesign their house as needed until they determine they are finished. Have students hypothesize how they think their animal will interact with their design.

Upon completing the final redesign, present the design to the animal and observe its behaviors. Have students brainstorm possible redesigns based on the animals' reaction and use of the house or toy. Ask students what a next design step would be. (Eg. Would they consider trying new materials or adding additional features?)

FACILITATION TIPS

- Students will need supervision when working with the scissors. Many types of cardboard boxes are difficult to cut. Avoid using boxes with 2 or 3 layers of corrugation. Also, limit groups to one person cutting at a time.
- Students may need assistance brainstorming ways to connect pieces of cardboard with no tape or staples. It may be helpful prior to the challenge to construct a series of example pieces with cardboard connected with cut tabs and interlocking slits.
- Emphasize the necessity of sketching a plan for a model. Drafts and drawings are essential in the engineering field, and they create an opportunity to bring math concepts of size and scale into the activity.
- Consider asking the students to present their designs to the class. This again emphasizes the importance of communicating ideas in science and technology.