

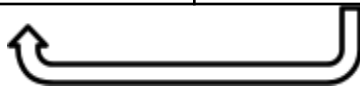
Insertion Sorting Lesson Plan

Sorting is a technique commonly used in computer science to re-organize elements based on a certain variable. This can be size, value, length etc. This activity will allow students to engage in insertion sorting hands on by sorting numbers and/or candy following this algorithm.

It is essential that students are doing their sort one-by-one since this is how the algorithm is completed within the computer. Students will sort the candy based on a corresponding value that will be written on each piece.

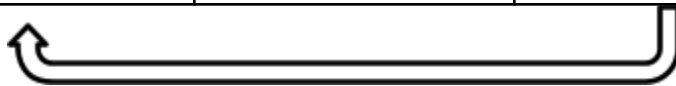
A demonstration of the algorithm can now be given by the teacher. Insertion sorts follow the pattern of picking an element, comparing it to the element directly to the left of it, then replacing that number if it is less than the one we are currently observing. Please see the figure below on sorting from least to greatest. Repeated numbers are placed side by side for as many repeats that exist.

7	4	1	9
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4 is the first number we're observing. Since 4 is less than 7 it will be moved to the left of it

4	7	1	9
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Once 4 is properly positioned we move on to the next number in the set which is 1. We compare this to the element directly to the left which is 7. Since 1 is less than 7 it'll move to the left, then it will need to be compared with 4. 1 is less than 4 again so it will move to the left

1	4	7	9
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The final number we must compare is 9. We take 9 and compare it to the element directly to the left of it once again. Since 9 is greater than 7, it will stay in the position it is currently in. We now have no numbers left in our set to compare so we know the set is now sorted.

In this activity students will follow this sorting algorithm by rolling dice and randomly generating numbers and then sorting these numbers according to the insertion sort algorithm. To begin, place students into groups of two, and give each pair of student two dice. They will roll the dice they are given a total of nine times to create the numbers that they will be sorting. Once all students have two dice and have been given the introduction to insertion sorting, they can begin the worksheet. Students will simply roll their dice and sort the numbers from smallest to largest as they go, inputting their numbers on the blank lines. They will collect points based on how many switches they make for each number, or how many places they move each number.