Nature Inspired Medical Tools

Vet Bags: Biomimicry Design Challenge

Grade Level

Grades 4-6

Engage and Explore

This activity is designed to start your students in recognizing themselves as scientists and thinking critically about problem-solving. The goal is to teach concepts through discovery and to encourage using scientific thought processes. As with all lessons provided, please feel free to adapt them according to your students' abilities. You may find it more successful to lead activities and discussions as a whole group as opposed to having your students' work in small groups. Certain scientific vocabulary may or may not be appropriate for your students' level of understanding. Take these ideas, make them your own and your students will have a greater chance at success.

How can nature inspire a design for more effective medical equipment to be used in providing veterinary care?

1. Begin this lesson by asking your students what kinds of tools veterinarians and doctors use during examinations. List the tools on the board in the classroom. Discuss some of the ways that these tools are used or how they work. (*Examples: Microscopes help us to see tiny things up close. Syringes allow us to either take blood out of the body or put medicines into the body through the skin in a safe way. X-rays allow us to see through skin and muscles to see if there is anything wrong with bones*.)

Explain

2. Break the students into small groups and share with each group the Animal Infographic cards. Have students explore the cards looking for adaptations or special features of the animal that might already be seen in medical equipment. Discuss with the entire class what medical devices they are reminded of. How are the animal adaptation and the device similar? Record at least a few examples on the board in the classroom.

Expand

3. Following the group brainstorm, student groups will start the process of designing their own veterinary tool (or redesigning an existing one) that is inspired by one of the animals highlighted in the infographic. If they feel more inspired by another animal that they know about, allow them to explore that in their design challenge. To discover more information about biomimicry to help develop their ideas, student groups can explore asknature.org.
4. Provide each group with poster board, presentation paper, pens/pencils, markers and various

art supplies for creating their design. Inform the groups that they will present their finished designs to the class.

Assess

5. Following the presentations, work with the entire class to discuss what they learned. How were the animal inspirations different for each of the medical equipment designs? Were there any inspirations that were the same? If so, how were those same inspirations used differently in each design?
6. Share your work! When you and your class have completed this activity, we'd love to see what you came up with! Click the "Share Resources" button at the top of the Zoo's Online Resource Library at resourcelibrary.clemetzoo.com. From the dropdown menu, select "Document". Attach your file and complete the form on the page. Please include your school's name and the grade that you teach. When you're done, click "Submit". When we receive your submission, we'll share your class' work!

Standards

Next Generation Science Standards
Engineering Design 3-5-ETS1-2 Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. MS-ETS1-1 Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principals and potentials impacts on people and the natural environment that may limit possible solutions. MS-ETS1-2 Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
Structure, Function, and Information Processing 4-LS1-1 Construct and argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

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Supplemental Materials

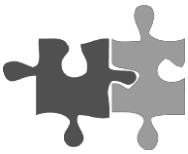
Research Plan

How can nature inspire a design for more effective medical equipment to be used in providing veterinary care?

1. Questioning
State the problem.
Make a hypothesis.

2. Planning
Make a plan by asking these questions (think, talk, write)

3. Implementing
Gather the materials.
Follow the procedures.
Observe and record the results.



4. Concluding
Draw a conclusion.

5. Reporting
Share my results (informal)
Produce a report (formal)