**MATHEMATICS LESSON PLAN**

**GRADE 7**

**TERM 3: July – September**

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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)** |

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| 1. **CONCEPTS & SKILLS TO BE ACHIEVED:**   **By the end of the lesson, learners should know and be able to :**   * Investigate and extend numeric patterns looking for relationships between numbers, including patterns: * limited to sequences involving a constant difference. * of learners’ own creation * represented in tables * describe and justify the general rules for observed relationships between numbers in own words |

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| 1. **RESOURCES:** | DBE workbook 2, Sasol-Inzalo book 2, Textbooks |
| 1. **PRIOR KNOWLEDGE:** | * Functions and relationships * Number sentence * Algebraic language * All four operations with whole numbers, fractions and decimals |
| 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. | |

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| 1. **INTRODUCTION**(Suggested time: 10 Minutes)   Ask learners to complete the activity below:  **Activity 1**   1. Extend the patterns below by writing down the next three terms. 2. 5; 8; 11;\_\_\_; \_\_\_\_; \_\_\_\_ 3. 0,2; 0,4; 0,6;\_\_\_; \_\_\_\_; \_\_\_\_ 4. ; ;;\_\_\_; \_\_\_\_; \_\_\_\_ 5. Write down how you got the next terms in these sequences in own words   **Note**: After learners have given their explanations, consolidate as follows:  5  8  11  13  3  3  3  Use the explanation such as the one above to explain to learners that the **same** number added to a term to get the next term is called the **constant difference.**  **( subtrahend difference minuend, minuend subtrahend difference )**  **Note:** When learners can extend the patterns with **constant difference**, they are ready to move on to describing the **general rule** for the pattern **in own words**, predict any input or output value in the pattern given the rule.  Encourage the learners to **describe the general rule in own words** by looking at the **relationship** between the **input value** ( *position of the term/ term number*) and **the output** value  (*the term itself,*) by first writing the **number sentence** and there after replace the **position of the term** by any **variable**, e.g. , where is a natural number.  Explain to the learners that if patterns are not represented in tables, the term which appears **first** in the pattern is the **first term,** unless stated otherwise.  **Equivalent descriptions of the rule for pattern A**   * **in words :** multiply the position number by 3 and add 2 * **using number sentence :** 3 **2** 2 8, where **2 in** 3 **2** is the position of the term **3** is the constant difference,  **2** is the constant term and **8** is the term itself , * **in algebra :** |

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| 1. **LESSON PRESENTATION/DEVELOPMENT**(Suggested time: 25 minutes) | |
| **Teaching activities** | **Learning activities**  (Learners are expected to:) |
| Activity 2 :   1. Complete the flow diagram below.   A  1  2  3  \_\_\_\_\_  20  \_\_\_\_\_  \_\_\_\_\_  \_\_\_\_\_  12  \_\_\_\_\_  B  1  2  3  \_\_\_\_\_  20  \_\_\_\_\_  \_\_\_\_\_  \_\_\_\_\_  15  \_\_\_\_\_  C  1  2  3  \_\_\_\_\_  30  \_\_\_\_\_  \_\_\_\_\_  \_\_\_\_\_  12  \_\_\_\_\_  D  1  2  3  \_\_\_\_\_  20  \_\_\_\_\_  \_\_\_\_\_  \_\_\_\_\_  12  \_\_\_\_\_   1. Ask learners to illustrate the input and the output valuesfor each flow diagram by means of a table   B   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | |  | 1 | 2 | 3 |  | 8 |  | 20 | |  | 3 | 5 | 7 |  | 15 |  | 41 |  1. Divide the learners into groups and ask them to answer the following questions and carry out instructions  * From each table, subtract two consecutive terms from right to left * What do you call the answer you got above? * Is the answer you got above the same throughout the pattern? * At which level did you find the common difference? * What is the degree / exponent of the variable in the flow diagram? * What can you say about the degree of the variable and the level of the difference? * What do you notice about the first level difference and the coefficient in the rule of each equivalent description i.e. flow diagram and table? * Multiply the position of the term by the common difference in each table and compare each product to the output. * How does the product differ from the output/ what do you do to each product in order to get each output, In B and C? * Is what you do above the same throughout the pattern? * Write any number sentence to describe the relationship between the input and the output in each table. * Describe the relationship between the input and output values in your own words. * Use your rule to find the 20th term in each table  1. After having completed the activity, ask the learners if it is possible to predict any term without adding the constant difference. The response should be YES. Ask them to briefly explain which steps to follow in order to write a general rule for the pattern.   **Note**: After learners have completed the activity, they can conclude by understanding that in a pattern with a constant difference   * the level at which the constant difference is found determines the exponent of the variable * the constant difference is the co-efficient of the variable * the constant can be found by completing the number sentence of any term using the constant difference, the position of the term and the term itself   Note: The example is given to clarify process of the investigation. It must not be done for learners.  **Example**   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | |  | 1 | 2 | 3 |  | *8* |  | 20 | |  | 3 | 5 | 7 |  | 15 |  | *41* |   In the table above   * 2 is the constant difference because it is always added to the previous term to get the next * Multiply the position of the term ( by 2 to get * the level at which the constant difference is found is level 1, therefore * find by completing number sentence using any input and output values * Predict any term by multiplying the term number by 2 in the number sentence or substituting for in e.g. find the 20th term   or   * Find the position of the term given the term by using the inverse operations from right to left, e.g.   Find the position of the term if the term  **is 15**   1. Ask learners to create their own patterns like the ones above and give the rule in own words | * Complete the work * Complete the work, as individuals * discuss in groups and present their findings to the whole class * design their patterns and generalise them |

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| 1. **CLASSWORK**(Suggested time: 10 minutes) |
| **Note:** Give the learners different number patterns to extend and generalise.  **Activity**   1. Extend the patterns below by writing the next three numbers   A.15; 19; 23;\_\_\_\_\_; \_\_\_\_\_\_;\_\_\_\_\_\_  B. 0,7; 0,9; 1,1;\_\_\_\_\_; \_\_\_\_\_\_;\_\_\_\_\_\_  C. ; ; ;\_\_\_\_\_; \_\_\_\_\_\_;\_\_\_\_\_\_   1. Describe the general rule for each pattern in own words 2. Write the rule that describes each pattern above in a form of a number sentence 3. What is the 50th term in each pattern? 4. What is the position of the term whose value is 203 in A? |

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| 1. **CONSOLIDATION/CONCLUSION& HOMEWORK (Suggested time: 5 minutes)** |
| 1. Emphasise that:  * to extend a pattern, look for constant difference between the terms. * to predict any term or position of the term in the pattern, first find the general rule. * to find the general rule for the pattern, look for the relationship between the position of the term and the term itself by following these steps. * identify the level of the common difference * decide on what will be degree of the polynomial * decide on what will the coefficient of the variable be * write the number sentence/ general rule in own words/ algebraically  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.  **Recommended Homework**:   1. Write the 10th and the 50th terms in the patterns below: 2. 18; 21; 24; \_\_\_\_\_; \_\_\_\_; \_\_\_\_\_ 3. 0,7; 1,4; 2,8; \_\_\_\_\_; \_\_\_\_; \_\_\_\_\_ 4. ; ; ; \_\_\_\_\_; \_\_\_\_; \_\_\_\_\_ 5. What is the position of the term whose value is 315, 140 and in A, B and C, respectively?   **Recommended investigation:**   1. From the tables in the activity ask the learners to  * write each term as a sum of the first term and a number. * write each number added to the first term as factors where one factor is a constant difference. * compare the other factor other than the constant difference to the term number * write the other factor in terms of the term number * write the number sentence and substitute the position of the term by any variable  1. Use the steps above to find the general rule of the pattern 15; 19; 23; \_\_\_\_ 2. Use the general rule to find the 20th term. |