Nature's Building Materials

Suggested Curriculum links (Grade 3)

Physical Science: Materials and Structures

- 100-34 describe the properties of some common materials and evaluate their suitability for use in building structures. Include:
  (i) strength
  (ii) mass
  (iii) ability to be joined

English Language Arts

- Students will be expected to select, read, and view with understanding a range of literature, information, media, visual and audio texts.
- Students will be expected to use a range of strategies to develop effective writing and media products to enhance their clarity, precision, and effectiveness.

Materials

- Various natural materials (leaves, branches, bark, grass)
- Styrofoam cups
- Tape
- Pencils
- Poster board

Overview

Animals use lots of natural materials (rocks, branches, bark, leaves, and grass) to build their homes, nests and cases. In this activity, students will investigate the properties various natural materials and how animals join them together.

Objectives

- To investigate the properties of available natural materials.
- To classify and display natural materials based on their properties.
- To learn about how animals use and join natural materials.

Background

Humans are not the only living organisms that build things: animals in the natural world are the original engineers. Beavers use trees, sticks, plants and mud to make their lodges and dams. Birds use string, grass, twigs and many other materials to construct their nests.

Animals use different materials depending on what they are building. Some materials like rocks, wood and mud provide strength to a structure. Grasses, leaves and other plants are light weight and flexible, ideal for small animals or for building structures in trees. They can also help provide shad and are quite strong when woven together.

Many animals require a "glue" to help their structures keep their shape. Birds may use spit, dung, mud and spider webs to glue their nest together. Some creatures like sticklebacks and Caddisflies produce glue from their body to make nests or a casing.

Procedure

At the Fluvarium
Join us for *Nature's Structures!* Humans are not the only living organisms that build things: animals in the natural world are the original engineers. This program focuses on the structures built and used by the animals in and around The Fluvarium. Students will investigate the ways in which these structures are built and the materials which are required to do so.

1. *Collect different kinds of natural materials.*
   Collect branches (from a deciduous tree like maple or dogberry), leaves, bark, and grass from a local natural area and bring them to the classroom.
2. *Explore the different materials collected.*
   Have the class feel the different materials they've collected. Have them identify which plants they come from.
3. *Investigate the flexibility of each material.*
   Have the students hypothesize which material is the most flexible. Ask them to write down their hypothesis, listing the materials from most flexible to least flexible. Ask the students to test the flexibility of each material by bending them (without breaking them). Students may group them in the following ways: not flexible – cannot or barely bends, moderately flexible – can make a "U" shape, very flexible – can make the ends touch in a teardrop shape. Have the students record their observations.
4. *Investigate the strength of each material.*
   Have the students hypothesize which material they've collected is the strongest or weakest. Ask them to write down their hypothesis, listing the materials from strongest to weakest. Have the students tape two Styrofoam cups upside down on their desk. Have the students make a bridge with each material by taping them across the two cups. Try to have as few gaps as possible. Test the strength by adding pennies to the bridge and seeing how many it can hold before it breaks. Ask the students to record their observations.
5. *Investigate the weight of each material.*
   Have the students hypothesize which material they've collected is the lightest or heaviest. Ask them to write down their hypothesis, listing the materials from lightest to heaviest. Have the students take enough of each material to cover the palm of their hand. Have them compare the materials to find the lightest to the heaviest. Alternatively have them weigh each material on a scale. Ask the students to record their observations.
6. *Display the properties of each material.*
   Have the students create a poster showing the properties of each material. They may tape a sample of each material and list how strong, flexible or heavy

they are. They may also list the properties by category and tape and label samples of each material in order from least to most flexible, weakest to strongest, lightest to heaviest.

7. *Investigate the ability for each material to be joined.* Ask the students to brainstorm how these materials could be used to make structures. What other things would they need to join these materials together to make a beaver lodge or a bird's nest? Have the class read **Nature's Builders** and answer questions at the end.

Extensions

- Have the class research different kinds of animals and how they use natural materials for building: caddisfly, red squirrels, ravens, etc.
- Have the students make bridges using only natural materials. Test their strength by seeing how many pennies they can hold.
- Challenge the students to build bridges using only grass and leaves. How can they improve on its strength?

Resources

Online Video

How beavers build a lodge - BBC Animals. Retrieved from http://www.youtube.com/watch?v=VuMRDZbrdXc

Books

Beavers: Big-toothed builders. Sullivan, Jody. Bridgestone Books. 2005.

The planet's most extreme builders. Discovery Channel. Blackbirch Press. 2004.

Name:_____ Date: _____

Nature's Builders

Animals use materials from in nature to build their homes and safe places for their babies. Beavers build homes called lodges that made out of wood. They cut down trees with their long sharp rabbit-like teeth. Beavers build a lodge by piling trees in an area and fill the gaps with mud, sticks and plants from the water. The mud dries insulates the lodge and holds all the sticks in place. The beavers dig out an underwater entrance and rooms inside the lodge to live.

Many song birds make nests in trees to hold their eggs. Bird's nests are made out of available materials that the bird can find including moss, lichen, string, twigs grass, and feathers. They also use spider webs, mud and their own saliva (spit) to glue their nests together.

Sticklebacks are small fish that live in freshwater or saltwater. They have three large spikes on their back. In Newfoundland they are called "pricklies". The male sticklebacks make a nest by choosing a sandy area and laying pieces of grass and water plants on it. He then makes a tunnel through the plant pieces where the female can lay her eggs. He keeps the tunnel in place using glue produced from his kidneys.

Name:_____ Date: _____

Nature's Builders Questions

1. A beaver's home is called a _____
2. A beaver uses _____, _____, and _____ to fill the gaps between the trees.
3. Name three materials that song birds use to build their nest:

_____

_____

_____

4. Name three things that song birds use to glue their nest together:

_____

_____

_____

5. Sticklebacks live in _____ water and _____ water.
6. The _____ sticklebacks make the nest and the _____ sticklebacks lay their eggs in it.
7. Male sticklebacks make a glue from their _____.