

AskNature Scavenger Hunt

The purpose of this activity is to get familiar with how to use the AskNature website by exploring what it has to offer. AskNature is a website that was designed for anyone who is interested in biomimicry - using examples from nature to inspire the design of solutions for human problems. It is used by engineers and designers as a resource to learn about both strategies in nature and innovative designs inspired by nature. Users can search the site by biological strategy or innovation (design) to find inspiration for new designs or learn about successful biomimicry inventions.

Connect to the Internet on your device and go to AskNature.org. Use the AskNature site to answer the questions below.

Explore Biological Strategy Pages

Each Biological Strategy page on AskNature tells a story about a phenomenon that occurs in nature. These pages are useful to people who are looking to learn more about ways that nature solves problems.

Check out what types of information you can learn from a few AskNature Biological Strategies. Using **Search** tool from the top menu, find a Biological Strategy page about how otters keep warm.

- Click on the Search tab
- Search for "otter"
- Narrow your search to "Biological Strategies"

1. Which page addresses how otters keep warm?

Title of Page: _____

2. Explain, in your own words, the biological strategy that otters have to keep their bodies warm and dry.

Now see if you can find another Biological Strategy via a slightly different route. One of the things that makes AskNature unique from other nature websites is that it allows you to search by function. In biomimicry, functions describe what a trait does for an organism

Trait: A trait describes a particular characteristic or attribute of an organism. Traits include internal and external structures, physical processes, and behaviors.

Click on “Functions Performed” in the otter Strategy page. Now you can see a list of functions related to the otter’s strategy.

3. What are the functions listed?

Click on “See More of This Function” to view a search result of all of the strategies on AskNature that also do that function. You will also see, in the Search feature, how this function is nestled under larger categories

The screenshot shows the AskNature website interface. At the top, there's a navigation bar with links: ask nature, COLLECTIONS, BIOLOGICAL STRATEGIES, INNOVATIONS, FOR EDUCATORS, ABOUT, and a SEARCH button. Below the navigation bar is a search bar with the text "SEARCH: cool". To the right of the search bar, there are two tabs: "BIOLOGICAL STRATEGIES 103" and "INNOVATIONS 11". Below the search bar, there's a section titled "FUNCTIONS" with a list of functions. The function "Protect From Temperature" is selected, and its details are shown on the right. The details include a description: "Many living systems function best within specific temperature ranges. Temperatures higher or lower than that range can negatively impact a living system's physiological or chemical processes, and damage its exterior or interior. Living systems must manage high or low temperatures using minimal energy, which often requires controlling responses along incremental temperature changes. To do so, living systems use a variety of strategies, such as..." Below the description, there are six cards, each representing a biological strategy. Each card has a title, a description, and an image. The cards are: 1. "Otters and seals have a two-layer fur system that prevents water penetration and creates an insulating layer." (Image of an otter). 2. "Hibernation Induces Dramatic Physiological Changes" (Image of a European hedgehog). 3. "Hormones Regulate Behavior in Response to Stress" (Image of an insect). 4. "Down Feathers Supply Super Insulation" (Image of a King eider). 5. "Small Leaves Buffer Insect Eggs From Heat" (Image of a Sacred datura flower). 6. "Leaves Protect from Freezing" (Image of a Giant groundsel plant).

This nested list of functions was created because designers who are using AskNature to inspire a solution to a problem need to be able to narrow down to a very specific function.

Functions can be used to help you search the site.

For the next few questions, pretend you are a designer looking to build a device to clean pollution from a river and you don't want your device to get clogged up. From the **Search** tool, try using Functions to narrow results by strategies to *filter solids*. It turns out nature has a lot of solutions to filter solids!

The screenshot shows the AskNature website interface. At the top, there's a navigation bar with links: ask nature, COLLECTIONS, BIOLOGICAL STRATEGIES, INNOVATIONS, FOR EDUCATORS, ABOUT, and a SEARCH button. Below this is a search bar with the text "SEARCH: Enter keyword". A filter bar indicates "BIOLOGICAL STRATEGIES 29" and "INNOVATIONS 8". A secondary filter bar shows "CAPTURE, ABSORB, OR FILTER SOLIDS" and "BIOLOGICAL STRATEGIES". On the left, a "Functions" sidebar lists various functions with counts and expand/collapse icons. The main content area is titled "Capture, Absorb, or Filter Solids" and includes a descriptive paragraph: "Some living systems must secure solid particles such as sediment, usually to keep the particles from hindering their health or activity. The most common way in which they do this is through filtering. To be effective, a filtering system must be appropriate to the sizes of solid particles to be captured and must capture only what is needed. It must also be effective in the appropriate media—air, water, or sometimes solids like soil. An example is mangroves, which are trees that...". Below this text are six "BIOLOGICAL STRATEGY" cards, each with an image and a title: "A Mucus House Filters Food" (Giant Larvacean), "Mangrove Forests Calm Coastal Waters" (Mangrove forest), "Hairy Hind Legs Carry Various-sized Pollen" (Mining bees), "Wrinkled Fingertips Enhance Grip" (Humans), "Charged Electrostatic Hairs Collect Pollen Granules" (Bees), and "The Clypeus Pollinates and Builds Nests" (Mason bee).

It might make sense to visit the Biological Strategies page, "*Filters Prevent Clogging.*" Find and click on that page.

4. On which two animals does this strategy page focus?

Watch the video linked from this page of the American Paddlefish feeding.

Explore Innovation Pages

Many of the Strategies on AskNature helped inspire some innovative product ideas. To learn about these biomimicry case studies, follow the instructions below to discover a few different ways to navigate to them.

5. What kind of product did the fur of otters and other mammals inspire?
 - Navigate back to the page "*Fur Keeps Heat in and Cold Water Out*" from step 2 above.
 - Follow the link from this page to its related Innovation page.
 - Title of Innovation Page: _____

6. What are some Innovations that have been inspired by nature's solutions to filtering solids?
- Go to Search
 - Filter by Innovations
 - Filter by function - *Capture, absorb or filter solids*

List some Innovations: _____

7. Using **Search**, see if you can find an innovation inspired by elephants.

Title of Innovation Page: _____

Explore Collection Pages

8. Navigating to **Collections** from the top menu bar, choose a collection of Biological Strategies associated with a topic that interests you. Click into a strategy that interests you. What is one of the functions listed for this strategy? Has this strategy inspired a design? If so, what is it called? If not, write a sentence explaining how this strategy could inspire designers in the future.

Collection: _____

Biological Strategy: _____

Function: _____

Innovation (if there is one): _____

How might this Strategy inspire a new Innovation?

After Your Exploration

Share with the whole group what interesting strategies and innovations you found while exploring question 8.

9. What excited you about the AskNature website?

10. What confused you about how the AskNature site works?