

Tall Towers

A LEGOLAND® Malaysia Educational Resource Guide

About Tall Towers

Educational Objectives

- Learn about man-made and natural structures
- Classify structures as frame or shell structures
- Learn how to build stable structures
- Relate Hands-On investigations to the experience of LEGOLAND attractions.

Background Information

Before you Build, Study These Structures!



What is a structure?

A structure is the arrangement of all the parts of a whole thing. It is something that is built.

What is a man-made structure?

A man-made structure is built or constructed by people. Houses, cars, towers, cranes, chairs, and bridges are all man-made structures.

What is a natural structure?

Natural structures grow, or are built by other living things. Leaves, snails, and turtle shells are natural structures that grow. A spider web, bird nest, beehive, and beaver dam are examples of structures that are built by other living things.



What is a shell structure?

A shell structure is built to enclose people or objects. Houses, cars, pitchers, and boxes are man-made shell structures. A beehive or bird nest is a natural shell structure.

What is a frame structure?

A frame structure is built to support a load. Bridges, chairs, and ladders are man-made frame structures. Spider webs and leaves are natural frame structures. Everyone has a natural frame structure in his or her own body—a skeleton.



Structures can be flexible or rigid.

Some structures are flexible or stretchy, like a net, folding doors, or a plastic bag. Some structures are rigid, like towers, houses, and tables.

How to Design a Structure

When you think about building a structure, think about what the structure will need to do and how it will be used. Then choose the right materials and shape for the structure.

Materials: For example, a spider's web needs to be stretchy and elastic so it can blow in the wind without breaking. A house needs to be strong and is often made of bricks.

Shape: For example, a chair needs a flat seat and legs to support the load of a person. A pitcher needs to have a spout for easy pouring.

Before and After the Visit: Minds-On Investigations

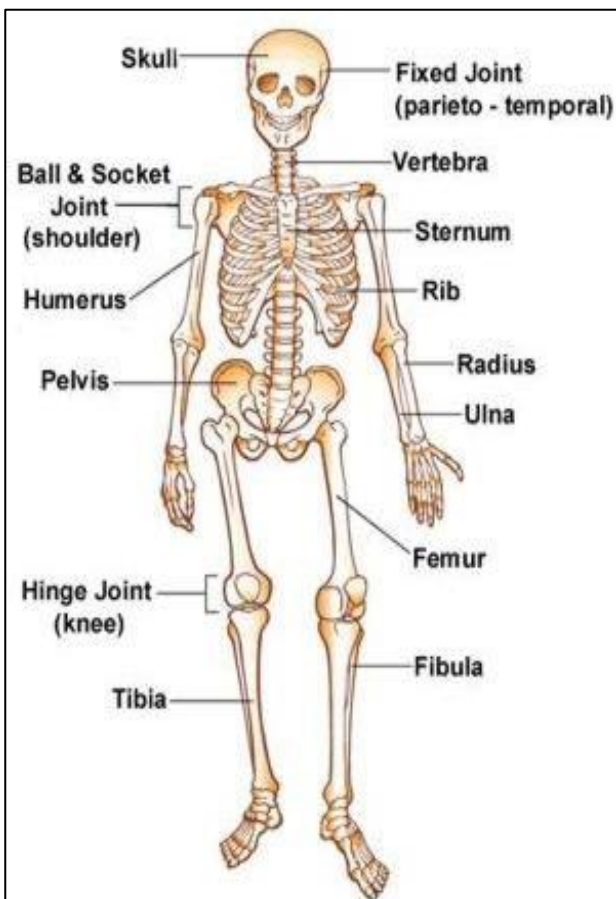
Paper Bridges

Strong and Stable or Weak and Wobbly?

When using identical materials, one design can be weak and another can be strong.

1. Place a sheet of paper between two desktops as shown. Lying flat, the paper will fall; it is not very strong or stable.
2. Now roll the paper and tape it to form a tube. Place the paper between the two tables. By changing the shape, a stronger and more stable structure is created.
3. Fold paper into different shapes and lay it across two desktops. Find the strongest and most stable design.

Your Skeleton: A Natural Frame Structure



Each person has a natural frame structure inside his or her body—a skeleton! Our skeleton gives us shape and supports the weight of our muscles. The size of our frame, or skeleton, determines how tall we are.

The tallest person who ever lived was Robert Wadlow (1918-1940), of Alton, Illinois. When he was five years old in Kindergarten, he was 5'6" tall. He grew to be 8'11" tall.

Compare Shapes and Sizes

1. Lie on the floor on butcher paper and ask a partner to trace the shape of your body. Cut out the shape. Trace your partner's shape and cut it out.
2. Now draw a 8'11" tall shape for the tallest man who ever lived.
3. Tape the shapes to the wall, along with a tape measure.
4. Find the difference between the tallest person in the class and the tallest man who ever lived.

Hands-On Investigations



Discover Structures

Look around at the man-made structures in LEGOLAND®. Name some man-made structures.

Natural structures grow or are built by other living things. Look at the natural structures. Name some natural structures that animals build.

Shell structures are built so that people or things can go into them. Name some shell structures.

Frame structures are built to support a load, or carry weight, or to span a gap so you can cross over.

Name some frame structures. Name the frame structure that is inside your body.

Tips for Building Stable Structures When we build structures, we want them to be stable, or strong. Here are two hints from LEGOLAND Master Model Builders to help build stable structures:

1. Overlap the bricks as you build the levels taller. This is also called interlocking.
2. Build a wide base, and do not make the top too skinny.

Build a Tall Tower!

With a partner, use the DUPLO® bricks to build the tallest tower you can! Remember the Model Builder's tips, and build a stable tower.

Earthquake Table Testing

Take turns and bring the tower to the Earthquake Table. When the table is turned on, it will shake like a real earthquake! Look at each tower as it is placed on the table. Are the bricks overlapping? Is the base wide? Will the tower stand up to the shaking-or will it crash?!



Discovery Worksheet

Shell Structure

People or things can go into a shell structure. Find the shell structures in each picture. Circle them.



Frame Structure

A frame structure can support weight, or a "load." Also, if it spans a gap and you can cross over it, it is a frame structure. Find the frame structures in each picture. Circle them.

