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Primary school maths: 'Eight students in every class have no idea what is going on'

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What maths and science skills would you expect a 10-year-old to have?

In Singapore, half of all grade 4 students have "advanced" maths skills. They can solve word problems with multiple steps, have a growing grasp of fractions and decimals and understand two- and three-dimensional shapes. (A circle is to a sphere what a square is to a cube.)

Mitcham Primary School students Jack and Aidan have been programming drones as part of the school's innovative STEM program. Photo: Eddie Jim

But just 9 per cent of their Australian peers reach this benchmark, according to the latest Trends in International Mathematics and Science Study, which tested 630,000 students around the world.

"Eight students in every Australian classroom have no idea what is

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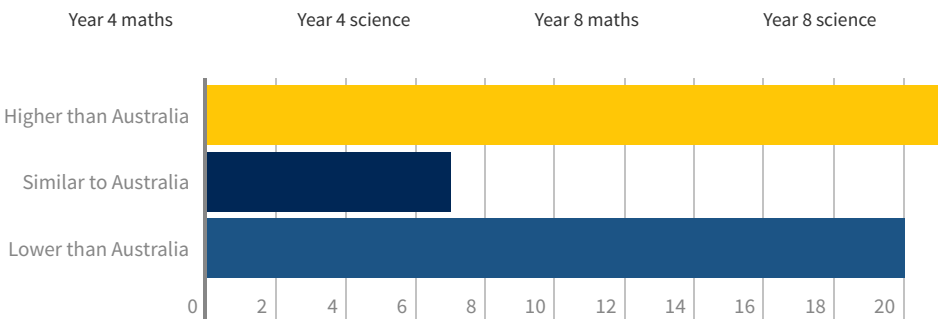
going on in year 4 maths," the Australian Council of Educational Research's director of educational monitoring and research Dr Sue Thomson said. The average primary school class size is around 24 pupils, so this means one in every three children in that typical year 4 maths lesson is having serious trouble with the concepts.

There are fears students will struggle with basic life skills. Photo: Jamieson Murphy

How Australia rates

Number of countries that are ...



Source: TIMSS 2015 First look at Australia's results

Our maths and science problem

International comparison of year 4 and 8 students

Year 4 maths ranking

1 - Singapore

2 - Hong Kong

3 - Korea

4 - Chinese Taipei

5 -Japan

6 - Northern Ireland

7 - Russian Federation

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FOLLOW SMH

8 - Norway

9 - Ireland

10 - England

11 - Belgium (Flemish)

12 - Kazakhstan

13 - Portugal

14 - United States

15 - Denmark

16 - Lithuania

17 - Finland

18 - Poland

19 - Netherlands

20 - Hungary

21 - Czech Republic

22 - Bulgaria

23 - Cypres

24 - Germany

25 - Slovenia

26 - Serbia

27 - Australia

Source: TIMSS 2015

Does it matter?

These year 4 students will struggle with basic life skills such as splitting a bill, calculating how much change they are owed and deciphering food labels.

They only have a basic understanding of multiplication by one through nine, limited knowledge of fractions, geometric shapes and measurement and can add and subtract whole numbers.

If they don't lift their game, they might also have trouble finding work when they grow up, with 75 per cent of the fastest growing jobs in science, technology, engineering and maths.

The aim is to have all students at or above the international intermediate benchmark.

To reach this level in year 4 maths, students must, among other things, understand whole numbers, have good knowledge of fractions and decimals, identify and draw simple shapes and make sense of bar graphs and tables.

When they reach year 8, they must solve problems with negative numbers, decimals and percentages, read and interpret graphs and tables and grasp the basics of chance.

What about science?

In year 4 science, students must have some understanding of the life cycle of plants and humans, and the impact of humans on the environment.

They must have some understanding of matter, electricity and basic knowledge of forces and motion and the physical characteristics of Earth, and its place in the solar system.

In year 8 they must interpret information from tables and graphs to draw conclusions, understand some aspects of force, motion and energy and demonstrate their knowledge of ecosystems.

Boys versus girls

In Australia, there was no difference in the performance of boys and girls for year 4 science and year 8 maths and science. However, in year 4 maths, boys outperformed girls for the first time in 20 years.

It is not yet known what has caused this gender gap, but it might have something to do with confidence. An OECD study released last year found that girls had less confidence in maths and science.

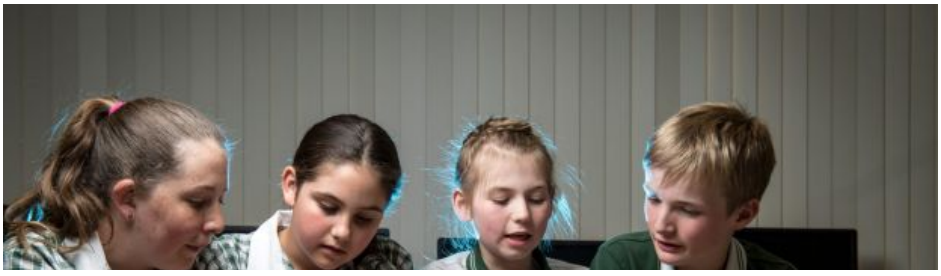
Why does Australia lag behind?

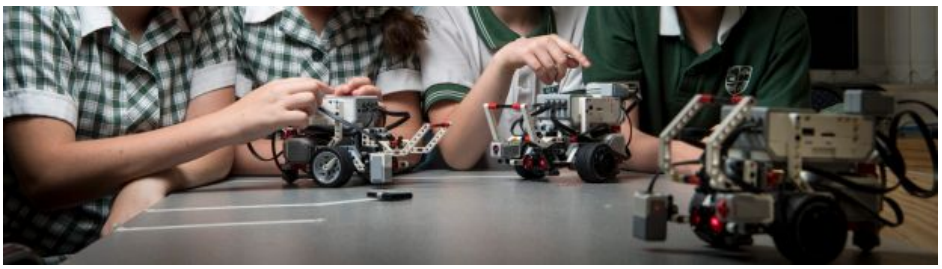
Janine Macintosh from the Australian Mathematical Sciences Institute said Australians need to stop teasing geeks. "I am one of them," she said. "In Australia it has become pretty cool to not be good at maths and that is the problem."

She said that many Asian countries like Singapore and Hong Kong outperformed Australia because they placed a huge importance on education, particularly science and maths.

"That is crucial to the attitude and culture that comes through with the students."

How one school is making a difference





Mitcham Primary School students Megan, Hailey, Jordan and Aidan have been programming robots to boost their science and maths skills. Photo: Eddie Jim

Mitcham Primary School has bought robots and drones to help boost students' maths and science skills.

The school's robotics co-ordinator Netanel Koles introduced bee bots - robots which look like bees - for the younger students, LEGO Minstorms for students in upper primary, while drones have been brought in for a group of 20 students who excel in coding.

Mr Koles said students are asked to program the robots to move in certain ways - a trial and error process that requires strong maths skills.

"When you're programming ... you need to work out how many revolutions the robot can do, how fast and how far it goes ... students need to use mathematical skills to figure out how to make it move," he said.

"It's about making real-life connections to material," said Mr Koles. "Building coding into the curriculum is about preparing students for the sorts of jobs that that will be out there in the next ten years."

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