

1.

## A ball inside a cylinder!

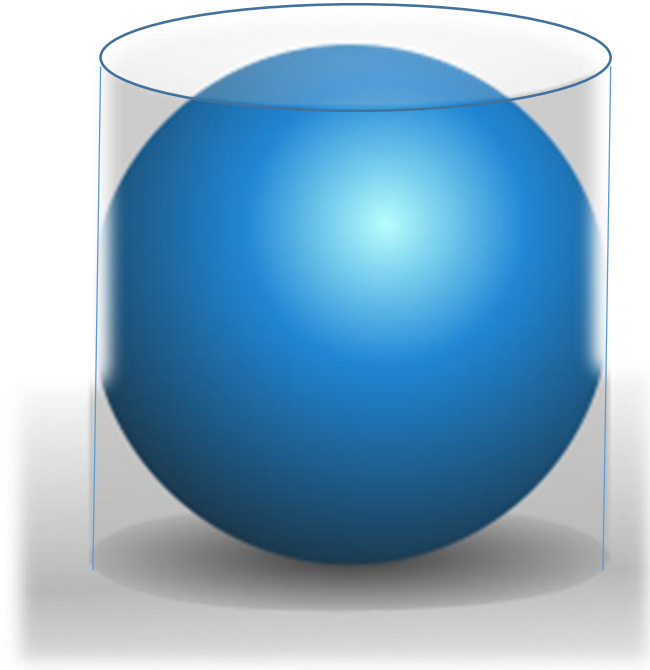
This is a very old problem – Archimedes solved it more than 2,000 years ago. See if you can find out the answer!

*It is possible to calculate the answer but that is a big challenge!*

Imagine putting a ball inside a cylinder or barrel so that it fits perfectly. You have to imagine that the width (diameter) of the ball is exactly the same as the width of the barrel and the height of the barrel.

What fraction of the space inside the barrel is filled by the ball?

The sphere fills exactly  $\frac{2}{3}$  of the cylinder. Cool!



2.

## A Famous Bridge



Where in the world is this bridge and what is it called?

This is to be found in San Francisco, USA. It is the Golden Gate Bridge

What sort of bridge is it?

A suspension bridge – the weight of the road (or deck) is suspended by cables.

3.

**What is this machine and how does it help us make sandwiches?**



A combine harvester. It harvests wheat from which we make flour to make bread for our sandwiches!

4.

What is this thing?

A mobile phone  
mast.



5.



What is this yellow thing called and what is it used for?

It is a spirit level. The bricklayer uses it to make sure she has made the bricks exactly horizontal or vertical.

6.

Why it might be better to use these



In a city to help people to get to work, compared to these?



The question is asking how trams might be better than buses. Reasons include: they are much bigger and can carry more people, they don't get stuck in traffic jams and they are electric so improve the air quality in cities and don't break down very much. People like them enough to stop using their cars, too. Tram networks are very expensive to build, though and, at the moment, only 8 cities in the UK have them. (Manchester, London, Nottingham, Sheffield, Blackpool, Croydon, Birmingham and Newcastle.)