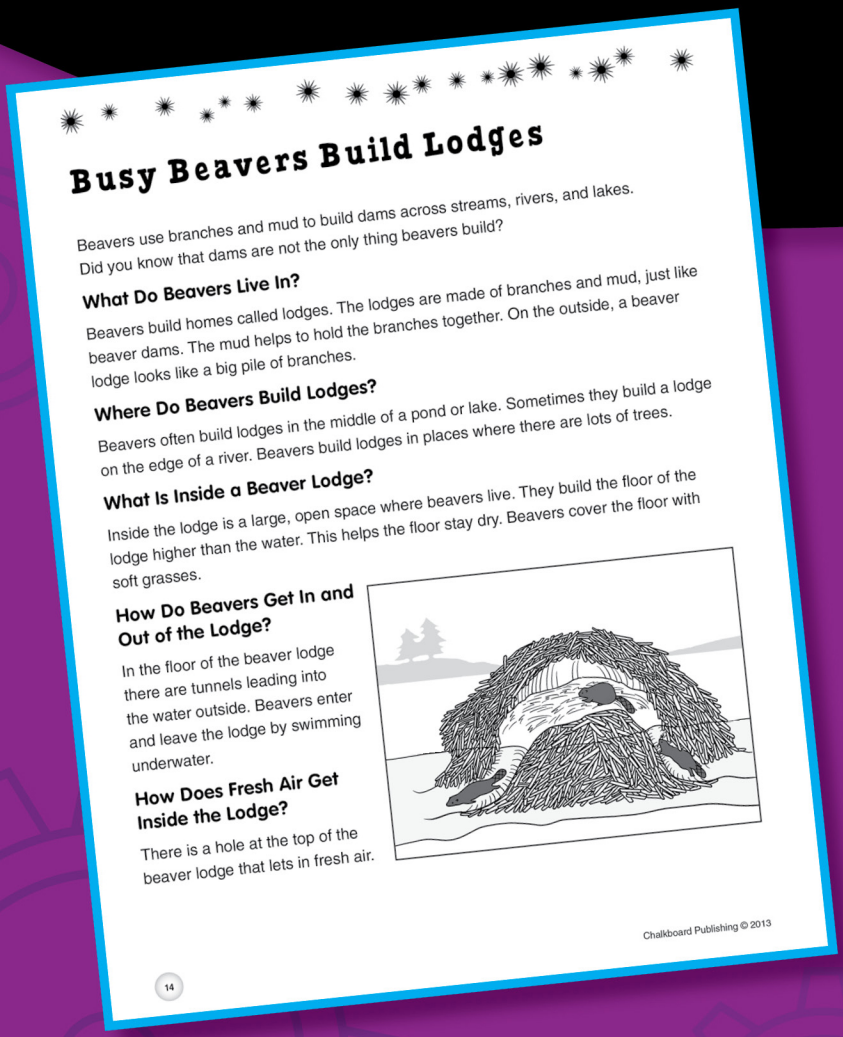
Canadian Curriculum Teaching Resource

3–5

Canadian Instant Structures and Mechanisms



Busy Beavers Build Lodges

Beavers use branches and mud to build dams across streams, rivers, and lakes. Did you know that dams are not the only thing beavers build?

What Do Beavers Live In?

Beavers build homes called lodges. The lodges are made of branches and mud, just like beaver dams. The mud helps to hold the branches together. On the outside, a beaver lodge looks like a big pile of branches.

Where Do Beavers Build Lodges?

Beavers often build lodges in the middle of a pond or lake. Sometimes they build a lodge on the edge of a river. Beavers build lodges in places where there are lots of trees.

What Is Inside a Beaver Lodge?

Inside the lodge is a large, open space where beavers live. They build the floor of the lodge higher than the water. This helps the floor stay dry. Beavers cover the floor with soft grasses.

How Do Beavers Get In and Out of the Lodge?

In the floor of the beaver lodge there are tunnels leading into the water outside. Beavers enter and leave the lodge by swimming underwater.

How Does Fresh Air Get Inside the Lodge?

There is a hole at the top of the beaver lodge that lets in fresh air.

Chalkboard Publishing © 2013

14

TEACHER RECOMMENDED

Includes

- Stability and Structures
- Pulleys and Gears
- Forces Acting on Structures and Mechanisms
- Informational Text

Real World Connections!

Chalkboard Publishing Inc

Contents

Teacher Tips

Encourage Topic Interest

Help students develop an understanding and appreciation of different science concepts by providing an area in the classroom to display topic-related non-fiction books, pictures, collections, and artifacts as a springboard for learning.

What I Think I Know / What I Would Like to Know Activity

Introduce each science unit by asking students what they think they know about the topic, and what they would like to know about the topic. Complete this activity as a whole-group brainstorming session, in cooperative small groups, or independently. Once students have had a chance to complete the questions, combine the information to create a class chart for display. Throughout the study, periodically update students' progress in accomplishing their goal of what they want to know, and validate what they think they know.

Vocabulary List

Keep track of new and theme-related vocabulary on chart paper for students' reference. Encourage students to add theme-related words. Classify the word list into the categories of nouns, verbs, and adjectives. In addition, have students create their own science dictionaries as part of their learning logs.

Learning Logs

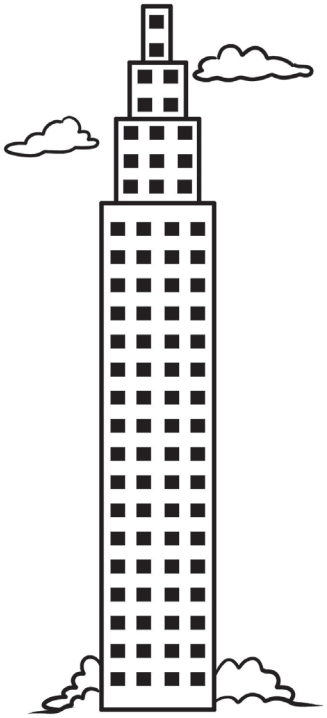
Keeping a learning log is an effective way for students to organize thoughts and ideas about the science concepts presented and examined. Students' learning logs also provide insight on what follow-up activities are needed to review and to clarify concepts learned.

Learning logs can include the following types of entries:

- Teacher prompts
- Students' personal reflections
- Questions that arise
- Connections discovered
- Labelled diagrams and pictures
- Definitions for new vocabulary

What Is a Structure?

skyscraper



A *structure* is something that holds or supports a load. A truck can hold a heavy load of boxes. A *load* is something that has weight.

Your bed is a structure that supports a load. When you lie on your bed, you are the load. The bed supports the weight of your body.

A Structure Has Size

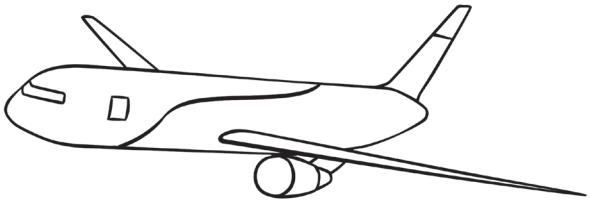
Structures come in many different sizes. A skyscraper is a huge structure. A skyscraper supports the weight of all the people, furniture, and equipment inside it.

A paper cup is smaller than a skyscraper, but a paper cup is a structure too. When you fill a paper cup with water, the water is the load. The cup has to support the weight of the water.

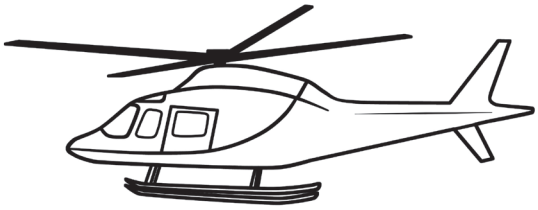
A Structure Has Shape

A structure can be almost any shape. A bookcase is a structure shaped like a rectangle. Buildings are structures. Think of all the different shapes that buildings can be. An airplane and a helicopter are both structures that can fly. They each have a different shape.

airplane



helicopter



A Structure Has a Purpose

A structure is built to do something. A bed gives you a soft place to lie down and sleep. A bookcase stores books. A truck carries large, heavy loads from place to place.

"What Is a Structure?"—Think About It!

1. What do all structures do?

_____

_____

2. The load a structure supports can be made up of more than one thing. For example, people, furniture, and equipment are all part of the load in a skyscraper. Name two things that might be part of the load in each structure below.

An airplane: _____ _____

A backpack: _____ _____

A shopping cart: _____ _____

3. What load is a skateboard made to hold? What is the purpose of a skateboard?

Load: _____

Purpose: _____

_____

4. Is a fence a structure? Explain your thinking using the information from the reading and your own ideas.

_____

_____

_____

_____

_____

_____

_____

_____

Natural Structures

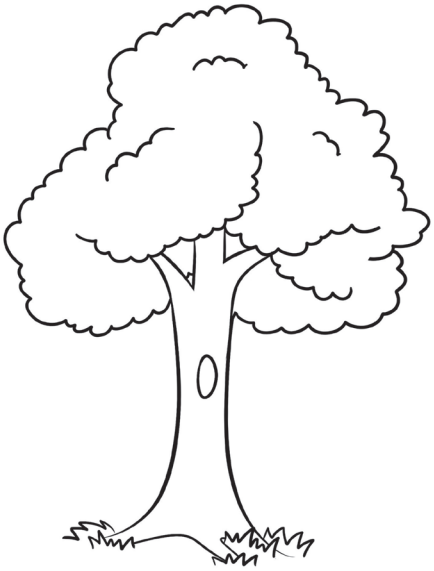
You can find many structures in nature.
Look at the two examples below.

Tree

A tree is a structure. It holds a load, has size and shape, and has a purpose.

It is easy to see that every tree has a size and shape. What load does a tree hold? A tree has to hold up the weight of its trunk, branches, and leaves. If a tree cannot hold up this load, it will fall over.

What is the purpose of a tree? A tree makes seeds so other trees just like it can grow.

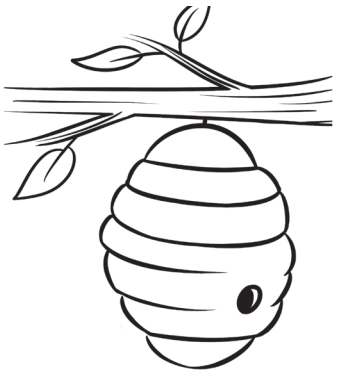


tree

Beehive

Bees make a home called a beehive. Thousands of bees can live in one beehive. Bees make honey, and they store the honey inside the beehive.

A beehive is a structure. It has size and shape. The load that a beehive holds includes the bees and the honey. The purpose of a beehive is to give the bees a home, a place to store food, and a place to keep their eggs safe.



Beehives often hang from tree branches.

Brain Stretch

Make a list of other structures found in nature. _____

_____

_____

_____

_____

"Natural Structures"—Think About It!

1. Many birds build homes called nests. Name two different things that can be part of the load in a bird's nest.

_____ _____

2. What is the shape of a bird's nest?

_____

3. What are some materials a bird uses to build a nest?

_____

_____

4. Spiders build structures called webs. What is one purpose of a spider web?

_____

_____

5. What are two things that can be part of the load on a spider web?

_____

_____

6. Beekeepers raise bees and sell the honey the bees make. A beekeeper builds special beehives where the bees live. Is this special type of beehive a natural structure? Tell why or why not.

_____

_____

_____

_____

_____

_____

_____

Strength and Stability

Strength

A structure has to be strong enough to hold its load. A chair is a structure. The person who sits on the chair is the load. If the chair is not strong enough, it will break when someone sits on it.

A paper cup does not have to be nearly as strong as a building. The liquid in a paper cup does not weigh very much.

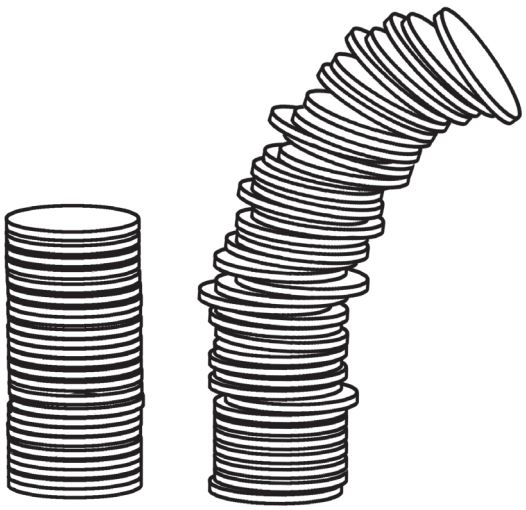
A person who sits on the chair is the load.

Stability

We say that a structure is stable when it can keep its balance and stay in place.

It is easy to keep your balance when you stand on two feet. Standing on two feet keeps you stable. Keeping your balance when you stand on one foot is harder. When you stand on one foot, you are not as stable. You might sway back and forth, so your body does not stay in place.

Have you ever tried to create a very tall stack of pennies? When the stack is short (less than 25 pennies), it is stable. The stack does not sway or jiggle much when you add pennies. Once the stack has about 40 pennies, it jiggles and sways much more. A short stack of pennies is more stable than a tall stack of pennies.

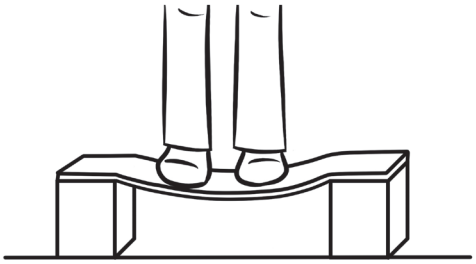


Have you ever tried to create a very tall stack of pennies?

Challenge

How long can you stand on one foot? Have a contest with your classmates.

"Strength and Stability"—Think About It!



Tanya's mom built a simple step to help her reach things on high shelves. She nailed a thin piece of wood on top of two thick blocks of wood. Then she stood on the step.

1. Does the step look strong? How do you know?

_____

_____

_____

_____

2. Does the step look stable? Explain your answer.

_____

_____

_____

_____

3. What could Tanya's mom do to make the step stronger?

_____

_____

_____

_____

4. Why would it be important for a step like this to be stable?

_____

_____

_____

_____

Experiment: Stability

What You Need

- 1 paper towel tube
- 1 toilet paper tube
- Tray

What You Do

1. Stand the tubes beside each other on the tray, with at least 5 inches of space between them. Place the tubes near an edge of the tray.
2. Slowly lift the tray from the edge closest to the tubes. Notice which tube falls over first. Keep lifting until the second tube falls over.
3. Record the order in which the tubes fall over.
4. Repeat the experiment twice to see if you get the same results.

Experiment 1	**Order:**
Experiment 2	**Order:**
Experiment 3	**Order:**

Questions

1. Which tube was more stable?

_____

2. Which would be more stable—a tall building or a short building? Explain your thinking.

_____

_____

_____

Stability Challenge

What You Need

- 2 paper towel tubes
- Tissue paper
- Tray
- A piece of cardboard
- Elastic band
- Tape
- Dried beans (enough to fill 1/4 of the tube)

What You Do

1. Your challenge is to choose a tube and use the materials to make the tube more stable. You can only use one tube. You cannot cut or damage the tube, or tape it to the tray. You do not need to use all the materials.
2. When you think you have made one tube more stable, test it out. Stand the two tubes beside each other on a tray. The tubes should be at least 13 cm apart. Place them near an edge of the tray.
3. Slowly lift the tray from the edge closest to the tubes. See which tube falls over first.

Question

1. If the tube you changed was more stable, explain what made it more stable. If it was not more stable, think of a new way to use the materials. Explain why you think your new idea might work better.

_____

_____

_____

_____

_____

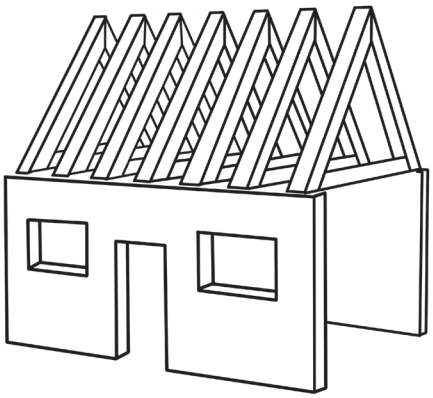
_____

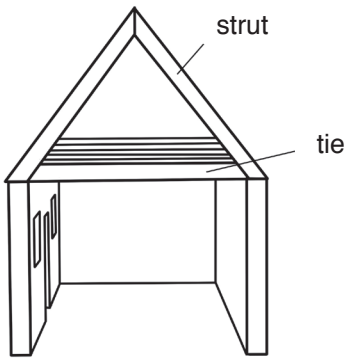
_____

_____

Building a Roof

Most houses have a roof shaped like a triangle. A triangle is a strong shape that can hold a heavy load. Workers start making a roof by building a frame of triangles.





The outside of the roof will be covered with large boards. The boards are then covered with shingles. The boards and shingles are heavy. The frame has to be strong enough to hold them up.

The weight pushes down on the roof. The corners of roof are pushed out. The roof could collapse. The tie holds the bottom corners in place. The tie makes the roof much stronger, so it will not collapse.

Try It!

Fold a strip of construction paper or thin cardboard into three equal parts to form a triangle shape. Stand the triangle up so the opening is at a bottom corner. Imagine the triangle is roof struts that are not attached to a tie. Push down on the top of the triangle. What happens? Push gently down on the two sides of the triangle at the same time. What happens? Now tape the opening together so it makes a complete triangle. Push on the top and sides again, the same way as before. This shows how a tie makes a roof stronger.

GET EVEN MORE!

Access thousands of activities and student pages just like these with a Chalkboard digital subscription!

Chalkboard engages students and inspires a love of learning with

- 100% Canadian curriculum-based content (featuring Canadian spelling and grammar!)
- A variety of materials that cover core, foundational and supplementary k-6 subjects and concepts
- Instant access to thousands of resources on all devices. All you have to do is print and teach
- High-quality learning materials, how-to's, tips and tricks, graphic organizers, and student success criteria
- Illustrations, word games and hands-on activities, students are able to learn concepts and practice skills while having fun

Visit www.chalkboardpublishing.com to learn more or to get started!