





PATTERNS EVERYWHERE (LEVEL 3)

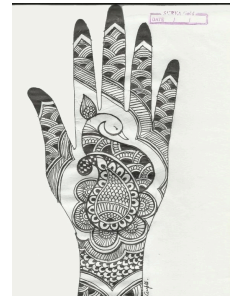
Description	Learners will explore patterns in designs, shapes, numbers and nature, and create an artwork piece using a combination of patterns. They will then explore patterns in their own behaviour, and find ways to encourage good patterns and break the bad patterns.
Leading question	How can patterns help us make things around us and ourselves beautiful?
Subjects covered	Math, Art and Design, Social and Emotional Learning
Total time required	40-60 min a day for 4 days
Resources required	Paper, pencil, coloured pens/pencils
Learning outcomes:	<p>By the end of this project, learners will be able to:</p> <p>Knowledge-Based Outcomes:</p> <ol style="list-style-type: none"> 1. Identify different kinds of patterns in daily life. 2. Explain with examples how patterns have meanings. 3. Identify patterns in behaviour and explain ways to strengthen good patterns and break bad patterns. 4. Identify patterns in number sequences (addition-, subtraction, multiplication, division-based rules) 5. Create mathematical patterns and sequences using different rules. 6. Explain the meaning and significance of the Fibonacci sequence. <p>21st Century Skill Outcomes:</p> <ol style="list-style-type: none"> 1. Think critically while analyzing patterns and making predictions based on them. 2. Be creative while creating and including patterns in the artwork. 3. Work collaboratively by seeking and implementing feedback on ways to enhance good patterns and break bad patterns.
Previous Learning	None
Supervision required	Medium

Day 1 -

Today, you will learn what a pattern is, search for patterns around you, and start thinking about your artwork and patterns in your own behaviour.

Time	Activity and Description
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<p>5 minutes</p>	<p>Defining a Pattern Note: Show learners 2–3 designs that show patterns, for example in a clothing item. Share how the designs follow rules. For example, squares repeat after every 2 polka dots.</p> <p>Such things that repeat themselves following some rules are called patterns.</p> <ul style="list-style-type: none"> - The Leading Question that we will answer in this project is: How can patterns help us make things around us and ourselves beautiful? - To answer this question, we will first explore different patterns in numbers, shapes, letters and our surroundings, and then make beautiful works of art using these patterns. Your artwork can be a drawing filled with patterns (such as a henna design drawn in the outline of a hand). - The second part of this project will be about ourselves. Looks or appearance does not make people beautiful. Beauty lies in who we are on the inside. To feel happier with ourselves, we will identify useful and harmful patterns in our own behaviour, and find ways to improve ourselves.
<p>10 minutes</p>	<p>Patterns in Shapes Let us start with identifying patterns in shapes!</p> <p>Note: Draw two to three patterns with shapes, such as the ones shown below, and ask learners to identify the pattern and predict what 3 shapes come next.</p> <p></p> <p></p> <p></p> <p>Next, ask them to draw the next shape in a pattern made of polygons</p> <p></p> <p>(The next shape will be a heptagon).</p> <p>Finally, ask them to draw two more patterns using polygons or other shapes.</p>




	Tip: To challenge learners further, ask them to make patterns using solid shapes, such as cubes, cuboids, cylinders and cones.															
15 minutes	<p>Planning Artwork Pattern</p> <p>Let us now start thinking about the kind of artwork we want to create using patterns. To do this:</p> <ul style="list-style-type: none"> - Make a rough sketch of the artwork. - Make sure you include patterns made using polygons and other shapes. 															
10 minutes	<p>Patterns in Our Behaviour</p> <p>Just like designs, shapes and our surroundings, our behaviour also shows patterns. Let us try and think about such patterns!</p> <p>Note: Ask learners to draw the given table in their notebooks and fill it every night before bed.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Behaviour</th> <th style="width: 10%;">Day 1</th> <th style="width: 10%;">Day 2</th> <th style="width: 10%;">Day 3</th> <th style="width: 10%;">Day 4</th> </tr> </thead> <tbody> <tr> <td>Did I cry today? When? What happened before and after this?</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Did I get angry today? When? What happened before and after this?</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>Ask them to add more rows to include any behaviour they want to track, such as “Did I wake up fresh?” or “Did I study properly after school?”</p>	Behaviour	Day 1	Day 2	Day 3	Day 4	Did I cry today? When? What happened before and after this?					Did I get angry today? When? What happened before and after this?				
Behaviour	Day 1	Day 2	Day 3	Day 4												
Did I cry today? When? What happened before and after this?																
Did I get angry today? When? What happened before and after this?																
At-home activities	<ul style="list-style-type: none"> - Fill in your behaviour patterns table before bed. - Draw three more patterns using polygons or other shapes of your choice and challenge a friend or a family member to identify the rule of the pattern. 															

Day 2

Today, you will explore mathematical patterns and include mathematical patterns in your artwork.

Time	Activity and Description
5 minutes	<p>Agenda</p> <p>Based on the information you filled in last night in your behaviour patterns table, can you predict any pattern in your behaviour?</p> <p>Tip: If needed, give learners prompts such as “I get angry when my best friend teases me” or “Each time I get a compliment, I feel like sharing it with someone.”</p> <p>Today we will identify patterns in numbers and include numerical patterns in our artwork designs.</p>

15 minutes	<p>Patterns in Numbers</p> <p>A group of numbers that follows a pattern is called a number sequence. Let us try to find patterns in some number sequences!</p> <p>Note: Share the number sequences listed below with learners and them to find out the pattern or rule of these sequences, and write the next 3 numbers. Once they are done, discuss the answers (given in brackets against each number sequence).</p> <ul style="list-style-type: none"> - 1, 0, 0, 1, 0 __ (repetition rule: 1 followed by 2 repeating 0s Ans: 0, 1, 0) - 1, 6, 11, 16, 21 __ (addition rule: add 5 to the previous term Ans: 26, 31, 36) - 50, 43, 36, 29 __ (subtraction rule: subtract 7 from the previous term Ans: 22, 15, 8) - 3, 9, 27, __ (multiplication rule: multiply the previous term with 3 Ans: 81, 243, 729) - 64, 32, 16 __ (division rule: divide previous term by 2 Ans: 8, 4, 2) <p>Now, write 5 more number sequences using repetition, addition, subtraction, multiplication and division, and share the rule that each sequence follows!</p> <p>Tip: To challenge learners at a higher level, ask them to find out the rule and the next 3 terms of these sequences:</p> <ul style="list-style-type: none"> - 1, 4, 9, 16 __ (rule: 1², 2², 3²... Ans: 25, 36, 49) - 3, 6, 11, 18 __ (rule: 12+2, 22+2, 32+2... Ans: 27, 38, 51) - 1, 8, 27, 64 __ (rule: 1³, 2³, 3³... Ans: 125, 316, 343) - 0, 6, 24, 60 __ (rule: 13-1, 23-2, 33-3... Ans: 120, 310, 337) - 81, 18, 64, 16, 49, 14 __ (rule: square of a number, double the number: (9*9), (9*2), (8*8), (8*2) etc.)
20 minutes	<p>Including Number Patterns in Artwork Design</p> <p>Now, you will improve your artwork designs to include numerical patterns in it!</p> <p>Tip: If needed, give learners prompts such as including shapes like trapeziums, triangles and squares following the sequence 1, 2, 3 as shown in the image.</p> 
At-home activities	<ul style="list-style-type: none"> - Fill in your behaviour patterns table before bed. - Show your artwork design to a friend or a family member and explain how you have used mathematical and numerical patterns in it. Once done, ask them to share their feedback or any ideas they have to improve it.

Day 3 –

Today, you will learn about the Fibonacci sequence and create your artwork!

Time	Activity and Description
15 minutes	<p>The Fibonacci Sequence</p> <p>Note: Write this sequence on the board: 0, 1, 1, 2, 3, 5, 8, 13. Ask learners to work on their own to identify the rule of the pattern and predict the next 2 terms.</p> <p>This is a special number pattern called the Fibonacci sequence.</p> <ul style="list-style-type: none"> - It was discovered many years ago by a mathematician from Italy called Leonardo also known as Fibonacci. - Starting with 0 and 1, each next term is the sum of the previous two terms. - This pattern is very commonly found in nature. <p>Note: Explain using these images from Appendix 1 how branches in trees and flower petals follow the Fibonacci sequence.</p> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div> </div> <div> </div> </div> <p>Check if your artwork design follows the Fibonacci sequence! Can you think of a way to include it?</p>
15 minutes	<p>Creating the Artwork</p> <p>Now you will create your artwork based on the design that you have been improving over the last few days!</p> <p>Note: Inform learners that if they can't finish creating their artwork in the stipulated amount of time, they can do so at home.</p>
10 minutes	<p>Preparing for Presentation</p> <p>In the next class, you will present your artwork/henna designs. To do this, you will explain the process you followed.</p> <ul style="list-style-type: none"> - Prepare for this presentation by listing down what you did first, second, and so on to make your artwork/ henna designs! - Remember to include how you used patterns of different kinds.

At-home activities	<ul style="list-style-type: none"> - Fill in your behaviour patterns table before bed. - If you could not finish the artwork earlier today, finish it at home today.
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Day 4 –

Today, you will identify patterns in your behaviour, find ways to strengthen good patterns and break bad patterns, and present your artwork to your friends and family!

Time	Activity and Description									
10 minutes	<p>Finding Patterns in Behaviour Note: Ask learners to draw the table shown below in their notebooks.</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 45%;">Pattern</th> <th style="width: 15%;">Good/Bad</th> <th style="width: 40%;">How to Encourage/Break the Pattern</th> </tr> </thead> <tbody> <tr> <td>When I _____, then _____.</td> <td></td> <td></td> </tr> <tr> <td> </td> <td></td> <td></td> </tr> </tbody> </table> <p>To make ourselves even more beautiful by improving our behaviour, we need to first find patterns in it!</p> <ul style="list-style-type: none"> - Read the rows of your behaviour patterns table and see if you can find any pattern in what happens before and after you show each type of behaviour. E.g if you felt angry 3 times last week, check what happened before or after it to identify patterns. - Once you identify a pattern, write it in this new table. - For example: When I disturb my friend, we fight and I feel sad. 	Pattern	Good/Bad	How to Encourage/Break the Pattern	When I _____, then _____.					
Pattern	Good/Bad	How to Encourage/Break the Pattern								
When I _____, then _____.										
5 minutes	<p>Identifying Good and Bad Patterns To understand if a pattern is good or bad for us, think: “How will each pattern affect me in 10 years?”</p> <ul style="list-style-type: none"> - If the effect is good, it is a good pattern. - If the effect is bad, it is a bad pattern. <p>Identify the good and the bad patterns and “good pattern” or “bad pattern” in the second column of the table, as applicable.</p>									
10 minutes	<p>Encouraging Good Patterns and Breaking Bad Patterns To make our lives better and feel happy with ourselves, we can encourage good patterns and break bad patterns.</p> <p>Note: Ask learners to copy the table shown below, think of ways in which they can encourage good patterns and break bad patterns, and write them in the table.</p>									

	Pattern	Good/Bad	How to Encourage/Break the Pattern
	<i>When I sleep early, I feel fresh and happy the next day.</i>	<i>Good pattern</i>	<i>Don't leave homework for the last minute. Set a fixed sleep time.</i>
	<i>When I fight with my best friend, I feel sad.</i>	<i>Bad Pattern</i>	<i>Talk calmly with my friend. Wait for my irritation to reduce before talking to my friend.</i>
	Tip: <i>If needed, give them some examples such as the ones prefilled in the table.</i>		
10 minutes	Presentation Note: <i>Ask learners to bring their friends and family to class for the presentation.</i> Present your artwork to your friends and family. Once done, ask them for their feedback on what they liked and think could have been done better.		
5 minutes	Reflection Now that you have completed this project, think and answer: <ul style="list-style-type: none"> - What went well during this project? - What could have been better? - How many good and bad patterns could you identify in your behaviour? - How do you plan to reinforce good patterns and break the bad ones? 		

Additional enrichment activities:	Learners can formulate a plan to reinforce good patterns and break bad patterns. Additionally, based on the principle that plans may not always work as envisioned, they may think about how they will approach a situation in which their plan does not work/ they fall into a bad behavioural pattern.
Modifications for simplification	Learners can skip identifying behavioural patterns and utilise the flipbook as the final product.

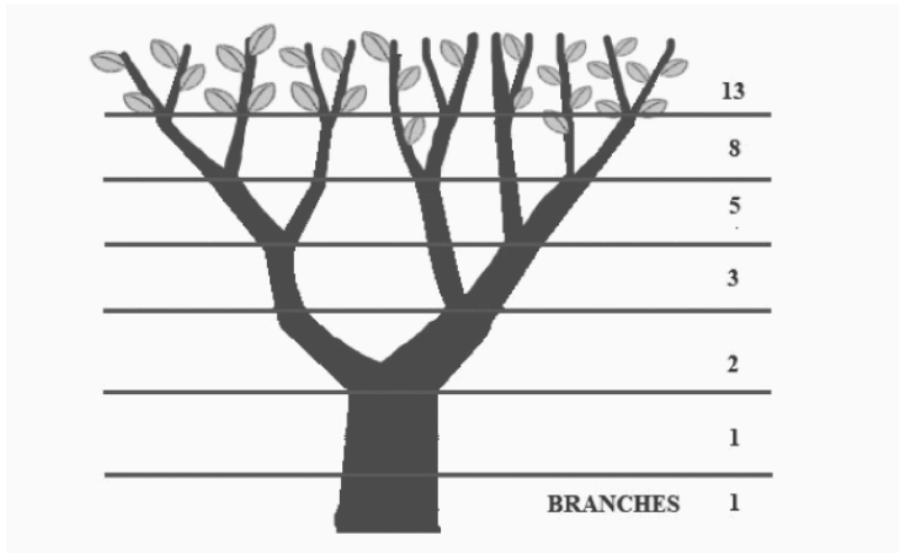
ASSESSMENT CRITERIA

A majority of my learners were able to:

- List 5 patterns that they identified in their surroundings.
- Create 5 simple mathematical patterns (using different operations) following clear rules.
- Make an artwork design that includes visual and mathematical patterns.
- Identify at least 1 good and 1 bad pattern in their behaviour, and suggest ways to encourage or break them.

APPENDIX

Appendix 1: Branches of trees follow the Fibonacci sequence.



The number of petals in flowers is often a term in the Fibonacci sequence

