# MATHEMATICS _2022 WEEKLY TEACHING PLAN _ GRADE 9

| TERM 1 | Week 1 3 days | Week 2 5 days | Week 3 5 days | Week 4 5 days | Week 5 5 days | Week 6 5 days | Week 7 5 days | Week 8 5 days | Week 9 5 days | Week 10 4 days |
|---|---|---|---|---|---|---|---|---|---|---|
| Hours per week | 2.5 hrs | 4.5 hrs | 4.5 hrs | 4.5 hrs | 4.5 hrs | 4.5 hrs | 4.5 hrs | 4.5 hrs | 4.5 hrs | 3.5 hrs |
| Hours per topic | 2.5 hrs | 7 hrs | | 9 hrs | | 2 hrs | 9 hrs | | 4.5 hrs | 4.5 hrs | 3.5 hrs |
| % Coverage | 1.7% | 4.8 = 6.5% | | 6.2 = 12.7% | | | 6.2 = 18.9% | | 3 = 21.9% | 3 = 25% | |
| **Topics, concepts and skills** | REVISION OF GRADE 8 WORK | **WHOLE NUMBERS**<br><br>**Properties of numbers**<br>• Describe the real number system by recognising, defining and distinguishing properties of:<br>– natural numbers, whole numbers, integers, rational numbers, irrational numbers<br><br>**Calculations using whole numbers**<br>• Revise: Calculations using all four operations on whole numbers, estimating and using calculators where appropriate<br><br>**Multiples and factors**<br>• Use prime factorisation of numbers to find LCM and HCF<br><br>**Solving problems**<br>• Solve problems in contexts involving:<br>– Ratio and rate<br>– Direct and indirect proportion | | **INTEGERS**<br><br>**Calculations with integers**<br>• Revise:<br>– addition and subtraction with integers<br>– Multiplication and division with integers<br>– perform calculations involving all four operations with integers<br>– perform calculations involving all four operations with numbers that involve the squares, cubes, square roots and cube roots of integers<br><br>**Properties of integers**<br>• Revise:<br>– Commutative, associative and distributive properties of addition and multiplication for integers<br>– Additive and multiplicative inverses for integers | | **FORMAL ASSESSMENT TASK**<br><br>**ASSIGNMENT**<br>• Whole numbers<br>• Integers | **EXPONENTS**<br><br>**Calculations using numbers in exponential form**<br>• **Revise** the following general laws of exponents.<br>– $a^m \times a^n = a^{m+n}$<br>– $a^m \div a^n = a^{m-n}$, if $m>n$<br>– $(a^m)^n = a^{m \times n}$<br>– $(a \times t)^n = a^n \times t^n$<br>– $a^0 = 1$<br>• **Extend** the general laws of exponents to include:<br>– integer exponents<br>– $a^{-m} = \dfrac{1}{a^m}$<br><br>• Perform calculations involving all four operations using numbers in exponential form | | **NUMERIC AND GEOMETRIC PATTERNS:**<br>**NUMERIC PATTERNS**<br>**Investigate and extend patterns**<br>• Investigate and extend numeric and geometric patterns looking for relationships between numbers including patterns:<br>– represented in physical or diagram form, not limited to sequences involving a constant difference or ratio, of learner's own creation, represented in tables, represented algebraically<br>• Describe and justify the general rules for observed relationships between numbers in own words or in algebraic language | REVISION | **FORMAL ASSESSMENT TASK**<br><br>**TEST**<br><br>All Term 1 topics |
| **Prerequisite skill or pre-knowledge** | | • The commutative; associative; distributive properties of whole numbers<br>• 0 in terms of its additive property (identity element for addition)<br>• 1 in terms of its multiplicative property (identify element for multiplication)<br>• Recognise the division property of 0, whereby any number divided by 0 is undefined | | • Perform calculations involving all four operations with numbers that involve squares, cubes, square roots and cube roots of integers<br>• Calculate the squares, cubes, square roots and cube roots of rational numbers | | | • Recognize and use the appropriate laws of numbers involving exponents and square and cube roots | | • Determine input values, output values and rules for patterns given in input-output diagrams<br>• Determine equivalence of different descriptions of the same relationship or rule presented verbally, in a flow diagram, by a number sentence. | | |

| TERM 2 | Week 1<br>4 days | Week 2<br>4 days | Week 3<br>4 days | Week 4<br>4 days | Week 5<br>4 days | Week 6<br>5 days | Week 7<br>5 days | Week 8<br>5 days | Week 9<br>5 days | Week 10<br>3 days | Week 11<br>5 days |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Hours per week** | 3.5 hrs | 3.5 hrs | 3.5 hrs | 3.5 hrs | 3.5 hrs | 4.5 hrs | 4.5 hrs | 4.5 hrs | 4.5 hrs | 2.5 hrs | 4.5 hrs |
| **Hours per topic** | 6 hrs | | 14 hrs | | | 2 hrs | 13.5 hrs | | | 2.5 hrs | 4.5 hrs |
| **% Coverage** | 4.1 = 29.1% | | 9.7 = 38.8% | | | | 9 = 47.8% | | | 1.7 = 50% | |
| **Topics, concepts and skills** | **NUMERIC AND GEOMETRIC PATTERNS**<br>**GEOMETRIC PATTERNS**<br><br>**Investigate and extend patterns**<br>• Investigate and extend numeric and geometric patterns looking for relationships between numbers including patterns:<br>  – represented in physical or diagram form, not limited to sequences involving a constant difference or ratio, of learner's own creation, represented in tables, represented algebraically<br>• Describe and justify the general rules for observed relationships between numbers in own words or in algebraic language | | **ALGEBRAIC EXPRESSIONS**<br><br>**Algebraic language**<br>• Revise the following:<br>  – Recognize and identify conventions for writing algebraic expressions<br>  – Identify and classify like and unlike terms in algebraic expressions<br>  – Recognize and identify coefficients and exponents in algebraic expressions<br>  – Recognize and differentiate between monomials, binomials and trinomials<br><br>**Expand and simplify algebraic expressions.**<br>• Revise the following: using the commutative, associative and distributive laws for rational numbers and laws of exponents to:<br>  – add and subtract like terms in algebraic expressions.<br>  – multiply integers and monomials by: monomials, binomials, trinomials<br>  – divide the following by integers or monomials: monomials, binomials, trinomials<br>  – simplify algebraic expressions involving the above operations<br>  – determine the squares, cubes, square roots and cube roots of single algebraic terms or like algebraic terms<br>  **N.B. ENSURE THAT COMMON FRACTIONS AND DECIMAL FRACTIONS ARE PART OF CALCULATIONS WITH EXPRESSIONS (Page 122 and 123 of CAPS)**<br>• Extend the above algebraic manipulations to include:<br>  – multiply integers and monomials by polynomials,<br>  – divide polynomials by integers or monomials,<br>  – the product of two binomials,<br>    the square of a binomial<br><br>**Factorize algebraic expressions**<br>• Factorize algebraic expressions that involve:<br>  – common factors<br>  – difference of two squares<br>  – trinomials of the form:<br>    ✓ $x^2 + bx + c$<br>    ✓ $ax^2 + bx + c$, where *a* is a common factor.<br>• Simplify algebraic expressions that involve the above factorisation processes.<br>• Simplify algebraic fractions using factorisation | | | **FORMAL ASSESSMENT TASK**<br><br>**INVESTIGATION**<br>• Numeric and geometric patterns<br>• Algebraic expressions | **ALGEBRAIC EQUATIONS**<br><br>• **Revise the following:**<br>  – set up equations to describe problem situations<br>  – analyse and interpret equations that describe a given situation<br>  – Solve equations by inspection<br>  – using additive and multiplicative inverses<br>  – using laws of exponents<br>  – Solve equations by substitution<br>  – Use substitution in equations to generate tables of ordered pairs<br>• Extend solving equations to include:<br>  – using factorisation<br>  – equations of the form: a product of factors = 0 | | | **REVISION** | **FORMAL ASSESSMENT TASK**<br><br>**TEST/EXAMINATION**<br><br>All Term 1 & 2 topics |

| **Prerequisite skill or pre-knowledge** | • Determine input values, output values or rules for patterns and relationships using flow diagrams, tables and formulae<br>• Determine, interpret and justify equivalence of different descriptions of the same relationship or rule presented verbally, in flow diagrams, in tables and by formulae<br>• | • Algebraic language<br>• Factors and multiples<br>• Expand and simply algebraic expressions<br>• Substitution<br>• Determine the squares, cubes, square roots and cube roots of single algebraic terms or like algebraic terms | | • Write number sentences to describe problem situations<br>• Analyse and interpret number sentences that describe a given situation<br>• Solve and complete number sentences by:<br>  − inspection<br>  − trial and improvement<br>• Identify variables and constants in given formulae or equations<br>• Use substitution in equations to generate tables of ordered pairs<br>• Extend solving equations to include:<br>  − using additive and multiplicative inverses<br>  − using laws of exponents | | |

| TERM 3 | Week 1 4 days | Week 2 5 days | Week 3 5 days | Week 4 5 days | Week 5 4 days | Week 6 5 days | Week 7 5 days | Week 8 5 days | Week 9 5 days | Week 10 5 days | Week 11 4 days |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Hours per work** | 3.5 hrs | 4.5 hrs | 4.5 hrs | 4.5 hrs | 3.5 hrs | 4.5 hrs | 4.5 hrs | 4.5 hrs | 4.5 hrs | 4.5 hrs | 3.5 hrs |
| **Hours per topic** | 6.5 hrs | | 9 hrs | | 5 hrs | 9 hrs | | 9 hrs | | 4.5 hrs | 3.5 hrs |
| **% Coverage** | 3.8 = 53.8% | | 5.2 = 59% | | 2.9 = 61.9% | 5.2 = 67.1% | | 5.2 = 72.3% | | 2.6 = 75% | |

**Topics, concepts and skills**

**FUNCTIONS AND RELATIONSHIPS**

**Input and output values**

- Determine input values, output values or rules for patterns and relationships using:
  – flow diagrams
  – tables
  – formulae
  – equations

**Equivalent forms**

- Determine, interpret and justify equivalence of different descriptions of the same relationship or rule presented:
  – verbally
  – in flow diagrams
  – in tables
  – by formulae
  – by equations
  – by graphs on a Cartesian plane

**GRAPHS**

**Interpreting graphs**
- Extend the focus on features of graphs with special focus on the following features of **linear graphs**:
  – $x$-intercept and $y$-intercept
  – Gradient

**Drawing graphs**
- Use tables of ordered pairs to plot points and draw graphs on the Cartesian plane
- Extend drawing of graphs with special focus on:
  – drawing linear graphs from given equations
  – determining equations from given **linear graphs.**

**TRANSFORMATION GEOMETRY**

**Transformations**

- Recognize, describe and perform transformations with points, line segments and simple geometric figures on a co-ordinate plane, focusing on:
  – reflection in the X-axis or Y- axis
  – translation within and across quadrants

**GEOMETRY OF STRAIGHT LINES**

**Angle relationships**
- Revise and write clear descriptions of the relationship between angles formed by:
  – perpendicular lines
  – intersecting lines
  – parallel lines cut by a transversal

**Solving problems**

- Solve geometric problems using the relationships between pairs of angles described above

**GEOMETRY OF 2D SHAPES AND COSTRUCTION OF GEOMETRIC FIGURES**

**Classifying 2D shapes**

- Revise properties and definitions of triangles in terms of their sides and angles, distinguishing between:
  – equilateral triangles
  – isosceles triangles
  – right-angled triangles

**Constructions**

**PROVIDE LEARNERS WITH ACCURATELY CONSTRUCTED FIGURES TO INVESTIGATE THE PROPERTIES OF TRIANGLES**

- Investigate the angles in a triangle, focusing on the relationship between the exterior angle of a triangle and its interior angles

**Classifying 2D shapes**

- Revise and write clear definitions of quadrilaterals in terms of their sides, angles and diagonals, distinguishing between:
  – parallelogram
  – rectangle
  – square
  – rhombus
  – trapezium
  – kite

**Constructions**
**PROVIDE LEARNERS WITH ACCURATELY CONSTRUCTED**

**REVISION**

**FORMAL ASSESSMENT TASK**

**TEST**

All Term 3 topics

| | | | | | |
|---|---|---|---|---|---|
| | | | | | <span style="color:red">**FIGURES TO INVESTIGATE THE PROPERTIES OF QUADRILATERALS**</span><br>• investigate sides and angles. and diagonals in quadrilaterals, focusing on:<br>  – exploring the sum of the interior angles of polygons<br>  – the diagonals of rectangles, squares, parallelograms, rhombi and kites | |
| **Prerequisite skill or pre-knowledge** | | | • Translations, reflections, rotations enlargements and reductions with geometric figures and shapes on grid paper | • Recognize and describe pairs of angles formed by:<br>  – perpendicular lines<br>  – intersecting lines<br>  – parallel lines cut by a transversal<br>• Solve geometric problems using the relationships between pairs of angles described above | • the sum of the interior angles of triangles<br>• Identify and write clear definitions of types of triangles focusing on sides and angles | |

<span style="color:red">**N.B. BY THE END OF TERM 3, LEARNERS SHOULD HAVE COMPLETED A PROJECT AND A TEST. SEE NOTES ON PROJECT FROM ABRIDGED SECTION 4.**</span>

| TERM 4 | Week 1<br>4 days | | Week 2<br>5 days | Week 3<br>5 days | Week 4<br>5 days | Week 5<br>5 days | Week 6<br>5 days | Week 7<br>5 days | Week 8<br>5 days | Week 9<br>5 days | Week 10<br>4 days |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Hours per week** | 3.5 hrs | | 4.5 hrs | 4.5 hrs | 4.5 hrs | 4.5 hrs | 4.5 hrs | 4.5 hrs | 4.5 hrs | 4.5 hrs | 3.5 hrs |
| **Hours per topic** | 6 hrs | | 4.5 hrs | | 9 hrs | | 9 hrs | | 2 hrs | 12.5 hrs | | |
| **% Coverage** | 4.9 = 79.9% | | 3.7 = 83.6% | | 7.4 = 91% | | 7.4 = 98.4% | | 1.6 = 100% | | | |
| **Topics, concepts and skills** | **GEOMETRY OF  2D SHAPES AND COSTRUCTIONS**<br><br>**Similar and congruent triangles**<br>• Through investigation, establish the minimum<br>  conditions for congruent triangles<br>• Through investigation, establish the minimum<br>  conditions for similar triangles<br><br>**Constructions**<br>**PROVIDE LEARNERS WITH ACCURATELY CONSTRUCTED FIGURES**<br>• Explore the minimum conditions for two triangles to be congruent<br><br>**Solving problems**<br>• Solve geometric problems involving unknown sides and angles in triangles and quadrilaterals, using known properties of triangles and quadrilaterals, as well as properties of congruent and similar triangles. | | **THEOREM OF PYTHAGORAS**<br><br>• Use the Theorem of Pythagoras to solve problems involving unknown lengths in geometric figures that contain right-angled triangles | **AREA AND PERIMETER OF 2-D SHAPES**<br><br>• Use appropriate formulae and conversions between SI units, to solve problems and calculate perimeter and area of:<br>– polygons<br>– circles | | **SURFACE AREA AND VOLUME OF 3 – D OBJECTS**<br><br>• Use appropriate formulae and conversions between SI units to solve problems and calculate the surface area, volume and capacity of:<br>– rectangular prisms<br>– triangular prisms<br>– cylinders cylinders | | **REVISION** | **FORMAL ASSESSMENT TASK**<br><br>**TEST/EXAMINATION** | | |
| **Prerequisite skill or  pre-knowledge** | | | • Determine whether a triangle is a right-angled triangle or not if the length of the three sides of the triangle are known<br><br>• Use the Theorem of Pythagoras to calculate a missing length in a right-angled triangle, leaving irrational answers in surd form | • Use of appropriate formulae to calculate perimeter and area of polygons to include circles to at least 2 decimal places and convert between appropriate SI units, including and up to $km^2$<br><br>• Calculate perimeter and area of complex figures | | • Use of appropriate formulae to calculate the surface area, volume and capacity of cubes and rectangular prisms<br><br>• Describe the interrelationship between surface area and volume of the objects mentioned above<br><br>• Use and convert between appropriate SI units, including:<br>– $mm^2 \leftrightarrow cm^2 \leftrightarrow m^2 \leftrightarrow km^2$<br>– $mm^3 \leftrightarrow cm^3 \leftrightarrow m^3$<br>– $ml\ (cm^3) \leftrightarrow l \leftrightarrow kl$ | | | | | |