## Overview

In this activity, your child/children create a simple model and then take photos to create instructions (an algorithm) for others to try and recreate their model. By removing one block at a time, they are decomposing the problem into manageable steps.

### Concepts:

**Algorithms**      **Decomposition**

**Age group:** 5 – 11
**Duration:** 15 – 45 minutes

### Materials you will need:

☑ **Building bricks** or something to make a small model

☑ **Device to take photos** or drawing materials

☑ **Block-building algorithm example photographs sheet**

## What will your child/children learn?

**Algorithms –** An algorithm is a precise sequence of instructions, or set of rules, for performing a task.

**Decomposition –** Decomposition is the process of breaking down a task into smaller, more-manageable parts. It has many advantages. It helps us manage large projects and makes the process of solving a complex problem less daunting and much easier to take on.

The behaviours **creating, persevering, collaborating** and **tinkering** (changing things to see what happens), are approaches to learning that are encouraged throughout our home activities.

## Getting started

1) Explain that they are going to design their own simple model using small building blocks and then create the instructions for someone else to make the same model.

2) Explain that they are going to take their model apart, step-by-step, taking photographs of each step. They will be creating clear instructions for someone else to follow so they can build the same model. You may wish to demonstrate this process first.

3) Explain: An algorithm is a sequence of instructions to get something done.

# Their turn

**1)** Give your child/children a set of ten random building blocks. Give them time to create a model using their set of blocks.

If appropriate, explain to them that they are using decomposition as they break down the task of building their model into small steps.

**2)** Once finished, they should photograph the completed model, using a digital camera or tablet. They should then take one brick off their model and re-photograph the model plus the removed brick next to the model.

Repeat the process until all of the bricks have been removed – each time they should just include the last removed block and clear away the rest.

# ...next

**3)** Upload the photos to a computer and add to suitable software, or add to an appropriate presentation or image app on the tablet. This could be done in a simple word processing document eg Word or Google docs.

**4)** Ask your child/children to arrange their pictures in the reverse order that they took them in, so that they start with the photo of two blocks and end up with a completed model. They should label the pictures in numerical order.

Once they have finished, ensure they save their work. Your child/children should then give their algorithm (either printed out or displayed on the tablet or computer) to someone else to follow to recreate the model.

If you don't have access to either a camera, computer or image software then the same can be done by drawing pictures of the steps on separate squares of paper so they can be re-arranged.

# Time to talk

**1)** Explain that they are using decomposition as they break down the task of building their model into small steps.

**2)** Explain that the instructions they have made are algorithms – a precise sequence of instructions for performing a task.

# More ideas

- Try to write the instructions rather than just use photographs. Provide a completed model and an algorithm to build it so that it includes an error or a mistake. Can they debug the algorithm? You could discuss more examples of decomposition, e.g. how can they break down the task of getting ready for school into smaller parts (having breakfast, having a wash, brushing teeth, getting dressed etc).
- Create an algorithm to enable someone to recreate a simple drawing such as a house or a smiley face.