

Animal Architects

Teacher's Guide





ANIMAL ARCHITECTS

SUBJECT:
Science

GRADE:
3

**CURRICULUM
CONNECTIONS:**

Grade 3:
**Structures and
Materials**

OVERVIEW:

Animals have special adaptations to either build elaborate structures or have body parts that structurally enable them to be safe or help them guide their way through life efficiently. Students will get a close-up look at some real animal structures and will be introduced to some of our socialized animals that have special adaptations or use unique homes or structures to keep them alive.

OBJECTIVES:

1. Students will be introduced to some physical characteristics of vertebrate animals that enable them to build certain structures.
2. Students will look at the form and function of a variety of natural structures.
3. Students will determine whether the natural structure is strong and stable through a look at the shapes of the structure.
4. Students will observe what kind of materials animals use to build their structures.
5. Students will learn that their body is a unique natural structure too!

KEY VOCABULARY:

Natural: existing in or made by nature

Structure (n): the way in which the parts of something are connected together, arranged or organized. It is designed to hold a load.

Adaptation (in reference to biology): structures or behaviours that enable an animal (or plant) to survive in its environment.

Strength: ability to resist a force

Stability: ability to maintain balance and stay in place

Hexagon: a six-sided shape where all sides are equal and all interior angles equal 120 degrees

Physical Characteristic: helps us explain an object. A physical characteristic is something we can explain using our senses (rather than describing what it does or how it behaves)

BACKGROUND INFORMATION

This program will focus primarily natural structures. We will also focus on why nature uses the hexagon shape so often. We see hexagon shapes in rock formations, wasp nest construction, coral reefs, turtle shells, snowflakes, pineapples and even in insect eyes! Why is this shape so efficient? It is both strong and provides the best surface area with the least amount of material.

PRE-VISIT ACTIVITIES

Activity One

Ask the students what the two words, strength and stability mean to them. After they've provided their examples, give them the definitions if they didn't come up with one that was close. Ask them if they know what you mean if you say the word, structure. Provide an answer if they do not. In groups, or on their own, see if they could list 5 structures that would be strong and 5 that they think would be stable. Provide some examples of a strong structure and a stable structure first so they understand. How could they show their strength and stability? Try different movements with their body - push against the hands of another student (one student against a wall prevents falling) to show strength or standing on two feet vs. standing on one foot for stability. Share their answers of structures with the class.

Activity Two

Find a picture that has a lot of different structures on it (including humans). Review that a structure is designed to hold a load. Have the students work in groups to list all the structures they see in the picture. Have them answer these questions: how are the structures similar/different? Are any structures in the picture stronger than others or more stable? Why? At the end, review their answers and discuss that all structures have a definite size, shape and carry a load. Look at some items in your classroom. Let's use a desk for example. What part of the structure carries the load or "supports" the load? (the legs). What is the purpose of the structure? (to have a surface to write on, if connected with a seat, then it supports the weight of a person, to hold things, etc). Where is the load on the structure? (on the table and, if connected to a chair, on the chair). Where would the structure "fail" (the legs if the load is too heavy)? See if they can answer these questions for other items in the class.

POST-VISIT ACTIVITIES

Activity One

At the Zoo, you saw or heard about a variety of natural structures. What materials were some of those structures made from (garbage, feathers, chewed up wood, branches, mud, etc)? Materials are chosen for a structure based on their properties. For example, a structure might need to be light, flexible, heavy, last a long or short time, based on how it will fit in their environment, etc. Give the students a bunch of examples of a variety of man-made structures, preferably real ones so they can handle them. Make sure they have a variety of materials - rubber, metal, wood, plastic for example. Why do they think the object has the material it does? Could another material work as well? Why or why not? For example, if you have a gym mat would it work to be made of stone? Why not? Then give the groups some pictures where they can't touch the material and ask the students what "properties" those items need in order to function. For example a backpack - it needs to be light enough to carry, have space to put items in, etc.

Activity Two

Indigenous peoples used the tipi as a cone-shaped dwelling. If possible, go to Wanuskewin for a tipi program. If not, focus on the construction of the tipi. What materials are used to build it? What shapes are in the structure? What holds the load? How do you keep warm in a tipi and what is needed to provide for that heat? There are lots of things to discuss just by examining this important structure.