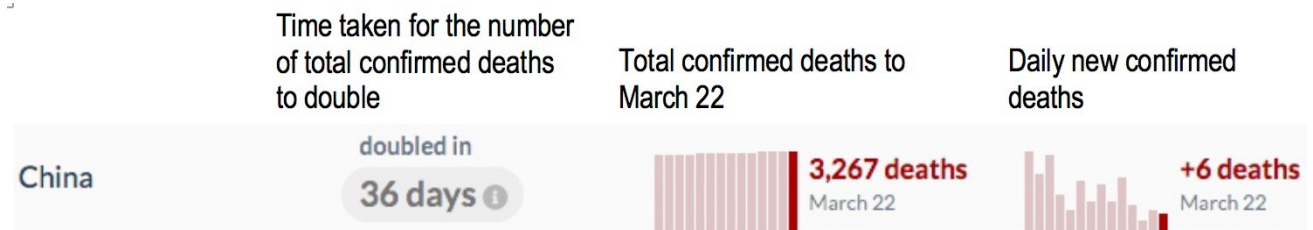


CORONAVIRUS 22/3/20 PASSING THE PEAK



This is not an activity to do on your own. The suggested plan is that you take the discussion points one by one, perhaps one a week, and discuss them in a class at school or at home. You might look at <https://ourworldindata.org/coronavirus> for the latest statistic.

There is an end in sight to this bad news in some countries. We need to look at the graphs for positive signs.

Discussion Point 1: Why do these graphs tell us that the news is not all bad? You had the clue last week in <https://aiminghigh.aimssec.ac.za/coronavirus-13-3-2020> when we asked what was different about the graphs for China and South Korea from the graphs for other countries. What do the graphs above show?

Discussion Point 2: It is 3 months since the first known cases of coronavirus in China and now there are comparatively few deaths each day. What is the mean number of deaths per day in China over the whole 3-month period?

Discussion Point 3: We know that China has a population of over 1,400 million, which is more than 20 times the population of the UK, and more than 24 times the population of South Africa. Can we deduce that there is a good chance that there will not be so many deaths in South Africa and the UK? What about your country?

Discussion Point 4: If we assume that the pandemic will follow the same pattern in other countries as in China and South Korea, then can we deduce that in 3 months the worst will be over and there will be weeks in other countries without any deaths due to coronavirus? What about your country?

HELP

There have been a total of 3267 deaths in China due to the coronavirus in 90 days. What is the mean number per day? Is the number of deaths per day in China going up or down?

NEXT

	Population (nearest million)	Deaths due to coronavirus per day March 22 2020	Deaths on the road per day	Deaths on the road per day per million people	For a person chosen at random give the probability that s/he will die in a road accident in a
CHINA	1439	6	175		
SOUTH AFRICA	68	0	40		
UK	53	56	5		

How do the number of deaths due to the corona virus compare to the statistics for deaths due to traffic accidents? Copy, complete and comment on the data given in the following table.

NOTES FOR TEACHERS

SOLUTION

The mean number of deaths per day in China due to the corona virus in the last 90 days is
 $3267/90 = 36$

	Population (nearest million)	Deaths due to coronavirus per day on March 22 2020	Deaths on the road per day	Deaths on the road per day per million people	For a person chosen at random give the probability that s/he will die in a road accident in a typical year.
CHINA	1439	36	175	0.12	0.00004
SOUTH AFRICA	53	0	40	0.75	0.0003
UK	68	56	5	0.07	0.00003

Diagnostic Assessment This should take about 5–10 minutes.

Write the question on the board, say to the class:

“Put up 1 finger if you think the answer is A, 2 fingers for B, 3 fingers for C and 4 fingers for D”.

The mean average rainfall in December was 3 mm per day.

What was the total rainfall in December?



3 mm



31 mm



93 mm



Impossible to tell

1. Notice how the learners respond.

Ask a learner who gave answer A to explain why he or she gave that answer and DO NOT say whether it is right or wrong but simply thank the learner for giving the answer.

2. Then do the same for answers B, C and D. Try to make sure that learners listen to these reasons and try to decide if their own answer was right or wrong.

3. Ask the class again to vote for the right answer by putting up 1, 2, 3 or 4 fingers. Notice if there is a change and who gave right and wrong answers.

It is important for learners to explain the reason for their answer otherwise many learners will just make a guess.

The correct answer is C

A. This is the mean not the total

B. This is the number of days in December, not the total rainfall.

D. The total divided by 31 gives the mean per day. So the total is $3 \times 31 = 93$

<https://diagnosticquestions.com>

Why do this activity?

This subject is important and topical and it is a good example of the application of mathematics to a real life issue. It provides a basis for discussion of trends that can be seen in the data and also of the mean. It provides data and graphs that give learners practice in interpretation and analysis and learning how to assess them critically.

Teachers can help learners to discuss at a level suitable to their age and maturity, the trends and comparisons that can be made but it only gives a glimpse of what is involved in mathematical modelling. Learners need to appreciate that predictions are based on limited data, assumptions about the future and estimated probabilities.

Learning objectives

- In doing this activity students will have an opportunity to:
- practise analysis and interpretation of data;
- discuss the statistics relating to an important social and public health issue;
- develop their understanding of the value of collecting data and the necessity for careful analysis and interpretation.

Generic competences

In doing this activity students will have an opportunity to:

- **think flexibly**, be creative and innovative and apply knowledge and skills;
- develop the **skill of interpreting visual images** representing situations;
- evaluate, organise, analyse, and interpret information;
- **exchange ideas**, criticise, and present information and ideas to others;
- analyze, reason and record ideas effectively;
- Discuss the need for people **to show consideration for others**, to show social responsibility and to work for the good of the community.

Suggestions for teaching

Start with the Diagnostic Quiz to assess whether the learners understand the calculation of the mean average. You can then guide the discussion according to the age of your learners. If the class has access to the internet then more information can be found on the World Health Organisation (WHO) website.

It is important to discuss these issues during the time when they are in the news and causing widespread concern. A series of these AIMING HIGH lesson activities will be published as the pandemic spreads. Perhaps 30 minutes can be set aside each week to talk about the statistics, perhaps one Discussion Point a week. This would help learners to appreciate a little about how the maths they learn in school has important applications and also it can help them to develop a better general understanding of social issues and data handling.

There have been 12,942 deaths and 335,000 confirmed cases which gives a death rate of 3.9% so this rate has not gone up significantly in the last week. The actual death rate is very much lower because there are many actual cases that have not been confirmed, for example in some countries they are testing only the people who are very sick and need to be admitted to hospital. There is more testing now than a week ago and the WHO advice is Test Test Test. This might be discussed with the class.

Comparing the death rate due to the virus to daily deaths due to **traffic accidents** shows that perhaps people should have less fear. Road accident death rates are very high in some countries but people experience less fear about them. Your group might discuss the thought that, as long as the right precautions are taken, on average, they are relatively safe.

Key questions

- Is the number of deaths per day in China going up or down?
- What do you do with those figures to calculate the mean?
- Why do we need to consider population size when we compare data for different countries?
- Do you think that there will be fewer road traffic accidents during the pandemic? Why?
- If you know the number of deaths per day how do you work out the number per year?
- If you know the actual number of deaths per 1 million people how do you work out the probability that one randomly chosen individual will die in a road accident in a typical year?

Follow up

This is the set of coronavirus lesson activities:

<https://aiminghigh.aimssec.ac.za/years-9-12-coronavirus-13-3-2020/>

<https://aiminghigh.aimssec.ac.za/years-6-12-coronavirus-22-3-2020-passing-the-peak/>

See also: <https://aiminghigh.aimssec.ac.za/years-10-12-epidemic/>

Note: The Grades or School Years specified on the AIMING HIGH Website correspond to Grades 4 to 12 in South Africa and the USA, to Years 4 to 12 in the UK and up to Secondary 5 in East Africa. New material will be added for Secondary 6.

For resources for teaching A level mathematics see <https://nrich.maths.org/12339>

Note: The mathematics taught in Year 13 (UK) and Secondary 6 (East Africa) is beyond the school curriculum for Grade 12 SA.

	Lower Primary Age 5 to 9	Upper Primary Age 9 to 11	Lower Secondary Age 11 to 15	Upper Secondary Age 15+
South Africa	Grades R and 1 to 3	Grades 4 to 6	Grades 7 to 9	Grades 10 to 12
USA	Kindergarten and G1 to 3	Grades 4 to 6	Grades 7 to 9	Grades 10 to 12
UK	Reception and Years 1 to 3	Years 4 to 6	Years 7 to 9	Years 10 to 13
East Africa	Nursery and Primary 1 to 3	Primary 4 to 6	Secondary 1 to 3	Secondary 4 to 6