

Suitable for
3-7 years

- ✓ Solo
- ✓ Pairs
- ✓ Groups

Diane's activity

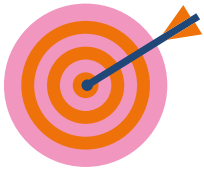
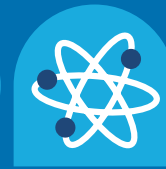
Introducing engineering

How to guide



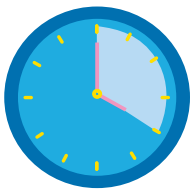
Diane's activity

Introducing engineering



Aim

In this activity the children will take on the role of a Quality Engineer. Can the children help engineer a solution for the farmer to water his crop by engineering the way through a maze and then designing the solution to delivering some sweets from the factory to the school, engineering a solution around some obstacles/challenges.



Timings

- Maze and design activity can be undertaken as a smart board activity or individually as a handout.
- Handout Activity – 30-45 minutes.



Materials and equipment

- Electronic or Paper Version of Maze and Sweets Delivery activity

Books (optional)

- **Problem Solving Ninja** – Mary Nhin
- **Ebony the Engineer** – Kid Problem Solver – Ebony Martin

Facebook (optional)

- [Ebony the Engineer Kid Problem Solver](#)

Extension Activities

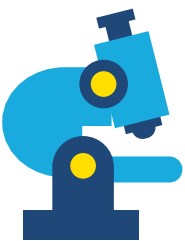
- Paper, Card, Cardboard, Building Blocks, Sand, Playing cards

- Small sticks
- Sandcastle Buckets
- Small stones, shells



Instructions

- Work with the class on either a board or using the handouts to engineer solutions to the problems of (a) getting water to the crops (food plants) and (b) the sweets to the class
- Discuss with class different types of engineering – Quality Engineering (Using engineering to find the reason why something is not working properly and helping to find a way to fix it), etc.
- Useful link to definitions of different types of engineering: [What is Engineering? – Definition and Types - TWI](#)



How does it work?

Quality engineers work with lots of different types of engineers to find the answers to why something is not working the way it should – think of some of your toys/games. What happens when they don't work, how do you fix them? Using engineering, e.g. check if the batteries need changing, check if something is stuck in your toy.

Quality engineers work on problems that have happened to help fix the problem, and also before the problem has happened to see what might go wrong and apply engineering to stop it happening.

When you are looking for an answer, do you ask your teacher or grown up “**Why**”. This is a key question in quality engineering.



Extensions

Can you think of something else that needs to be solved in the classroom/nursery? Often an engineer will start by identifying a problem. The Explore phase of the engineering design cycle is about identifying problems– who or what needs help and why? This phase also involves finding out more about the problem and thinking about lots of different ideas.

Using material that you have available think about how the children can engineer solutions to:

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1. Make a house from cards

Instructions

- How can the house be made as tall as possible, how can you make it strong enough to stand up for a long time.
- Set out a variety of cards of different shapes, sizes, materials and thicknesses.
- Build an example structure to illustrate the idea.
- Challenge the children to build a house of cards as tall as possible.

Questions and prompts for activity

- What is the best way to build the different levels – do you just build it up on top of each other or is it best to build side by side before building up?
- What material should you use to make it strong – paper, card, plastic?
- What happens when you change the thickness, is thick paper better than thin.
- Is there any other way of making the section strong – tape cocktail sticks to the sheet, etc.

2. Fix a tower that keeps falling over

Instructions

- Set out a variety of building materials.
- Build a wobbly tower.
- Challenge the children to fix the tower You can then ask them to work in pairs or small groups with one child building a wobbly tower and the others try to fix it.

Questions and prompts for activity

- What happens when you change the shape of the building pillars.
- What material is best to build with – Paper, Cardboard?
- What happens when you build it on a different surface – Carpet, Floor or Table? To explore this further try our building on sand/flour activity by Moh.

3. Make a sandcastle

Instructions

- Set out some sand, sandcastle buckets, stones and shells.
- Challenge the children to build a sandcastle and think about why the sandcastle sometimes turn out well and why sometimes it crumbles.

Questions and prompts for activity

- What is the best material fine sand or rough sand?
- Can you make a castle with other materials in your bucket?
- How can you make a door in the sand – what would you need to support?
- Is there anything that you can add to make it stronger once built – Stones or shells around the outside.
- What happens if you have small or big sandcastles – are the stronger or more weak.



Experiences and Outcomes

Health and Wellbeing

- I can describe some of the kinds of work that people do and I am finding out about the wider world of work. HWB 0-20a / HWB 1-20a

Mathematics

- I am developing a sense of size and amount by observing, exploring, using and communicating with others about things in the world around me. MNU 0-01a

Technologies

- I explore ways to design and construct models. TCH 0-09a
- I can design and construct models and explain my solutions. TCH 1-09a
- I can recognise a variety of materials and suggest an appropriate material for a specific use. TCH1-10a
- I explore and discover different ways of representing ideas in imaginative ways. TCH 0-11a
- I can explore and experiment with sketching, manually or digitally, to represent ideas in different learning contexts. TCH 1-11a
- I explore a variety of products covering a range of engineering disciplines. TCH 0-12a
- I explore and discover engineering disciplines and can create solutions. TCH 1-12a