The teacher provides learners with multiple opportunities to draw and interpret geometric solids with the preservation of their properties.

In Grade 7 learners learnt to draw objects from different perspectives. That is, concrete objects were used as the basis for making these drawings. While the illustrative example for Grade 7 introduced the idea of the "preservation" of properties implicitly, in this grade we become more explicitly interested in the "preservation" of properties.

Example 2

2.1 Imagine looking at a rectangular prism in **figure 1** below at points X, Y and Z;-

a) Draw what you would see as you look from different views.
b) Describe each view.

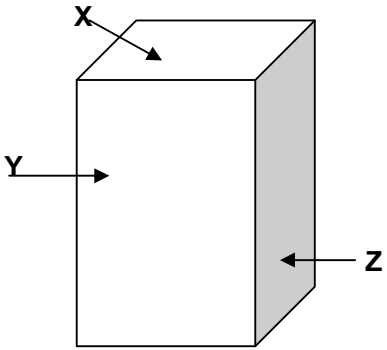


Figure 1

2.2 a) Will you see a rectangle or a triangle when looking at the triangular prism in **figure 2** below, from points P to T each time?

b) Explain how many triangles and rectangles would you see and describe from which view you'll be looking at.

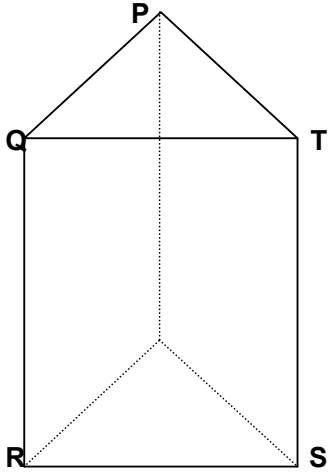
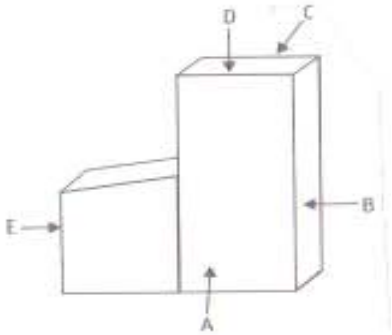


Figure 2

2.3 Match views a) to e) below with what you see from points A to E in **figure 3** below;-



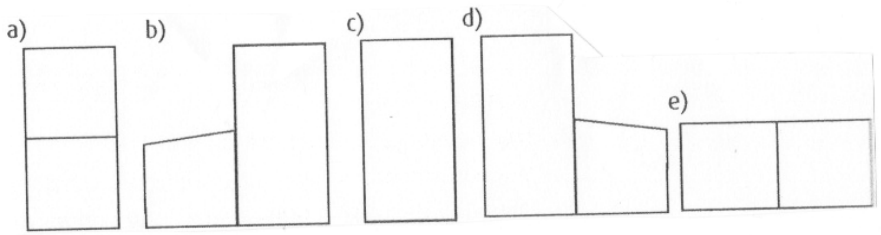


Figure 3

Describe each view in a) to e).

2.4 The drawings in **figure 4** below show 3-D front and back views of the same group of solids;-

a) Draw the 2-D views you would get from points A to E.

b) Check your work with a partner.

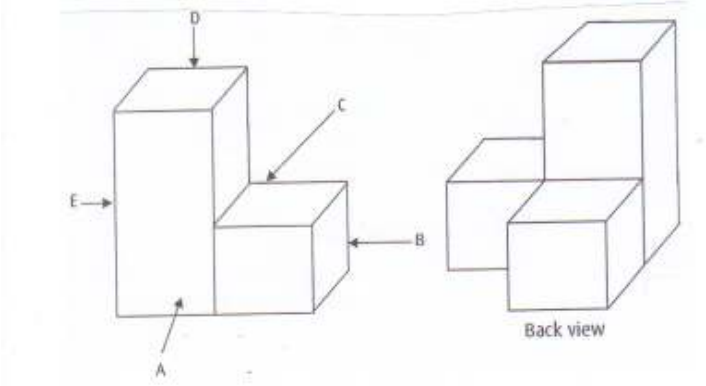


Figure 4

2.5 Here is the picture of the city skyline of Johannesburg in **figure 5** below. Most major cities of the world have their skyline

dominated by skyscrapers (very tall buildings). Many of these are magnificent buildings and are constructed in the shape of different geometric solids.

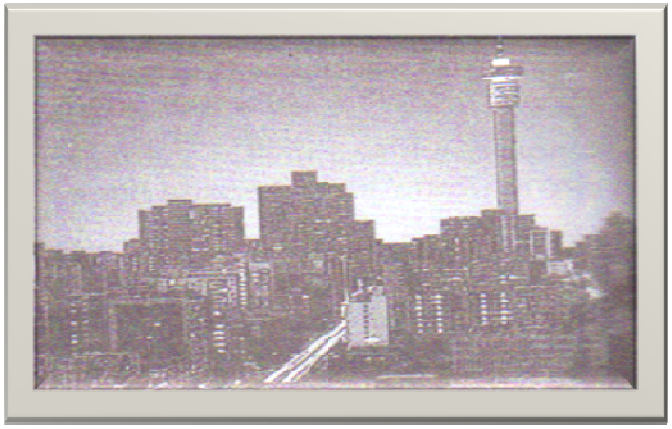
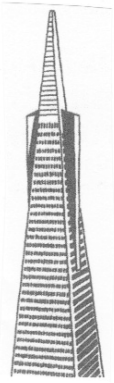


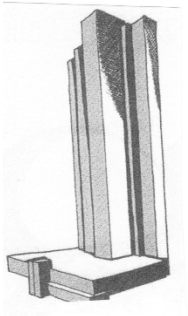
Figure 5

Look at each building below carefully and work out what geometric solid shapes make up each one;



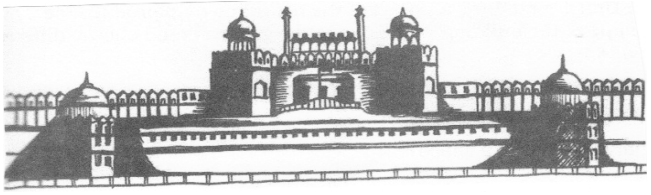
a)

b)

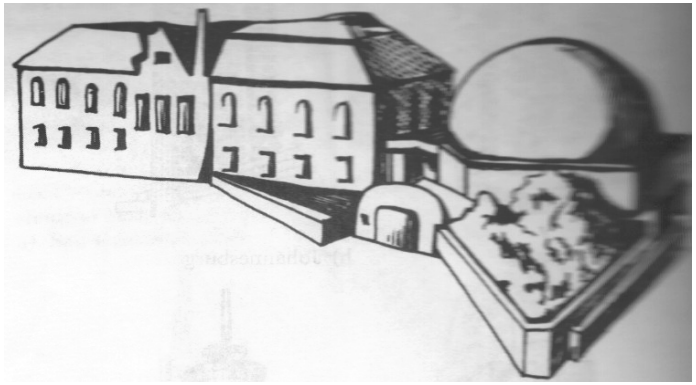


c)

d)



e)



f)

g)

The teacher gives more activities to consolidate this concept.

RESOURCES: grid paper; ruler; maps; direction compass; pencil; shapes and maths instrument sets.

INTEGRATION: LO 2 Patterns, functions and Algebra; Social Sciences and Technology.

ASSESSMENT: Assignment; Investigation and Test.

BARRIERS TO LEARNING: Plotting of position on Cartesian planes might be a challenge, remind learners beforehand. Also, those learners who have never used an Atlas before might find difficulties in doing Act. 1.4 Ask the Geography teacher to assist you in this regard.

EXPANDED OPPORTUNITIES: Give more challenging real life activities for the mastering of these concepts.

TEACHER REFLECTION:

WEEK	LO's & AS's	CONTENT	ACTIVITIES
6	**CLUSTER 2 [LO 3]** LO 3 : Space and Shape 8.3.6 Uses transformations (rotations, reflections and translations) and symmetry to investigate (alone and/or as a member of a group or team) properties of geometric figures. 8.3.7 Uses proportion to describe the effect of enlargement and reduction on properties of geometric figures.	Investigation of properties of geometric figures using transformation and symmetry. Description of the effect of enlargement and reduction on properties of geometric figures using proportion.	**ACTIVITY 1** The teacher recaps and extends on the uses of transformations and symmetry as it was dealt with in grade 6 with the learners. **ACTIVITY 2** The teacher does revision on enlargement and reduction of 2 – D shapes drawn in grade 6 using the grid paper to compare size and shape.
	ACTIVITY 1 The teacher reminds the learners about the properties of geometric figures which are preserved when using Transformations and investigate symmetries in polygons. Example 1.1 i) Use the grid in **figure 1** below, to tessellate triangle ABC so that the whole grid is covered with triangle. ii) Describe, in terms of transformations, how you moved the triangle in order to create the tessellation.		

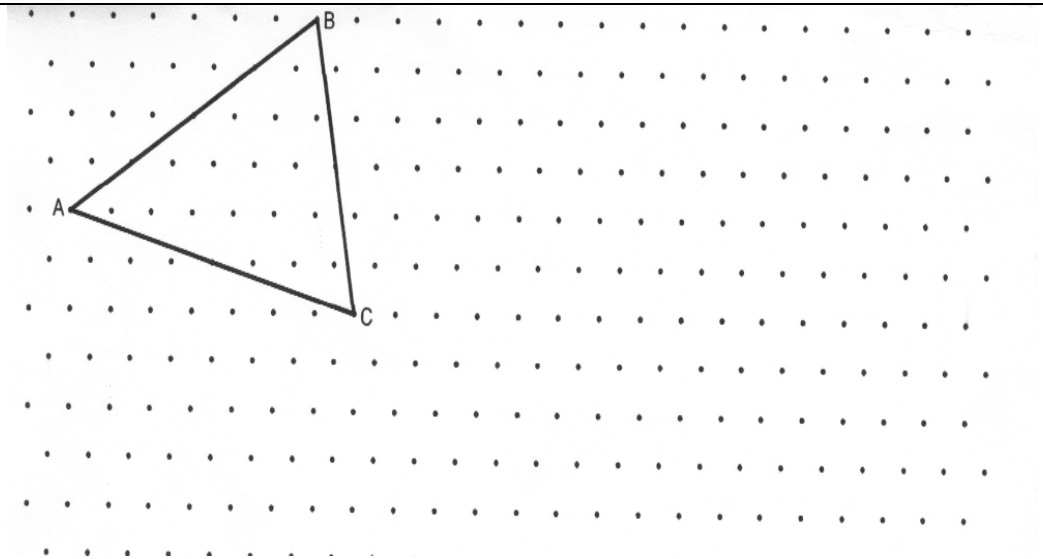


Figure 1

iii)By highlighting a pair of parallel lines and a transversal that cuts them use the tessellation to justify the properties of the following angle pairs:- Alternate angles;
- Corresponding angles and
- Co-interior angles.

iv) By highlighting the intersection of two lines use the tessellation to justify the properties of vertically opposite angles.

v) Use the tessellation to justify the rule which states that the angle sum of the interior angles of a triangle is 180°.

vi) Use the tessellation to justify the rule which states that the exterior angle of a triangle is equal to the sum of the interior opposite angles of the triangle.

Rotations, reflections and translations do not change the angle sizes or the lengths of the sides of a shape.

Example 1.2

a) Translate the triangle eight units to the right. Write down the coordinates of the vertices the translated angle on **figure 2** below;-

b) Record what remains the same. What changes?

c) Complete the following coordinates;-

i) (-7 ; -3) is translated to (___ ; ___)

ii) (-4 ; -3) is translated to (___ ; ___)

iii) (-4 ; -1) is translated to (___ ; ___)

iv) (-x ; -y) is translated to (___ ; ___)

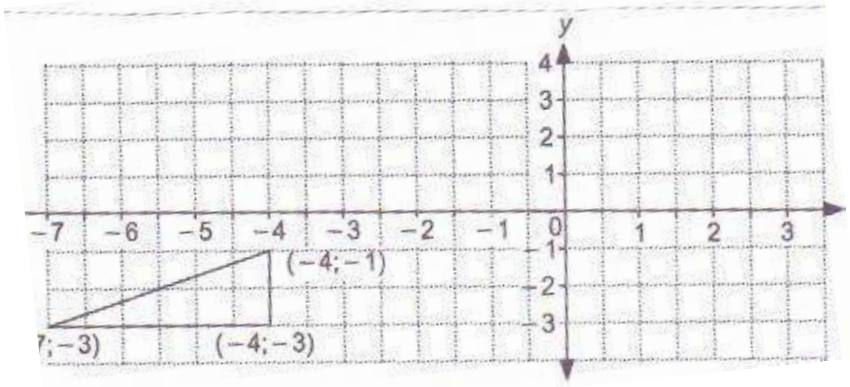


Figure 2

Example 1.3

a) Consider the translation which moved KODM to the new position K'O'D'M' in **figure 3** below;-
Complete: The short rule for this translation is (__; __). In words translation (__; __) means: __ units to the right ___ units (K' reads'' K'')

b) Line KM is translated to line K'M' is the image under the translation. Record the image of;-

i) KO

ii) OD

iii) DM

c) Study the following:

K (-3; 3) is translated to K' (-3 + 5; 3 – 4)

M (-1; 3) is translated to M' (-1 + 5; 3 – 4)

O (-4; 1) is translated to O' (-4 + 5; 1 – 4)

Describe in your own words the meaning of +5 and -4 in the coordinates of K', M' and O'.

d) Record the ordered pair rule for the translation in the form $(x; y) \rightarrow (\_\_; \_\_)$.

e) Record the translation as short rule (__; __).

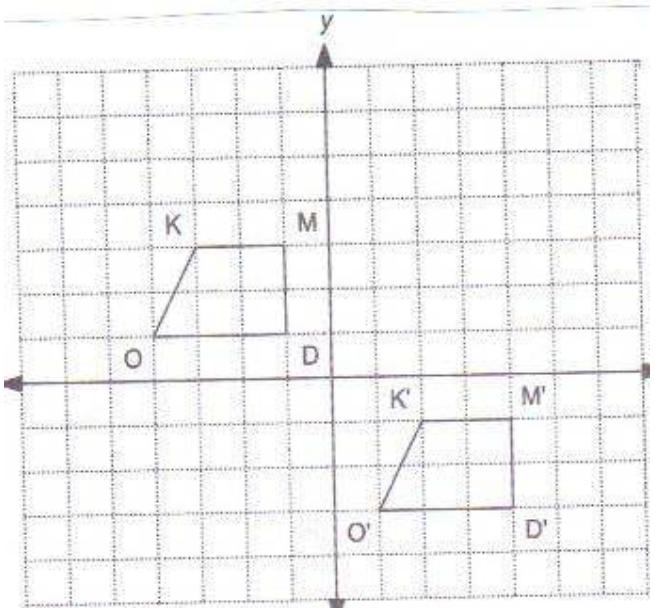


Figure 3

Example 1.4

Apply the translation (4;3) on ∆PQR, with vertices P(-5;5), Q(-5; 1) and R(-3;1)

Example 1.5

The provides learners with activities where they will use symmetry to investigate (alone and/or as a member of a group or team) properties of geometric figures;-

a) Draw a square with sides at least 6cm. Cut out the square. Use this square to investigate reflectional symmetries for the square.

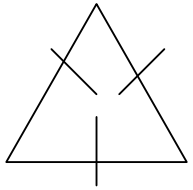
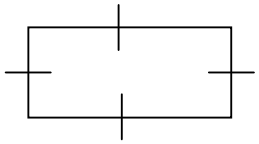
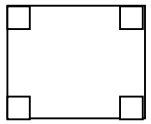
i) Fold the square about a vertical line in the middle. Check if the two parts fit exactly onto each other. What do you observe?

ii) Fold the square about a horizontal line in the middle. Check if the two parts fit exactly onto each other. What do you observe?

iii) Fold the square about the main diagonal line. What do you observe?

iv) Fold the square about the main diagonal line. What do you observe?

b) Give the learners a table to use it to identify symmetries in polygons. Copy and complete the table in **figure 4** below. Tick off which symmetries are present in each polygon.;-

Shape			
Reflectional symmetry			
Vertical			
Horizontal			
Main diagonal			
Other diagonal			
Rotational symmetry			
60°			
90°			
120°			
180°			
240°			
270°			
300°			
0° or 360°			
Number of symmetries per shape			

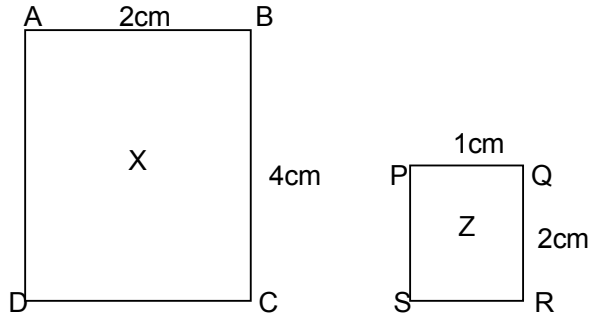
ACTIVITY 2

The teacher does revision on enlargement and reduction of 2 – D shapes drawn in grade 6 using the grid paper to compare size and shape. S/he must also provides learners with various activities in which they will explore proportion, enlargement and reduction and introduces the concept of the scale factor as used in enlargements and reductions.

Example 2.1

The teacher allows the learners to discuss in their respective groups, the understanding and prior knowledge of the concepts enlargement, reduction, scale, factor based on their daily life experience. Then learners report back and the teacher consolidates;-

Using a Cartesian plane, learners draw any rectangular shape x as shown on **figure 4** below;-



The teacher explains what it means to reduce a shape by, e.g. a scale factor of 2 as in shape Z.
Learners then compare the properties of the two shapes in terms of angles, dimensions, areas and perimeter then report back.

The teacher gives more activities to consolidate this concept.

RESOURCES: Isometric grid; square grid paper; pencil and ruler.

INTEGRATION: LO 1: Numbers, operations and relationship.

ASSESSMENT: Assignment; investigation and test.

BARRIERS TO LEARNING:

EXPANDED OPPORTUNITIES:

TEACHER REFLECTION:

WEEK	LO's & AS's	CONTENT	ACTIVITIES
7 – 8	**CLUSTER 3 [LO 5]** LO 5 : Data handling 8.5.10 Consider a simple situation (with equally likely outcomes) that can be described using probability and: • Lists all the possible outcomes; • Determine the probably of each possible outcome using the definition of probability; • Finds the relative frequency of actual outcomes for a series of trials; • Compares relative frequency probability and explains possible differences; • Predicts with reason the relative frequency of possible outcomes for a series of trials based on probability.	Description of simple situations using probabilities.	**ACTIVITY 1** The teacher recaps on concepts like possible outcomes, impossible, certain, uncertain and frequency as it was dealt with on previous grades. **ACTIVITY 2** The teacher introduces the concept probability and sample space with the intention to relate and consolidate with the concepts in activity 1. **ACTIVITY 3** Application of probability, sample space, general formula of probabilities including frequency.
	ACTIVITY 1 The teacher recaps on concepts like possible outcomes, impossible, certain, uncertain and frequency as it was dealt with on previous grades. Example 1 The teacher unpacks the concept probability and sample space with the intention to relate to the aforementioned concepts. Probability is the $\frac{\text{number of favourable outcomes}}{\text{total number of possible likely outcomes}}$		

ACTIVITY 2

The teacher introduces the concept probability and sample space with the intention to relate and consolidate with the concepts in activity 1.

Example 2

A boy is rolling a fair die once;-

a) Write down a sample space of a fair die.
b) Use the general formula of probability to calculate ;-
   i) What is probability of getting a perfect square?
   ii) What is probability of getting even numbers?
   iii) What is probability of getting odd numbers?
   iv) What is probability of getting prime numbers?

Example 3

The teacher ask the learners to work in groups and consider the following trials;-

a) Rolling a fair die 120 times, listing how many times you roll 5.
b) Tossing two coins at the same time 100 times to see how many times they both land with the two heads up.
c) Using a bag with three balls (black; blue and green).

- Record the frequency of the trials given above.

Example 4

When a trial is repeated several times we can predict the number of times we expect a successful result to occur.

e.g. Expected successful events = probability of getting a 5 = $\frac{1}{6}$

$\therefore$ Expected events = $\frac{1}{6}$ x 120

= 20 $\longrightarrow$

$\Rightarrow$ It is reasonable to expect a 5 to occur 20 times if we roll the dice 120 times, though in reality this may not be the case.

ACTIVI TY 3

Expanding on example 1, group learners into 8 groups. Provide each group with a fair die and ask them to roll the die 100 times. Let them record their findings on the table in **figure 1** below;-

Number on dice	Probability	Number of times in 100 trials	Experimental Probabilities
1			
2			
3			
4			
5			
6			
Even			
Odd			

Compare and explain the possible differences between relative frequency and probability.

The teacher gives more activities to consolidate this concept.

RESOURCES: Dice; coins; bag; coloured balls; pencil and ruler.

INTEGRATION: LO 1: Numbers, operations and relationship.

ASSESSMENT: Investigation and test.

BARRIERS TO LEARNING: Terminology might be a challenge use a dictionary to check unfamiliar terms.

EXPANDED OPPORTUNITIES: Use more real life activities like lotto to expand on this concept.

TEACHER REFLECTION: