

Using History to Teach Mathematics

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Abstract

Students today need to be taught not only the real life context of their mathematics lessons but also the historical context of the theory behind their mathematics lessons. Using history to teach mathematics, makes your lessons not only interesting but more meaningful to a large percentage of your students as they are interested in knowing the who, how and why about certain rules, theorems, formulas that they use everyday in class. Students are captivated by learning the history behind mathematicians, rules, etc. and therefore can link the lesson to something in history and a concept. Even learning the mathematics behind historical events motivates and interests them. They cannot get enough!

Introduction

How do we get our students interested in learning mathematics? There are countless times that I have dealt with students who have stated that they “didn’t like maths”, “couldn’t understand why we need to ‘do’ maths” etc. I have even taught very bright students who have a natural ability in mathematics who “didn’t like it”. How do we help them to understand that mathematics can be fun and, hopefully, encourage them to enjoy it? The two major questions I felt needed to be asked were: What do students need/want to know? and How do we, as educators, make it interesting?

I first thought about this problem and asked myself what I found interesting and enjoyable about Mathematics. I have always regretted not taking up history during my high school years, although the essay aspect would have killed me! I have had a keen interest in history and I thought that maybe we could link both mathematics and history, to begin with, especially when we have national curriculum that encourages the teaching across the curriculum.

What use could using history to teach mathematics be? I know that we have all taught about Roman Numerals and how the number system changed throughout the years, but what about bringing into our teaching of the mathematics the answer to WHY?

Why is it that we have a ‘number’ zero? Why do we use x’s and y’s to represent variables in algebra? Why did **that** mathematician come up with **that** theorem?

Where is/has that mathematical concept been used?

One method of “Using History to teach Mathematics” involves telling the class small stories from maths history books or using class activities that can really engage the students at any stage within a lesson. For example, in a year 8 (12/13 yr old students) classroom, we were beginning a unit on algebraic equations, so I asked the class if anyone knew why we used x’s and y’s to represent our unknowns. I could tell that they were thinking “Why would we know something like that?” So I told them the story of Descartes’ first publication. I told them that back in those days, they had a printer who had to use tiles to print out newspapers, books etc and I explained how that happened. I then told them that the publication went to the printer and the printer then contacted

Descartes and asked him if he needed all the y's and z's in the text. Descartes asked why he wanted to know and the printer told him that he didn't have enough z's. Descartes then asked him what letter he had plenty of and the printer replied 'I have plenty of x's' and the rest is history as they say.

You don't have to be someone who has undertaken a history degree. I just started collecting maths history books and read them. Picking out bits of information that I thought I could use in the classroom. I got this small piece of information from a maths history text book. I thought it was just a little interesting and maybe it would work with the students. About a month or so later, I was speaking to a parent of a student in my class and they mentioned the story. The students had loved hearing it. It seems like a pretty small concept, but it also worked in helping me to make their mathematics learning fun!

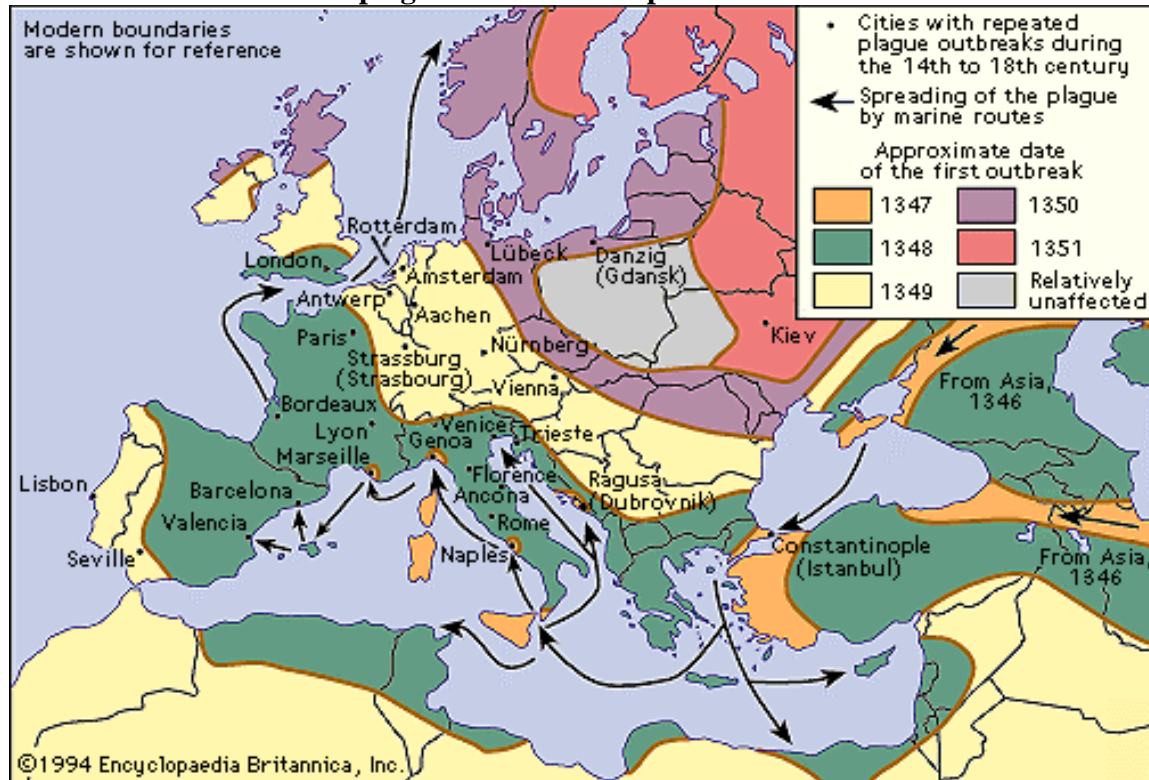
The second method of "Using History to Teach Mathematics" is taking actual historical events and extracting the Mathematics from them. One such example is as follows:

WORKSHEET: The Bubonic Plague

The plague is a disease that was rampant in the 1300's and killed almost 20 million people throughout Europe, this was nearly one-third of Europe's population. It was spread to humans by fleas that lived on Black rats. The plague was around for some time but by the time 1665 arrived, it was rampant in London. The table shows the Number of people to die from the Plague from selected years leading up to the infamous 1665 Plague of London.

<http://www.britainexpress.com/History/plague.htm>

The plague moves in Europe 1347 – 1351



1. Using the map above, calculate the area affected by the plague for each year, commenting on the exponential effect the plague had on Europe.
2. By what percentage did each year increase/decrease?

3. Which year had the biggest percentage increase?
4. What area was 'relatively unaffected'?
5. What is the percentage of area unaffected to area affected?
6. For the whole of Great Britain, England, Ireland, Scotland and Wales, what percentage was affected in 1348?
7. What was the increase in area affected in Great Britain for 1349 compared to area for 1348?

Number of Deaths from the Bubonic Plague, London 1592 - 1665

Month	Year				
	1592	1603	1625	1630	1665
January	123	103	45	0	0
February	94	53	32	0	0
March	87	11	23	0	0
April	140	26	85	0	2
May	200	83	224	0	43
June	1333	362	564	19	590
July	2986	2996	5887	235	4127
August	2404	8922	16455	242	19066
September	1820	12500	9969	310	26220
October	1236	3943	1514	233	14373
November	503	1390	256	133	1414
December	196	160	37	44	0

<http://www.schoolshistory.org.uk/plaguedata.htm>

8. Draw a line graph with all the yearly periods on the same graph. Use an appropriate scale.
9. How many people died in total for each year shown?
10. Which year had the greatest number of deaths?
11. Looking at your graphs, do you see a trend? Give a possible explanation for this trend
12. Looking in particular at the year 1665, where the plague reached epidemic numbers, draw a sector graph showing the number of deaths each month.
13. From your sector graph for the year 1665, what do you notice? Give a possible explanation for this occurrence.

The above worksheet has been written with the idea that a classroom teacher can change it in any way in order to make it easier or more difficult depending on the need of the class they are teaching. As you can see, there are many, mathematical opportunities within such a worksheet and therefore it can be used to help 'extend' the brighter or the more interested students within the classroom.

I also have an interest in coding and cryptography. This topic is one of my favourites and can be used in all areas of Mathematics, especially statistics. It is also a wonderful historical topic that a teacher can manipulate in order to engage young students or older, high-level mathematics students.

Overall, I have found BOTH methods of using History to Teach Mathematics interests students and engages them in your classroom. I do not believe you have to use these methods *every* lesson, but it certainly makes Maths FUN!