# Reasoning statements to use with students

## Year 5–10 students

When proposing the statements below, ask questions such as the following.

*Is (this proposition) true?*

*Is it just sometimes true, or is it or always true?*

*When is it true?*

*How do you know?*

*How could we demonstrate/show/prove that it is true?*

- The mean of three consecutive numbers is the middle number.

- Triangles tessellate.

- Pentagons tessellate.

- Hexagons tessellate.

- Area = length × width

- 5 + 5 = 13

- Volume = area of the end × length

- If the water in our dams increases by 10% this month, and then decreases by 10% next month, it will be back to where it started.

- If you add the same number to the top and the bottom of a fraction, the fraction gets bigger in value.

- If you add $n$ consecutive numbers together, the result is divisible evenly by $n$.

- The square of a prime number is one more than a multiple of 24.

- Two odd numbers add to give an even number.

- Two prime numbers add to give another prime number.

- The probability of an outcome = $\dfrac{1}{\text{the number of different possible outcomes}}$.

- When tossing a coin, if the result has been HHHHHHH, then it is likely that the next result will be T.

- The person sitting next to me likes chocolate.

- The sum of a multiple of 3 and a multiple of 5 is divisible evenly by 15.

- The circumference of a cylinder is greater than its height.

- All hexagons tessellate.

- A graph of $3n + 4$ will always be a straight line that always crosses the $y$-axis at 4.

## Year 1–4 students

Students can use equipment and practical examples to explore the statements below. Ask questions such as the following. Many of the above statements may also be used or adapted.

- Squares tessellate.
- Parallelograms tessellate.
- If you add 3 consecutive numbers together, the result is divisible evenly by 3.
- If you add 4 consecutive numbers together, the result is divisible evenly by 2.
- Two even numbers add to give an even number.
- The sum of a multiple of 3 and a multiple of 2 is divisible evenly by 6.
- The person sitting next to me likes football.
- If two coins are tossed lots of times, two heads will result about $\frac{1}{3}$ of the time,

  two tails will result about $\frac{1}{3}$ of the time,

  and one head and one tail will result about $\frac{1}{3}$ of the time.
- Pineapples grow in Alaska.
- The area of Greenland is larger than the area of Western Australia.
- If you double numbers then add 6, then graph the results, the graph line will always be straight.

Encourage both primary and secondary students to adapt these propositions and to make up others to explore. Remember that the emphasis is on reasoning. (When is it true, and why?)