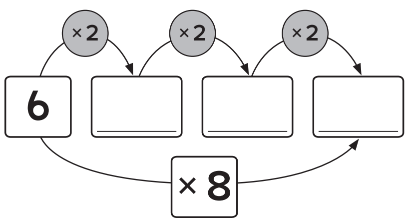
ORIGO STEPPING STONES

Core Focus

- Working with the eights, ones, and zeros multiplication facts
- Solving word problems involving multiplication
- Working with fractions using the number line and area models
- Exploring fraction families, the additive nature of fractions, and improper fractions using fraction strips

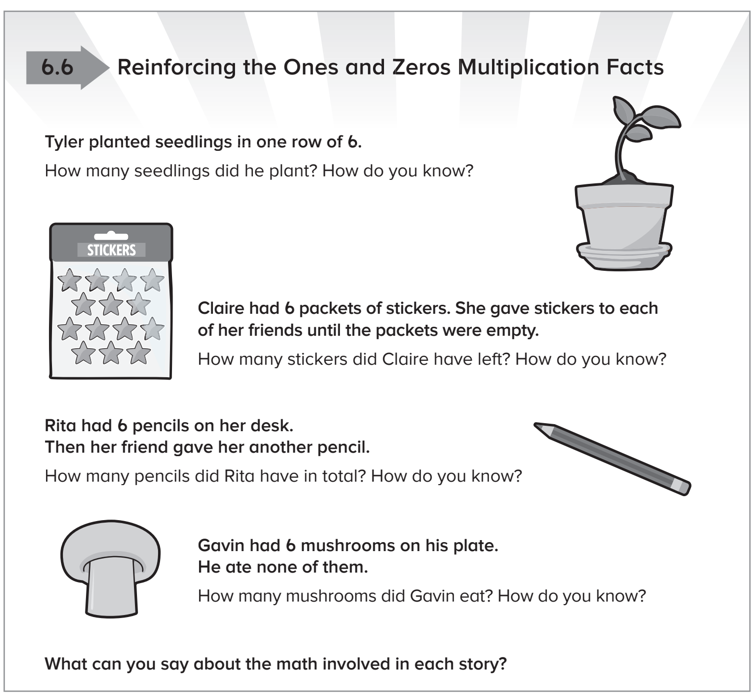
Multiplication

- Mastery of multiplication and division requires more than just memorization. In Grade 3, fact families are introduced in a logical order, building on what students already know, so working with the facts makes sense.
- In this module, doubling/halving strategies for the twos and fours multiplication/division facts are extended to the eights facts using **double double double**.



This arrow diagram shows how using the double double double strategy supports learning the ×8 facts. “Double 6 is 12, double 12 is 24, and double 24 is 48, so 6 × 8 = 48.”

- Ones and zeros facts are some of the last multiplication facts introduced. While easy for adults, it is challenging for students to visualize x0 as “no groups with some in each group,” or x1 as “one group with no repeating.”



6.6 Reinforcing the Ones and Zeros Multiplication Facts

Tyler planted seedlings in one row of 6.
How many seedlings did he plant? How do you know?

STICKERS

Claire had 6 packets of stickers. She gave stickers to each of her friends until the packets were empty.
How many stickers did Claire have left? How do you know?

Rita had 6 pencils on her desk.
Then her friend gave her another pencil.
How many pencils did Rita have in total? How do you know?

Gavin had 6 mushrooms on his plate.
He ate none of them.
How many mushrooms did Gavin eat? How do you know?

What can you say about the math involved in each story?

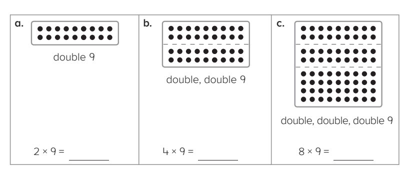
In this lesson, students think about situations that have either one or zero groups, or one or zero in each group.

Ideas for Home

- Practice the eights doubling facts, e.g. “What is 8 x 7?” Instead of stopping at “56,” ask your child to explain by doubling. “I know that double 7 is 14, double 14 is 28, and double 28 is 56, so 8 x 7 is 56.”
- Take turns to make up fact stories with zero and ones facts: e.g. 4 x 0, “4 crayon boxes were emptied of crayons, how many crayons were left to use?” Or 1 x 5: “There was one package of cookies with 5 in it.”

Glossary

- Arrays are dot arrangements that show the rows and columns expressed in a multiplication sentence. They are useful for representing the **double double double** strategy.



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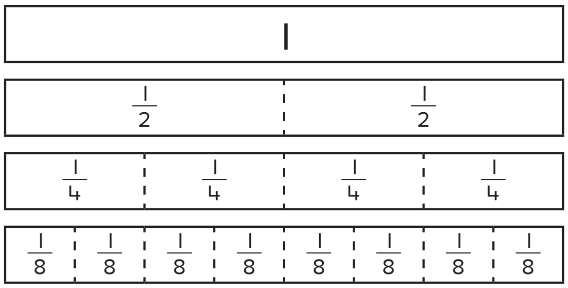
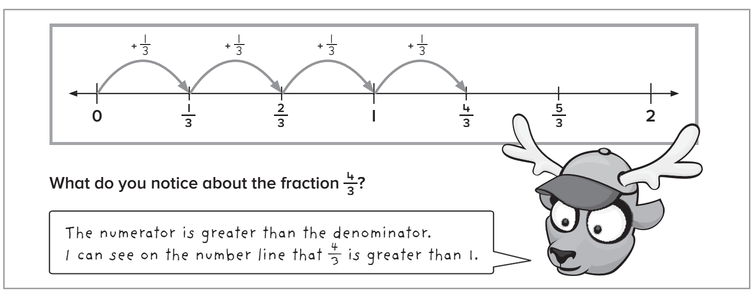
Fractions

- To visualize fractions, students fold paper strips, shade some parts, and then label with a fraction. The bottom number (**denominator**) tells how many pieces are folded into the **whole** strip, while the top number (**numerator**) tells **how many of those pieces** are shaded.



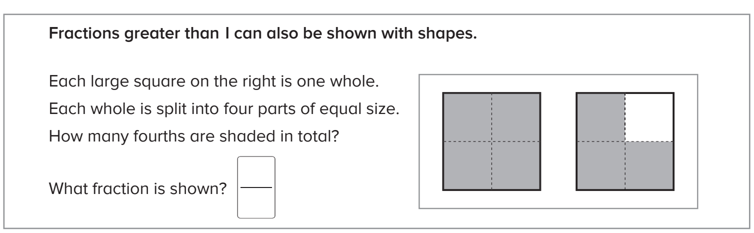
This model shows how paper strips can be folded to represent related fractions.

- Students also visualize fractions using a number line. The denominator tells how the distance between whole numbers (0 to 1, or 1 to 2, etc.) is split up; the numerator tells the count of hops along those dividing marks.
- When the numerator and denominator are the same ($\frac{3}{3}$), the fraction is equal to 1. Fractions that are greater than 1 ($\frac{10}{3}$) are called **improper fractions***, which can be rewritten as **mixed numbers** ($\frac{4}{3} = 1\frac{1}{3}$).



In this lesson, the number line is used to explore fractions greater than 1.
Each whole is divided into thirds; 4 hops = $\frac{4}{3}$.

- Students show specific improper fractions, first with the number line model and then explore how these new fractions can be represented with an area model.



In this lesson, students use area models to think about fractions that are greater than 1.

*While $\frac{10}{3}$ is called an **improper fraction**, this type of fraction is acceptable to write and use in mathematics.

Ideas for Home

- Practice counting by unit fractions. E.g. to measure $1\frac{3}{4}$ cups of flour, use a $\frac{1}{4}$ cup unit to count: "$\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$, $\frac{4}{4}$, $\frac{5}{4}$, $\frac{6}{4}$, $\frac{7}{4}$ in $1\frac{3}{4}$."
- Cut a rectangular pan of food into rows and columns of equal portions (brownies, lasagna, corn bread, etc.) Count the portions by unit fractions. E.g. if a pan of lasagna is cut into 12 pieces count the pieces of the total lasagna: "$\frac{1}{12}$, $\frac{2}{12}$, $\frac{3}{12}$, etc ... to $\frac{12}{12}$."
- When it is time to clean up, ask your child how much lasagna is left and to express it by counting in unit fractions.

Glossary

- A **unit fraction** is a proper fraction that has 1 as the **numerator**. For example, $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$. All fractions are composed of unit fractions: e.g. $\frac{1}{5} + \frac{1}{5} + \frac{1}{5} = \frac{3}{5}$.

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