Several of these solids are likely to have already been created from the various truncations carried out in Idea 77. As these are made students might be told these solids are Archimedean.

Questions about calculating the surface area of the solids and the volumes of the solids will provide the most confident mathematicians with some really 'hard sums' to do!

IDEA 79

TAKE AN A4 PIECE OF PAPER

This idea is about making two open cuboids and comparing volumes. This idea is also described in the ATM publication *Learning and Teaching Mathematics without a Textbook*.

The task described below can be simplified by using rectangular pieces of paper that have integer length dimensions.

Take one piece of A4 paper and fold it into four equal strips, 'landscape' orientation. Make this into an open, top and bottom, cuboid.

Fold the other piece of A4 paper into four equal strips 'portrait' orientation and make a second cuboid.

What are the volumes of each cuboid?

Further questions might be:

- What is the percentage volume decrease between the largest and the smallest cuboids?
- What is the percentage volume increase between the smallest and the largest cuboids?
- Suppose tops and bottoms are added to each cuboid, what are the surface areas of each?
- If we use any size of rectangular paper, say l by w, can the surface areas in the previous question be written in terms of l and w?
- What volumes are gained if we make each piece of paper into triangular prisms?
- What volumes are gained if we make each piece of paper into cylinders?