Learning Plan (Volume of Prisms).							
Subject	*Mathematics*	**Week**	*20*	**Duration**	*4HR S*	**Form**	*1*
Strand	*Geometry Around Us*	**Sub-Strand**	*Measurement*				
Content Standard	*Demonstrate conceptual understanding of the measurement of surface area, volume and capacity of solid shapes.*						
Learning Outcome(s)	*Determine the volume and capacity of solid shapes and solve problems that involve SI and imperial units.*						
Learning Indicator(s)	*a) Solve problems that involve SI and imperial units in volume of prisms.* *b) Solve real world problems that involves the volume of prisms.*						
Essential Question(s)	*(A) How can the concept of volume be extended to different types of prisms, such as rectangular prisms, and trapezoidal prisms, and how are the volume formulae derived for these shapes?* *(B) How are the concepts of volume of prisms applied in real – world scenarios, such as in packaging, shipping, and architecture, to determine quantities and make decisions?* *(C) What strategies can be used to solve real – world problems involving the volume of prisms, and how do these problems enhance our understanding of volume measurement in practical contexts?*						
Pedagogical Strategies	*Experiential Learning, Problem – Based Learning, Collaborative Learning.*						
Teaching & Learning Resources / References	*Calculator, whiteboard, marker, Mathematics Teacher Manual (Page 57 – 63), NTS handbook, Concise Core Mathematics Textbook (Page 479 – 511), Visual aids (charts showing prism types), Worksheets with practice problems, 3D models of rectangular, square, triangular, and trapezoidal prisms, Real – world examples (e.g., packaging boxes, architectural models), physical objects with prism shapes (e.g., boxes, tents)*						

Key Notes on Differentiation

Learning Tasks:

a) Learners identify various prisms and indicate the type of face, number of faces, edges and vertices.
b) Learners determine the volume of given prisms.
c) Learners workout the height or width or length of a prism when the volume is given.

Pedagogical Approach 1: *Group & pair activities.*

Learners discuss and provide justification for given formulae of prisms. ***Learners also*** *solve problems, using formulae for determining the volume of the prisms with given dimensions.*

To differentiate;

a) Offer different modes of instruction to cater to diverse learning styles. Some students may benefit from direct instruction, while others may prefer hands-on activities or collaborative learning experiences.
b) By incorporating a variety of instructional approaches, you can engage all students more effectively.

Pedagogical Approach 2: *Problem-based group learning.*
Learners complete task sheets on volume, including word/real-life problems to solve.
To differentiate,

a) Monitor each group's progress closely and provide personalized feedback to address specific misconceptions or difficulties that arise.
b) Encourage peer teaching within the groups so that students can learn from one another and clarify any misunderstandings together.

Key assessment
Assessment Level 2

a) What is the volume of a triangular prism with dimensions of 12 m, 16 m, and 20 m?
b) A swimming pool in the shape of a cuboid has a length of 10 meters, a width of 5 meters, and a depth of 2 meters. If the pool is filled with water, how much water does it hold?
c) *The height of a square prism is 11 yards. The volume is 99 cubic yards. What is the length of the side of the square at the base of the prism?*

Keywords	*Volume, Prism, Rectangular Prism, Trapezoidal Prism, Base Area, Height, Packaging, Architecture, Uniform Cross – section, Combination Prisms, Real – world Application.*

Lesson 1

Main Lesson drawing on Concepts, Skills, and Competencies to reinforce as in the Subject Teacher Manual

Teacher Activity	***Learner Activity***
Starter ***Activity (e.g.,10 minutes)*** ***Teacher Activity:*** *Display a variety of 3D everyday objects shaped like rectangular, square, triangular, and trapezoidal prisms (e.g., cereal boxes, tents, ramps, etc.) and ask learners which objects might have the largest volume and why?* ***Learner Activity:*** *Learners relate to the concept of volume through the familiar objects displayed or shown to them and answers which of the objects might have the largest volume with reasons.*	
Introductory Activity (e.g., 15minutes) *Introduce the concept of volume by revisiting the area of 2D shapes specifically rectangle, square, triangle, and trapezium. Discuss how these areas form the base of 3D shapes, leading to the concept of volume.* ***Activity 1 (e.g.,40 minutes)*** ❖ *Explain the concept of volume through a visual presentation that includes animations showing how liquid fills shapes and explain prism as a solid with uniform cross-sectional area.* ❖ *Guide learners in naming prisms by the shape of the cross section. (For example, the Triangular*	***Introductory Activity*** *Learners pay attention and observe the connection of how the areas of 2D shapes form the base of 3D shapes.* ***Activity 1*** • *Learners pay attention, observe, and take key notes on words like cross section.* • *Learners name other prisms by the shape of their cross sections.*

prism derived its name from the shape of the cross – section, Triangle, the Trapezoidal prism derived its name from the shape of the cross – section, Trapezium, etc.) ❖ *Present images of the following prisms and ask learners to identify the uniform cross – sectional areas of each. (Rectangular Prism (Cuboid), Square Prism (Cube), Triangular Prism, Trapezoidal Prism, Hexagonal Prism, Pentagonal Prism, and Cylinder.* ***Hint:*** *Teacher moves around to supervise and offer help where necessary.* ***Activity 2 (e.g., 45 minutes)*** ❖ *Use 3D models of rectangular, square, triangular, and trapezoidal prisms to explain and derive the volume formulas for each type of prism by multiplying the area of the base (cross – sectional area) by the height.* ❖ *Present and work through a set of examples where the volume of each type of prism is calculated step – by – step.* ❖ *In mixed ability and gender groupings, assign other models of prisms to learners to calculate the volume of each using the derived formulas.* ***Hint:*** *Teacher moves around to supervise the work assigned to each group.*	• *Learners identify uniform cross – sectional areas of prisms presented to them.* ***Activity 2*** • *Learners pay attention and take key notes of the formula for each type of prism.* • *Learners participate in the process by asking guiding questions.* • *Learners in their respective groupings collaborate to calculate the volume of each prism assigned and share their solutions to the class.*
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Assessment Level 2 *(a) What is the volume of a triangular prism with dimensions of 12 m, 16 m, and 20 m?* *(b) A swimming pool in the shape of a cuboid has a length of 10 meters, a width of 5 meters, and a depth of 2 meters. If the pool is filled with water, how much water does it hold?* *(c) The height of a square prism is 11 yards. The volume is 99 cubic yards. What is the length of the side of the square at the base of the prism?*	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	

Activity: 10 minutes

(a) Recap the key concepts discussed, particularly the formulas for the volume of prisms.

(b) Invite learners to share one new thing they learned and how they think it might be useful outside the classroom.

Reflection & Remarks

(a) Reflect on whether the lesson objectives were met and identify any areas where learners might need additional support.

(b) Reflect on how well the learners grasped the concepts and participated in group work.

Lesson 2

Main Lesson drawing on Concepts, Skills, and Competencies to reinforce as in the Subject Teacher Manual

Teacher Activity	***Learner Activity***
Starter ***Activity (e.g., 10 minutes)*** ***Teacher Activity:*** *Ask learners to recall the formulas for calculating the volume of individual prisms (Rectangular, Square, Triangular, and Trapezoidal).* ***Learner Activity:*** *Learners write down the formulas for the volume of individual prisms.*	
Introductory activity (e.g.,15 minutes) *Introduce a combination prism by showing model or diagram of a shape made by combining a rectangular prism with a triangular prism or other prisms put together and demonstrate how to decompose the shape into simpler prisms and calculate the volume of each, then sum the volumes to find the total volume.*	***Introductory activity*** *Learners pay attention, observe the demonstration of the decomposition process, and take key notes.*
Activity 1 (e.g., 30 minutes) *Use Visual aids to show the decomposition process of combination prisms into simpler prisms and explain the steps involved in calculating the volume.*	***Activity 1*** *Learners pay attention, observe the demonstration of the decomposition process into simpler prisms, and take key notes of steps involved in calculating the volume.*
Activity 2 (e.g., 30 minutes) ❖ *Provide learners with examples of combination prisms and guide them through the decomposition and calculation process.* ❖ *In mixed ability and gender groupings, assign other combination prisms to learners to calculate their volumes.* ***Hint:*** *Teacher moves around to supervise*	***Activity 2*** • *Learners participate in the process by asking guiding questions.* • *Groups present their solutions to the class, explaining their decomposition process and volume calculations.*

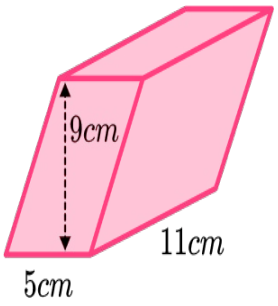
and assist groups as they work on decomposing prisms and calculating volumes assigned to them. ***Activity 3 (e.g., 25 minutes)*** *In mixed ability and gender groupings, present problems related to packaging or architecture for learners to apply their knowledge on volumes to solve.* ***Hint:*** *Teacher moves around to supervise the work assigned to groups.*	***Activity 3*** *Learners collaborate in their respective groups to solve the real – world problems assigned to them.*

Assessment DoK aligned to the Curriculum and Subject Teacher Manual

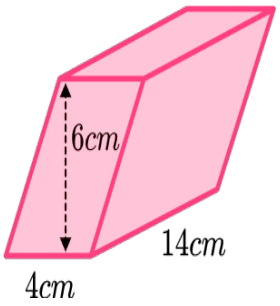
Assessment Level 3:

1. Work out the volume of the prisms below:

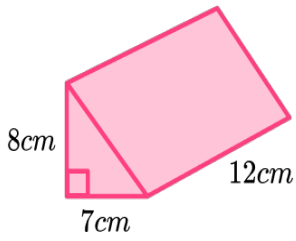
a)



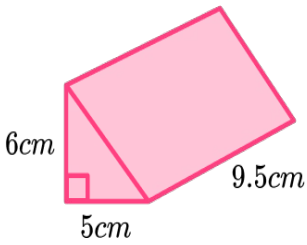
b)



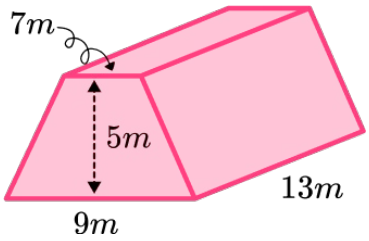
c)



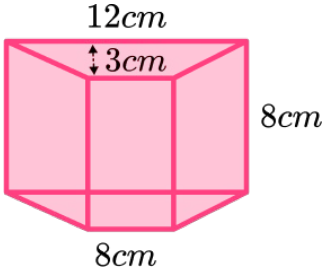
d)



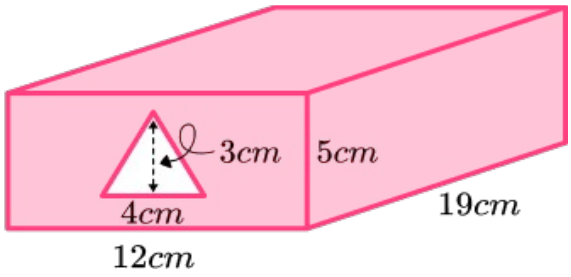
e)



f)

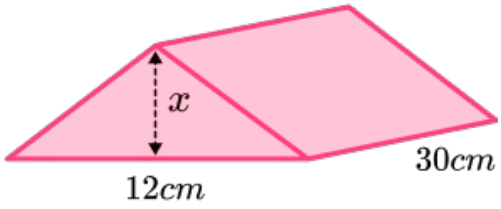


2 (a) *This solid shape has a hole all the way through the middle. Work out the volume of the solid shape.*



(b) Convert the volume to m^3.

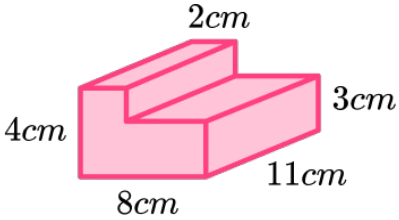
(c) Work out the value of x in the prism below given that its volume is $1440\,cm^3$.



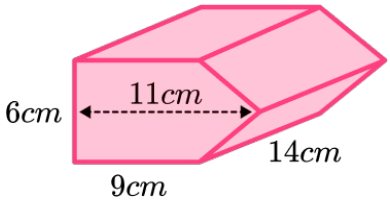
$Volume = 1440cm^2$

3. *Work out the volume of the prisms below:*

a)



b)



Assessment Level 4:

A storage box is designed by combining two different prisms: a rectangular prism at the bottom and a triangular prism on top. The rectangular prism has a length of 60 cm, a width of 40 cm, and a height of 50 cm. The triangular prism has a base of 40 cm (which matches the width of the rectangular prism), a height of 30 cm, and a length of 60 cm (which matches the length of the rectangular prism). Calculate the total volume of the storage box.

Lesson Closure

In completing this part, refer to the Essential Questions to check that learning has taken place.

Activity: 10 minutes

(a) Summarize the lesson's key points, emphasizing the process of calculating the volume of combination prisms.

(b) Ask learners to reflect on what they found most interesting and how they can use this knowledge in everyday life.

Reflection & Remarks

Teacher Reflection:

Reflect on the success of the lesson:

(a) Did the learners grasp the concept of the combination prisms and the method of calculating their volume?

(b) Was the problem – based approach effective in helping them understand real – world applications?

(c) Was there enough time allocated for each activity, or did some sections feel rushed?

(d) Were learners actively involved in discussions, problem – solving, and hands – on activities?

(e) Were the materials and activities appropriate for learners with different levels of understanding?

(f) Did the learners see the relevance of calculating the volume of combination prisms in practical scenarios like packaging or architecture?

Learner Reflection:

Encourage learners to reflect on their learning experience, identifying areas where they excelled and where they might need further practice.

Remarks:

(a) Note any specific observations about learner engagement or difficulties encountered.

(b) Consider adjustments for future lessons based on these observations.