**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 2)** |
| 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.     - represented in tables     - represented algebraically |

* + 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. **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) | |
| Ask learners to work in pairs. Give them the following pattern: 2; 5; 10; 17; …  Let them extend the pattern by finding the next 3 terms. Let them describe the pattern in their own words. | |

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| 1. **LESSON PRESENTATION/DEVELOPMENT**(Suggested time: 20 minutes) | |
| **Teaching activities** | **Learning activities**  (Learners are expected to: ) |
| **Activity 1.**   * Give learners the following sequence and ask them to provide a rule that describes the relationship between the numbers in this sequence: * Ask them to use this rule to find the term in this sequence.   *Learners may choose the relationship between consecutive terms i.e. adding to the previous term up to the term to find the answer.*  *Or*  *They may choose to look for a relationship or rule between the term and the position of the term, in which case they will be able to predict the answer without continuing the pattern e.g.*   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | *Position in sequence* | *1* | *2* | *3* | *4* |  | *20* | | *Term* |  |  |  |  |  | *?* |   Term 1:  Term 2:  Term 3:  Term 4:  The general rule:  Let learners decide with reasons which method would be more convenient.  **Activity 2**   * Ask learners to provide a rule to describe the relationship between the term and its position in the sequence and use this rule to find the 10th term.   2; 5; 10; 17; …  *Learners interpret the pattern in a table*   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | *Position in sequence* | *1* | *2* | *3* | *4* |  | *10* |  | *?* | | *Term* | *2* | *5* | *10* | *17* |  | *?* |  | *626* |   The numbers in bold above represent the position of the term in the sequence.  Learners identify the relationship between the position of the term and the value of the term itself.  *Rule : Term 1: This can be written as*  *Term 2: This can be written as*  *Term 3: This can be written as*  *Term 4: This can be written as*  *Therefore term 10:*  We can then **generalise** and write the rule as: where represents the position of the term.   * We can also find the position of the term in the sequence when given the term, e.g. 626 above.   *To get the position of the term we must do the opposite of what the rule says i.e. subtract 1 and get a square root of the difference.*  **Activity 3**   * Ask learners to extend the pattern in the table below and provide a rule to describe the relationship between the term and its position in the sequence.  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | Position of the term | 1 | 2 | 3 | 4 | 5 |  |  | | term | 1 | 5 | 25 | 125 |  |  |  |   Learners identify the ratio in the sequence  *Rule: Term 1:* This can be written as  *Term 2: .* This can be written as  *Term 3: .* This can be written as  *Term 4:* This can be written as  *Therefore term 5: 625*  The numbers in bold above represent the position of the term in the sequence.  We can then **generalise** and write the rule as: where represents the position of the term.   * We can also find the position of the term in the sequence when given the term e.g. *3 125* above.   *To get the position of the term we must write the number as a power and solve.* | Learners investigate and come up with a more convenient way of finding the term in the sequence |
| Learners identify the relationship between the term and its position in the sequence: 2; 5; 10; 17; … by inspection.  Learners attempt to find the 10th term by inspection.  Learners extend the pattern and find the rule |

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| 1. **CLASSWORK**(Suggested time: 15 minutes) | | |
| Carefully choose the exercises which show different cognitive levels from Sasol-Inzalo workbooks, 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. Determine the rule and use the rule to find the missing values.   (a)   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Position of the term | 1 | 2 | 3 |  | 40 | | term | - 3 | -7 | -11 |  |  |   (b)   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | Position of the term | 1 | 2 | 3 | 4 |  | 66 | | term | 2 | 8 | 18 | 32 |  |  |   (c)   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | Position of the term | 1 | 2 | 3 | 4 |  | 10 | | term | 10 | 20 | 40 | 80 |  |  | | | |
| Sasol-Inzalo Workbook 1 | DBE Workbook | Textbook |
| Page 93 to 98. | Page 68 No. 4 |  |
| 1. **CONSOLIDATION/CONCLUSION& HOMEWORK**(Suggested time: 5 minutes) | | |
| 1. **Emphasise that:**  * The formula for a number sequence can be written in two different ways:   A description of the relationship between consecutive terms  A description of the relationship between the value of the term and its position in the sequence | | |
| 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 books, workbooks and/or textbooks for learners’ homework. The selected activities should address different cognitive levels.  **Homework:** DBE workbook 1 – Page 68: No. 5 | | |