

INTRODUCTION:

Let's Build a House steps through the main stages of construction of a house with concrete foundations, wooden frame and external brick walls.

People around the world live in different types of homes. Below are just a few:

- Igloo;
- Flat or apartment;
- Ranch;
- Castle;
- Stilt-house;
- Tree house;
- Mobile home;
- Houseboat;
- Tent.

ACTIVITY: Find pictures of different types of homes and discuss. Describe your own house or the house of somebody you know. What do you think it is built from? Draw a picture of the house and a layout map of each of the floors, showing the rooms. If you can't remember, use your imagination.

WHO IS INVOLVED IN BUILDING A HOUSE?

These are some of the people who are involved in building a house:

- **Planner** – this person decides if it is okay to build your house where you want it to be built. You wouldn't want to cut down lots of trees and destroy wildlife habitats just so you could live somewhere nice. And you wouldn't want to build it in the middle of a swamp. They also make sure it is built correctly and that everybody follows the rules when they are building it.
- **Architect** – this person designs your house. They draw it on paper and pick out all the materials and colours the builder will use. They make sure it looks the way you want it to. They give their drawings to an engineer.
- **Engineer** – this person makes sure your house will be built to last and that everything goes together properly, not just on paper. They make sure the foundations and frame are strong enough. They also design the electricity, the lighting, the plumbing and the air conditioning.
- **Builder** – this person builds the house from the foundations up. They may work with other building specialists like bricklayers, carpenters, roofers, steelworkers, window fitters, painters and tilers.

ACTIVITY: What do you think each of these people do? What materials do they use? What tools might they use?

- **Electrician** – this person puts in all the wires that go to the electrical sockets, the lights and the cooker. They may also install the cables for your phone and internet. Electricity can be very dangerous, so you should never touch the wires or play with the sockets.
- **Plumber** – this person puts in all the pipes that bring clean water into your home and all the pipes that take the dirty water away. They may also install gas pipes for a fireplace or for the cooker.

ACTIVITY: If you were building a house, which job would you like to have? Why?

WHAT SERVICES CONNECT TO A HOUSE?

Houses need to have services connected to them from the street so that you can use taps, go to the toilet, watch TV or use the internet.

- **Electricity** – this may come in on wires above ground from a pole, or below ground.
- **Water** – this comes into your house from underground pipes. Some of it goes straight to your taps and some goes through a heater so that you can have warm water.
- **Gas** – if your house uses gas for heating or cooking, it will come in through underground pipes.
- **Phone and internet** – this will come in through small wires below ground.
- **Sewage** – dirty water from sinks and toilets is taken away from your house in underground plastic pipes.
- **Stormwater** – rainwater from the roof and gutters is taken away in underground pipes.

ACTIVITY: Take the house layouts you have drawn and mark where all the above services would come into your house from the street. Inside each of your rooms, list what services would be needed, using the first letters below (i.e. a bathroom would need W, S and maybe E).

E for Electricity (used for sockets, cookers, fridges, lights)

W for Water (used for sinks, showers, baths, toilets)

G for Gas (used for cookers, heaters)

I for Internet (used for routers, phones)

S for Sewage (taking dirty water from sinks, showers, baths, toilets)

SAFETY

It's very important to stay safe when you're building a house. There are heavy materials to lift, tools that can be dangerous and high parts of the house that need to be climbed upon. Here are some of the things you can use to stay safe:

- **Hard hats** – so that you don't hurt your head if somebody drops something from a ladder or a crane or to stop you bumping your head on things sticking out.
- **Hi-vis vests** – so that you are easily seen by people carrying things or by people driving big vehicles.
- **Safety glasses** – to stop things going into your eyes when you are cutting or drilling.
- **Ear plugs** – for when you are using noisy tools like drills, saws or grinders to stop you damaging your hearing.
- **Masks** – to stop you breathing in dust from cement or when you are cutting up wood or sweeping up.
- **Safety gloves** – so that you don't cut your fingers on sharp objects.
- **Safety boots** – these boots have metal toe caps, just in case you drop something heavy on them.
- **Harnesses** – harnesses should be worn if you are working on a roof. You put the harness on and then tie it onto the roof. If you trip, it will stop you from falling over the edge.



CLIMB IN THE DIGGER

What happens if you poke your finger into a bucket of sand or some soft mud? Houses are very heavy and can't be built on soft or muddy ground – after a while the walls would sink and the house would fall down. Houses need to sit on something flat, strong and solid called foundations. Before a house can be built, a deep hole needs to be dug through all the soft ground. Digging a hole this size with a shovel would be very hard, so nowadays a digger is used to scoop out all the soft soil and load it into a truck to be taken away until only hard ground is left below.

Foundations are made from a mixture of small stones, sand and cement. Water is added to the mixture and it is poured into the hole in the ground from a mixer truck. The cement is like glue and when the water dries the cement sticks the sand and stone together. This material mixture is called concrete. Concrete is very hard and strong when it is set, but it can crack over time. To stop this cracking, a reinforced steel bar (or rebar) frame is put into the hole first and then the wet concrete is poured around it. When the concrete dries, the rebar stops any movement that could make the concrete crack.

ACTIVITY: Find some building blocks. See how high you can build them on:

- Something soft (sand, a soft chair, somebody's hand);
- Something hard (a desk, a hard floor).

Which is best out of these two?

- Something sloped (a book wedge open, a piece of board resting on a pencil);
- Something flat (a desk, hard floor).

Which is best out of these two?

MAKE THE WOODEN FRAME

The walls of some houses are made using only stone blocks and bricks. Others, like the one in this book, are made by first putting up a frame. The frame can be thought of as the skeleton of the house and can be made with timber (wood) or with metal. As well as being the skeleton for the outside walls, the frame also sets out the inside rooms. People who make things out of wood are called carpenters or 'chippies'. The timber used in making homes needs to be treated with chemicals to stop it from being eaten by termites or from rotting over time.

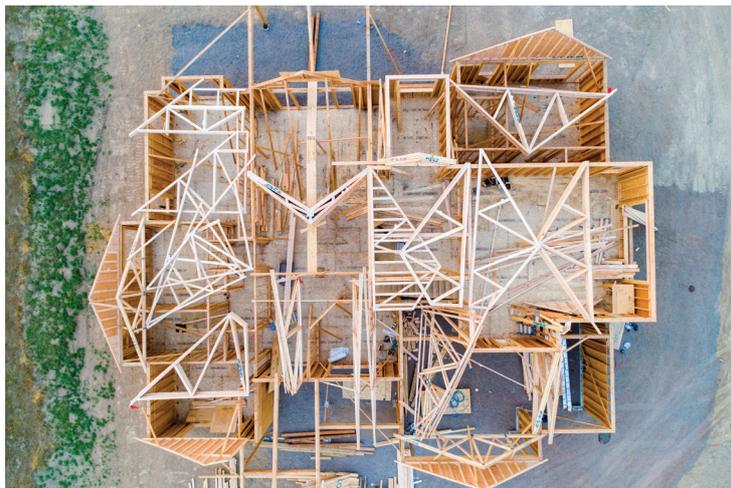


Photo by Avel Chuklanov on Unsplash

The frame is made by connecting vertical (up and down) wooden lengths called *studs* to horizontal (left to right) wooden planks called *wall plates*. To make the frame stronger, diagonal *struts* or *plywood sheets* can be used. Floors of houses are supported on wooden beams called *joists*, and *rafters* are the sloping wooden beams that support the roof.

The lengths of wood are connected together using metal hangers, straps and braces that fit around the ends of the wood and are nailed or screwed into place.

ACTIVITY: Draw the wooden frame of the front of your house. Remember to leave a space for the door and windows! Make sure your house won't wobble.

NOW FOR THE OUTSIDE WALLS

Once the frame has been built, the outside walls need to go up. Outside walls can be built using wood, fibreboard or, like in our book, bricks and mortar. Mortar is a mixture of sand and cement. The bricklayer adds some water to the mortar and then uses a trowel to spread the mortar like glue onto the bricks to stick them together. Bricks can't just be piled up on top of each other, otherwise the wall will fall down easily. They need to be staggered, which means that a brick needs to sit half on one brick and half on another. This will make the wall much stronger. The corners of houses make the wall even stronger.

ACTIVITY: Using building blocks, build three walls.

Wall 1: Build a wall five blocks long, five blocks high. Place the blocks straight on top of each other.

Wall 2: Build a wall five blocks long, five blocks high. This time, stagger the blocks.

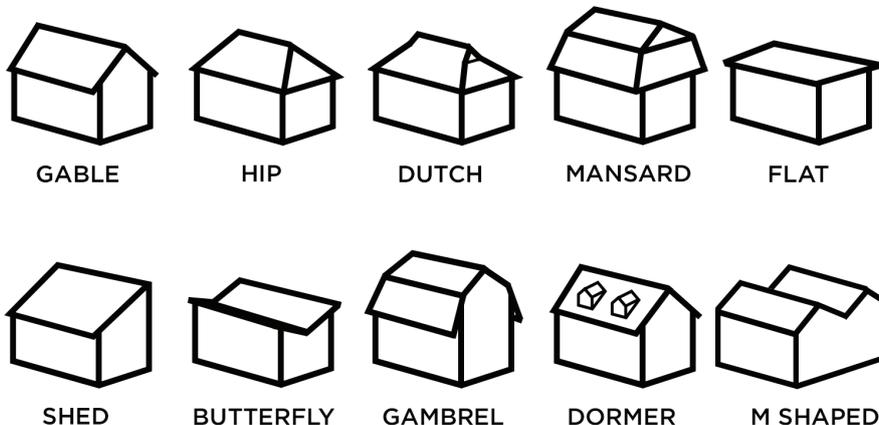
Wall 3: Build a wall five blocks long, five blocks high, staggering the bricks. Add a corner and build a wall three blocks long, five blocks high.

What happens when you gently push the walls? Which wall falls to pieces easiest? Which is the hardest to push over?

CLOSE UP THE ROOF

The roof of a house has to be built very carefully to make sure the rain, birds and other animals don't get in. Possums, in particular, love finding secret passages into roof spaces and setting up home in the attic. Roofs can be built using metal sheets or cement tiles. In the house in our book, cement tiles are used. The tiles are laid onto the wooden frame and nailed into place. The roofer starts at the bottom of the roof and works upwards, placing one tile partly on top of the one below it, so that the rain will run off and into the gutters. Pointed ridge tiles at the top are stuck on using mortar.

TYPES OF ROOFS



ACTIVITY: Take a look out your classroom window. Can you see the roofs of any buildings? What type can you see? Can you see anything poking up through them? What could this be?

FIT THE WINDOWS AND THE DOORS

It's nice to have lots of light in your house, but sunlight often brings heat. Lots of windows can make your house too hot in the summer because of the sun shining through and, because some glass is very thin, lots of heat can leave your house through the glass in winter. Nowadays, lots of buildings are fitted with environmentally friendly windows (with thicker glass) or double glazing (two sheets of glass with air in between). These windows help to keep your house cool in summer and warm in winter, saving on energy and helping the planet.

Doors to the outside need to fit just right, otherwise warm air can escape through the gaps and cold air can enter in winter. Doors hang on hinges, which allow them to swing open and closed. They are fitted with handles and some doors are fitted with locks.

ACTIVITY: How do different building materials affect your school?

What type of day is it? Is it a hot day or a cold day? Is the sun shining?

If the sun is shining on a window, stand in front of it, but don't look at the sun. Now move away from the window and stand beside a wall. Does it feel any different? Why do you think this is?

If it is cold outside, put your hand on a window. Now put your hand on a wall beside it. Which feels the coldest? Why do you think this is?

Can you feel any drafts at the doors and windows? If so, get your teacher to call a builder to fix them and help save the planet.

TIME TO PUT IN THE PIPES

Water comes into the house through underground pipes. It can come from a local reservoir, where it is already cleaned and made safe to drink. Some houses that aren't near reservoirs have rainwater tanks that collect the rain from the roof gutters. This water needs to be put through filters that take out any lumps and dead bugs and cleaned with a special ultraviolet light or chemicals to get rid of any germs. The water tank needs a pump to force the water back up and out of the taps in your kitchen or bathroom because water doesn't flow uphill by itself. The pipes to all these things are run inside the walls, above ceilings or below floors.

If rainwater isn't collected into a tank, it runs from roof gutters into underground pipes and joins the stormwater from the street before it runs out to a river or sea.

Dirty water from your sink, bath or shower is called sewage. It leaves your house through plugholes and then goes down through walls and under floors out into the street and to a waste water treatment plant somewhere near where you live. Or, if there isn't one nearby, it goes to a septic tank in your garden that is pumped out by a big truck and driven away to the plant. The plant cleans up the water so that it can be put back into the water cycle.

Stormwater and sewage leave your house through different pipes and the two cannot be mixed. Why do you think this is?

Electrical wires are also run through the walls to supply all the things that need electricity in your house. Electricity can be very dangerous, so you should never touch wires or play with sockets.

ACTIVITY: List as many things in your house that you can think of that work using electricity.

ACTIVITY: On your map of the house you drew earlier, draw in all the toilets, sinks, showers and baths. Now, using a blue pencil, draw the water pipes inside the walls or in the ceiling from where it enters the house and join them all together. These things also need pipes to take away the dirty water. Using a brown pencil, draw the drainpipes inside the walls or below the floors and join them together to where it leaves the house.

FINISH OFF THE WALLS AND CEILINGS

Inside walls can be built with bricks or wood or can be finished off like the house in our book with plasterboard sheets. The big flat sheets are fixed back onto the wooden or metal frame using screws. Ceilings can also be finished off using plasterboard.

Before the sheets go on the outside walls, the gap between the plasterboard and the outside brick needs to be filled with insulation.

People like houses to keep them warm in winter and cool in summer. Air conditioning can be used to heat up or cool down the house, or fireplaces and heaters can be used for warmth only. All of these things need energy – electricity or wood burning – which takes valuable resources from our planet. To stop heat escaping in winter, or to stop heat coming through the walls in summer, and to help save our planet, insulation is put in between walls and above ceilings. This insulation can be soft and look and feel like wool. Or it can be harder and look and feel like foam. Some of it is even made out of recycled bottles. Insulation acts like a thick coat around the house in winter and like the door of a fridge in summer: it keeps the house cold when you want it to stay cold and warm when you want to stay cosy. And, because of this, an air conditioner or heater won't need to work so hard, not so much electricity will be used, and your house will be helping to save the planet. Windows can also have thicker glass or be double glazed to help insulate the house.

ACTIVITY: What are the inside walls of your classroom or library made from? What about the ceilings? If you tap on a wall, does it sound hollow or solid? If it is hollow, that means it is probably plasterboard with a gap behind that may be filled with insulation. If it sounds solid, it is probably brick.

OUR HOUSE NEEDS PAINTING

Painting helps to protect walls, floors and ceilings. It also makes them look nice, and you can choose whatever colour you would like for each surface. Paint can be put on the walls using a brush or a roller. It is best to put down old sheets when painting, so that the paint doesn't go everywhere.

ACTIVITY: What colours would you choose for the outside of your house and for each room inside?

NEARLY THERE!

Cleaning and tidying is an important part of any job. Builders clean and tidy up their tools so that they are ready to be used on the next job. Trash is separated so that some of it can be recycled. Wood, plastic, metal and cardboard should be put into big separate bins, called skips. Everything is left neat and tidy for when you move into your new house.

ACTIVITY: It's time to tidy up around you. Take all the materials you have used for the other activities and put them away. Clean up where you have been working. There! You're ready to have more fun at school. Perhaps there's time for one more activity.

WE'RE ALL DONE! TIME TO MOVE IN.

ACTIVITY: Choose a room, draw it and decorate it. Does it have windows or doors? Where is the light in the ceiling? What are the walls made from? Is there carpet on the floor, or is it wooden? Perhaps you could hang some pictures. Put in the furniture, perhaps a bookshelf. Maybe add some ornaments. Does the house have a cat or a dog? Once you've finished, it's time to sit back and relax in your new home.

WORKSHEET 1. WORD SEARCH

T	S	M	S	E	E	S	H	L	P	R	D
L	P	N	S	O	P	P	A	I	P	N	I
T	G	I	E	R	E	S	R	I	A	S	G
W	E	H	P	L	F	E	N	T	I	L	G
A	M	L	A	E	I	M	E	L	N	R	E
L	B	U	I	M	L	T	S	O	T	D	R
L	H	U	A	I	M	P	S	T	L	E	W
S	W	O	I	P	G	E	H	O	U	S	E
N	O	B	E	L	O	T	R	E	O	B	P
U	T	W	P	A	D	W	I	N	D	O	W
A	G	O	L	T	R	E	R	G	G	M	D
I	P	O	A	W	B	D	R	O	O	F	P

**WINDOW
PIPE**

**DIGGER
BUILDER**

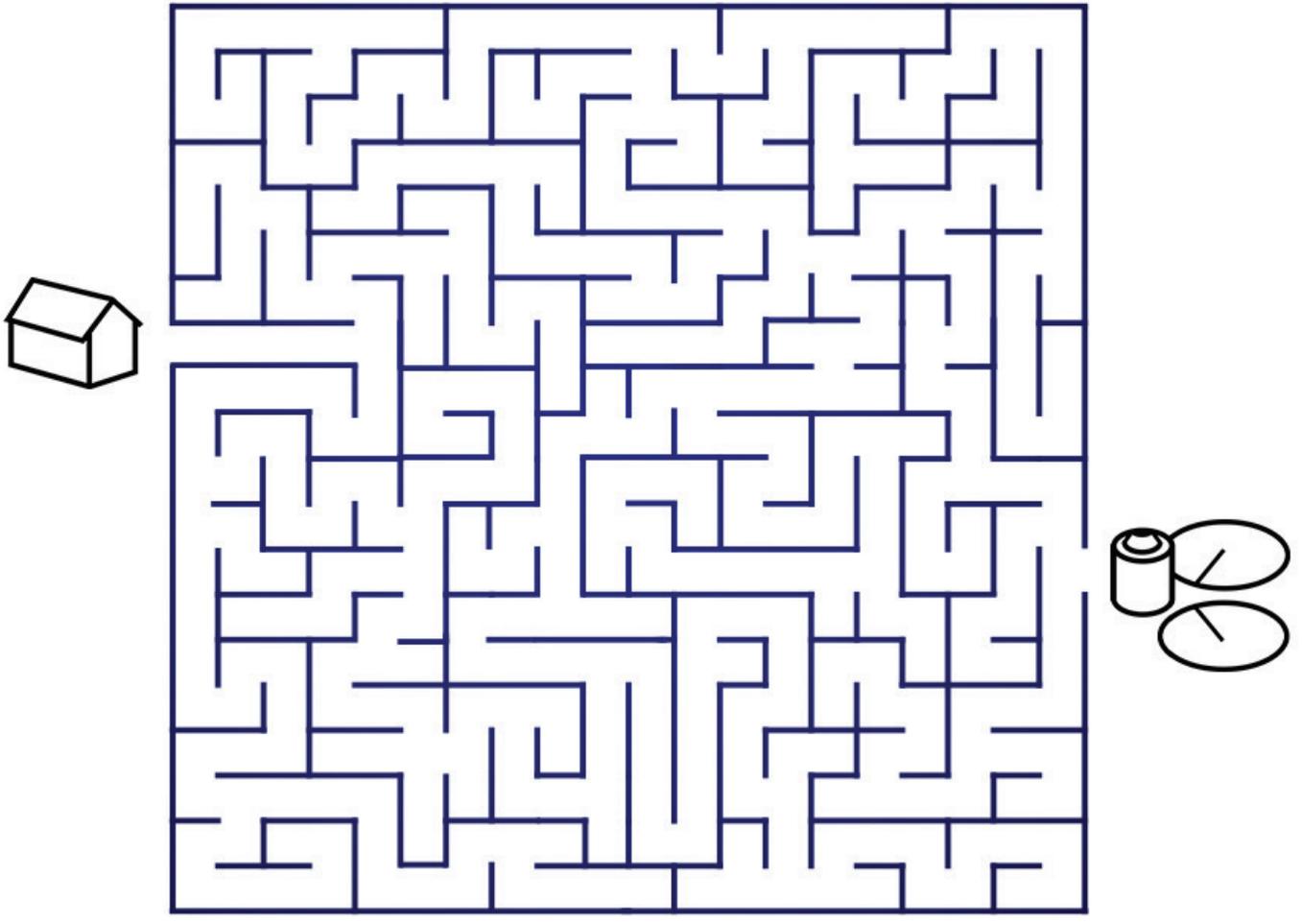
**HARNESS
HAMMER**

**ROOF
PAINT**

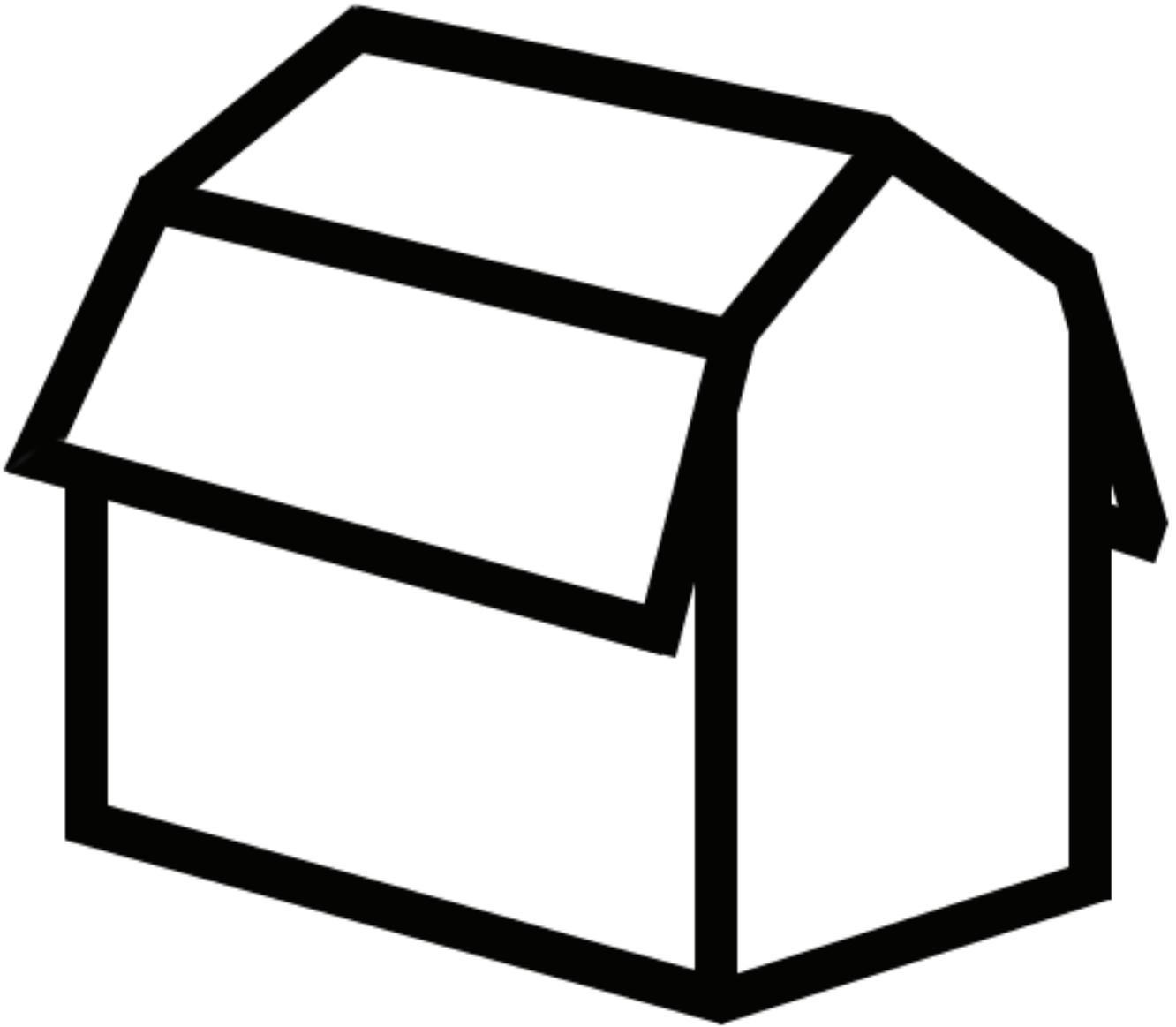
**HOUSE
WALL**

WORKSHEET 2. MAZE

Draw a pipe connecting the house to the water treatment plant.

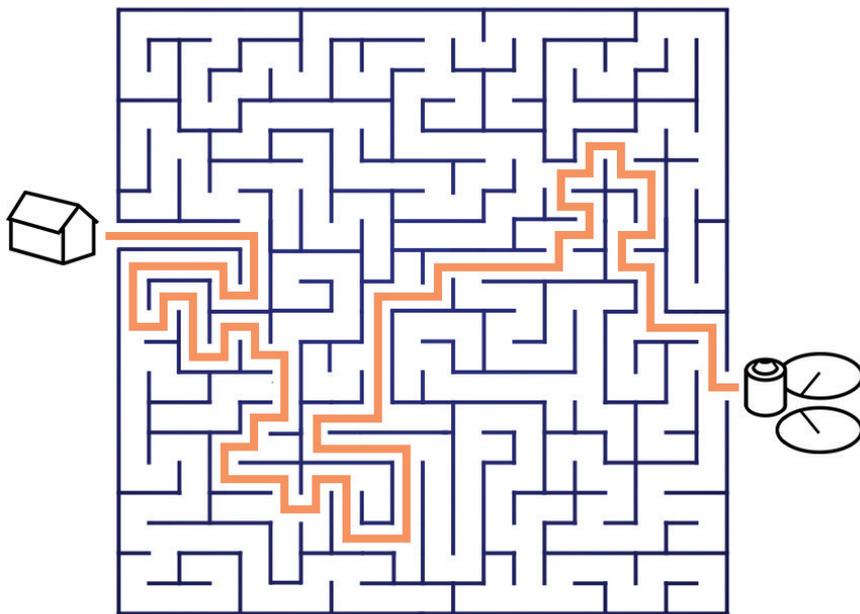


WORKSHEET 3. HOUSE COLLAGE



WORKSHEET SOLUTIONS

T	S	M	S	E	E	S	H	L	P	R	D
L	P	N	S	O	P	P	A	I	P	N	I
T	G	I	E	R	E	S	R	I	A	S	G
W	E	H	P	L	F	E	N	T	I	L	G
A	M	L	A	E	I	M	E	L	N	R	E
L	B	U	I	M	L	T	S	O	T	D	R
L	H	U	A	I	M	P	S	T	L	E	W
S	W	O	I	P	G	E	H	O	U	S	E
N	O	B	E	L	O	T	R	E	O	B	P
U	T	W	P	A	D	W	I	N	D	O	W
A	G	O	L	T	R	E	R	G	G	M	D
I	P	O	A	W	B	D	R	O	O	F	P



AUTHOR'S NOTE

There are many different types of house design and construction methods, and it would be impossible to capture them all within a picture book. *Let's Build a House* focuses on a wooden frame, brick façade building with cement tile roof, relatively common in Australia. In the book, the roof tiles are installed after the brick walls, but it is just as likely that, as long as the structural support had been built, the roof would go on first. Though the process of installing pipes has been touched upon, the mention of electrical wiring was left out due to the safety implications of children playing the role of an electrician. The mention of insulation in the walls opens up the opportunity to discuss environmental aspects of buildings.

The words were written with the intention of the story being both educational and fun. It uses a three-line metered rhyme on each spread, followed by three-word repetition to allow younger children to join in.

There are examples of alliteration, assonance and onomatopoeia throughout the book, three very important tools for writing poetry.

ILLUSTRATOR'S NOTE

When I started to put pencil to paper, naturally I jumped on to Google and looked for references, but I'm naturally a curious bunny so I'd also start wandering down the building tool isles in hardware stores, slowing down in the car to look at new houses that were being built, having a coffee and watching builders on building sites in town.

I also rooted out old photos of our house renovation to give me an idea of the wooden framing and the builders with their work belts and what they tended to wear. Most of my references come from inside my head, my filing cabinet of junk.

I grew up watching *Trumpton* and *Camberwick Green*, I think that's where my style for little vehicles came from, and also my experimenting with scale.

FURTHER READING AND REFERENCES

WEBSITES:

If you want to go all out and get some ideas of how to build a house in the classroom, visit:

<https://inventorsof tomorrow.com/2016/10/17/if-i-built-a-house-2/>

For information on houses around the world:

<https://www.kidcyber.com.au/houses-around-the-world>

For a simple computer game, where children get to build a house:

https://www.abcya.com/games/build_a_house

For *Building a House* downloads and flashcards:

<https://www.twinkl.com.au/resource/t-t-3929-building-a-house-sequencing-posters>

BOOKS:

A House of Mud, Sophie Masson (illustrated by Katrina Fisher), Little Pink Dog Books, 2020

Construction, Sally Sutton (illustrated by Brian Lovelock), Walker Books, 2014

Demolition, Sally Sutton (illustrated by Brian Lovelock), Walker Books, 2012

If I Built a House, Chris van Dusen, Puffin, 2012

Roadworks, Sally Sutton (illustrated by Brian Lovelock), Walker Books, 2008

SONG:

'This Is the Way We Build a House' (sung to the tune of 'Here We Go Round the Mulberry Bush')

Visit: <http://resourcesforearlylearning.org/educators/activity/994/>