steAm in ECE: science, technology, engineering & math, through visual arts

Design thinking can be a powerful framework for problem-solving and creating anything. As teachers engage in visual arts experiences with children it is important to make time for this initial design stage. When teachers begin to ask questions related to design and engineering children are encouraged to identify problems and design solutions. O'Conner (2013) introduces the idea of asking 'genuine questions', when engaging in creative experiences.

Moving through the design Process might involve asking the following questions or making the following decisions:

ASK: What is the problem? What have others done? What are the constraints?

IMAGINE: What are some solutions? Brainstorm ideas. Choose the best one.

PLAN: Draw a diagram. Make lists of materials you will need.

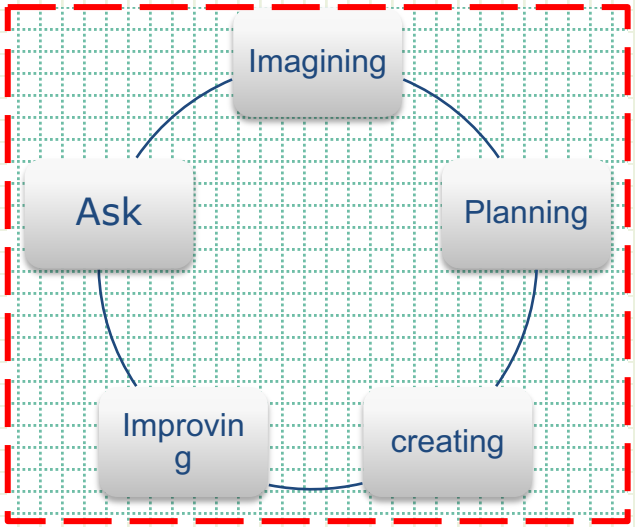
CREATE: Follow your plan and create it. Test it out!

IMPROVE: Talk about what works, what doesn't, and what could work better. Modify your design to make it better. Test it out!

(Cunningham & Hester, 2007, p. 5)

Engineers, design technologies using an understanding of science, technology, art and maths. Young children are engineers in the sense that they modify the world to satisfy their own needs and wants.

I wonder what will happen if?
What else could we use?
Do you have any other ideas?
How are they alike, different?
How could we make it work?
How could we work together to solve this?
How did that happen?
How did you feel when you finished it?
How did you know that? How did you work it out?
Tell me about how you worked together.



•Kaiako understand the contribution that technical knowledge and knowledge of artistic processes play in enabling tamariki to reach their creative potential. Importantly, they embed these in the everyday experiences and activities they offer, rather than leave them to chance.
•https://tewhariki.tki.org.nz/en/teaching-strategies-and-resources/arts/

Lee-Anne Turton 5/10/18
Celebrating Northlands Tamariki

Loose Parts: provide an opportunity for 'self-chosen, uninterrupted, imaginative play.'

Consider how you make connections to the children's lived experiences:

- How do we set the scene for play?
- Making space and time for children to develop their working theories with the tools they have at hand.
- When we take a close look at our learning environments we begin to make intentional decisions about provisions for play.
- Considering space, time, resources, the teachers role and how children are provided freedom to truly BE!

The Theory of Loose Parts: The theory of loose parts has begun to influence child-play experts and play environment designers in a big way. It was first proposed back in the 1970's by architect Simon Nicholson, who believed that it is the loose parts in our environment that **empower our creativity**.

What are Loose Parts?

In an early childhood environment, loose parts are materials that can be moved, carried, combined, redesigned, lined up, and taken apart and put back together in multiple ways. They are materials with no specific set of directions that can be used alone or combined with other materials. **Loose parts can be natural or synthetic**. In an early childhood outdoor environment, we can provide a range of loose parts for use in play: stones, stumps, gravel, fabric, twigs, wood, pallets, balls, buckets, baskets, crates, boxes, logs, rope, tyres, cardboard tubes, cable reels, tree stumps and many more

There are many reasons why play spaces should include a multitude of loose parts, including:

- Loose parts can be used anyway children choose
- Loose parts can be adapted and manipulated in many ways
- Loose parts encourage creativity and imagination
- Loose parts develop more skill and competence than most modern plastic toys
- Loose parts can be used in combination with other materials to support imagination
- Loose parts encourage open ended learning.

Loose parts encourage problem solving, perseverance and cooperation.

Algebra and algebraic reasoning in early childhood:

By breaking down algebra into its basic concepts— patterns, symbols, and relationships between concrete materials—they show how even the youngest children can begin to grasp concepts of concrete algebra and algebraic reasoning, significantly increasing their odds of success in other courses later on and in life.

Algebra vocabulary includes pattern, repeating/ following pattern, the same pattern, different pattern, and growing/extending patterns.

Science in Early Childhood

Engagement with quality science learning experiences is vital to help children understand the world, collect and organise information, apply and test ideas, and develop positive attitudes toward science.