STEM and future-ready children

STEM and preschool research

Digital play

Contact us

STEM and inquiry

Any questions?

Future-ready STEM engagement

STEM stands for Science, Technology, Engineering, and Mathematics.

Thinking about STEM in the early years means we are building a solid foundation and bedding down a love for inquiry and curiosity that will provide the basis for future skills.

In this half hour we want to value-add to what you are already doing by looking at the idea of future-ready STEM ideas.

The STEM pipeline

STEM Pipeline

Research shows us that girls, rural and remote children, children from indigenous backgrounds and those from low socio-economic backgrounds are the least likely to pursue STEM careers.

Often this is due to lack of exposure to STEM practices from parents and other adults in early life.

Being exposed to STEM exploration in early childhood is a known contributor to later life success in these subject areas.

Future-readiness and 21st Century Skills.

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ELSA
EARLY LEARNING STEM AUSTRALIA

STEM and the EYLF V 2.0

Belonging, Being and Becoming

(These remain the core foundation of the revised EYLF v 2.0, but have been expanded to include current knowledge in the field.)

STEM FOCUS:

Belonging now includes local and global communities as it recognises how digital technology is connecting us beyond our local communities.

Becoming acknowledges children's capabilities and participations as active citizens (problem solvers and critical thinkers, which are inherent to STEM inquiry).

STEM inquiry & learning outcomes

Early learning STEM resources

Simple STEM activities

STEM & EYLF outcomes

STEM inquiry is embedded in the following EYLF outcomes:

Outcome 4 - Children develop a growth mindset and learning dispositions such as curiosity, confidence, creativity, commitment, enthusiasm, persistence, imagination and reflexivity (v 2.0)

Outcome 5 - Children use digital technologies and media to access information, investigate and represent their thinking

Early learning STEM resources (Teaching Toolkit)

ELSA
EARLY LEARNING STEM AUSTRALIA

Let's Count
ONLINE

Government of South Australia
Department for Education

LITTLE SCIENTISTS AUSTRALIA

View more information about these STEM resources:
https://docs.google.com/document/d/1x1LTRoRurTNzGoX4oYDzbSHJE1cg5Q2lkSscZstBENE

STEM and inquiry-based learning What does this look like?

Inquiry-based learning

Pipe cleaner counting (maths)

- Investigating
- Problem-solving
- Questioning
- Critical and Creative thinking
- Designing
- Interpreting
- Explaining
- Communicating findings

View more information about these STEM resources:
https://docs.google.com/document/d/1x1LTRoRurTNzGoX4oYDzbSHJE1cg5Q2lkSscZstBENE

Cloud in a jar (science)

Oil spill (engineering/ science)

Stop-motion animation video (technology)

How does inquiry-based learning enhance the teaching and learning of STEM?

- Enhances reasoning skills
- Encourages agency: student voice and choice
- Promotes exploration (investigating, designing, imagining)
- Positive attitudes to failure (iterative nature of STEM problems demonstrates failure as an important part of the problem-solving process)
- Encourages reflection

STEM (MATHS)

Focus: Learning to count using a visual

Materials:

- Pipe cleaners
- Paper
- Pen
- Glue
- Beads

Method:

1) Begin by folding a piece of paper around one end of each pipe cleaner and fixing it in place with a swipe of your glue stick.
2) Depending on the age of your child and their skill level, write a number on each piece of paper.

Inquiry:

How could you sort these...?
What happens when we....?
What can be made from.....?
Can you see a pattern?....
What have you discovered?....

This STEM Maths inquiry is flexible enough that teachers can cater it to suit their students' needs and skills.

1) **Ordering numbers:**

- Invite students to place the pipe cleaners in numerical order (counting and checking)

2) **Number formations:**

- Students can trace their finger over each number to focus on the features of each number

3) **Making numbers:**

- Students can thread the correct number of beads onto the end of each pipe cleaner

4) **Fine motor development:**

- Counting beads on pipe cleaners supports fine motor skills

1)

2)

3)

4)

STEM (SCIENCE)

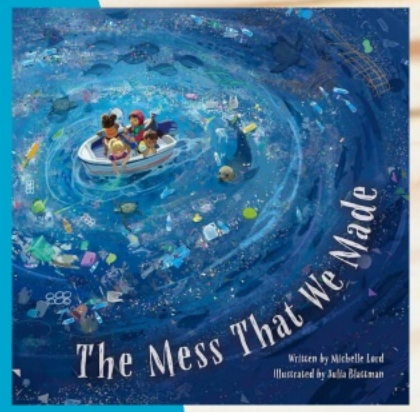
Condensation, water cycles, states of matter (exploration of clouds and rain)

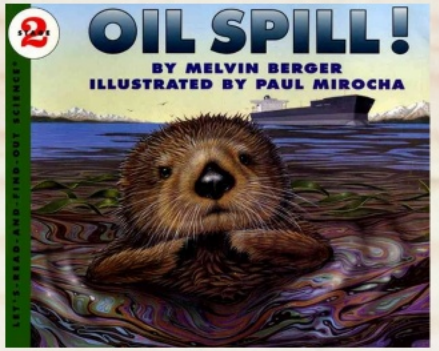
Materials:	**Method:**
• A large jar (it can be plastic) • Shaving cream (not a gel version) • Food colouring • Pipettes or droppers	1. In a small cup, mix the food coloring with some water. 2. Fill the large jar with water until it is about 3/4 full. 3. Place the jar and the cups of coloured water on the table. Place a pipette in each cup of colored water. 4. Right before the children are ready to do the experiment, spray a bunch of shaving cream in the jar until it is just a small bit above the top of the jar.
Inquiry: What I think will happen..... What I observed..... What I learned..... Ask the students to pick up some coloured water with a pipette and squirt it on top of the shaving cream cloud. Repeat this step one or two more times, but pay close attention to what is happening below the cloud! The coloured water will begin to seep down through the shaving cream and into the water below. Just like rain!	

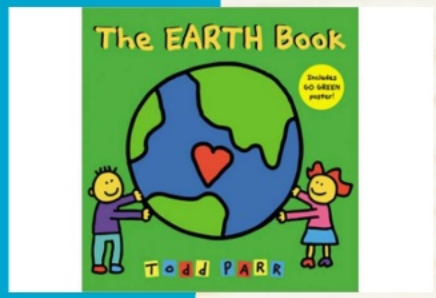
STEM (SCIENCE/ ENGINEERING)

Global issue: Oil spill

Materials:	**Method:**
• Oil (vegetable) • Water • Sponges • Paper towels • Feathers • Spoons	1) Mix oil and water in a large container and add a few 2) Pass out materials like sponges, paper towels, or little spoons and instruct the children to try to remove the oil from the water and feathers.
Inquiry: What happened?.... Where could it go?.... What could it affect?.... What harm could it cause?... What can be done to help?.... Have the children try to remove the oil without removing too much water. You can use this activity to show how oil spills can affect the environment, letting them observe how the oil affected the feathers and how difficult it was to remove it from the water. The basic elements of this activity (mixing oil and water) make it easy for the learning level to be scaled up or down depending on the child's age—oil can obviously be messy, so use your discretion with younger learners.	

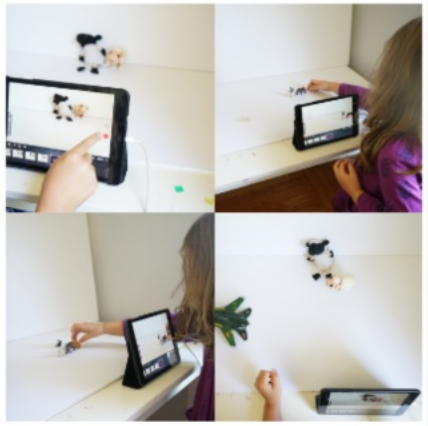


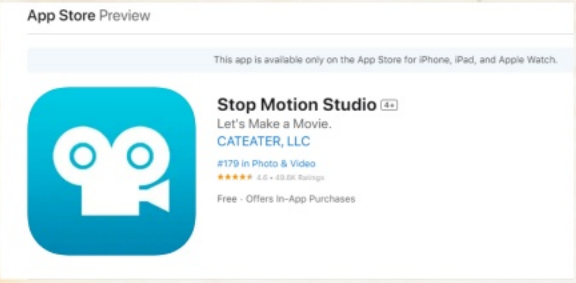




STEM
(TECHNOLOGY)

Focus: Creating a stop-motion video

Materials:	**Method:**
• Two pieces of thick cardboard (which could be backed onto a thicker board for durability) • Collection of objects to animate • Smartphone or iPad • Free stop motion app (any selected free ones from the App Store)	1) Set up a backdrop. This could be a wall or thick cardboard 2) Gather toys to include in your animation. 3) Set up your iPad or smartphone on a stand or tripod, across from the thick cardboard. 4) Start the Stop Motion Animation App and make your movie
Inquiry: I wonder what would happen if?..... How do living things survive in this environment? What is the environment? I wonder how...? To make it work, you place an object in front of a camera and snap a photo. You then move the object a tiny bit and snap another photo. Repeat this process twenty to as many times as the students like to tell a story. Play back the sequence in rapid progression, and the object appears to move fluidly across the screen.	



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Any questions?

Technology & Digital Play

Technology doesn't need to mean digital technology.

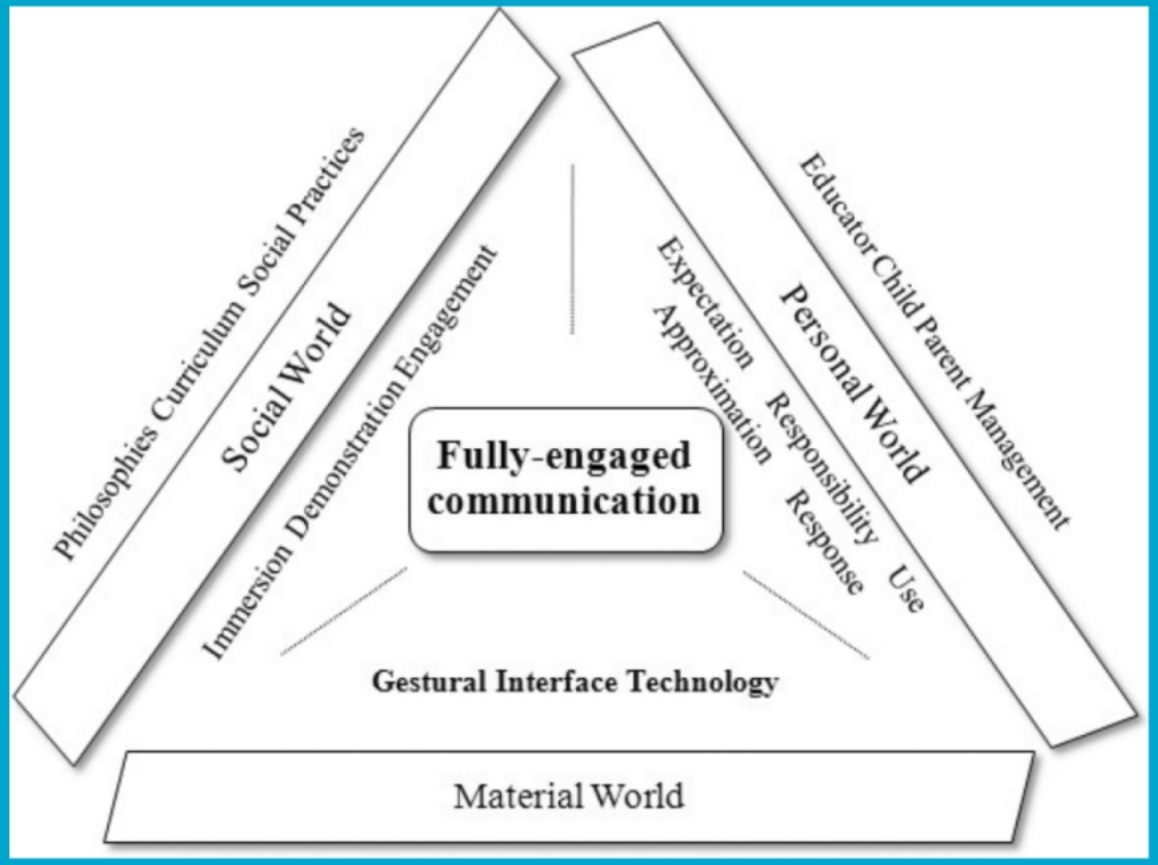
Re-examining screen-time: passive vs active engagement.

Positive technology interactions are important for children, educators and parents/carers.

Digital communication

Digital play

Digital communications



Digital play

Helps educators observe and assess young children's learning to use technologies through play

https://elsaprogram.com.au

https://www.digitalchild.org.au/

https://www.monash.edu/conceptual-playworld/home

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Any questions?

What would you like to know more about?

- From this presentation?
- In future presentations?
- About the ELSA team and what we do?

Thank you

Today we have showcased some future-readiness STEM ideas that can used in your teaching.

We hope we've given you some food for thought and maybe sparked a new idea or two!

We hope to see you online again for future presentations.

Thanks for your passion and committment to our future STEM leaders.

Our Contact Details

Our contact details

Feel free to explore the ELSA program for your centre – it's full of high-quality STEM resources, and ERA aligned activities, that can support and extend your existing STEM teaching.

elsaprogram.com.au

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