The history of shelter: Outcomes and activities

God is a Protector Year 5

God is our refuge and strength

Spiritual Awareness: God is our shelter

For in the day of trouble He will keep me safe in His dwelling; He will hide me in the shelter of His tabernacle and set me high upon a rock. Psalm 27:5

A house is a shelter from wind and rain, from heat and cold. It provides protection from the elements. God is our shelter. He is our Heavenly Father who protects us against the storms of life. God's shelter is invisible. That is, the invisible shelter of His love and care.

Shelters can also provide protection from physical danger. The castle of the Middle Ages, was a refuge in times of attack. Forts and fortresses are also refuges. A refuge is a place where we can go when we are in trouble. God promises to be our refuge and strength. We can trust in God's amazing power and strength. God is stronger than any fortress. He can protect us from danger and evil. He provides us with weapons to fight evil. These weapons are found in the armour of God.

God is able to protect us because of His strength. He is not only great, strong and mighty, but also faithful in His care for us. The Psalms tell us that God is a rock. He is a refuge and our strength, and an ever-present help in the time of trouble. This picture of strength is linked with His omnipotence. He is Lord and King, the only true God, great and mighty and one in whom we can trust.

Our response to 'God is a Powerful Protector'

- Because God is a Powerful Protector I will…
- trust God
- have faith
- have peace
- not be afraid because He is with me
- give my worries to God
- do what God asks me to do
- believe that God will do as He says
- put on the armour of God to protect me against the enemy

Bible stories: God is our strength

Exodus 7-14 - God set the Israelites free, and by His strength He held back the Red Sea.
Judges 6-8 - Through His power God used Gideon to set the Israelites free.
Judges 13-16 – Samson could have used his God-given strength for the glory of God and the support of his nation, but his sin caused him to lose God's protection
Joshua 6 - The walls of Jericho. God's power is greater than man's strength.
Joshua 10 - By His strength and power God caused the sun to stand still.
Ephesians 6:10-18 The armour of God

Bible Verses

Psalm 46:1 - God is our refuge and our strength, an ever-present help in the time of trouble.
2 Samuel 22:2 & 32; Psalm 18:30-36; Psalm 31:3; Psalm 71:3; Psalm 89:26; Psalm 91:5 - God is a rock
2 Samuel 22:33 - It is God who arms me with strength
Proverbs 18:10; Psalm 61:13 - God is a strong tower
Luke 1:37 - Nothing is impossible with God.
Phil 4:13 – I can do all things through Christ who strengthens me.

Buildings in the Bible
Tower of Babel (Genesis 11)
Noah's Ark (Genesis 6-8)
The tabernacle (Exodus 26 & 27)
The temple (1 Kings 6 & 2 Chron. 3 & 4)
The house on the rock (Matt 7:26)
Image of Christ the cornerstone (Ephesians 2:20)
Image of the body of Christ as living stones (1 Peter 2:5)

Key Questions
Why does a rock remind us of strength?
What does the Bible tell us about God's power and strength?
Which miracles in the Bible show God's strength?
There is evidence that some early people groups lived in caves. How would you use Biblical evidence to explain to someone that early cave dwellers were not ape-like beings but intelligent people like you and I?

Outcomes
Students will
Knowledge
- study early shelters of traditional people groups around the world
- compare building techniques and materials
- identify some famous architectural structures around the world
- understand that the stability of a structure is affected by the type of force and where that force impacts the structure

Skills
- assess the strengths and weaknesses of different types of shelters
- design and build structures to produce maximum strength
- assess strength of bridge and tower construction, using engineering features such as arch, dome, cylinder, cantilever, buttress
- discover rigid and non-rigid shapes
- test materials and structures for strength and ability to support weight
- explain why some shapes will support weights better than others
- change the shape of a piece of paper or card to support a weight more successfully
- explain the two types of support used in buildings: tension and compression
- explain how laying patterns can affect the strength of a brick wall
- predict the ability of a beam to span between two supports

Values
- show patience in construction work
- trust in God as our strength through life

Activities

- Research the history of shelter, (See *Beacon Media Research cards: History of shelter*)
- Make small bricks from various materials, e.g. mud or clay. Add reinforcements to some, e.g. stones, straw. Test the strength of the bricks by dropping them from waist height.
- Make spaghetti or drinking straw towers and bridges.
- Investigate the strength of fresh eggs by applying loads to different parts.
- Take a sheet of A4 paper and predict its possibilities to support a weight, unaided. Pleat the paper using 4-5 cm pleats. Make a column from the piece of paper and try to support a ruler.
- Test the column with other weights. Find out how much weight the column will actually support. Make a table showing results.
- Make a bridge from the pleated paper using two supports. Find out how much weight the paper will support when placed as such. Compare results with those of the single support.
- Take another piece of A4 paper and make a column by rolling. Compare the supporting ability of the column with the above.
- Suspend a rock on a piece of string or rubber band to show the principle of suspension.
- Place a rock on top of a pillar to show the principle of compression.
- Look for use of these two principles in existing structures.
- Use a strip of card to form a bridge between two pillars (or wooden blocks). Find out how to stop the card collapsing in the middle by - a) moving the pillars closer together, b) using wider card, c) using a stronger material. Draw conclusions.
- Experiment with building blocks to show the stability of different laying patterns similar to those used in bricklaying.
- Form groups and hold a competition to see which group can make the tallest structure using only - a packet of straws, a roll of sticky tape, scissors and newspapers.
- Observe structural features in famous buildings around the world e.g. Egyptian pyramids, leaning tower of Pisa, Eiffel Tower, The Beehive (Wellington N.Z.).
- Describe some of the structural developments of Greek and Roman times such as columns, arches, stone arch bridges (aqueducts).
- Investigate the strength of triangles and arches. Make a model aqueduct using scored cardboard for arches. Use plastic straws or cardboard strips to make triangular constructions.
- Compare bridges designed on suspension or compression principles e.g. Golden Gate Bridge USA (suspension) Roman stone arch bridges (compression).
- Make models of historical examples.
- Explore the local environment comparing old and new buildings. Assess stability of buildings, taking into account building materials and methods.

Assessment

Design and build a model of structure that is strong and stable. Explain why your model is a strong structure.

Mathematics:

Research strength of shapes and prisms; measure heights of structures; estimate, measure, and record length, height, and distance, using standard units (i.e., centimetre, metre, kilometre); estimate, measure and record the mass of the load that the structures can support.

Values education Year 5
God is Protector
Faith and Trust

Faith is complete trust or confidence in someone or something. Trust is being certain that the 'someone' or the 'something' will not let you down.

Having faith and trust means:

- we trust those who have proven themselves trustworthy.
- we feel safe with people we can trust.

Christians put their trust in God who is trustworthy. They have faith that God is in control of their life and whatever happens, He is still looking after them.

Discussion and activities

Talk about a time when you felt afraid.
Name something you might be afraid to do in the future.
What do people worry about mostly?
Finish this sentence: "When I am afraid I can have faith because …"

Bible passages

- Isaiah 41:13 "I the Lord hold your right hand. Do not be afraid. I am the one who helps you."
- Romans 8:28 All things work together for good, in the lives of those who love and trust God.
- Psalm 23 The Lord is my shepherd
- Hebrews 11:6 Without faith it is impossible to please God.
- Ephesians 6:16 Put on the shield of faith.
- Matthew 17:20 Faith as a grain of mustard seed.
- Matthew 21:21-22 If you have faith, you can say to this mountain, 'move' and it will move.

Practical Science Year 5

God is Protector

Topic: The history of shelter / Structures for Strength

How strong is an egg shell?

http://www.scienceweek.ie/assets/media/Resources/Primary%20Schools/2012%20activities/2012-Science-Week-how-strong-is-an-eggshell.pdf

What happens if you drop an egg onto a hard surface?
That's right, the shell breaks. Is an eggshell always this fragile? Let's investigate.
What you need 4 raw eggs (same size) Pencil Glass Scissors Sheet of A4 paper Ruler Heavy books

What you do

1. Using the pencil, draw a line around the widest part of one of the eggs.
2. Crack the pointed part of the egg. Pour the contents into a glass (you could use these eggs to make a nice healthy omelet).
3. Carefully break off the pieces of the eggshell down to near the pencil line. Use a scissors to nip off the shell near the line. Try and keep the rim of the shell as even as possible.
4. Repeat steps 1 to 3 with the other 3 eggs.
5. Draw a rectangle on a sheet of paper (about 18 cm by 12 cm).
6. Place one of the egg shells on each corner of the rectangle, with the cut edges facing down, as shown.
7. Carefully place a heavy book on top of the eggshells as shown.

What happens?
The eggs do not crack.

Why?
The halved egg shells under the books are dome shaped. As you can see from the diagram below, a dome is like a number of small arches arranged in a circle.
An arch is strong because its shape evenly spreads the weight on top of it. The weight of the books acting downwards is balanced by the strength of the dome-shaped eggshells. The weight of the books is spread evenly along the curve of the eggshells as shown below.

Note
Arch bridges date back to ancient times, when they were constructed from stone or bricks. Arch bridges are also found in Ireland, for example the famous Ha'penny Bridge (Liffey Bridge) in central Dublin.

Practical Science Protector Year 5

The history of shelter / Structures for Strength

Amazing Triangles

http://www.primaryscience.ie/media/pdfs/col/triangles.pdf

What you need:

- Toothpicks or match sticks
- Bag of marshmallows
- mini-marshmallows or any soft sweets.

Background information

The triangle is a strong shape and is used to support structures. Under a heavy load, a square distorts easily – it ends up looking like a parallelogram. If you put a brace diagonally across the square, you create two triangles and a much stronger shape. In fact, the triangle is the only shape that cannot be deformed without changing the length of one of its sides. Because it is not easily deformed, the triangle is an extremely popular building shape.

Questions

What shapes do you know?
Can you pick out any shapes in this room?
If you look at a bicycle (or a picture of one) can you pick out any shapes?
What shapes help the bicycle move? (Circles, wheels)
What shapes make the bicycle strong? (Triangles in the frame).
How would you make a corner stronger on a bench or a table?
(Add a strut across the corners to make a triangle.)

Activities

1) Squares and Cubes
(This takes 8 sweets and 12 toothpicks sticks).
Take 4 toothpicks sticks and 4 sweets. Poke the cocktail sticks into the sweets to make a square with a sweet at each corner. Poke another toothpick into the top of each sweet. Put a sweet on top of each toothpick. Connect the sweets with toothpicks to make a cube.

2) Triangles and Pyramids
(A triangular-based pyramid takes 4 sweets and 6 toothpicks sticks). Make a triangle using 3 sweets and 3 cocktail sticks. Poke a toothpick into the top of each sweet, and bend these 3 into the centre; now poke them into the 4th sweet to make a pyramid. Now make a square-based pyramid by first building a square base and then 4 triangular sides. Press down on these shapes. Which shape is the strongest?

3) Construction challenge:
(When you make a structure that uses both triangles and squares you can make large structures).
Set the rules: limit the number of toothpicks available per person or per pair, and decide on the criteria for winning, e.g. it could be the tallest structure (skyscraper) or the strongest

structure (i.e. the one that can take the most weight), the one that most resembles a famous building such as the Eiffel tower, etc. A time limit may be set if you wish.

Safety
Careful with points of toothpicks.

Follow-up activities
Look up pictures of different structures – e.g., bicycles, Eiffel Tower, truss bridges, etc. Can you find triangles in them? Can you make strong structures with straws and split pins/ paper fasteners?

Practical Science Protector Year 5

The history of shelter / Structures for Strength

Design a bridge

http://www.primaryscience.ie/media/pdfs/col/dps_maths_bridges_activity.pdf

Find a context where children have to think about crossing a river. This might be a story or a local river crossing. Find out what children think and know about bridges. They may mention tunnels as well as a means of getting across.
Have a display of pictures of bridges.
Visit a local bridge.
Do this introductory work on the day prior to doing the activity?

Questions
What is a bridge?
Where would you find bridges?
What are bridges made of?
What makes a good bridge?
What types of bridges are there? Can you name any?
(Bridge designs include arch, suspension etc.)
Can you find out about the tallest bridge in the world, opened in December 2004?
Ask the children to draw a bridge they know or have crossed. They can count how many bridges (if any) they meet on the way home.

Activity 1
Place two piles of books the same distance apart on each table.
Make different kinds of bridges between the books and test which ones are strongest.
e.g. make a simple bridge using 1 page of A4 paper. Test its strength by adding coins or other masses.

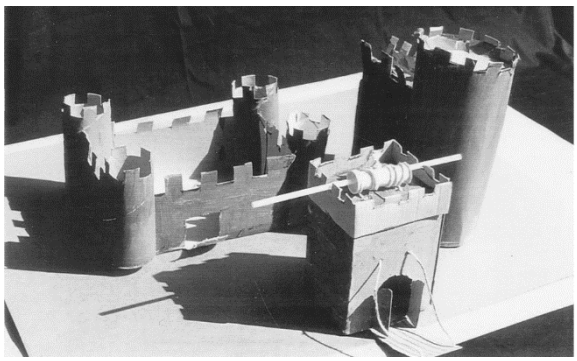
Activity 2
Design a Bridge
Explore how to make a paper bridge stronger
Using the blocks or books, paper and coins, design a bridge that will take the heaviest weight.
Try the following and record the results:

1) Make a bridge from one piece of paper and test its strength by adding coins or other masses until the bridge collapses.
2) Use two pieces of paper and test again.
3) Use one piece of paper and fold up sides, i.e. a walled bridge
4) Make an arch (using two pieces of paper).
5) Make a corrugated bridge, (folded like a paper fan.)
6) Make a bridge out of a different material.

Art Year 5

God is Protector

Buildings of the world



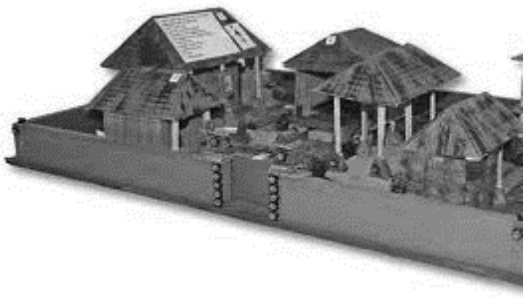
Biblical wall display: The name of the Lord is a strong tower. The righteous will run into it and be safe. Proverbs 18:10

Drawing and painting

Buildings past and present: Make a timeline in picture form of the history of buildings in your country.

Buildings rural and urban: draw the different buildings you might see in a village. Compare to buildings in a city.

Construction and collage



Thinking Skills Protector Yr 5

Structure for strength 1 Draw a boat. Now redesign it by using the following steps: **B** - igger **I** – instead of **N** - onsense **G** – et rid of **O** – ther uses	**Structures for strength 2** Construct a bridge using: •a book •10 straws •sticky tape
Structures for strength 3 Give 3 possible explanations for: **a collapsed bridge**	**Structures for strength 4** Think of 5 ways that God can give us **'strength'**.
Structures for strength 5 Make a new product using: •**an egg** •**a pack of cards** •**a cardboard cylinder**	**Structures for strength 6** Design a structure that will not collapse in the event of an earthquake. Draw it if possible. Give reason for the design of your structure and the choice of materials.

Thinking Skills Protector Yr 5

Structure for strength 7 List 10 materials that are **not** used in the construction of a house.	**Structures for strength 8** What if there were no multi-story buildings allowed to be built. Write down 3 possible consequences.
Structures for strength 9 Consider 5 alternatives to: **"crossing rivers using bridges".**	**Structures for strength 10** The answer is: **"The Eiffel Tower"** Think of 5 questions.
Structures for strength 11 Brainstorm 5 ways that **"The Leaning Tower of Pisa"** could be made to stand upright.	**Structures for strength 12** List 3 disadvantages and 3 improvements to: **a brick house**

History of shelter 1
The First Homes

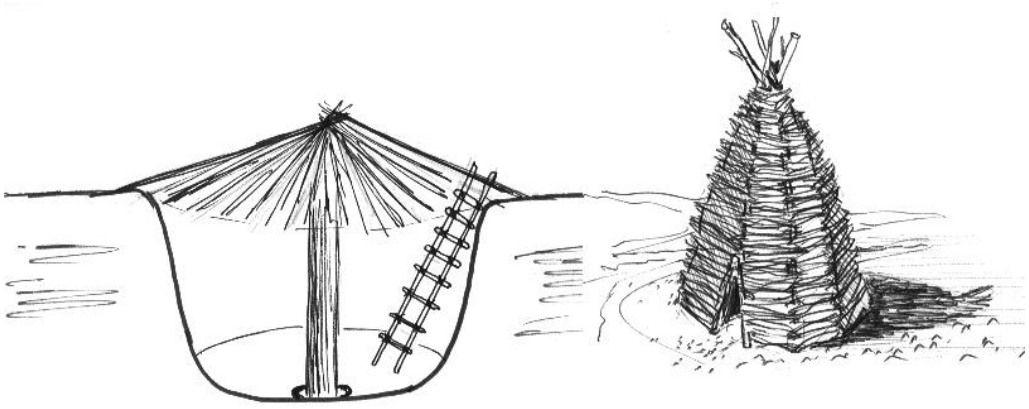
Student activities

Most people, who do not believe the Bible, imagine that the first people were a kind of half man, half ape, living in caves and having little intelligence. However, Christians know that there were never such beings as ape-men, and that people were created with the same intelligence that people have today.

It is true that some people did live in caves because we see their paintings on the walls, but these people as intelligent as people today. Early people were also able to build structures out of the materials they found around them. Noah, who lived on earth 1500 years after the creation, was capable of building a huge and wonderful boat, capable of staying afloat for 40 days. The people of Babel, who we read about in Genesis 11, were capable of building an enormous tower.

Archaeologists are people who look for things from the past. Some have found remains of early types of dwellings. They have found evidence that people in early times built pit dwellings. To make pit dwellings, holes were dug in the ground and covered with logs, placed horizontally over the hole. Then earth was heaped on top.

Remains of other types of dwellings have also been found. It seems that in early times, people used materials like wooden posts, reeds, leaves, mud and animal skins.
Draw and label 3 types of early homes.



History of Shelter 2
Desert homes

Desert homes must perform two functions. They shield the interior from intense daily heat, and must also store that heat for use during the cool nights. The best material for this is heavy clay or mud, moulded and baked into bricks. Mud bricks slowly absorb the sun's rays during the day, preventing the heat from penetrating the interior of the home. Then, during the cold night, the warm bricks radiate their stored heat and keep the interior warm. There is evidence that mud bricks were used in hot desert areas all around the world.

Another type of desert home is the tent. Tents were used by nomadic people. These are people who move around from place to place. A tent can be taken with you wherever you go. The desert tents, like those of the Arabs, usually have broad canopies over the doorways, to lessen the effects of the sun and wind. Tents were originally made from animal hides which were sewn together. Tents were used by many people around the world, including the American Indians.

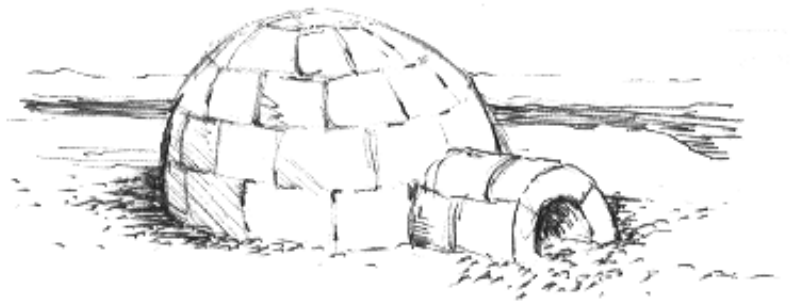
1. Why are mud bricks such an effective form of shelter in desert regions?
2. Why were tents a suitable form of shelter for nomadic people?
3. Draw a tent belonging to an Arab from a nomadic tribe. Label your drawing to show the main parts of the tent and the materials used.
4. Compare a camping tent of today with traditional tents. What do they have in common?

History of Shelter 3
Eskimo homes

Eskimos live in the arctic, in the far north of the world.
The arctic climate is harsher than any climate in the world. The only building material available to traditional Eskimos was the snow itself. The Eskimos, using a semi-circular snow knife, cut long flat blocks of snow and arranged them in an ascending spiral, that became smaller and smaller at the top, forming a dome. The igloo was built from the inside. Cutting blocks from around his feet, the Eskimo would lower the floor level as the dome rose above him. When the igloo was finished, more then half was below the surface. A small tunnel was connected to the igloo. This is where the sled-dogs sheltered. A small hole was left at the top of the igloo to provide ventilation, and to allow smoke to escape.

The inside of the igloo was warm, keeping out the outside cold and wind. Seal oil-lamps provided light and warmth. Blocks of ice were cut for furniture, and covered with animal skins. The temperature of the inside of the igloo was much higher than the temperature outside. The dome shape was excellent for the arctic conditions as the howling winds only swirled around the smooth shape and did no damage.

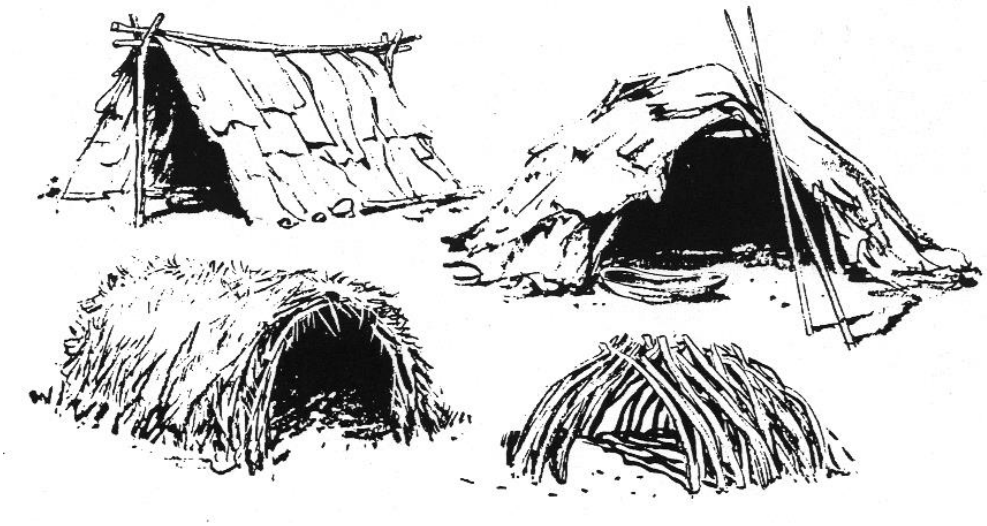
1. Draw a picture of an igloo. Include the details you have read about in the text.
2. How did the Eskimo get the floor level to be lower than the ground outside?
3. What was the small tunnel for?
4. Why was there a small hole at the top?
5. What was the igloo like inside?



History of Shelter 4
Early homes of Australian Aboriginal people

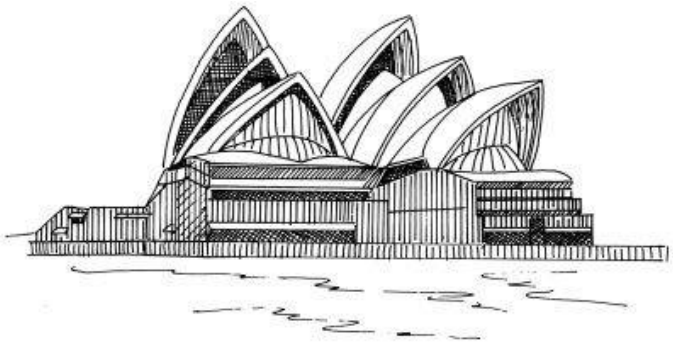
The Australian Aboriginal people moved around from place to place. They understood the land, and never mistreated it. They would never take all the food plants from one place, but left some so there were enough seeds to produce more plants. Their homes were easily built from the materials around them, like bark, grass and sticks. When they moved on, they simply built new homes. Australian Aboriginal people now live in permanent homes made of modern building materials.

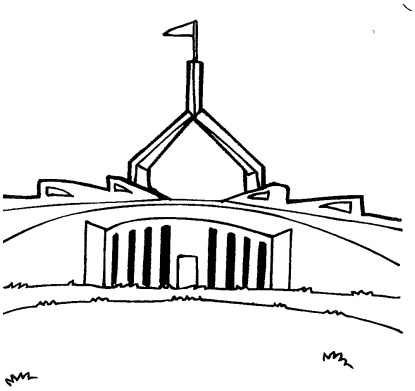
Draw and write a description of some of the early Australian Aboriginal homes.



History of Shelter 5
Famous buildings of Australia

Identify these buildings. Draw them. Name the State and City in which they can be found. Explain the purpose of each building.

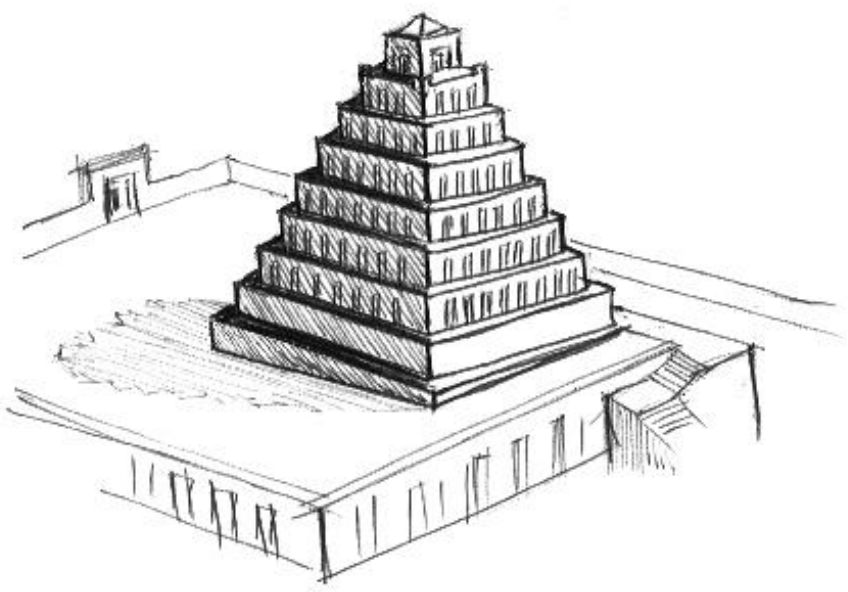




Name and draw two other important buildings in your State or Territory.

History of Shelter 6

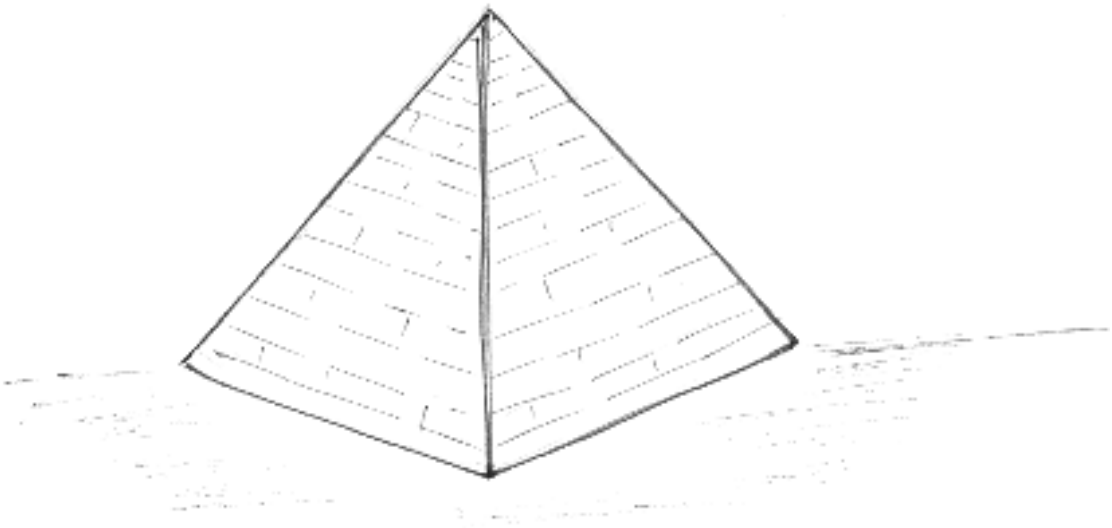
Famous buildings around the world
The Tower of Babel (Babylon, now Iraq)
You can read about this tower in Genesis 11. It was built by the descendants of Noah, who thought they were so great that they could reach heaven. God saw their proud hearts and put a stop to the building by confusing their languages. Because they suddenly spoke different languages, they couldn't communicate with one another to finish the building project. It is believed that the tower was a 90 metre high stepped pyramid called a ziggurat.



1. Draw the Tower of Babel.
2. Why was the Tower of Babel built?
3. Why wasn't it finished?

History of Shelter 7

Famous buildings around the world
The Pyramid of Giza (Egypt)
Like the people who built the tower of Babel, the Egyptians also wanted to build tall structures to get closer to heaven. The Egyptians worshiped false gods. They buried the pharaohs in the pyramids, along with their treasures, and food for their next life. Without steel or concrete, the only way of building high in ancient times was to pile stone blocks on top of one another. Slaves were used to haul the huge stone blocks. God's people, the Israelites were slaves to the Egyptian pharaoh at the time, but God chose Moses to set them free. The Great Pyramid of Giza was completed about 2550 BC and was 146 metres high.



1. Draw the pyramid of Giza
2. Why did the Egyptians bury the pharaohs with food and treasure?

History of Shelter 8

Famous buildings around the world
The Colosseum (Rome, Italy)
About 2,000 years ago, the city of Rome was at the heart of a vast empire.The Romans built huge arenas called amphitheatres. Men called gladiators fought each other or wild animals, while people watched. Sometimes Christans were put in the arena with wild animals. The Colosseum, in Rome, was the biggest amphitheatre they built. It had room for about 50,000 people. The Romans sometimes flooded the Colosseum and watched ships fighting each other in sea battles.

The Colosseum had three layers of arches and the arena was oval shaped. There were about 80 entrances, and tickets had the right entrance number stamped on them. Slaves and women sat on wooden benches at the back. The other seats were marble.

1. Draw the Colosseum.
2. What was it used for?
3. What did the Roman government do to Christians?

History of Shelter 9
Famous buildings around the world

The leaning tower of Pisa (Italy)
The 55 metre high leaning tower of Pisa in Italy was built between 1174 and 1350. Unfortunately, it was built on soft ground without proper foundations. As a result, the soil has settled unevenly, making the tower lean about 5 metres towards the ground.

1. Draw the leaning tower of Pisa.
2. Why is it leaning?

History of Shelter 10
Famous buildings around the world

The Eiffel Tower (Paris, France)
Alexandre Gustave Eiffel, a French engineer, was one of the first to realise the great possibilities that iron had in building. Using iron was the first step to building skyscrapers. Eiffel made the highest iron building ever, for the Paris exhibition in 1889. It was 300 metres tall.

1. Draw the Eiffel Tower
2. Why was the Eiffel tower built?
3. What was it made from?
4. What did people learn from the building of the Eiffel Tower?

History of Shelter 11
Some important building structures

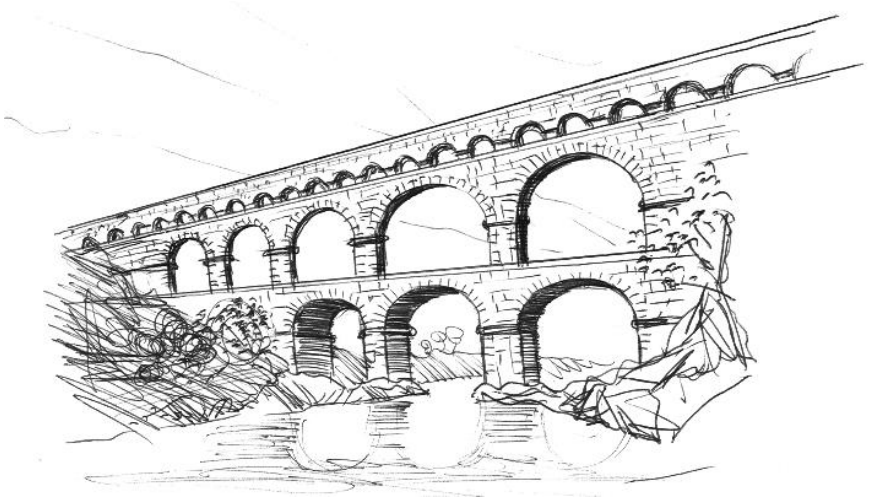
Engineers are people who work out the strength of a building. They must understand the strength of the materials and the forces that will make a building stay upright. Bridges, towers, domes, arches are some of the structures built by engineers.

Arches
The Romans were the first to use the arch. They put an arch shaped wooden frame on top of two stone pillars. Stones were tightly packed together around the frame. Sometimes a wedge-shaped stone at the top held the other stones in place. This was called a **keystone**.

The arch is a very strong shape. It can support a heavier weight than a post and beam.

The Romans also used arches for strength in the building of aqueducts. An aqueduct is a canal built on top of a bridge made of arches. The series of arches support the canal of water above.

1. Why do builders use arches?
2. Draw pictures of buildings that have arches.



History of Shelter 12
Some important building structures

Roof frames
Making a strong waterproof roof can be the most difficult part of building a house. Flat roofs often leak. A sloping roof works better because the water runs off, but the roof must be strong enough to support the weight and stand up to high winds.

Triangles
If we look around us, we will see that many structures are triangular in design. Unlike the square frame, the triangular frame is rigid and will not change its shape.

Domes
It was the Romans who learned to make domes. They made a frame from wood and poured concrete over the wooden moulds. When the mixture dried, the framework was taken down.

The top of the dome was made of a slightly different mixture to make it lighter. At the top of the dome was a window called the *eye.* The dome was very strong.

1. Draw and describe the best kind of roof to keep the rain off.
2. Draw a building with a dome shaped roof.
3. What are some dome-shaped things that we use?