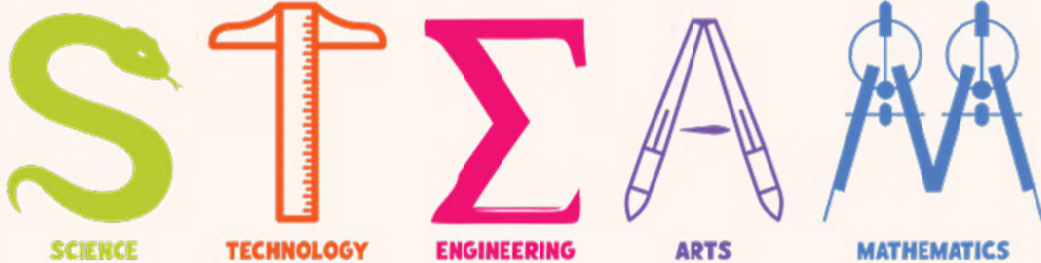


An



INTRODUCTION

to



in Early Childhood

for Educators





COURSE DESCRIPTION

This training explores the importance of STEAM (Science, Technology, Engineering, Arts, and Mathematics) in early childhood education.

Participants will learn how to integrate STEAM concepts into everyday experiences, fostering curiosity, problem-solving, and critical thinking in young learners.

The session includes discussion on developmentally appropriate STEAM pedagogy, and strategies for creating engaging learning experiences for children.



OBJECTIVES

By the end of this course, learners will be able to:

- **Understand the Importance of Early STEAM Exposure** – Explain why STEAM learning is crucial in the early years and how it supports cognitive and social-emotional development.
- **Integrate STEAM into Everyday Learning** – Identify ways to incorporate STEAM concepts into play, storytelling, outdoor activities, and routine experiences.
- **Foster Inquiry and Problem-Solving Skills** – Use open-ended questions and guided exploration to encourage critical thinking in young children.
- **Support a Growth Mindset in STEAM** – Develop strategies to help children develop confidence, persistence, and a love for exploration.



WHAT IS STEAM, AND WHY IS IT IMPORTANT?

STEAM stands for **Science**, **Technology**, **Engineering**, **Arts**, and **Mathematics**.

In early childhood, STEAM is not about complex equations or advanced technology, it's about **exploration**, **curiosity**, and **hands-on learning**.

Young children naturally engage in STEAM thinking as they experiment with objects, ask questions, and explore their environment.



WHAT IS STEAM, AND WHY IS IT IMPORTANT?

Why is STEAM important in early childhood?

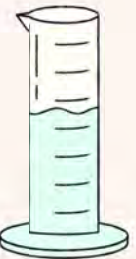
- **Encourages Curiosity & Exploration** – Young children are natural scientists, constantly testing and learning from their surroundings.
- **Builds Problem-Solving Skills** – STEAM experiences promote trial and error, persistence, and creative thinking.
- **Supports School Readiness** – Early STEAM exposure lays the foundation for future learning in literacy, numeracy, and critical thinking.
- **Develops Fine & Gross Motor Skills** – Play such as building, measuring, and experimenting enhance physical coordination.
- **Promotes Social & Emotional Growth** – STEAM activities encourage teamwork, communication, and resilience.



THE ROLE OF EARLY STEAM EXPERIENCES IN BRAIN DEVELOPMENT

Research shows that early STEAM experiences help shape brain development, particularly in areas related to:

- **Cognitive Growth** - Problem-solving and logical thinking develop through hands-on experimentation.
- **Executive Function Skills** - STEAM encourages skills like focus, memory, and self-control.
- **Language Development** - STEAM discussions introduce rich vocabulary (e.g., “predict,” “compare,” “observe”).
- **Creativity & Innovation** - STEAM fosters open-ended exploration, helping children think outside the box. Early STEAM experiences help children develop the foundational skills they will use throughout life, supporting learning across all subject areas.



DISPELLING THE MYTHS



Myth 1: STEAM is only about science experiments

Reality: STEAM includes problem-solving, creativity, and inquiry.

In practice, this looks like building, painting, and exploring patterns through play.

Myth 2: STEAM is too advanced for young children

Reality: Children are natural explorers who ask questions, test ideas, and investigate cause and effect in everyday play.

Myth 3: You need expensive resources or technology

Reality: STEAM can be explored using simple, everyday materials and loose parts: it's about how resources are used.



DISPELLING THE MYTHS



Myth 4: Educators need to be “experts”

Reality: Educators support learning by being curious, asking questions, and exploring alongside children. They are the co-collaborators in constructing knowledge.

Myth 5: Boys are naturally better at STEAM than girls

Reality: STEAM is for everyone! All children should be equally encouraged to explore, building confidence and challenging stereotypes.



A young child with short brown hair is shown in profile, looking upwards and to the right. Inside the child's head, there is a cluster of colorful gears in red, blue, green, and yellow. Two bright blue light flares are visible near the gears. The background is a light blue wall with a geometric, low-poly pattern.

STEAM CONCEPTS AND YOUNG LEARNERS

STEAM in early childhood focuses on **hands-on, play-based experiences** that help children explore the world around them.

FACILITATING STEAM

1. Identify a Meaningful Challenge or Inquiry Topic:

A real-world, age-appropriate question, challenge, or phenomenon that sparks the curiosity of the children.



Example:

Children are building in the block center with blocks and cars. Educator prompts, "I wonder how you could add a bridge to your road strong enough for cars to drive on?"

FACILITATING STEAM

2. Connect Learning Across Learning Areas:

Educators take on the role of Co-
constructor and More Knowledgeable
Other in the following learning process:



*Example: Educators prompt children using open-ended questions:
I wonder how bridges are built? Where do you think we can find out? I think there is a book in the library about bridges. How could we learn about building bridges before we start building?*

FACILITATING STEAM

3. Guide children in planning and organising

Educators guide children regarding the materials and supplies they will need to encourage an exploratory environment.



Example:

- "What type of blocks do you think would be best for building a bridge?"
- "Do you think you will need ramp blocks?"
- Do you think you would like to make a plan by drawing a picture of your bridge before you start building?

FACILITATING STEAM

4. Prompt curiosity and investigation through open-ended questions, providing support but **not taking over.**

Children test ideas, manipulate materials, observe outcomes, and revise their thinking.



Example:

- "I wonder what would happen if you...?"
- "How do you think you could make it stronger?"
- "What else could you try?"

FACILITATING STEAM

5. Facilitate collaboration and discussion

Educator encourages children to work together, share ideas, and explain their thinking.



Example:

- *"John can you share what you told me about using the ramps and blocks together?"*

FACILITATING STEAM

6. Guide Reflection and Documentation



Example:

- *"Do you think your bridge is strong enough to support your cars? Why or Why Not?"*
- *"What was hard when building your bridge?"*
- *"What would you do differently next time?"*
- *"Do you think there is a better way to build a bridge?"*

FACILITATING STEAM

7. Encourage Redesign

Children revise their creations or ideas based on what they have learned



FACILITATING STEAM

8. Assess Learning

Educators notice **significant learning** and assess **learning outcomes** and **developmental domains indicators**, using appropriate tools such as:

- noticing tool
- conversations with children
- web of noticings

NOTICING TOOL

EDUCATOR NAME:	YEAR:	DATE:	DATE:	DATE:	DATE:	DATE:
Learning Outcomes Domain 1: Learning Area 1 (L1) and 2 (L2) Focus Area: Suggestive Evidence: []	Learning Outcomes Domain 1: Learning Area 1 (L1) and 2 (L2) Focus Area: Suggestive Evidence: []	Learning Outcomes Domain 1: Learning Area 1 (L1) and 2 (L2) Focus Area: Suggestive Evidence: []	Learning Outcomes Domain 1: Learning Area 1 (L1) and 2 (L2) Focus Area: Suggestive Evidence: []	Learning Outcomes Domain 1: Learning Area 1 (L1) and 2 (L2) Focus Area: Suggestive Evidence: []	Learning Outcomes Domain 1: Learning Area 1 (L1) and 2 (L2) Focus Area: Suggestive Evidence: []	Learning Outcomes Domain 1: Learning Area 1 (L1) and 2 (L2) Focus Area: Suggestive Evidence: []
Learning Outcomes Domain 1: Learning Area 1 (L1) and 2 (L2) Focus Area: Suggestive Evidence: []	Learning Outcomes Domain 1: Learning Area 1 (L1) and 2 (L2) Focus Area: Suggestive Evidence: []	Learning Outcomes Domain 1: Learning Area 1 (L1) and 2 (L2) Focus Area: Suggestive Evidence: []	Learning Outcomes Domain 1: Learning Area 1 (L1) and 2 (L2) Focus Area: Suggestive Evidence: []	Learning Outcomes Domain 1: Learning Area 1 (L1) and 2 (L2) Focus Area: Suggestive Evidence: []	Learning Outcomes Domain 1: Learning Area 1 (L1) and 2 (L2) Focus Area: Suggestive Evidence: []	Learning Outcomes Domain 1: Learning Area 1 (L1) and 2 (L2) Focus Area: Suggestive Evidence: []
Learning Outcomes Domain 1: Learning Area 1 (L1) and 2 (L2) Focus Area: Suggestive Evidence: []	Learning Outcomes Domain 1: Learning Area 1 (L1) and 2 (L2) Focus Area: Suggestive Evidence: []	Learning Outcomes Domain 1: Learning Area 1 (L1) and 2 (L2) Focus Area: Suggestive Evidence: []	Learning Outcomes Domain 1: Learning Area 1 (L1) and 2 (L2) Focus Area: Suggestive Evidence: []	Learning Outcomes Domain 1: Learning Area 1 (L1) and 2 (L2) Focus Area: Suggestive Evidence: []	Learning Outcomes Domain 1: Learning Area 1 (L1) and 2 (L2) Focus Area: Suggestive Evidence: []	Learning Outcomes Domain 1: Learning Area 1 (L1) and 2 (L2) Focus Area: Suggestive Evidence: []

Completed Web of Noticing

Early childhood learning trajectories Noticing & Reflection Tool

Executive Function - Working memory

What might you see the child doing?	Changes as child develops and grows			
Shows interest and the most attention towards people or objects for short periods of time.	→	Engages and follows simple instructions or sequences with increasing persistence.	→	Remembers increasingly complex sequences of words, pictures or actions independently.
Engages in play experiences and explores the world around them.	→	Engages in play experiences and explores the world around them.	→	Engages in play experiences and explores the world around them.
Engages in play experiences and explores the world around them.	→	Engages in play experiences and explores the world around them.	→	Engages in play experiences and explores the world around them.
Engages in play experiences and explores the world around them.	→	Engages in play experiences and explores the world around them.	→	Engages in play experiences and explores the world around them.

CONVERSATION WITH CHILDREN

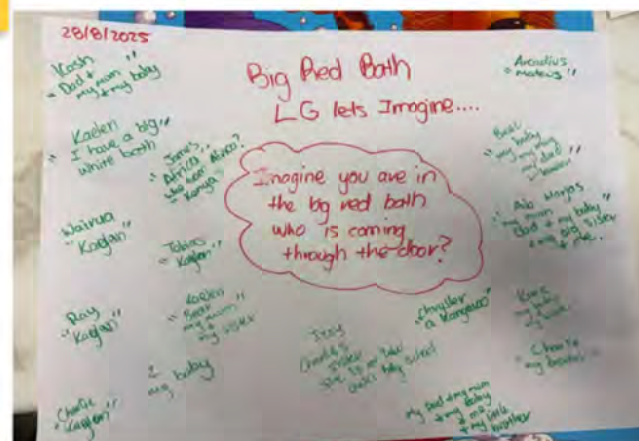
Day: 23rd July 2025 Room: Five Kids
What can we do if the puzzle pieces don't fit?
How can we solve it together?

Children's Voices
Ethan: "More done I did."
Miss M: "How did you do that before going up?"
Liam: "Try turning it like this."
Ethan: "Then you said 'I did it' and I was like 'no'."
Miss M: "That's okay, Ethan. I was just trying to help you."
Liam: "Look at the picture - does it match the picture?"
Miss M: "Good, Ethan. The puzzle pieces are in place."
Ethan: "Yeah! The one has straight sides. Maybe it goes there."
Miss M: "You're thinking like a team of problem solvers! What do you need to do next?"
Liam: "Let's keep going and see if it works better."
Miss M: "Solving is a great idea. That shows you're working together and trying different strategies."
Ethan: "It worked! We just had to help each other."
Miss M: "You did it! You were so proud of yourselves. That's what teamwork and problem-solving looks like."

Educator's Note
The children displayed persistence and collaboration as they tackled a challenging puzzle during group time. Each child contributed ideas, used different strategies, and encouraged one another. The exchange reflected strong cognitive development and social problem-solving skills. I also observed how the conversation supported critical thinking and reasoning. I will extend this experience by introducing more complex puzzles and encouraging small group tasks that involve shared decision-making.

Completed
Conversation
with children
tool

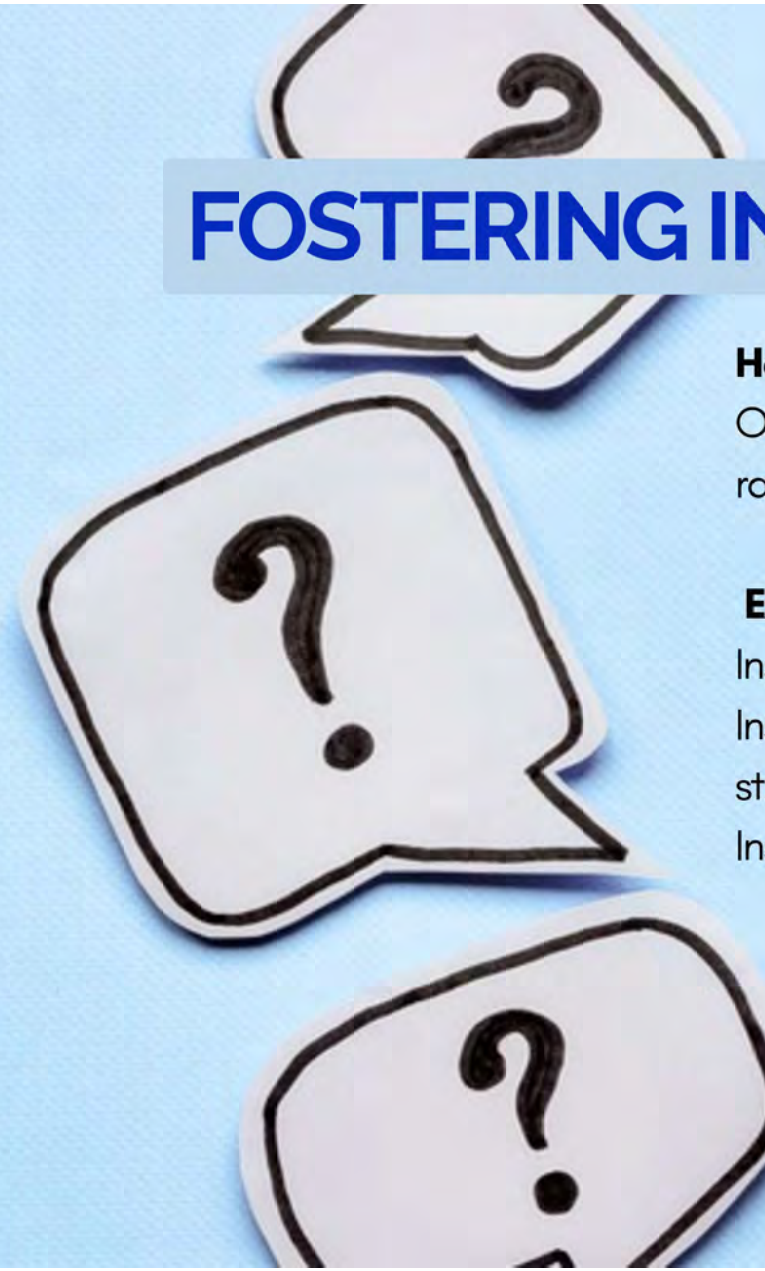
Completed
Web of
Noticing



A young child with light brown hair, wearing a white short-sleeved onesie, is standing on a light-colored wooden floor. The child is leaning forward, reaching into a dark-colored cabinet drawer. The background shows a kitchen with light wood cabinetry and a white oven. The scene is brightly lit, suggesting a sunny day.

FOSTERING INQUIRY AND EXPLORATION

Young children are naturally curious, and fostering inquiry helps them develop critical thinking and problem-solving skills. This section focuses on **asking open-ended questions, encouraging observation and experimentation, and supporting curiosity through guided discovery.**



FOSTERING INQUIRY AND EXPLORATION

How to Ask Open-Ended Questions

Open-ended questions encourage children to think, explore, and express their ideas, rather than just giving yes/no answers.

Examples of Open-Ended Questions:

Instead of: "Is the ball rolling?" → Ask: "What do you notice about how the ball moves?"

Instead of: "Did your tower fall?" → Ask: "What do you think will make the tower stronger?"

Instead of: "What color is this?" → Ask: "What does this color remind you of?"

Techniques for Asking Great Questions:

Start with "What do you think...?" or "How can we...?"

Give time to answer – Silence is okay! Let children process their thoughts.

Encourage multiple answers – There's no single "right" answer in exploration.



FOSTERING INQUIRY AND EXPLORATION

Encouraging Observation, Prediction, and Experimentation

Inquiry-based learning encourages children to observe their surroundings, make guesses, and test their ideas.

Observation – Helping children notice details about objects, actions, or events.

- “What do you see happening to the bubbles when you blow softly vs. hard?”
- “Can you describe what the leaves feel like?”

Prediction – Encouraging children to guess what might happen before an experiment.

- “What do you think will happen if we add more blocks to the tower?”
- “What do you think will happen when we put ice in the sun?”

Experimentation – Testing ideas and adjusting based on results.

- “What could we try next to make the paper airplane fly farther?”
- “How can we change our bridge design to make it hold more weight?”



FOSTERING INQUIRY AND EXPLORATION

Supporting Curiosity Through Guided Discovery

Guided discovery allows children to explore independently while receiving gentle support.

Strategies to Support Curiosity:

- Provide hands-on materials – Let children explore with natural items, blocks, and sensory tools.
- Model curiosity – Show excitement about discovering something new: “I wonder what happens if we mix these two things together?”
- Allow mistakes and revisions – Encourage trial and error: “That didn’t work –what else could we try?”
- Connect learning to real life – Tie concepts to everyday experiences: “Where have you seen bridges like this before?”

FOSTERING INQUIRY AND EXPLORATION

REFLECTION QUESTION

What 3A games can you embed into your STEAM experiences that support your strategy?



STEAM-RICH ENVIRONMENTS AND RESOURCES

Creating a STEAM-rich environment in early childhood education means designing spaces and providing materials that encourage exploration, creativity, and problem-solving.

Here's how to set up a STEAM-friendly learning space, incorporate natural and recycled materials, and use children's literature to spark curiosity.



STEAM-RICH ENVIRONMENTS AND RESOURCES

Setting Up an Engaging STEAM Learning Space

A well organised STEAM space invites children to explore, experiment, and create. It doesn't have to be high-tech: simple hands-on materials and an open-ended approach work best.



Key Features of a STEAM Learning Space:

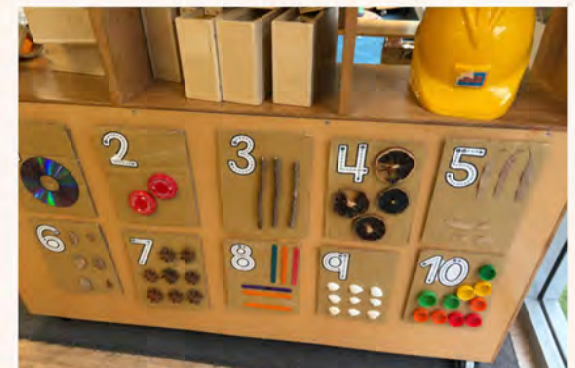
- **Accessible Materials** – Items should be at a child's level to encourage independent exploration.
- **Open-Ended Exploration Areas** – Spaces for building, tinkering, and experimenting (e.g., block area, sensory table).
- **Flexible Seating & Workspaces** – Provide floor mats, standing tables, and cozy nooks for different experiences.
- **Display STEAM Inspiration** – Show images of real scientists, engineers, books and nature discoveries to spark curiosity.
- **Outdoor STEAM Opportunities** – Take learning outside! Nature provides endless opportunities for exploration.

STEAM-RICH ENVIRONMENTS AND RESOURCES

Setting Up an Engaging STEAM Learning Space

Example STEAM Quadrant in the studio:

- **Engineering & Building zone**– Blocks, cardboard tubes, LEGO, ramps, and connectors.
- **Science & Exploration Area** – Magnifying glasses, mirrors, magnets, sensory bins, and scales.
- **Math & Patterns Corner** – Counting bears, shape puzzles, measurement tools, and sorting games.
- **Tinkering & Invention Station** – Loose parts like nuts, bolts, old keyboards, and simple tools.



STEAM-RICH ENVIRONMENTS AND RESOURCES

Incorporating Natural and Recycled Materials

STEAM learning doesn't require expensive toys!

Nature and recycled items make excellent STEAM resources.

Natural Materials for STEAM Exploration:

- Leaves, sticks, and rocks – Sorting, counting, and pattern-making.
- Water and sand – Experimenting with textures, measuring, and cause-and-effect play.
- Seeds and plants – Observing plant growth and exploring life cycles.
- Sunlight and shadows – Learning about light, reflection, and time changes.



STEAM-RICH ENVIRONMENTS AND RESOURCES

Incorporating Natural and Recycled Materials

Recycled & Loose Parts for STEAM:

- **Cardboard boxes & tubes** – Perfect for engineering and creative building projects.
- **Plastic bottle caps & containers** – Great for sorting, counting, and experimenting.
- **Fabric scraps & buttons** – Exploring textures, designing patterns, and creative problem-solving.
- **Old electronics & tools** – Safe dismantling of old keyboards, clocks, or phones encourages curiosity about how things work.



REFLECTION QUESTION

"Does your service have access to a recycled materials library to support open-ended exploration?"

STEAM-RICH ENVIRONMENTS AND RESOURCES

Using Children's Literature to Introduce STEAM Concepts

Books are a fantastic way to introduce STEAM topics and connect storytelling to hands-on exploration.

Great STEAM Books for Young Learners:

Science:

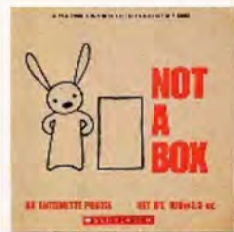
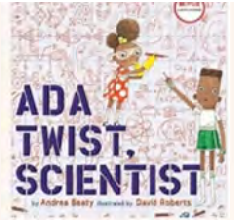
- **Ada Twist, Scientist** by Andrea Beaty – Encourages curiosity and problem-solving.
- **Over and Under the Pond** by Kate Messner – Explores ecosystems and observation skills.

Technology & Engineering:

- **Rosie Revere, Engineer** by Andrea Beaty – Celebrates perseverance in engineering.
- **Not a Box** by Antoinette Portis – Sparks creative thinking and engineering play.

Mathematics:

- **How Many?** by Christopher Danielson – Engages children in visual counting and patterns.
- **Anno's Counting Book** by Mitsumasa Anno – Explores number sense in real-world contexts.



OVERCOMING CHALLENGES AND ENCOURAGING EQUITY IN STEAM

STEAM education should be inclusive and accessible for all children, regardless of background, ability, or prior experience.

This section explores strategies for supporting diverse learners, making STEAM accessible, and fostering a growth mindset to build resilience in problem-solving.



Our Core Foundational Goal 9:
Ensuring equity in learning

THE CONVENTION ON THE RIGHTS OF THE CHILD

in child friendly language

Article 3

All adults should do what is best for you. When adults make decisions, they should think about how their decisions will affect children.

Article 28

You have the right to a good quality education. You should be encouraged to go to school to the highest level you can.



Article 23

You have the right to special education and care if you have a disability, as well as all the rights in this Convention, so that you can live a full life.

Article 31

You have the right to play and rest.

Article 29

Your education should help you use and develop your talents and abilities. It should also help you learn to live peacefully, protect the environment and respect other people.

Article 17

You have the right to get information that is important to your well-being, from radio, newspaper, books, computers and other sources. Adults should make sure that the information you are getting is not harmful, and help you find and understand the information you need.

Alignment to the

EARLY YEARS LEARNING FRAMEWORK V2.0

and

VICTORIAN EARLY YEARS LEARNING AND DEVELOPMENT FRAMEWORK V2.0

Principles

- Secure, respectful and reciprocal relationships
- Partnerships
- High expectations and equity
- Respect for diversity
- Ongoing learning and reflective practice

Practices

- Holistic approaches
- Responsiveness to children
- Learning through play
- Intentional teaching
- Learning environments
- Cultural competence
- Continuity of learning and transitions
- Assessment for learning



LEARNING OUTCOMES

Outcome 1

Children have a strong sense of identity

- Children develop their emerging autonomy, inter-dependence, resilience and sense of agency

Outcome 4

Children are confident and involved learners

- Children develop dispositions for learning such as curiosity, cooperation, confidence, creativity, commitment, enthusiasm, persistence, imagination and reflexivity
- Children develop a range of skills and processes such as problem solving, inquiry, experimentation, hypothesising, researching and investigating
- Children transfer and adapt what they have learned from one context to another
- Children resource their own learning through connecting with people, place, technologies and natural and processed materials

Outcome 2

Children are connected with and contribute to their world

- Children develop a sense of belonging to groups and communities and an understanding of the reciprocal rights and responsibilities necessary for active community participation

Outcome 3

Children have a strong sense of wellbeing

- Children become strong in their social, emotional and mental wellbeing

Outcome 5

Children are effective communicators

- Children interact verbally and non-verbally with others for a range of purposes
- Children engage with a range of texts and gain meaning from these texts
- Children express ideas and make meaning using a range of media
- Children begin to understand how symbols and pattern systems work
- Children use information and communication technologies to access information, investigate ideas and represent their thinking



Alignment to the

NATIONAL QUALITY STANDARDS

for STEAM-rich educational practice

Quality Area 1

Educational Program and Practice

- 1.1.1 Approved learning framework
- 1.1.2 Child-centred
- 1.2.1 Intentional teaching
- 1.2.2 Responsive teaching and scaffolding
- 1.2.3 Child-directed learning
- 1.3.1 Assessment and planning cycle
- 1.3.2 Critical reflection

Quality Area 3

Physical Environment

- 3.2.1 Inclusive environment
- 3.2.2 Resources support play-based learning

Quality Area 5

Relationships with Children

- 5.1.1 Positive educator to child interactions
- 5.1.2 Dignity and rights of the child
- 5.2.1 Collaborative learning
- 5.2.2 Self-regulation

Quality Area 6

Collaborative Partnerships with Families and Communities

- 6.1.2 Parent views are respected
- 6.2.2 Access and participation
- 6.2.3 Community engagement

Quality Area 7

Governance and Leadership

- 7.2.1 Continuous improvement
- 7.2.2 Educational leadership
- 7.2.3 Development of professionals





SCIENCE



TECHNOLOGY



ENGINEERING



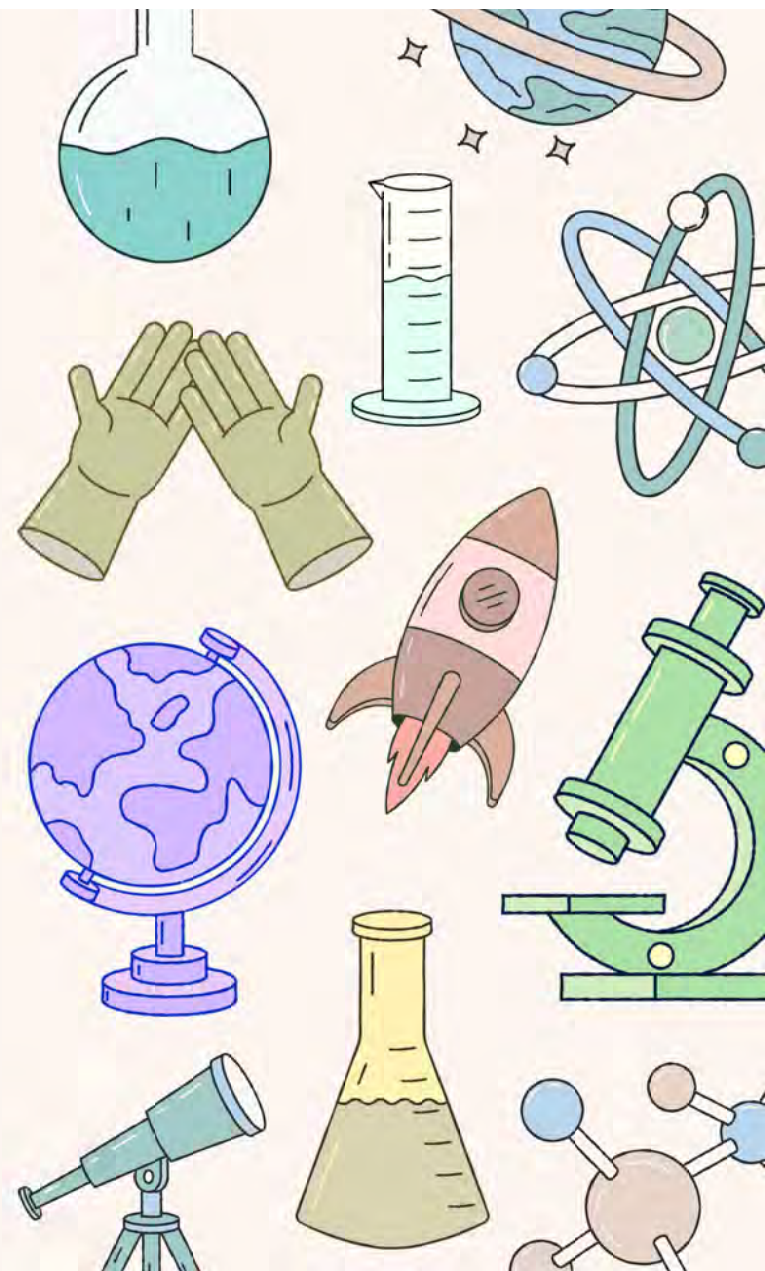
ARTS



MATHEMATICS

STUDIO

Reference Resource





Southport Imagine

STEAM STUDIO



STEAM STUDIO

Southport Imagine

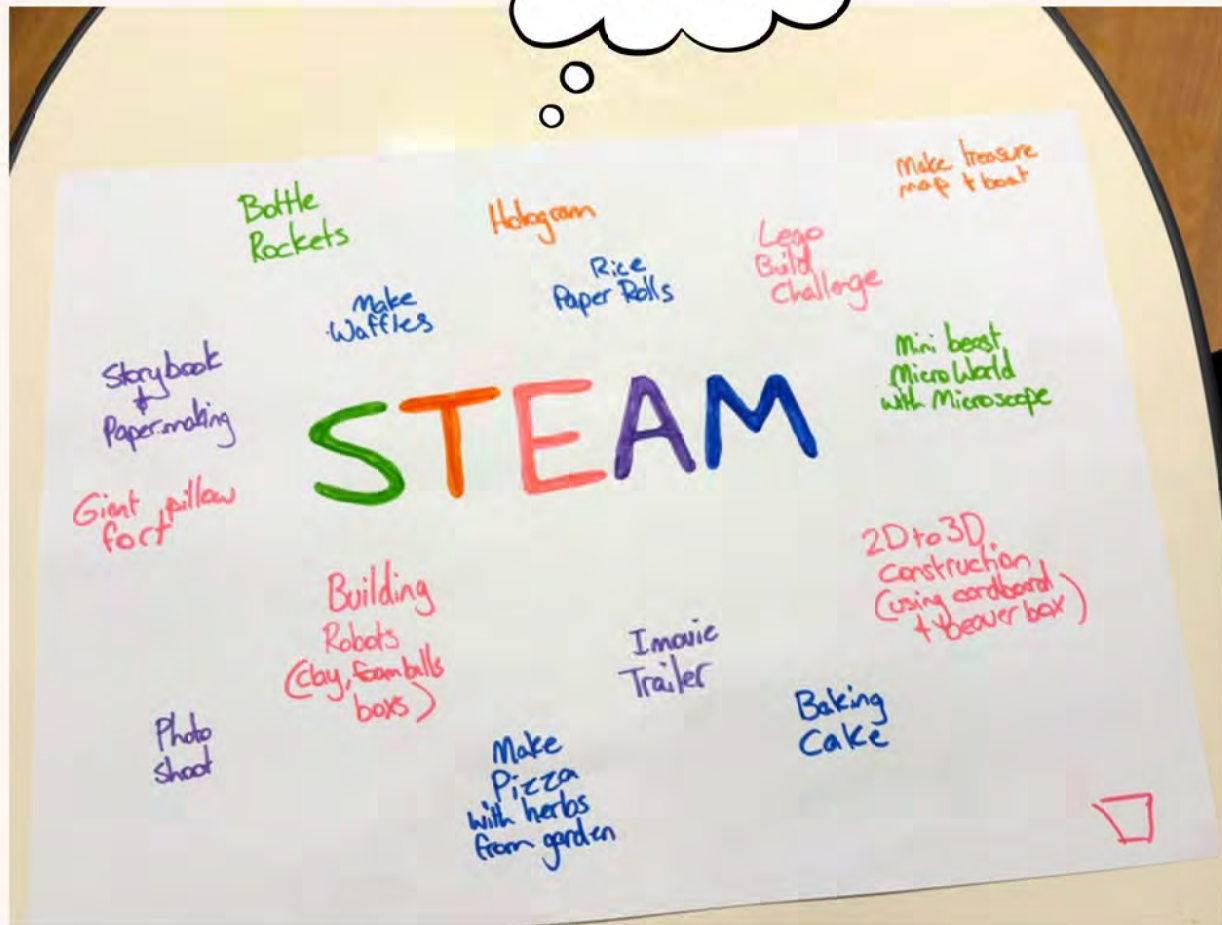




Our children collaborate with educators to create our STEAM Agreement



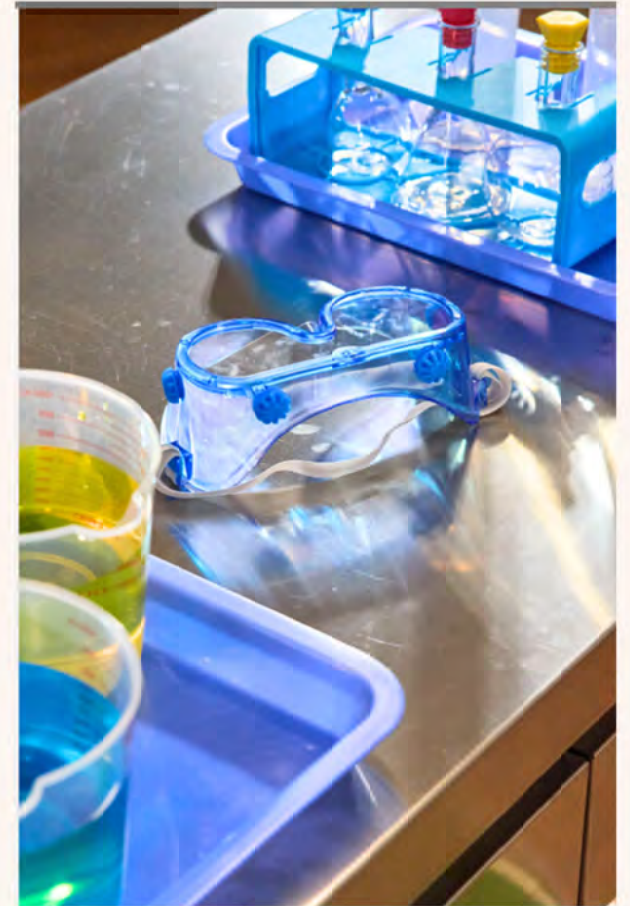
Let's
Mindmap!





Southport Imagine

STEAM STUDIO



Southport Imagine

STEAM STUDIO



Southport Imagine

STEAM STUDIO



Mernda Children First

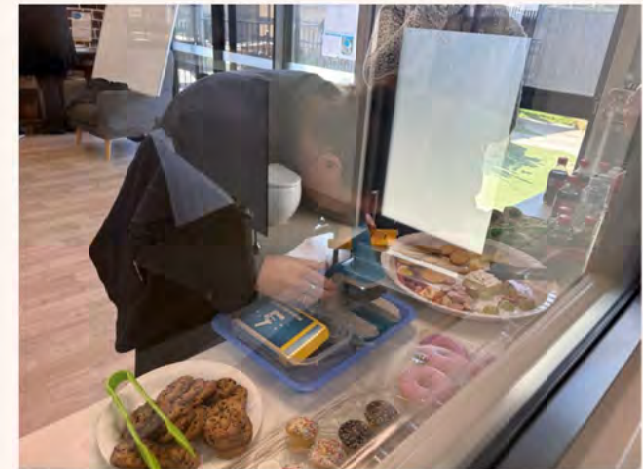


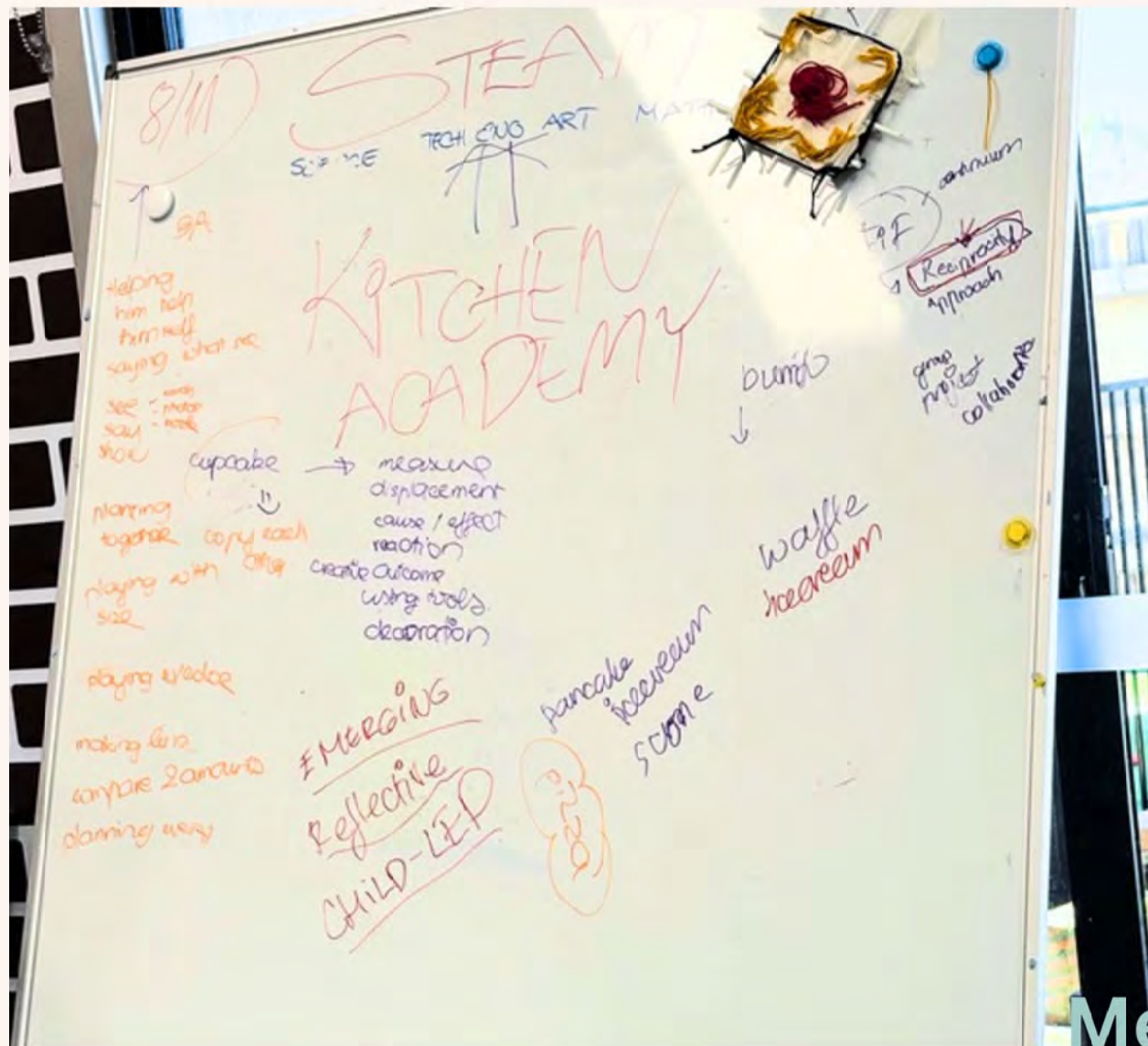


Mernda Children First



Mernda Children First





Mernda Children First

