**MATHEMATICS LESSON PLAN**

**GRADE 9**

**TERM 1: JANUARY – MARCH**

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| **PROVINCE:** |  |
| **DISTRICT:** |  |
| **SCHOOL:** |  |
| **TEACHER’S NAME:** |  |
| **DATE:** |  |
| **DURATION**: | 1 Hour |

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| 1. **TOPIC: NUMERIC AND GEOMETRIC PATTERNS: Numeric patterns (Lesson 1)** |
| 1. **CONCEPTS & SKILLS TO BE ACHIEVED:** |
| **By the end of the lesson learners should know and be able to**   * investigate and extend numeric and geometric patterns looking for relationships between numbers, including patterns: * not limited to sequences involving a constant difference or ratio. * of learner’s own creation. * Describe and justify the general rules for observed relationships between numbers in own words or in algebraic language. |

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| 1. **RESOURCES:** | Textbooks, DBE Workbook, Sasol-Inzalo book 1. | |
| 1. **PRIOR KNOWLEDGE:** | * Basic operations with whole numbers. * Numeric patterns done in grade 8. * Integers. | |
| 1. **REVIEW AND CORRECTION OF HOMEWORK** (suggested time: 10 minutes)   Homework provides an opportunity for teachers to track learners’ progress in the mastery of mathematics concepts and to identify the problematic areas which require immediate attention. Therefore it is recommended that you place more focus on addressing errors from learner responses that may later become misconceptions. | | |
| 1. **INTRODUCTION**(Suggested time: 10 Minutes) | | |
| Remind learners of the importance of patterns in their lives. Mathematics helps you predict, and number patterns are all about prediction. What will the 70th number of this sequence be? Working with number patterns develops an understanding of the concept of functions in mathematics. To be able to recognise number patterns is an important problem-solving skill. The pattern that you observe when you study a sequence systematically can be used to generalise thus find a solution to the problem.  Ask learners to work in pairs. Learners investigate and extend the sequences below by writing down the next two numbers. They must also explain, in each case, how they figured out what the numbers should be.  Sequence A: 3; 10; 17; 24;… ; …  Sequence B: 3; 9; 27; …. ;…  Sequence C: 4; 16; 80; 480;…;…  Sequence D: -11; -18; -25; … ; …  Sequence E: 432; 72; 12; 2; …; …  Sequence F: 18; 14; 11; 9;…;…  Revise the terms in bold below:  Numbers that follow one another are said to be **consecutive.**  A list of numbers which form a pattern is called a **sequence.**  Each number in a sequence is called **a term** of the sequence.  The first number in the sequence is the **first term**. | | |
| 1. **LESSON PRESENTATION/DEVELOPMENT**(Suggested time: 20 minutes) | | |
| **Teaching activities** | | **Learning activities**  (Learners are expected to: ) |
| **Activity 1.**   * Ask learners to provide a rule to describe the relationship between the terms in sequence A: 3; 10; 17; 24; … ; …   *Here learners should be able to identify the* ***constant difference*** *between consecutive terms. They can describe this pattern in their own words as “adding 7” or “counting in 7s starting from 3” or “adding 7 to the previous number in the pattern’.* | | * learners work in pairs to identify the constant difference in sequence A. Each time they describe the pattern in their own words. * Learners discover that some patterns have constant difference. |
| * Ensure that learners describe the pattern in their own words. * At the end explain that when the differences between consecutive terms of a sequence are the same, we say the **difference is constant. Hence the difference is called ‘constant difference’** | |  |
| **Activity 2**   * Ask learners to provide a rule to describe the relationship between the terms in Sequence B: 3; 9; 27; …. ; …   *Here learners should be able to identify the* ***constant ratio*** *between consecutive terms. They can describe this pattern in their words as “multiply the previous number by 3”*   * Ensure that learners describe the pattern in their own words. * At the end explain that the number that we multiply with to get the next term in the sequence is called a **ratio**. If the number we multiply with remains the same throughout the sequence, we say it is a **constant ratio**. | | * Working in pairs learners identify a constant ratio in sequence B. Each time they describe the pattern in their own words. * Learners discover that some patterns have a constant ratio. |
| **Activity 3**   * Ask learners to provide a rule to describe the relationship between the terms in Sequence C: 4; 16; 80; 480; …; …   *This pattern has* ***neither a constant difference nor constant ratio****. This pattern can be described in learners’ own words as “multiply with one more than was multiplied with to get the previous term”.*   * Ensure that learners describe the pattern in their own words. * Explain that there are sequences where there is **neither a constant difference nor a constant ratio** between consecutive terms and yet a pattern still exists. | | * Working in pairs learners identify that there is neither a constant difference nor constant ratioin sequences C. Each time they describe the pattern in their own words. * Learners discover that some patterns have neither a constant ratio nor a constant difference. |
| **Activity 4**   * Let learners create their own patterns and say whether they have a constant difference, constant ratio or neither. * Group all sequences of the same kind together in the chalkboard. This will enable learners to easily identify the different kinds of numeric patterns. | | Working in pairs learners create their own patterns and identify them as having a constant difference, constant ratio or neither. |

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| 1. **CLASSWORK**(Suggested time: 15 minutes) | | |
| Carefully choose the exercises which show different cognitive levels from Sasol-Inzalo Book 1, DBE workbooks, ANA question papers and any textbook used in your school. The following are some of the questions that can enhance understanding of numeric patterns.   1. Extend the following numeric sequences to get the next 3 terms or the first 3 terms and then describe the sequences in your own words. | | |
| (a) 8; 64; 512; …; ... ;...  (b) 55; 49; 43; … ;...; ...  (c) -13; -17; -21; ... ; ...; ...  (d) 24; 6; , …; ...; ...  (e) 3; -9; 27; -81; ...; ...; ...  (f) ...; ...; ...; 64; 27; 8; 1 | | |
| 1. Find the missing numbers in the sequence   100,62; 100,49; 100,36;… ;… ; 99,97; 99,84; 99,71 | | |
| Sasol-Inzalo book 1 | DBE Workbook | Textbook |
| Page 93 No. 1 a and b | Page 68 No. 1 - 2 |  |
| 1. **CONSOLIDATION/CONCLUSION& HOMEWORK**(Suggested time: 5 minutes) | | |
| 1. **Emphasise that**:  * A list of numbers which form a pattern is called a **sequence**. * Each number in a sequence is called a **term** of the sequence. * Numbers that follow one another are said to be **consecutive**. * When the **differences** between consecutive terms of a sequence are the same, we say the difference is **constant**. * The number that we multiply with to get the next term in the sequence is called a **ratio**. * If the number we multiply with remains the same throughout the sequence, we say it is a **constant ratio.** * There are sequences where there is **neither a constant difference nor a constant ratio** between consecutive terms and yet a pattern still exists  1. The primary purpose of Homework is to give each learner an opportunity to demonstrate mastery of mathematics skills taught in class. Therefore Homework should be purposeful and the principle of ‘Less is more’ is recommended, i.e. give learners few high quality activities that address variety of skills than many activities that do not enhance learners’ conceptual understanding.   Carefully select appropriate activities from the Sasol-Inzalo book, DBE workbooks and/or textbooks for learners’ homework. The selected activities should address different cognitive levels.  **Homework :** DBE workbook 1 – Page 68 : No. 3  Sasol- Inzalo book 1 Page 94 No 3 and 4 | | |