

Literacy

Find out the **roots of words**, and use them to explain concepts.

Eg: Fractions:

'Fraction' means 'to break'

'Per Cent' means 'out of a hundred'

'Denominator' means 'name'

'Equivalent' means 'equal value'

(See if you can find a rational link between 'surd' and 'susurratio'...)

Tell stories: The human element of mathematics comes across most strongly in the words we use to describe concepts and the story of their discoveries.

Is $\sqrt{-1}$ any less real than the reals?

Why did Archimedes streak?

Research

Know your stuff:

Be able to answer: 'Why does that work?', 'What if I use this method?', 'Can't we do it like this?', 'Is this the only way?'

Don't be afraid to say 'I don't know', but follow it with 'yet'.

Before you teach a new topic, learn it inside-out, talk to fellow teachers, try a bunch of exam papers.

Tweet:

Follow some of the thousands of other keen educators out there for dozens of ideas and resources, and be inspired to share your own. Read blog posts, go to the occasional conference, talk to people who are passionate about education.

Share resources:

Upload your own somewhere (TES is a good start if you don't have your own website yet), and browse some compilations such as [Resourceaholic](#) for materials and inspiration.

Memory

For certain topics, there will be a particular question students will always ask. These will vary depending on the examples you use, but chances are, if you teach the same lesson again, the same questions will crop up.

Here's a couple of my most commonly used interesting factoids:

Height of the Eiffel Tower: 301 m

(A penny dropped from there won't kill you – after 15 metres it reaches its terminal velocity of around 25mph.)

Radius of the Earth: 6370 km

(A journey through the centre via a frictionless tunnel would reach the other side in 42 minutes.)

Speed of a bullet: 200 to 1500 m/s

(A bullet fired horizontally falls downwards just as quickly as a bullet dropped from your hand.)

Skills

Make use of the following pieces of software:

Quick Tip: press Alt and = in Word or PowerPoint for Equation Editor!

Excel:

- Quickly analyse data, organise class lists and plan lessons. Use [Ozgrid](#) to learn new things.
- Make a budget in class, modelling 'real' algebra by writing useful formulas with them.
- Make your own custom self-marking homework for students.

Eg: Students find their own cuboid at home, enter the dimensions and the surface area and volume, to get it automatically checked for them: [Surface Area & Volume](#).

- Use the functionality of Excel to allow students to perform their own investigations

Eg: [Area & Perimeter of Polygons](#), approaching circles or [FlightPath](#), using parabolas.

GeoGebra:

- Intuitive, versatile and (importantly) completely free program: <http://www.geogebra.org>
- Sketch graphs, create loci, draw vectors, construct geometric shapes. Like a graphical calculator, but so much faster and easier to use. Great with an interactive whiteboard, too.

At A-level, [play with normal distribution](#), [introduce calculus](#), [illustrate kinematics problems](#)...

- Loads of great resources to get you started on dedicated site: <http://www.geogebraTube.com>

Stretch

Make time to learn new things:

The more you learn and the more you challenge yourself in your subject, the better you'll become at supporting your students as they learn.

A few suggestions to get you started:

[MIT Courseware](#) [ViHart](#) [Numberphile](#)
[XKCD What If?](#) [GeoGebraTube](#) [QI](#)

Do some one-to-one tutoring:

People who understand maths *and* can explain it are in short supply. If you're well organised with your time, it's a great way to build confidence with a new topic. If you want to teach A-level Further Maths some time, work through FP1, do some exam papers, then *tutor someone* through it!