**LESSON DEVELOPMENT FOUR**

**SUBTRACTION OF BINARY NUMBER SYSTEM**

|  |  |  |  |
| --- | --- | --- | --- |
| **STAGE/TIME** | **TEACHER’S ACTIVITIES** | **LEARNER'S ACTIVITIES – MIND/HANDS ON** | **LEARNING POINTS** |
| **Step 1****Introduction – Introductory Activities** **(5 minutes)** | Lets the pupils add these numbers together – 1. 1 7 – 1 3 = 2. 4 5 – 27 = Tells the pupils that, whenever they borrow 1 from the next digit in decimal numbers, the 1 is 10. | Solution 1 Solution 2  (3)(15) 1 7 4 5 + 1 3 + 2 7 4 1 8 | Linking the Previous knowledge to the new lesson |
| **Step 2** **Development** **(5 minutes)** **Grouping** | 1. Groups the learners into four groups – A, B, C, and D. 2. Guide the learners to choose a leader and secretary for your group. 3. Gives each group learning materials – chart showing simple subtraction of binary numbers.  | 1. Belong to a group. 2. Choose their leader and secretary. 3. Received learning materials for their group.  | Learner’s group, leader and secretary confirmed. |
| **Step 3****Development – Groups Activities** **(5 minutes)** | Lets pupils to study the chart carefully. Asks them to compare the results of both subtraction of decimal and binary numbers together. Asks the pupils – Did You observe any difference? If yes, what’s and observations?  |

|  |  |
| --- | --- |
| **Decimal Numbers**  | **Binary Numbers**  |
| **0 – 0 = 0****1 – 0 = 1****1 – 1 = 2****10 – 1 = 9** | **0 – 0 = 0****1 – 0 = 1****1 – 1 = 0****10 – 1 = 1** |

Yes, there’s different. 1 + 1 = 10, how?Tells them that 1 + 1 = 2 (base 2). Convert 2 to base 10, 2/2 = 1 R 0. Add 0 digit 1, it gives 10. Therefore, 1 + 1 = 10. | Introduction to subtraction of binary numbers  |
| **Step 4****Development – Groups Activities** **(5 minutes)** | Guides the pupils to add this binary numbers – 111 + 101  | Solution 1 1 1 1 + 1 0 1 1 1 0 0Teacher’s contribution – 1 + 1 = 10, write down 1 and carry 1. 1 + 1 + 1 = 3 (base 10), 3 to base 2 is 11. That’s 3/2 = 1 R 1. Add 1 digit to 1 gives 11. | Addition of binary numbers  |
| **Step 5****Development – Groups Activities and Presentation****(15 minutes)** | Groups workAdd1. 101 + 1112. 1011 + 1101 | Presentation  | Addition of binary  |
| **Step 5****Development****(5 minutes)**  | To conclude the lesson, the teacher revises the entire lesson and ask the key questions. **SUMMARY** To add an expression in base two notation, just do the arithmetic. | The learners listen, ask and answer questions.**KEY QUESTIONS** Lets each of the pupils add 1. 101 + 1112. 1011 + 1101 | Lesson Evaluation and Conclusion  |