

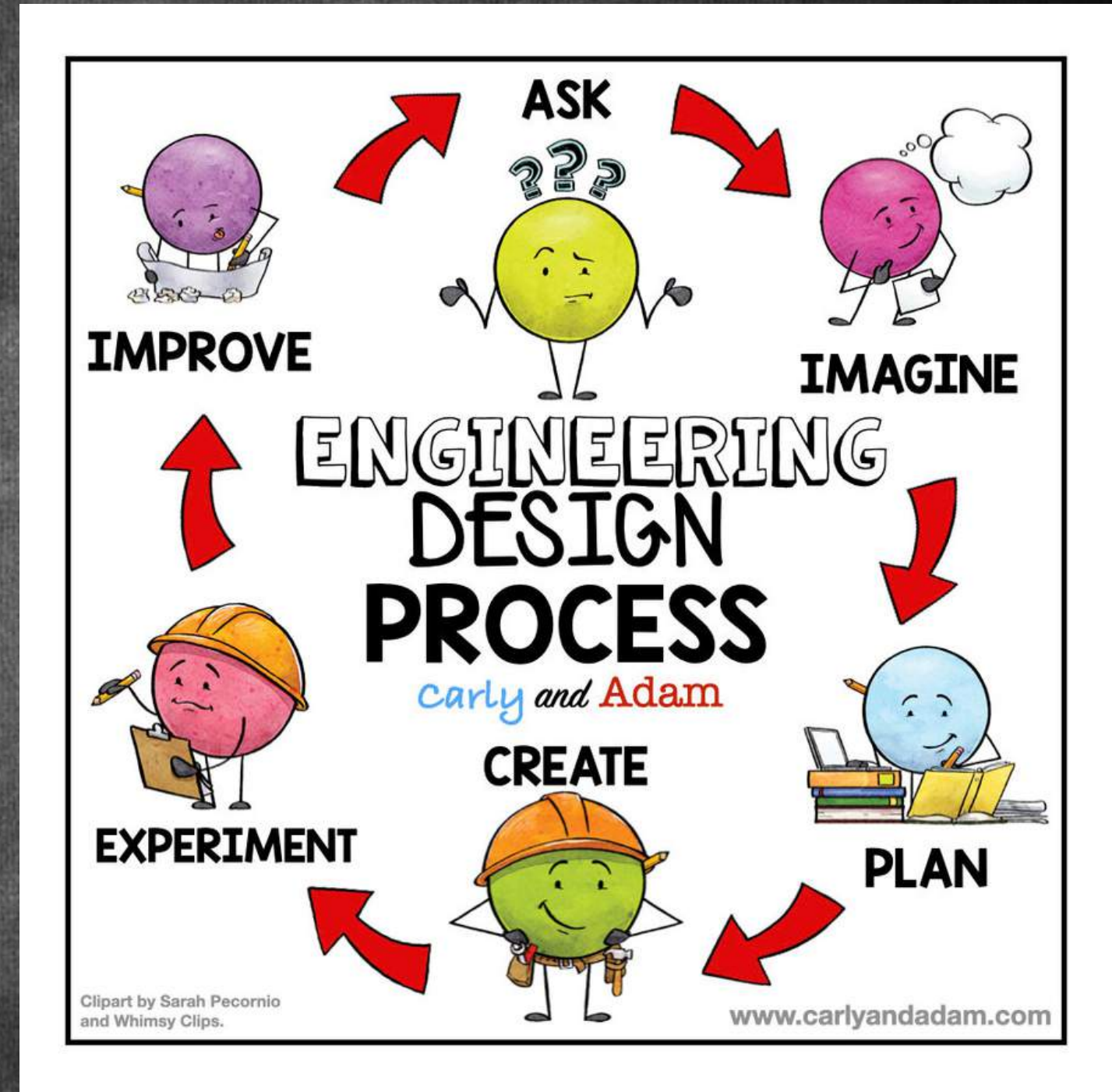
# PEDAGOGICAL DOCUMENT LEARNING ENGINEERING

Lisna Oktaviani

# ENGINEERING PROCESS IN EARLY CHILDHOOD

Ask and imagine:

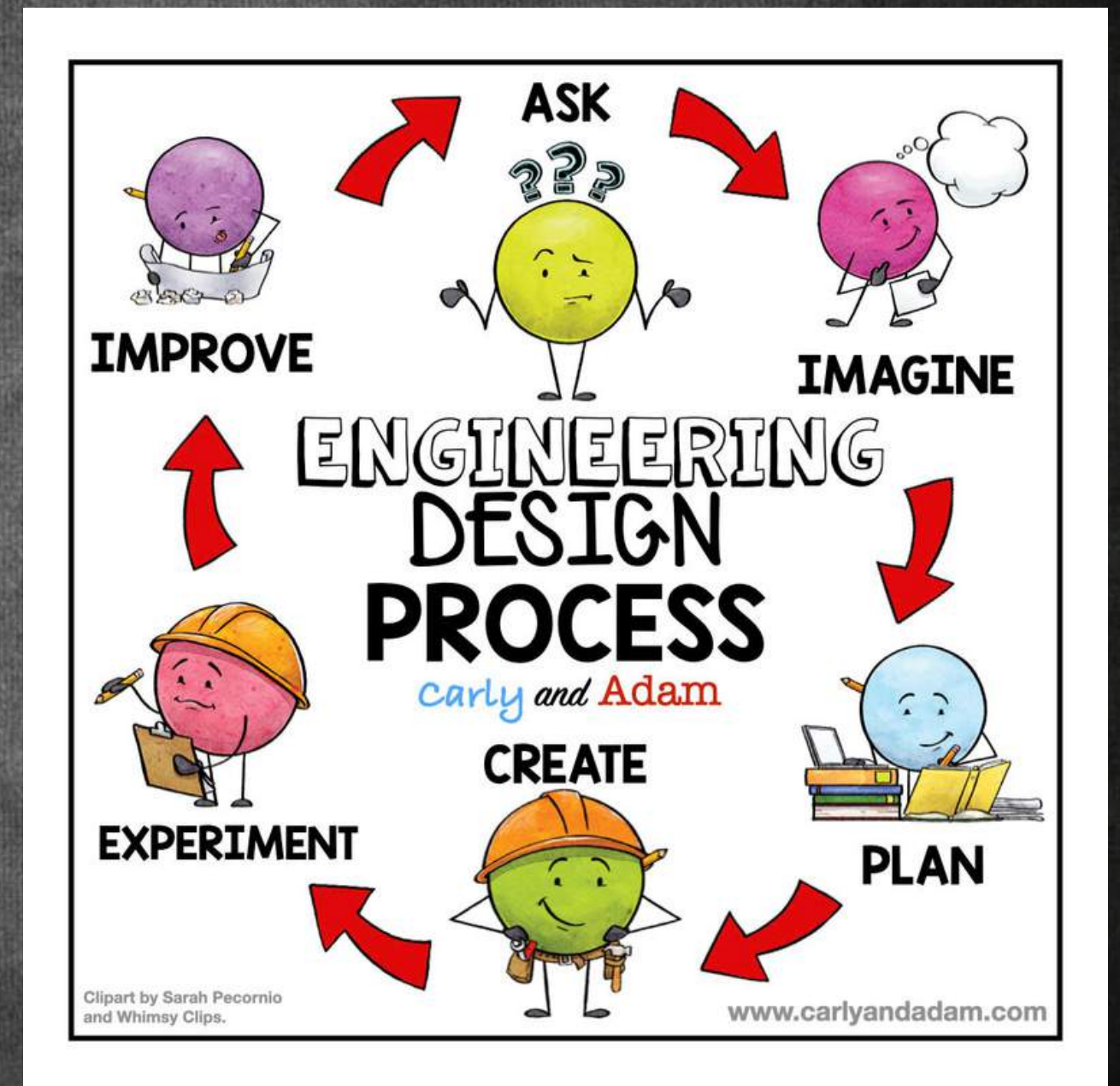
Encourage children's curiosity by motivating them to inquire and imagine responses to real-world challenges they face. This encourages imaginative thinking and critical thinking from a young age.



# ENGINEERING PROCESS IN EARLY CHILDHOOD

Plan and Create:

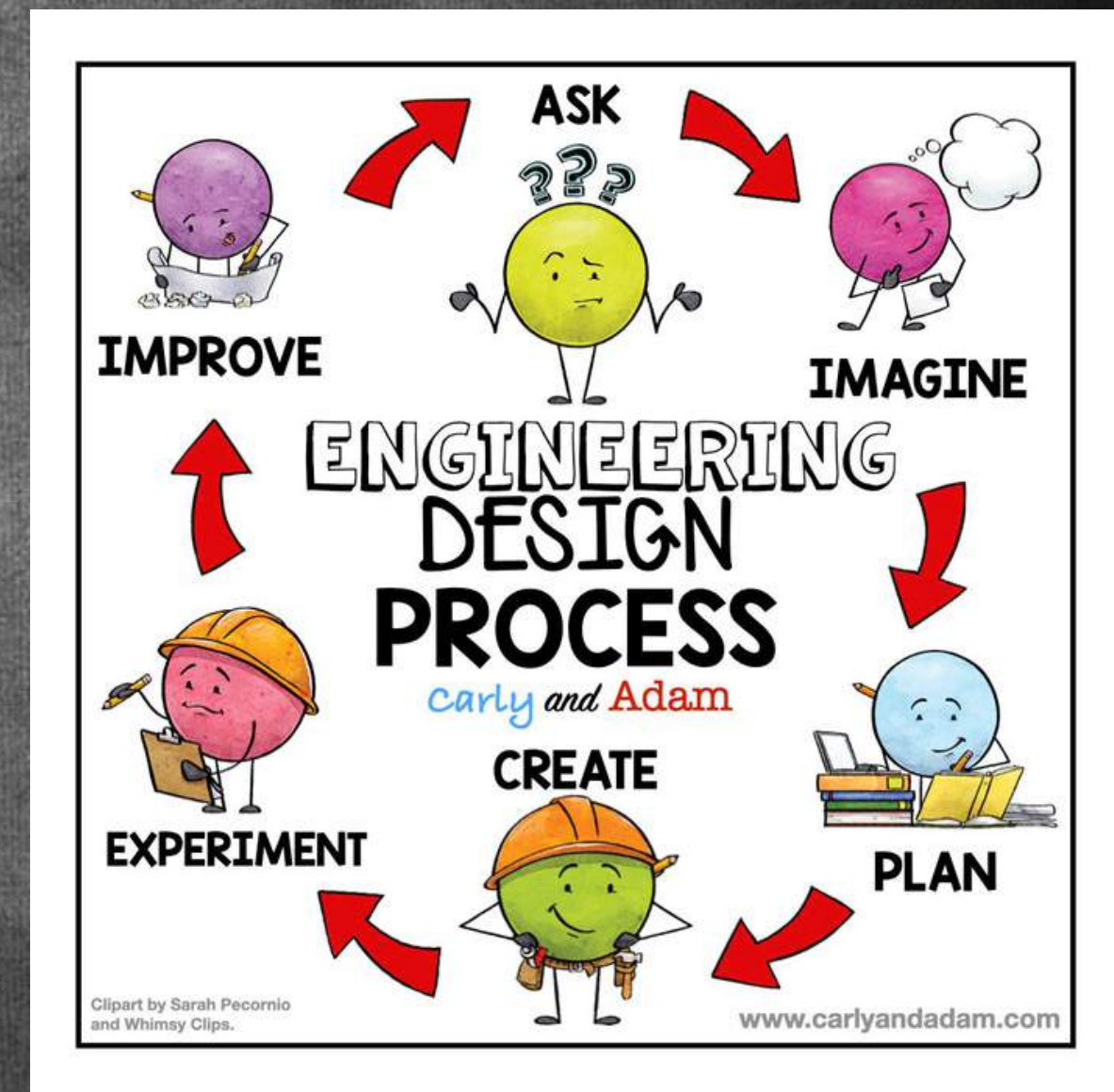
Help children plan and develop their responses, utilizing a range of resources and methods to bring their thoughts to life. This hands-on method encourages spatial thinking and motor skill growth.



# ENGINEERING PROCESS IN EARLY CHILDHOOD

Experiment and Imagine:

Allow children to experiment using their inventions, testing new approaches and improving their designs depending on what they discover and have experienced. This recurrent process fosters resilience and endurance as children learn via trial and error.



# ENGINEERING PROCESS IN EARLY CHILDHOOD

**Link to Early Childhood:** This engineering cycle coincides with children's innate sense of wonder and imagination, resulting in a well-suited foundation for early childhood education. Children lay the framework for potential academic achievement and lifelong learning by participating in hands-on experiments that encourage creativity and reasoning.

# LEGO-CONSTRUCTION

A small group of children had gathered around a massive pile of LEGO bricks. They are excitedly selecting bricks and assembling them to form their own unique buildings. Some children may construct tall buildings, while others may concentrate on designing complex shapes such as animals or cars. Their imaginations run wild as they discover the limitless possibilities of LEGO construction



# DOMINO EFFECT EXPERIMENT

J.O has a strong interest in constructing, particularly X-shaped wooden structures. He considers how to use the numerous X-shaped wooden pieces as toys. J.O runs this activity on a round table, developing strategies for experimenting with the wooden pieces to create a domino effect. He places them at regular intervals and tries to knock down the wooden X at the beginning position. Some parts fall properly, whereas others do not. He experimented with the spacing between the wooden pieces until he found the optimal distance to fall all of the wooden X pieces.



# DOMINO EFFECT EXPERIMENT



J.O appears to be intensely focused, but he truly likes the process. It is clear that J.O has great problem-solving abilities and appreciates cognitive activities. Despite the challenge of making the wooden X fall, he keeps going, trying with persistence. After finding the best strategy, he arranges the dominoes in a long line using all of the available wooden X pieces.





# Building the Train

Children create a train rail construction from the materials provided. They collaborate to design and build a track that can accommodate the motion of vehicles toy. They consider the configuration, bends and elevation of the circuit. Children acquire the ability to overcome problems that arise over their construction process.

# Building the Train Rail



After the train rail has been made, children can test it with vehicles. They monitor how the vehicles go around the track and identify any areas for improvement. They talk about the ways they can improve the track's functioning and stability.

# Building the Racing Car

Play-based construction with varied materials such as cardboard, ramps, and blocks. This activity improve spatial reasoning and fine motor skills. Children are talking to each other to plan their race tracks, like materials, elevation or heights, and trials test.





# Building the Racing Car

Children make a plan to construct the racing tracks, they use rolling cardboard. They use their imagination and their knowledge about gravitation. They work as teamwork to solve problem they found in making the tracks.



# Building the Racing Car

They are very serious to test their racing track. They change the elevation to different height and measure the speed. They experiment which elevation produce the fastest speed.

The session ends with testing the tracks, discussing accomplishments and areas for development, and sharing creations.

# Building with Magnetic Tiles



Children organize items by size, form, and colour, constructs towers of four or more blocks, and replicates complicated structures using magnetic tiles/blocks blocks. They play individually or in groups, play together, take turns, and share. Children use magnetic tiles to build constructions with multiple blocks through attract and repel.



**Children are able to explore the tiles, testing their magnetic characteristics and exploring how the magnet connect to each other.**



**They conceive a variety of structures, such as houses and abstract shapes.**



# **Building with Magnetic Tiles**



# Building with Magnetic Tiles

Children are working together to create a long rail of tiles, they prefer to bend it instead of making it a straight line so they can use the space.



# Food Construction

This activity is intended to give children an opportunity for exploring their senses and creativity as they participate in a collaborative construction exercise. Using fruits and spaghetti as construction supplies, children will acquire fine motor abilities, hand-eye coordination, and awareness of space in an enjoyable and participatory manner.



- Children will learn how to solve problems as they explore different ways to build solid buildings out of fruits and spaghetti.
- Children are going to participate in collaborative play to improve their collaboration and communication abilities.
- Children will improve their ability to use fine motor skills by properly threading spaghetti into fruit pieces and managing them to form stable structures.

# Food Construction

Children are given a variety of fruits (such as apples, grapes, and strawberries) and raw spaghetti. They are collaborating in small groups to build various constructions with fruits as components and spaghetti as connectors.





# Food Construction

J.O was very excited, he also demonstrated passion and participation. He positively cooperated with their friends, demonstrating ingenuity in constructing their fruit creations and improving his fine motor abilities by threading spaghetti through the fruit pieces.

**Thank you**