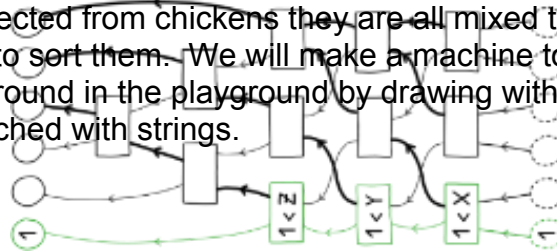


## Outdoor Learning, STEM

Learning experience	
Computational Thinking – The sorting eggs network	
CfE Level - First	
Experiences and Outcomes and associated benchmarks/skills	
<p><b>E&amp;Os</b> TCH 1-15a I can demonstrate a range of basic problem-solving skills by building simple programs to carry out a given task, using an appropriate language.</p>	<p><b>BMs/Skills</b> Simplifies problems by breaking them down into smaller more manageable parts. Constructs a sequence of instructions to solve a task, explaining the expected output from each step and how each contributes towards solving the task. Constructs a sequence of instructions to solve a task, explaining the output from each step and how each contributes towards solving the task. (Identifies when a program does not do what was intended and can correct errors. Evaluates solutions/programs and suggests improvements.) If taking it further.</p>
Overview of learning experience	
Pupils will create a super computer in the playground to sort numbers into a numberline. The context for this could be sorting eggs (easter link) into sizes so they can be boxed as medium or large eggs.	
Outline of learning	
<p><b>LI/SC</b> I can follow instructions to create a super computer. I can use a super computer to sort numbers from small to large. I can explain how a super computer could be used to sort eggs into sizes before boxing.</p>	<p><b>Resources</b> Chalk or String Laminated number cards (choose complexity of numbers depending on class level of work) Could be numbers 1-6 or <math>\frac{1}{2}</math>, <math>\frac{1}{3}</math>, <math>\frac{1}{4}</math>, <math>\frac{3}{5}</math>, <math>\frac{8}{10}</math>. A box of medium and a box of large eggs.</p>

### Description of learning experience and assessment opportunities

Explain that when eggs are collected from chickens they are all mixed together in size. A machine must be used to sort them. We will make a machine to do that. Construct this network on the ground in the playground by drawing with chalk or laying out laminated boxes attached with strings.



1. Organise students into groups of six. Only one team will use the network at a time.
2. The current team should stand on the circles at the "input" end of the Sorting Network.
3. Give each of the six students a card (number on an egg shape) to hold (initially use the set of cards containing the numbers from 1 to 6; the cards should be given to the students out of order). These cards are the inputs into this cool chalk computer (this is a special kind of computer that can process several operations at the same time).
4. Get the first two students to follow the lines from their circles until they meet at a box (the others should pay attention).
5. When the two have entered the box, they should say "Hello" to each other (this is to make sure that they stop and both engage in this step), and then compare cards to decide who has the lower number and who has the higher number.
6. The student with the lower number should follow the line out to the left and go to the next box, while the person with the higher number follows the line leaving to the right to go to the next box.
7. Now get the next pair of students to do the same, meeting at a box and leaving it with the smaller to the left and the larger to the right.
8. You can now get the remaining pair of students to do this (remind them to say hello when they meet).
9. Once they have the idea, tell them to repeat this process until they get to the end of the network. If someone gets left behind, have the students go back to the beginning; they will need to pay attention when they meet at a square, and ensure that both people who have met know the outcome.
10. When they have all reached the circles at the other end of the network have them turn and face the starting circles and read what's on their card, from left to right. They should be in the correct order from smallest to largest; if not, they may need to try again and work more carefully.
11. When each group has been through the Sorting Network, introduce a Sorting Network race to see which group can successfully complete the task in the shortest amount of time (either with two Sorting Networks racing

teams at the same time, or one network with the times measured using a stopwatch).

Discuss how this computer may speed up the process for sorting eggs rather than doing it by hand. What other parts would this machine need to sort the eggs? (a measuring device to assign each egg a number, soft grips or channels to ensure the eggs don't break etc.)

#### Consideration of risk

The surface of the playground could be uneven so consider if this is suitable for racing on.

If using string this could be a trip hazard if pupils are to move at speed, warn pupils to be careful of this.

Chalk could wash away so be wary of the weather forecast.

#### Taking it further – what else could you do?

Increase the complexity of number cards to be sorted ie fractions or larger numbers. Or numbers with decimals.

This could be used to sort anything, months of the year, days of the week, stages in a plant life cycle, stages of the moon, plot in a book, instructions for a task.

Create a deliberate mistake in one of the paths of the network and get the pupils to try to fix the error.