Algorithms Lesson Plan 3

Main focus of activity:

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

Learning objectives:

- To be able to work out simple calculations using BIDMAS
- To be able to apply all four operations using written methods
- 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

- BIDMAS
- Four operations
- Powers
- Brackets

Activity outline:

<u>Introduction</u>

- 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

Work out these calculations and then place them 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.

Main

The input values this time require pupils to actually work out the final answers to calculations. For instance 3+5x7=
This adds a level of complexity to the task and allows teachers to really stretch more able pupils as they can use brackets and powers. Low ability pupils can participate with more able pupils in the same task.

A less able pupil might be asked to evaluate the following: 4+9-7
A more able pupil might be asked to evaluate the following: $5^3+8\text{x}9$

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 BIDMAS

calculations which they can hold on a piece of paper each. Teachers are encouraged to come up with calculations that are specific to their pupils.

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.

If students have created their own algorithm in a previous lesson, they may want to use this instead of the example given.

Plenary

Why are algorithms so important? If we didn't have them how would it affect our everyday lives?

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

If pupils are confident using a variety of algorithms, they may want to do a speed test to compare different techniques.