

By the end of the year, your child will be meeting the Year 10 mathematics standard if...

... they are able to model a given scenario or solve a given problem both numerically and visually. They can explain and justify their thinking and solution, and use deductive reasoning, theorems and algorithms.

Data can be represented in a wider range of displays and interpreted with new techniques and language. Students will be able to comment on the validity of data they see in the world and consider how conditions impact probability.

To meet the standard, your child will be learning to:

- recognise the effect of rounding and approximations
- model scenarios of growth and decay by choosing which function to apply
- make and test their own conjectures to try and generalise patterns
- solve two equations simultaneously
- interpret and use logarithmic scales to represent small or large quantities or change
- measure the surface area and volume of composite objects
- identify the impact of measurement errors
- observe how networks can be used to represent relationships and describe connectedness
- plan and conduct statistical investigations
- analyse claims, inferences and conclusions they encounter in a range of settings by taking ethical considerations and potential biases into account
- design and conduct chance experiments and simulations
- determine sets of outcomes for compound events and assign probabilities to each.

This is a small part of the skills and knowledge your child is learning in order to meet this standard. Talk to the teacher for more information about your child's learning.

TOOLS AT YOUR DISPOSAL

In Year 10, students develop their skills of abstraction and generalisation to model and analyse the world in more complex ways. Numerical and visual representations become more connected as algebra and geometry are linked closer together. With the skills to access them, students spend more time solving interesting real-world problems.

MATHEMATICS PROBLEMS AT THIS LEVEL MIGHT LOOK LIKE THIS:

Teacher: If you buy a car that you know will decrease in value by 8% per year, how long will it take for the car's value to halve (to the nearest day)?

I need an equation to model this scenario.

$$\text{current value} = \text{initial value} \times (0.92)^{\text{years}}$$

When the car's value has halved, the current value will be $\frac{\text{initial value}}{2}$.

I can substitute this value into my model and rearrange to get $\frac{1}{2} = 0.92^y$

Now I can solve it with the use of the laws of logarithms and my calculator.

$$y = 8.31295 \dots$$

Therefore, it will take 8 years and 114 days for my car's value to halve.

Ask the teacher what your child is doing in mathematics. Talk about how you can work together to support your child's learning.



MATHEMATICS AT HOME

Think critically and analyse data with your child

Here are some things you can do with your child.

- Pause after a defining moment in a card or board game to reflect on the probability of success or failure given the conditions. Simulate what might happen if that moment were to occur many times over.
- Try to produce reasonable estimations to questions such as 'I wonder how much garbage is produced per person per year' rather than asking a search engine.
- While discussing a topic of interest, look for a moment to test a hypothesis with data. For example, 'That team won the premiership because they had the most experienced players.' What data could confirm or deny that claim? Where could it be accessed?
- Design a network diagram to represent the characters in a favourite show or the public transport options in your local area.
- Discuss the very small and the very large. 'How far away is a Mars? The next galaxy? How thin is a hair? How old is the universe? How big is an electron? How fast is the speed of light?' What is the difference in magnitude between different measurements?
- Be precise and use formulas to find volumes and surface areas when doing things such as organising a big load of groceries into the fridge, covering a cake in icing or retiling the shower.
- Try to model everyday situations with familiar functions. How long will it take for the bath to fill with water? What height should the sprinklers be set at?

Ask them to teach you what they learnt in class. Adopt a curious mindset and ask questions to check the depth of their understanding.

SUPPORT YOUR CHILD.

Parents, family and carers like you play a big part in your child's learning every day – you can support and build on what they learn at school.

Involve your child in easy, everyday activities like these

- Develop step-by-step plans for how to approach a range of scenarios. Create diagrams that show what actions can be taken based on predicted possible outcomes.
- Investigate and compare financial arrangements ... or gas plans. Use spreadsheets to present comparisons.
- Discuss investment and budgeting and make a financial plan for how your child might allocate any earnings. Encourage them to track an investment that might be of interest, collect data and present this after a period of time.
- Build a dataset to track a favourite sports team. Keep it updated after each game and look for patterns that emerge. Make and test predictions based on the data collected.
- Estimate probabilities for goals and dreams and discuss the implications of these. What can be done to improve the chances? Are there contingencies?
- Build a dataset to track a favourite sports team. Look for patterns that emerge. Make and test predictions based on the data collected.



Being positive about mathematics is really important for your child's learning – even if you didn't enjoy it or do well at it yourself at school.

Talk with your child's teacher to understand what they are learning about in mathematics and what the learning is in the homework they are doing.

FOR SCHOOL HOLIDAYS, WEEKENDS OR RAINY DAYS

Here are some suggestions for what you and your child can do together.

- Learn how to write some simple code or use a range of online tools to create a website or app.
- Produce a strategy guide for a favourite household game.
- Research a significant historical figure in mathematics and the contributions they made to the field. Some examples are Euclid, Pythagoras, Ramanujan, Newton, Gauss, Pascal, Euler, Archimedes, and the ancient Egyptians or Babylonians.
- Trace the history of a famous mathematical constant, such as π , e or ϕ .
- Tackle problems available online from previous editions of mathematics competitions.
- Provide opportunities for your child to 'show off' their new skills. Can you find the volume of this oddly shaped vase? How many cans of spray paint would we need to cover the car?

