4th Grade Math: Using Formulas for Area and Perimeter

Lesson Objective:

By the end of this lesson, students will be able to:

- Understand and apply formulas to find the area and perimeter of rectangles and squares.
- Solve real-world problems using area and perimeter formulas.

1. Introduction to Area and Perimeter

What is Area?

- **Area** is the amount of space inside a shape. It is measured in square units (like square centimeters, square meters, etc.).
- The formula for the area of a rectangle or square is:

$$\text{Area} = \text{Length} \times \text{Width}$$

What is Perimeter?

- **Perimeter** is the total distance around the outside of a shape. It is measured in linear units (like centimeters, meters, etc.).
- The formula for the perimeter of a rectangle is:

$$\text{Perimeter} = 2 \times (\text{Length} + \text{Width})$$

For a square, where all sides are equal, the formula is:

$$\text{Perimeter} = 4 \times \text{Side Length}$$

2. Understanding and Applying Formulas

Example 1: Area of a Rectangle

A rectangular garden has a length of 8 meters and a width of 5 meters.

- **Step 1:** Use the area formula for a rectangle:

$$\text{Area} = \text{Length} \times \text{Width} = 8 \times 5 = 40 \text{ square meters}$$

The area of the garden is 40 square meters.

Example 2: Perimeter of a Rectangle

The same garden has a length of 8 meters and a width of 5 meters.

- **Step 1:** Use the perimeter formula for a rectangle:

$$\text{Perimeter} = 2 \times (\text{Length} + \text{Width}) = 2 \times (8 + 5) = 2 \times 13 = 26 \text{ meters}$$

The perimeter of the garden is 26 meters.

3. Real-World Application of Area and Perimeter

Example 3: Painting a Wall

You are helping to paint a rectangular wall in your classroom. The wall has a length of 12 feet and a width of 9 feet. How much paint will you need to cover the wall?

- **Step 1:** Use the area formula to find the area of the wall:

$$\text{Area} = 12 \times 9 = 108 \text{ square feet}$$

You will need enough paint to cover 108 square feet.

Example 4: Fencing a Yard

Your family wants to put a fence around a rectangular yard that has a length of 20 meters and a width of 10 meters. How much fencing is needed?

- **Step 1:** Use the perimeter formula to find the perimeter of the yard:

$$\text{Perimeter} = 2 \times (20 + 10) = 2 \times 30 = 60 \text{ meters}$$

You will need 60 meters of fencing.

4. Practice Problems

1. A rectangular playground is 15 meters long and 10 meters wide. What is the area of the playground?
2. A square has a side length of 6 centimeters. What is the perimeter of the square?
3. You are building a rectangular dog pen that has a length of 12 feet and a width of 8 feet. How much fencing will you need for the pen?
4. The classroom rug is a square with side lengths of 4 meters. What is the area of the rug?

5. Real-World Problems

Problem 1: A kitchen floor is shaped like a rectangle with a length of 5 meters and a width of 3 meters. You are planning to tile the entire floor. How many square meters of tile do you need?

Problem 2: You are helping a friend measure their garden, which is shaped like a rectangle. The garden has a length of 7 meters and a width of 4 meters. They want to put a fence around the garden. How much fencing do they need?

6. Review and Wrap-Up

Key Takeaways:

- The **area** of a shape tells you how much space is inside the shape.
- The **perimeter** of a shape tells you the total distance around the shape.
- You can use simple formulas to calculate the area and perimeter of rectangles and squares.

Exit Question: A rectangular room is 9 meters long and 6 meters wide. What is the area of the room, and how much material is needed to go around the outside?