GRADE: 9

UNIT (S): Geometry and Measurement

TOPIC: Classifying Triangles and Calculating Perimeter

DATE: Nov. 17 – 21, 2025

STANDARDS:
AT3: Describe and represent properties of 2D shapes and their interrelationships.
AT4: Use appropriate techniques, tools, formulas, and units to determine measurements.

GENERAL OBJECTIVES:

- Students will recognize that geometric properties and measurement are used in design, construction, and everyday life.

- Students will appreciate the logical structure of geometric classification.

- Students will develop problem-solving skills by applying knowledge of perimeter to real-world scenarios.

SPECIFIC OBJECTIVES:
By the end of the lesson, students will:

1. Classify triangles as being:
   a. right-angled,
   b. isosceles,
   c. equilateral,
   d. scalene.

2. Use the properties of the sides and equality of angles in a triangle to aid classification.

3. Measure and/or calculate the perimeter of polygons and other objects without using a formula.

4. Make decisions and find solutions in real-world situations that need the calculation of perimeter.

KEY VOCABULARY:

- Triangle
- Right-Angled
- Isosceles
- Equilateral
- Scalene

- Perimeter
- Side
- Angle
- Classification
- Polygon

RESOURCES:

- Geoboards & elastic bands

- Protractors & rulers

- Sets of plastic or cardboard triangles for sorting

- Chart paper and markers

- "Mystery Triangles" activity cards

- Real-world objects (e.g., picture frames, notebooks, maps of school field)

- Whiteboards and markers

- Digital tools (e.g., GeoGebra, if technology permits)

PRIOR LEARNING:
Check that students can:

- Identify basic polygons.

- Name different types of angles (acute, right, obtuse).

- Use a ruler to measure length in centimetres.

- Understand the concept of adding numbers.

LEARNING OUTCOME:
Students will be able to confidently classify triangles based on their sides and angles and accurately determine the perimeter of various objects through direct measurement and addition.

CONTENT
Triangles can be classified by their **side lengths** (equilateral - all sides equal, isosceles - two sides equal, scalene - no sides equal) and by their **angles** (right-angled - one 90° angle). The **perimeter** of any polygon is the total distance around its outside, found by adding the lengths of all its sides. Understanding these properties helps us describe shapes accurately and solve practical problems involving fencing, framing, or bordering.

TEACHING/LEARNING ACTIVITY:

Engage

The teacher will begin with a class discussion: "Look around the room. Can you spot any triangles? (e.g., roof trusses, bridge supports in pictures, a slice of pizza). Why do you think triangles are used so often in structures? What words might we use to describe the different kinds of triangles we see?"

- In pairs, students will be given a set of diverse plastic or paper triangles. They will be asked to sort them into groups based on their own reasoning (e.g., "all pointy," "has a square corner," "all sides look the same").

- The teacher will then hold up a notebook and ask, "If I wanted to put a string around this, how would I figure out how much I need?" This introduces the concept of perimeter in a tangible way.

Explore
Students will investigate the properties that define different types of triangles.

Class Activity

- **Station 1:** Using rulers, students measure the side lengths of various triangles and sort them into Scalene, Isosceles, and Equilateral groups on a large poster.

- **Station 2:** Using protractors (or right-angle checker tools), students measure the angles of triangles to identify which ones contain a right angle (90°), classifying them as Right-Angled.

- **Station 3:** Using geoboards and elastic bands, students are challenged to create an equilateral, isosceles, scalene, and right-angled triangle.

Explain
The teacher will review the exploration activities and formally introduce the classification names and properties.

Class Activity

- The teacher leads a discussion to formalize the definitions, creating an anchor chart with the class.

- The teacher explicitly models how to use both side length and angle information together to fully classify a triangle (e.g., "This triangle has two equal sides, so it's isosceles, AND it has a right angle, so it's a Right-Angled Isosceles triangle").

- Students will practice with guided whiteboard problems, drawing and classifying triangles based on given clues.

Elaborate/Evaluate
The teacher will review perimeter as the sum of all sides and connect it to the real world.

Class Activity and Project

- Students will be assigned a project where they design the layout for a new mini-park in their community. The park must be a composite shape made of at least 3 different polygons (e.g., a triangular sandpit, a rectangular lawn, a pentagonal flower bed).

- They will create a poster that includes:

    1. A coloured drawing of their park layout.

    2. Labels identifying at least two different types of triangles used in the design.

    3. Measurements (in cm) for all sides of each shape, written directly on the drawing.

    4. A "Materials Order" section where they calculate the total perimeter of the triangular sandpit and the rectangular lawn to determine how much fencing is needed for each.

- Students will present their projects to a small group, explaining their triangle classifications and how they calculated the perimeters.

ASSESSMENT:

- Observation of group work and participation in station rotations.

- Accuracy in sorting and measuring during "Triangle Detective" activities.

- Successful completion of whiteboard classification and perimeter practice.

- Quality, accuracy, and explanation in the "Design a Mini-Park" project.

LINKS TO OTHER SUBJECTS:

- **Art & Design:** Using shapes and spatial reasoning in design projects.

- **Social Studies/Geography:** Interpreting land plots and maps, understanding space in community planning.

- **Science & Technology:** Understanding the structural strength of triangles used in engineering and architecture.

- **Literacy:** Using precise vocabulary to describe and classify geometric figures.