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| **Strand:** | Geometry and Measurement | **Sub-Strand:** | Measurement |



**BASIC 9**

**WEEKLY LESSON PLAN – WEEK 12**

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| **Content Standard:** | B.9.3.2.1 Derive the formulas for determining the surface area of prisms (i.e. cuboid and triangular prism) and use to solve problems | | | | |
| **Indicator (s)** | B9.3.2.1.3 Use the net of a triangular prism to determine its surface area.<br>B9.3.2.1.4 Express points in the Cartesian plane as position vectors | **Performance Indicator:** Learners can use the net of a triangular prism to calculate its surface area. | | | |
| **Week Ending** | 29-11-2024 | | | | |
| **Class** | B.S.9 | **Class Size:** | | **Duration:** | |
| **Subject** | Mathematics | | | | |
| **Reference** | Mathematics Curriculum, Teachers Resource Pack, Learners Resource Pack, Textbook. | | | | |
| **Teaching / Learning Resources** | Poster, Cardboard, Pictures, video | **Core Competencies:** | • Communication<br>• Critical thinking<br>• Creativity and Innovation | | |

| **DAY/DATE** | **PHASE 1 : STARTER** | **PHASE 2: MAIN** | **PHASE 3: REFLECTION** |
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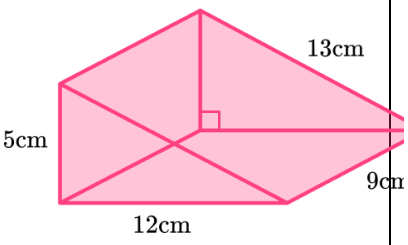
| **MONDAY** | Review Learners knowledge on the concept of nets and how they represent 2D representations of 3D shapes. | 1. Briefly explain to the Learners that the surface area of a triangular prism can be found by summing the areas of its individual faces.<br>2. Demonstrate how to calculate the surface area by adding the areas of each face<br>3. Provide a worksheet with examples and practice problems for Learners to complete on their own<br><br>**Calculating the surface area of a triangular prism**<br>The surface area of a triangular prism can be calculated using the formula:<br><br>**Surface Area = L + 2B**<br><br>Where:<br><br>• **L** is the lateral surface area (the area of the rectangular faces)<br>• **B** is the area of one triangular base (multiplied by 2 to account for both bases)<br><br>To find **L**, the lateral surface area:<br><br>1. Calculate the perimeter of the triangular base (P) | Use different types of triangular prisms (e.g., right triangular, isosceles, equilateral) to challenge Learners and provide opportunities for differentiation.<br><br>**Exercise;**<br><br>Calculate the surface area of the triangular prism.<br><br>  |

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| | | 2. Multiply P by the height (h) of the prism<br><br>**L = P × h**<br><br>To find **B**, the area of one triangular base:<br><br>1. Calculate the base (b) and height (h) of the triangle<br>2. Use the formula: **B = (1/2) × b × h**<br><br>Then, add the lateral surface area (L) to twice the base area (2B) to get the total surface area:<br><br>**Surface Area = L + 2B** | |
| **WEDNESDAY** | Show Learners examples of nets of triangular prisms and ask them to identify the different faces (triangular and rectangular). | 1. Assist Learners to use the net to identify the areas of each face:<br><br>a. Triangular faces: use the formula 1/2 × base × height<br>b. Rectangular faces: use the formula length × width<br><br>2. Distribute printed nets and ask Learners to work in pairs to calculate the surface area of each prism.<br>3. Learners brainstorm to create their own nets and calculate the surface area to reinforce their understanding.<br><br>**Triangular Prism:** The formula for the surface area of a triangular prism is:<br><br>$A = 0.5 \times \sqrt{((a + b + c) \times (-a + b + c) \times (a - b + c) \times (a + b - c))} + h \times (a + b + c)$<br><br>where a, b, and c are the lengths of three sides of the triangular prism base, and h is the height (length) of the prism.<br><br>**Rectangular Prism (Box):** The formula for the surface area of a rectangular prism (box) is:<br><br>$A = 2(ab + bc + ac)$<br><br>where a, b, and c are the lengths of three sides of the rectangular prism.<br><br>**General Prism:** The formula for the lateral surface | Circulate around the room to provide guidance and answer questions.<br><br>**Exercise;**<br><br>1. Find the surface area of a prism given above whose base area is 12 square units, the base perimeter is 18 units and the height of the prism is 6 units.<br>2. What will be the surface area of the triangular prism if the base and height of a triangular prism are 8 units and 14 units respectively along with the height of the equilateral triangular bases being 9 units?<br>3. Find the lateral surface area of the prism given if the perimeter of the base is 200 inches, height of the prism is 75 inches. Also, find the surface area of the prism if the base area is 250 sq. inches. |

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| | | area of a right prism is:<br><br>A = perimeter × height<br><br>where perimeter is the sum of the bases and height is the distance between the bases.<br><br>**Oblique Prism:** There is no easy way to calculate the surface area of an oblique prism in general.<br><br>Using these formulas, we can calculate the surface area of each prism. However, without specific dimensions (a, b, c, and h) for each prism, we cannot provide exact values. If you provide the dimensions, I can assist with the calculations.<br><br>Here's a summary of the formulas:<br><br>• Triangular Prism: $0.5 \times \sqrt{(a + b + c) \times (-a + b + c) \times (a - b + c) \times (a + b - c)} + h \times (a + b + c)$<br>• Rectangular Prism (Box): $2(ab + bc + ac)$<br>• Right Prism: perimeter × height | |
| **FRIDAY** | Introduce graphing software and online tools for visualization and calculation | 1. Assist Learners to use Desmos Studio to graph and calculate surface areas of:<br>  ○ Triangles (e.g., equilateral, right, isosceles)<br>  ○ Rectangles (e.g., squares, rectangles with different side lengths)<br>2. Discuss with the Learners on how changing parameters (e.g., side lengths, angles) affects surface area.<br>3. Learners brainstorm to use graphing software to visualize and compare surface areas of different shapes.<br>4. Learners in small groups to discuss real-world applications and scenarios where surface area calculations are important.<br><br>• **Desmos**: A free online graphing calculator that allows you to explore math concepts, including graphing functions, plotting points, and visualizing algebraic equations. You can use Desmos to create graphs comparing the surface areas of different shapes, such as spheres, cylinders, and prisms.<br>• **Graphviz**: A graphing software that offers features for concrete diagrams, including options for colors, fonts, and custom shapes. You can use Graphviz to create diagrams illustrating the surface areas of various | Learners brainstorm to complete exercises and problems using graphing software to calculate surface areas |

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| | | shapes, highlighting their differences and similarities.<br>• **Adobe Illustrator**: A vector-based design software that can be used for graphing and visualizing shapes. You can create custom shapes and calculate their surface areas using mathematical formulas, then visualize the results using Illustrator's graphing tools.<br><br>**Example Comparison**:<br><br>Suppose you want to compare the surface areas of a sphere, cylinder, and rectangular prism with the same volume. You can use **Desmos or Graphviz** to create a graph illustrating the surface areas of each shape. The graph could display the following information:<br><br>• **X-axis**: Volume (constant for all shapes)<br>• **Y-axis**: Surface Area<br>• **Shapes**: Sphere, Cylinder, Rectangular Prism<br><br>The graph would allow you to visualize the surface area differences between the shapes, enabling you to identify which shape has the smallest or largest surface area for a given volume. | |

**Name of Teacher:** **School:** **District:**