Department of Education

GOVERNMENT OF WESTERN AUSTRALIA

Public education
A world of opportunities

Kindergarten to Year 2

EXPLORING STEM AT HOME

Science, technology, engineering and mathematics

Activities and ideas for parents to support their children's learning and development.

WHAT'S INSIDE

TITLE: Exploring STEM at home: Science, technology, engineering and mathematics.

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CHILDREN ARE NATURALLY CURIOUS

Playing, exploring and asking lots of questions – that's how children learn about themselves, about others and about the world around them.

This booklet has lots of activities you can do at home with your children to support their learning and development in STEM (science, technology, engineering and mathematics).

WHAT IS STEM?

STEM is an approach to learning and development that integrates the areas of science, technology, engineering and mathematics.

Through STEM, children learn to:

- ask questions
- work together
- think creatively
- solve problems
- explore
- take calculated risks
- test solutions
- discover new ways of doing things.

As your child's first teacher, you can start building their STEM skills from an early age, creating a solid foundation for future learning. By encouraging your child to play, explore and investigate, you are helping them become active participants in their own learning.

With advances in technology, around 65 per cent of children starting primary school are likely to work in jobs that don't yet exist.

PLAY IS ESSENTIAL FOR LEARNING

Play is a fun and important part of children's learning and development.

Through play, children:

- are interested in and connected to what they are doing
- learn through copying others
- have the freedom to explore their own interests and answer questions for themselves
- learn at their own pace
- learn to talk and interact with adults and other children
- develop their imagination
- build resilience.

There are many opportunities at home, outside and in the community to learn about STEM. And best of all, they're free.

Mess is good! It's an important part of playing and learning – so is cleaning up afterwards.

What can I do?

- Develop and respect your child's curiosity and creativity.
- Let your child discover and learn at their own pace.
- Accept the answers your child provides – they make perfect sense to them!
- Ask lots of questions. Questions help your child understand the task.

Give your children the opportunity to play by themselves and with others – this builds their confidence and adaptability skills.

TOY BOX FUN

- With your child, sort objects in the toy box by size, shape, colour, texture, weight, material and use.
- Take two toys and guess which is heavier. Find out by holding the toys in each hand. Use scales to compare the weights.
- See how quickly cars, marbles and balls roll down different surfaces such as baking trays, big books and planks of wood. See if changing the surface changes how fast the object goes.

TASK

Make a balance scale by tying a plastic bag to each end of a coat hanger. Hang the coat hanger on a broom handle suspended between two chairs. Place objects in each bag. See what happens when your child adds heavier and lighter objects.

IN THE KITCHEN

- Show your child that cooking involves different steps like reading the recipe, measuring the ingredients and then cooking in the oven or on the stove.
- Describe to your child what you are doing when cooking. Use words such as more, less, lighter, heavier, melt, cool, hot, cold, dissolve and set.
- Name and describe ingredients. Get your child to guess what will happen when you mix them together.
- Smell and taste the ingredients (only let your child taste ingredients you know are safe).
- Talk about how the ingredients change when you cook them.

Jelly

- Get your child to describe the jelly crystals before and after water has been added (from a solid to a liquid).
- Have your child look in the fridge every half an hour as the jelly sets and talk about how it changes.
- Ask what would happen if some jelly is left out of the fridge after setting. Try it!

IN THE KITCHEN (CONTINUED)

Play dough

- See how many shapes and patterns you can make together.
- Add essential oils, glitter and sand to play dough to change the texture and smell.

Kitchen utensils

- Explore how different kitchen utensils work, like a can opener and an ice cream scoop.
- Look at the reflection on both sides of a spoon. Ask *Why is each side different?* and *Which side is like looking in a mirror?*
- Get your child to pick up small, big, light and heavy items with tongs.

TASK

Make a stove with your child. Talk about the parts you need, for example an oven, knobs, switches and grill. Collect items to create the parts such as boxes, bottle tops and corrugated cardboard. When making the stove, talk about where the different parts go and how they can be attached. And then paint the stove!

QUESTIONING SKILLS

Questioning encourages children to expand their thoughts rather than giving yes or no answers.

Ask	For example
What does it…	**feel like? Close your eyes and tell me how it feels.** **look like? Compare the colour, pattern, size, shape and texture.** **taste like? Have you tasted something like this before?** **smell like? Does it remind you of something else?** **sound like? Where have you heard this sound before?**
What do you think would happen if…	**we add water to this?** **a playground slide grew bigger?**
Why do you think…	**the shadow has moved?**
How does…	**a robot work?**
What if we…	**change the size of the wheels on different toys?**
How can you…	**make blocks balance?**

LEARNING THROUGH READING

With your child, read *The Enormous Turnip* by Irene Yates.

- Talk with your child about the story using 'describing' sentences to give more information, for example *The turnip is heavy because it is so big*.
- Talk about other ways to remove the turnip, like cutting it into smaller pieces.
- Talk about different ways to move objects around the house.

With your child, read *The Very Hungry Caterpillar* by Eric Carle.

- With your child, find butterflies in the garden. Describe the colours and patterns on their wings.
- Dress up as caterpillars. Move like a caterpillar. Ask your child to show you how they would live in a cocoon – and how they would get out of the cocoon.
- Talk about how animals and humans have lifecycles.

ON RAINY DAYS

- Listen to the rain fall on different surfaces. Ask your child questions like *What does it sound like?* and *What does it smell like?*
- Watch what pets and other animals do before, during and after the rain.
- Look at the clouds. Talk about how clouds form different shapes and colours.

The great family meltdown

- Give each family member an ice cube and ask them to find ways to stop it melting without using the fridge or freezer. For example, get them to put it in a sock, wrap it in foil or bubble wrap, or bury it in the dirt. Time how long it takes the ice cubes to melt. Talk about why some ice cubes melt faster than others.

TASK

Watch the rain splash in puddles. Get your child to make ripples with their fingers. Look at your reflections. Splash water out of the puddle by jumping in it.

COLLECTING TREASURES

- Collect treasures with your child like shells, small stones, leaves and feathers. Display them around your home or keep them in a special place.
- Sort the treasures into groups, for example by colour, size, texture, shape and the number of edges. Talk with your child about how each group is similar and different. Use words like line, circle, square, triangle and rectangle. Look for repeated patterns and special designs.
- Examine each object under a magnifying glass or take photos with your phone and enlarge them on the screen.

Take lots of photos while doing activities. Use a mobile app to change the way the photos look. This develops your child's digital skills.

THE GREAT OUTDOORS

- Have your child use old kitchen utensils such as sieves, funnels, dishes and jugs to dig and play with water, sand and mud.
- Talk about where water comes from and where it goes. Test these ideas by getting your child to paint or spray water on a concrete surface and see what happens. Extend this activity by discussing how clothes dry after washing.
- Place torn newspaper into a large jar and soak with water. Push some bean seeds half way down the inside of the jar so they can be seen easily. Put the jar in a warm, light place and keep the paper moist. Watch what happens over a week (the roots grow down from the seed and the shoots grow up from the seed).

Garden play

- Plant vegetable offcuts and seeds, flower seeds and seedlings with your child. Watch how they grow over time. Take photos to record the changes. Talk about the changes together.
- Plant them in some different places to see how they grow differently (shade or sun, soil types, pot or garden bed). Discuss the differences and what works best.

TASK

Investigate a small area of ground with your child using a magnifying glass. Ask questions like *How many insects can you see?* Concentrate on one insect and see what it is doing. Follow it to see where it goes.

AT NIGHT

- Explore outside at night with your child – with and without a torch. Ask questions like *What can you see?* and *What can you hear?*
- Make shadows on the wall with a torch. Talk about how shadows change when the torch or objects are moved closer to or further away from the wall.

AT THE BEACH

- Get your child to use their senses to explore – like smelling the air, looking at the waves, listening to the birds, tasting the seawater and feeling the sand.
- Stand at the water's edge and let the waves lap up against your feet. Ask questions like *What can you feel under your feet?*

TASK

Dig a hole near the water's edge and see how long it takes to fill with water. Talk about where the water comes from. Stand in the hole to see what happens.

IN THE PARK

- Investigate a tree together. Try and hold hands around the tree trunk. Ask questions about what the bark looks, feels and smells like. See how many colours you can find. Talk about what lives in the tree and see if you can find anything.
- Close your eyes and listen for different sounds. Talk about what you can hear, for example the birds and the wind rustling the leaves. Listen for sounds outside the park, for example cars and planes.
- Stand still in one place. Talk and ask questions about the things you can see moving around you like birds flying overhead, leaves blowing on the ground, dogs running and people walking.

Playground equipment

- Get swinging! Talk about what makes the swing work. Describe how to make the swing go higher.
- Slide down the slide and talk about how and why you can stop mid-slide.
- Roll an object down the slide. Talk about how to make it go faster or slower.

BUBBLE BLOWING

- Blow bubbles and get your child to try and catch them. Ask questions like *What makes the bubbles float?* and *What makes the bubbles pop?* See how long a bubble can stay in the air.
- Get your child to make bubbles with their hands by forming a small circle with their thumb and forefinger and blowing through the circle.

TASK

How to make bubbles

Put 600ml of dishwashing detergent and 25ml of glycerin into a one litre container and fill it with water. Get your child to use a pipe cleaner to make a wand with a circle at the top. Get your child to dip the wand in the bubble mixture and blow through the circle.

BATH TIME PLAY

- Put different objects in the bath with your child. Get your child to see if they float or sink. Ask them to guess what they think might happen before they try. Ask why some objects float and others sink. Talk about ways to make floating objects sink, and sinking objects float.
- Get your child to fill different objects with water and then empty them. Use cleaned shampoo bottles to squirt water. Squeeze the bottle when it is empty and full and talk about how that feels. Squeeze the bottle under water and above water to see what happens.

Ask questions about what happens when the bath plug is removed.

RETHINK, REDUCE, RECYCLE AND REUSE

Rethink

- Rather than driving your child to school, walk there. If you live far from school, drive part of the way and walk the rest.
- Encourage your child to think about the way they use their environment with others. Suggest things like placing rubbish into bins and tidying up after playing.

Reduce

- Reduce electricity by getting your child to turn off appliances and lights at the wall when they are not being used. Make signs together as a reminder.
- Get your child to turn off the water while cleaning their teeth.
- Show your child the gas, water and electricity meters so they understand how utilities are measured.
- Put a bucket in the shower when your child showers and measure how much water is collected.

Recycle

- Show your child the ‘recycle’ symbol. Talk about how important it is to recycle.
- Discuss the sorts of materials that can and can’t be recycled.

Reuse

- Reuse paper plates, boxes, cards, wrapping paper and ribbon for arts and craft activities. Store buttons, crayons and pencils in glass or plastic containers.
- Reuse shoeboxes to create houses for toys and treasure boxes.
- Identify ways water can be collected and reused around the house, instead of going down the drain.

TASK

Before you throw items in the rubbish, talk about what each item is made of and ask your child to look for the recycle symbol. Sort out the recycling items together and put them in the recycle bin.

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