Worksheet Activity: Sorting Weights

Aim: To find the best method of sorting a group of unknown weights into order.

You will need: Sand or water, 8 identical containers, a set of balance scales

What to do:

1. Fill each container with a different amount of sand or water. Seal tightly.

2. Mix them up so that you no longer know the order of the weights.

3. Find the lightest weight. What is the easiest way of doing this?
   Note: You are only allowed to use the scales to find out how heavy each container is. Only two weights can be compared at a time.

4. Choose 3 weights at random and sort them into order from lightest to heaviest using only the scales. How did you do this? What is the minimum number of comparisons you can make? Why?

5. Now sort all of the objects into order from lightest to heaviest.

6. When you think you have finished, check your ordering by re-weighing each pair of objects standing together.

Selection Sort

One method a computer might use is called selection sort. This is how selection sort works. First find the lightest weight in the set and put it to one side. Next, find the lightest of the weights that are left, and remove it. Repeat this until all the weights have been removed. Count how many comparisons you made.

Extra for Experts: Show how you can calculate mathematically how many comparisons you need to make to sort 8 objects into order. What about 9 objects? 20?