# COMPLEX PATTERNS (04-PS-07-LP)

## Lesson Plan: CLASS 4 / CS / 35 MINUTES



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| **Overall goal of the lesson** | Children learn to observe and look for patterns. |
| **Prior knowledge required** | Knowledge of simple patterns |

**MODULE 1:** **Module time: 2 x** 35 minutes

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| **Goal:** | To introduce patterns through exercises and explain what is a pattern after they learn to intuitively recognize patterns |
| **Description:** | Children will learn to look for patterns in a group of things or in sequences or in visual designs. |
| **Material required:** | **Physical:**<br>1. One copy of the worksheet per child.<br>2. Writing material to solve the worksheet: pencil and eraser.<br>**Electronic:**<br>PPT Presentation |
| **Procedure Summary:** | 1. Run through the presentation<br>2. Do all the activities that are in the presentation<br>3. Distribute the worksheets<br>4. Let children try to solve them in class and help them with the answers |
| **Procedure Details:** | 1. Slide 1:<br>Start with an activity rather than explaining the topic. Let the children read each line slowly, one item at a time – like so: 1…. 2…. 3…. 4…. 5…. 6…. And then pause, and ask, what comes next? Almost all of them will answer 7!!!<br>Go to the next one – this is slightly tougher so see how many kids are able to get it. Give them a hint – ask them to say the table of 2. They will be able to get it then.<br>Go to the next one – here too, the children may find it difficult – ask them if they know what are odd numbers? And then let them try again.<br>The next one – it is the table of 5 and this time they should get it, since they have done the table of 2 example earlier.<br>The next one – we are multiplying by 10 each time. They may not get that – they may say we are adding a zero to get the next number – that's fine! As long as they recognize the pattern correctly.<br><br>2. Slide 2:<br>This is a similar pattern recognition activity, but with letters. Here again, the difficulty level of each example slowly goes up – so take your time with each line! The trick is to read the example with the correct 'stress' so that the pattern is immediately apparent.<br>So the answers are: i, j, k ggg af, ag, ah, ai ghg, hih<br><br>3. Slide 3 uses the music scale – and this is an optional slide – use if comfortable and for fun if need be. Patterns are heavily used in music! So the answers are<br><br>Dha, Ni, Sa DhaNi, NiSa MaGa, Pa,Ma, DhaPa GaMaPa, MaPaDha, PaDhaNi, DhaNiSa<br>GaMaPaDha, MaPaDhaNi, PaDhaNiSa |

4. Slide 4 & 5
   Now we move to visual patterns and the concept of a 'motif'. Let the children observe the cloth and tell you what they see. Ask if they see something repeating. Let them try and identify exactly, the piece which repeats.
   The next slide shows the repeating piece. Explain that this becomes a 'motif' for the printed material. Explain how a template is made of this motif and then the printing is simply repeated in a horizontal line to create a border, for example.

5. Slide 6 & 7
   This is another visual pattern – a coiled string. There is a basic motif of a spiral and it is used to create a pattern. As the children to observe, and try to identify the motif, ask them to draw the motif.
   Ask them if they can create their own designs using this motif?
   Slide 7 shows a few sample designs.

6. Slide 8 & 9
   We introduce the idea of having a series of shapes and trying to identify the repeating pattern.
   So on Slide 9 we have a list of visual shapes.
   The first one is sets of squares – you can say as a hint: here we have one square, then 2 squares, then 3 squares, then 4… so what should come next?
   The second example just repeats the motif of triangle and circle – they should be able to get this one.
   Then comes a slightly more difficult one – each time we add a line of triangles so as to get a bigger overall triangle. *And* we alternate between blue and red colours. So first we have a blue triangle. Then we add 2 read triangles. Then we add 3 blue triangles. Therefore next we should add 4 red triangles. If they find this one hard to understand – draw it on the board showing how you go from one item to the next.

7. Slide 10, 11, 12, 13
   We are now going to analyse the way our minds give us the answers, and then use that to predict any arbitrary element in the list, or, the '$N^{th}$' element in a list.
   So we revise the first two number examples in Slide 10 and question ourselves.
   In Slide 11 we analyse the first example – how do we go from one element to the next, what do we have to do? Then we try to find the 'pattern' – that's why the corresponding numbers are coloured – and we find that the $N^{th}$ number = N. So now you can ask, what will be the $52^{nd}$ number? The $456^{th}$ number? The $800^{th}$ number?

   In Slide 12 we similarly analyse the second example – how do we go from one element to the next, what do we have to do? Then we try to find the 'pattern' – that's why the corresponding numbers are coloured – and we find that the $N^{th}$ number = N X 2. So now you can ask, what will be the $12^{th}$ number? The $20^{th}$ number? The $100^{th}$ number?

   In Slide 13 we take another example – the multiples of 5. We analyse – how do we go from one element to the next, what do we have to do? Let them answer this time.
   Then we try to find the 'pattern' – that's why the corresponding numbers are coloured – and we find that the $N^{th}$ number = N X 5. So now you can ask, what will be the $12^{th}$ number? The $20^{th}$ number? The $100^{th}$ number?

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| | 8. Slide 14, 15<br>We repeat the analysis exercise with the alphabet examples. Here, the important thing is to read the lines with the correct emphasis so that the pattern is immediately obvious.<br>You can test if they have understood by asking if N can be a number more than 26.<br>Slide 15 is a tougher example so take your time with this one. Explain how the first item in the list is formed by pointing to the table and then they should be able to answer how the next item will be formed and then the $N^{th}$ one. In this case N cannot be more than 25 – see if the children can arrive at that by themselves!<br><br>9. Slide 16 formalises our thinking by explaining the idea of pattern and repetition.<br>10. Slide 17 tries an example with shapes. Here, we are given shape patterns just like before, but the questions we are asked are different!<br>So, in the first example – the children will guess that the next position has 5 squares, but they need to extrapolate that the $7^{th}$ position will have 7 squares using the method of analysis they have learned before. So let them try to solve this in their notebooks or on the board.<br>The second example is harder – each next item in the list adds 4 new squares – so first we have 1 square, then we have 5, then we will have 9, then 13 and then 17 in the $5^{th}$ position. In this case $N^{th}$ position has 4 X (N-1) + 1 or 4N – 3 squares – but it's ok if they don't arrive at this. Some of the quicker kids might get it.<br>The third example needs to be explained well – the idea of an 'edge' should be explained on the board. Then the idea of the outer boundary of the combined shape. So the next position will have 18 edges on the outer boundary.<br><br>11. Slide 18 & 19 – Odd man out<br>The moment we talk about patterns – we can easily see, that some elements follow a pattern and some do not. E.g., if I am making a list of multiples of 5, then I cannot put 7 in that list. 7 becomes an 'odd man out' in the list. Give them some more examples – like a boy is odd-man-out in a group of girls, a child is odd-man-out in a group of senior citizens, a science student is odd-man-out in a team of arts students, and so on.<br>So Slide 18 introduces the concept and Slice 19 has a few examples.<br><br>12. Slide 20 and 21<br>Finally, we try to recap what patterns are, and why we need them. You can have a nice discussion here and try to get the children to spot patterns in the world around them.<br><br>13. On to the worksheets! |
| **Assessment:** | |
| **Information Broadcast:** | |