InsightMath

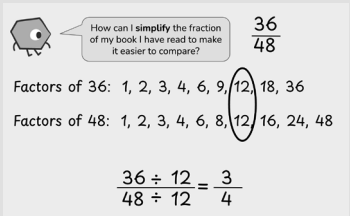
Exploring Equivalence

Family Guide | Grade 6 | Unit 2

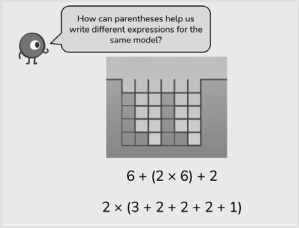
Your student is exploring how any number or expression can be represented in an infinite number of ways that have the same value.

Key Math Ideas

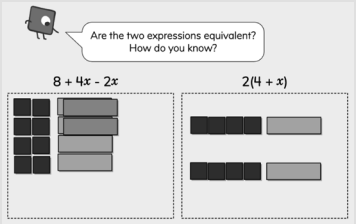
Your student entered grade 6 with the understanding that numerical expressions can be written in different, equivalent ways. In this unit, your student will explore equivalence further to find how every fraction, every numerical expression, and every algebraic expression can be represented by an infinite number of different, but equivalent, fractions. Throughout the unit, students use common factors and multiples, models, and mathematical properties to both find and recognize equivalent fractions and expressions.



Using a common factor of the numerator and denominator, then dividing to find an equivalent fraction



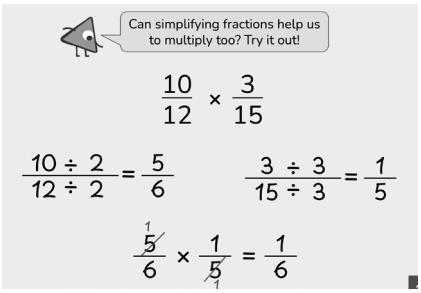
Identifying equivalent numerical expressions using a visual model.



Using models (algebra tiles) to determine that two algebraic expressions are equivalent.

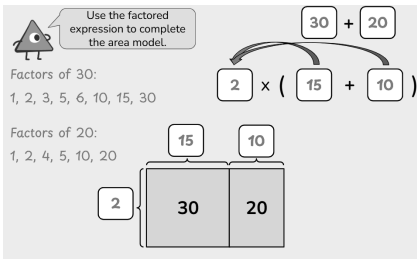
→ In the beginning of the unit, your student will learn to

- identify the greatest common factor (GCF) of two whole numbers up to 100;
- identify the least common multiple (LCM) of two whole numbers up to 12;
- identify the reciprocal of fractions and explain why their product is one, such as $\frac{1}{3} \times 3 = 1$ and $\frac{2}{3} \times \frac{3}{2} = 1$;
- explain why a number found in both a numerator and a denominator can be "canceled" when multiplying fractions, for example $\frac{2}{3} \times \frac{3}{5} = \frac{2}{5}$;
- find equivalent fractions by dividing both the numerator and the denominator by a common factor to simplify, as shown in the example to the right.



→ In the middle of the unit, your student will learn to

- use visual models to show whether numerical expressions are equivalent;
- use the distributive property to write equivalent numerical expressions by multiplying the number outside of the parentheses with those inside the parentheses, such as 6(3 + 4) = 18 + 24;
- identify and use a common factor in a numerical expression to find an equivalent expression, such as using the common factor of 3 to find that 24 - 12 = 3(8 - 4);

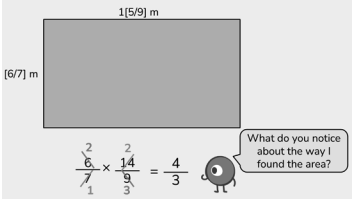


→ By the end of the unit, your student will learn to

- use visual models to show whether algebraic expressions are equivalent;
- identify and use a common factor in an algebraic expression to find an equivalent expression, such as using the common factor of 6 to find that 18*x* + 24 = 6(3*x* +4);
- describe that algebraic expressions are equivalent if they have the same value when any number is substituted for the variable(s).

Helpful Hint

In this unit, while multiplying fractions, your student may cancel out numbers in the numerator or numbers in the denominator based on common factors (as shown in the example to the right). To help your student retain their conceptual understanding of this concept, ask them to explain why the they can "cancel" numbers when multiplying, focusing on finding common factors.



Tips for Supporting Your Student at Home

Questions to Ask Your Student

→ In the beginning of the unit:

- How can factors and multiples help you solve problems?
- How can you use a common factor or multiple to find an equivalent fraction?
- How can you make multiplication of fractions easier?

→ In the middle of the unit:

- How many ways can you write equivalent numerical expressions?
- How can you use multiplication and addition together to write equivalent expressions?
- How can you use the distributive property in reverse to write equivalent expressions?

→ By the end of the unit:

- What is a good way to test if algebraic expressions are equivalent?
- How can you use factoring to make expressions easier to understand?

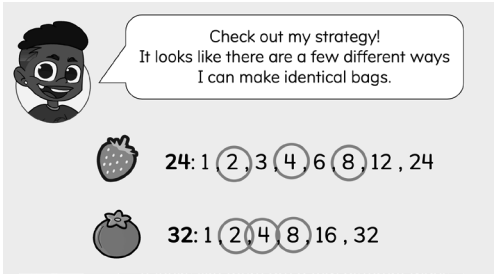
If...	Try...
your student attempts to combine terms that have different variables, such as incorrectly simplifying $3x + 2y$ as $5xy$ or $5(x + y)$ . . .	encouraging them to pick a different value for each variable and evaluate the expression before and after they combine and compare. For example, when comparing $3x+2y$ and $5xy$, have your student evaluate with $x = 5$ and $y = 4$. They should recognize that $3(4) + 2(5)$ equals 22 and $5(4)(5)$ equals 100, so they are not equivalent.

Student Strengths Spotlight

I value mistakes.	Exploring new ideas can lead to mistakes, and students take this opportunity to recognize that every mistake is an opportunity to learn.
I explain how my classmates' reasoning compares to my own.	Students make comparisons between their expressions and their strategies for finding equivalent expressions, recognizing that there are multiple pathways.
I notice patterns and try to apply them across situations.	Recognizing patterns when using factors and multiples supports students to think flexibly and expand their strategies.
I choose representations to help me solve problems and to record and share my thinking.	Students find equivalent expressions and show their thinking in different ways, such as using models, mathematical properties or substituting values in for variables.

Try This Together!

- **Find the GCF Around You!** Have your student find the GCF (Greatest Common Factor) in daily situations. Come up with your own amounts of fruit (or other items), or use the example shown below making bags of the same amount of strawberries and blueberries. The greatest number of identical bags that can be made is 8 bags because 8 is the greatest common factor of 24 and 32.



- **Equivalent Expressions 3 in a Row.** Set up a tic-tac-toe board with 9 spaces (3 rows and columns) and made the center a "free space." Have your student write a numerical or algebraic expression, then try to come up with equivalent expressions to cover the board. Try to get 3 in a row!