

FACTORS AND MULTIPLES

GENERAL INFORMATION

Background

According to the Australian Curriculum by the end of Year 5 students should be able to recognise and describe factors and multiples of whole numbers. This builds on knowledge from the previous level whereby at the end of Year 4 students should be able to recall their multiplication facts up to 10×10 . The issue is often not with the ability of students to recall the facts, but with the understanding of the terms, factors and multiples.

Australian Curriculum Link(s):

- Recall multiplication facts up to 10×10 and related division facts ([ACMNA075](#))
- Identify and describe factors and multiples of whole numbers and use them to solve problems ([ACMNA098](#))

Year Level(s): 4 – 5

Author: Cassandra Lowry

Details:

- Recall multiplication facts up to 10×10 and related division facts
- Understand the terms factors and multiples and their links to multiplication, division and skip counting
- Determine all 'factors' of a given whole number, e.g. 36 has factors 1, 2, 3, 4, 6, 9, 12, 18 and 36
- Determine 'multiples' of a given whole number, e.g. multiples of 7 are 7, 14, 21, 28, ...

POSSIBLE ACTIVITIES

Getting started

For many students, despite exploring early multiplication and division concepts from their first year of school, Year 5 will be the first time they encounter the terms, **factors** and **multiples**. **Factors** are the numbers we multiply together to get another number, for example, $3 \times 4 = 12$ so 3 and 4 are both factors of 12. **Multiples** are what we get as a result of the multiplication, for example, $3 \times 4 = 12$, so 12 is a multiple of 3 and a multiple of 4. Another way to think of **multiples** is to relate it back to the practice of **skip counting**. Skip counting, something students will learn about from the first year of school, is the process of counting forwards (or backwards) by the same number, so the skip counting by 5 pattern is 5, 10, 15, 20, etc. These numbers can also be called the multiples of 5.

Finding Factors and Multiples

One way for students to identify the factors and multiples of a number is to use a counting chart (1 – 100) and some coloured blocks or Unifix cubes. Start with the number 2 and place a red block on all the multiples of 2 (i.e. on the twos skip counting pattern, so 2, 4, 6, 8, 10, etc.). Repeat the process for say the first ten numbers changing colours each time. The numbers with the tallest towers have the highest number of factors. The numbers with only one block are the **prime** numbers. The colours of the blocks represent the factors of that number. This process is sometimes called the *Sieve of Eratosthenes*. An interactive version of this process can be found here: <https://www.visnos.com/demos/sieve-of-eratosthenes>

Factors and Arrays

Another way for students to identify the factors of number, particularly if they are unfamiliar with the multiplication facts is to create arrays (i.e. rectangles with an area of the number). Using square tiles or cubes (or square grid paper) a student creates all the arrays they can using that number. For example, if the student were investigating the number 10, they could create a 1×10 or 10×1 array and a 2×5 or 5×2 array. The factors of 10 are then 1, 2, 5, and 10 (note factors are generally recorded in numerical order).

Factors and Division

Another way to identify if a number is a factor of another number is to check whether it can be divided equally into that number. For example, is 3 a factor of 96? To check we can find $96 \div 3 = 32$. From this we know that 3 is a factor of 96. Five is not a factor of 96 as $96 \div 5$ is 19 remainder 1 (19 r 1). The factors of 96 are 1, 2, 3, 4, 6, 8, 12, 24, 36, 48 and 96.

Questions

- What is a factor? What is a multiple?
- What are the factors of 6? How can you check?
- What are the first 10 multiples of 6? How can you show this?
- Is 6 a factor of 100? How can you check?
- What are the factors of 100?
- How can skip counting help us to identify multiples of numbers?

Games

The following games may help students to practise identifying factors and multiples.

- **NRICH** Factors and Multiples Game: <https://nrich.maths.org/factorsandmultiples> (Note: This game could also be played on a 1-100 counting chart)
- **NCTM Calculation Nation** Factor Dazzle: <http://calculationnation.nctm.org/Games/>
- **Math Playground** Factor Pair Up: https://www.mathplayground.com/factor_pair_up.html
- **ABCYA** Number Ninjas – Multiples: https://www.abcya.com/games/number_ninja_multiples

Additional Resources

Check out the Factors and Multiples Lesson on our AMSI Schools Calculate website:

<https://calculate.org.au/2018/10/04/factors-multiples-year-5-6/>

Listen to our AMSI Schools Multiplication Matters MathsTalk podcasts: <https://calculate.org.au/mathstalk-podcast/>

FURTHER INFORMATION

Australian Mathematical Sciences Institute. (2011). *The improving mathematics education in schools (TIMES) project: Multiples, factors and powers*. Retrieved from

http://amsi.org.au/teacher_modules/Multiples_factors_and_powers.html

Australian Curriculum and Assessment Reporting Authority. (2014). *Foundation to Year 10 curriculum: Mathematics*. Retrieved <https://www.australiancurriculum.edu.au/f-10-curriculum/mathematics/>

NSW Government Education Standards Authority. (2018). *Mathematics K-10: Rationale*. Retrieved from <https://educationstandards.nsw.edu.au/wps/portal/nesa/k-10/learning-areas/mathematics/mathematics-k-10/rationale>

Math is Fun. (2017). *Factors and multiples*. Retrieved from <https://www.mathsisfun.com/numbers/factors-multiples.html>