4 **Module 11**

Core Focus

- Multiplication: Using the standard algorithm and using the associative property with two-digit numbers
- Geometry: Exploring points, lines, line segments, and rays, and identifying lines of symmetry and transformations

Multiplication

- The **standard algorithm** provides a method for performing multi-digit multiplications that are difficult to do mentally, such as 45 × 8.

11.4 Multiplication: Solving word problems involving two-digit numbers

Step In   The local sports team needs to buy eight team shirts.

How could you calculate the total cost?

I could use the partial-products strategy, the double-and-halve strategy, or I could double double, double 45.

$45

$38

Amber used the standard multiplication algorithm to calculate the total cost.

Which method do you think is the easiest to use with these numbers? Why?

The team also needs to buy nine shorts.

Which method would you use to calculate the total cost? Why?

H	T	O
	4	
	4	5
×		8
3	6	0

In this lesson, students relate their informal methods for solving multiplication problems to the standard algorithm for multiplication.

- Applying the **associative property for multiplication** allows students to multiply the factors in any order. For example, 5 × 4 = 20, 20 × 4 = 80, 80 × 7 = 560.
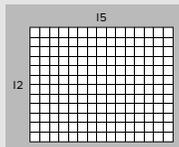

11.5 Multiplication: Using the associative property with two two-digit numbers (double and halve)
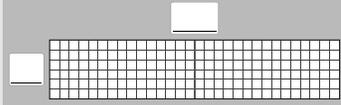
Step In

I want to lay turf in an area that measures 12 yd by 15 yd. How many square yards of turf will I need?

15

12

Look at this array. How could you calculate the number of square yards without counting all the squares?

There are 30 squares in two rows. 30 + 30 + 30 + 30 + 30 + 30 = 180.

You could also double and halve.
Imagine the array above is cut in half and rearranged like this.

In this lesson, the double-and halve-strategy uses the associative property of multiplication. 12 × 15 becomes 2 × 6 × 15 or 6 (15 × 2).

Ideas for Home

- When shopping, choose an item that has a two-digit price, such as $45, and ask your child to figure out the total cost of 6 of the items. Your child may use factors or use the double-and-halve strategy to make multiplying easier.

- Select the cards showing 2–9 from a standard deck of cards. Mix them and place them facedown on a table. Ask your child to choose 3 cards, then multiply the numbers in any order to find the product. This can also be played in pairs or with siblings. The first person to find the correct product is the winner. Alternatively, the person with the greatest/least product could be the winner.

Glossary

▸ The **standard multiplication algorithm** is the familiar paper-and-pencil procedure for multiplying multi-digit numbers that most adults were taught in school.

▸ The **associative property for multiplication** allows three or more factors to be multiplied in any order.

4 Module 11

Angles

- Students are formally introduced to the fundamental building blocks of geometry: *points*, *lines*, *line segments*, *rays*, and *parallel* and *perpendicular* lines. These lessons focus on identifying and naming these important geometric features.
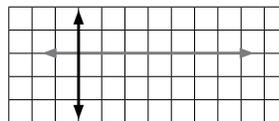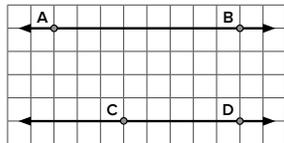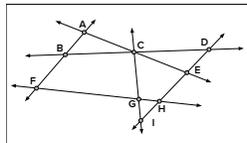
The figure on the left shows points, lines, line segments, and rays. Figures in the middle show parallel lines and the figure on the right shows perpendicular lines.

Transformations

- **Reflectional symmetry** and **lines of symmetry** are geometry concepts that are simple, but interesting, and can be found everywhere in our everyday lives, in art, and in nature.

11.11 Transformations: Reflecting shapes

Step In   Imagine you were wearing this shirt and looked in the mirror.

What would the shirt look like?
What words can you use to describe what mirrors do?

When I look in the mirror, I see my reflection.

Some shapes have parts that are a reflection of each other. Draw the other half of the letter M on the other side of the dashed line. How will you know it is a reflection?

What other letters have two sides that are a reflection of each other?

In this lesson, students identify and draw lines of symmetry in 2D shapes and images.

Ideas for Home

- Look around your community or home for examples of parallel and perpendicular lines. Railroad tracks are parallel, while the side and top of a door frame are perpendicular. Roads, fences, and tiles are also useful.

- To explore reflections and symmetry, spread some paint on paper, then fold and unfold the paper. This will create an image that is the same on both sides of the fold, which is the line of symmetry.

- Write the alphabet in capital letters, and examine it for symmetry. Some letters (like A and T) have vertical lines of symmetry; some (like B and E) have horizontal lines of symmetry; some (like H and X) have both vertical and horizontal lines of symmetry.

Glossary

‣ A **line of symmetry** is drawn to divide a shape into two parts that are the same size and shape, resulting in **reflectional symmetry**.