

Get It Sorted: Bubble Sort Algorithms

LESSON OVERVIEW

This activity introduces the topic of 'bubble sort' and what it is. It also shows how everything computers do involves follows instructions written by computer programmers.

LESSON OBJECTIVES

Students will:

- Understand what 'bubble sort' is when learning about algorithms
- Know how software is programmed in computing devices to carry out functions

MATERIALS, RESOURCES AND PREPARATION

- L5- Get It Sorted Activity Sheet
- L5- Get It Sorted Number Cards Sheet
- Pen/ Pencil and stopwatch/ timer
- Paper for your partner to keep a tally of the number of moves you make.

LESSON SEQUENCE

Computers don't just automatically know how to do things – they need software programmed for them by people. A mobile phone, for example, has software installed to tell the on-board computer how to carry out different functions. This includes running the menus, digitising your voice to transmit it, and even playing music or games.

The software breaks down these functions into individual tasks, each of which is processed by a particular **algorithm**.

Discussion In computer science terminology, what do you think 'bubble sort' might be? (5 mins)

Bubble sort is a 'sorting algorithm' which really just means that it is a set of computer instructions that sort items into order. Examples include sorting **emails** (newest-oldest date or read-unread), a **contacts list in your parent's mobile phone** (alphabetical order, first name, last name) and an **online dictionary** (alphabetical order, most closest synonyms/antonyms first). The downside of bubble sort is that it isn't very fast.

Activity

Your next step is to carry out a bubble sort activity of your own.

1. The aim of the bubble sort activity is to try and get from **start** to **finish** position, in as little time

as possible and whilst ordering the cards from low-high.

2. You can only swap one pair at a time. An example of how bubble sort would work is shown below (blue digits are the only ones moving at any one time-an adult or older sibling may

8 5 6 4	8 is bigger than 5 so swap	5 8 6 4
5 8 6 4	8 is bigger than 6 so swap	5 6 8 4
5 6 8 4	8 is bigger than 4 so swap	5 6 4 8

Repeat!

5 6 4 8	5 is smaller than 6 so no swap	5 6 4 8
5 6 4 8	6 is bigger than 4 so swap	5 4 6 8
5 4 6 8	6 is smaller than 8 so no swap	5 4 6 8
5 4 6 8	5 is bigger than 4 so swap	4 5 6 8

Array is sorted Stop!

need to help you with understanding this)

3. Your turn- Cut out the 9 number cards 0-50 and to ask somebody shuffle them up for you (L5- Get It Sorted Number Cards Sheet). The 3 spare grids are for you to play with a partner or for you to choose your own number cards.
4. Place them upside down and pick 6 cards. Place them right side up on the start line of L5- Get It Sorted Activity Sheet. Make sure you put them straight down in the order you picked them- no ordering at this stage. Ask your partner to keep a tally score of the number of moves you make.
5. Using a 'stopwatch' or even a 'timer' on a mobile device, see how fast you can go from start to finish.
6. Try 'bubble sort' again, but this time from high-low and the aim now is to beat your previous timing by playing 'beat the clock!'
7. If you wanted to, you could adapt this, by printing out 2 copies of the bubble sort sheet and number cards, and play with a sibling.

Who can get there fastest and what problems did you encounter along the way?

Happy Playing!