Algorithms Lesson Plan 2

Main focus of activity:

- To introduce the idea of algorithms to KS2 and KS3 pupils

Learning objectives:

- To be able to order simple positive fractions
- To be able to order simple positive negative fractions
- To be able to work effectively as a team.
- To be able to effectively follow instructions

Links to curriculum: Links to the maths curriculum are as follows

- Positive and Negative Simple Fractions
- Multiples

Activity outline:

Introduction

- The students are split into groups and must work collaboratively to order the numbers in ascending order.
- The activity can be introduced via the flipchart where a slimmed down version of one of the algorithms is in place.
- Pupils need to work together to correctly make the decision at each iteration of the algorithm. Where some pairs of students work out the answer quicker than others they are allowed to help other pairs of students. Where necessary pupils are expected to show there working out on paper (or mini-whiteboards) to prove that they have not just guessed.

Starter

Put the fractions in order from smallest to biggest. This activity allows teachers to access prior knowledge and to establish start points before deciding on which input values to use. *There is an explanation of 2/6 or 3/8 on the IWB resource.*

Main

The algorithm is set up for 6 people (In a class of 30 some pupils will obviously need to go more than once). This will need to take place in a large indoor or outdoor space and requires considerable preparation time.

See resource pack for cards – these should be laid on the floor using arrows to connect input and nodes. Pupils can copy the diagram from the Whiteboard resource. Give the pupils 6 fractions which they can hold on a piece of paper each. You can choose from any of the list below depending on your pupils' abilities.

The input values are shown below.

1) Set of fractions . (one half, one sixth, five sixth, three twelfths, two thirds, three quarters)
2) 6/50, 3/5, 4/10,10/25,4/20,3/100

3) 1/7, 3/11, 4/10, 5/8, 4/9
4) 2/1/5,2/1/11,3/1/6, 3/4/7, 2/6/10

The pupils will race to see who can correctly execute the algorithm first. It is important to make clear that some pupils cannot race ahead of others as they need to wait for their peers in order to have a number to compare with.

You may want to provide groups with a blank grid to record their working on.

Plenary

If it took 5 iterations to correctly order a set of 6 fractions. How many iterations would it take to order a set of 60 fractions? Discuss with your partner?
Could we do this on paper?

Extension

Challenge pupils to invent their own sorting algorithm with a step-by-step guide that they can share with the class.

You may want to introduce some more advanced sorting techniques to the class with the following resources (please note that these resources are not attributed to LGfL and should be used at your discretion):

1) Algorythmics YouTube Playlist
    a. These videos introduce sorting algorithms through the medium of Gypsy/Romanian folk dancing!
    b. The bubble sort and insert sort are good starting points.
2) Sorting Algorithms Animations
    a. Animations to compare the speed and efficiency of different algorithms