

JEWELLERY MARKET! (GRADE 5)

Preparation:

Leading Question:	How can we use patterns in math to make jewellery?
Description:	In this project, learners will design and create jewellery, such as bracelets and necklaces, using local or recycled materials. They will explore repeating patterns, use mathematical operations to create number-based sequences, complete pattern puzzles, and experiment with arranging beads in square or triangular formations. They will also incorporate simple tessellations into their designs. To conclude the project, learners will set up a mock jewellery market where they will price their creations and sell them using mock currency. This project will help learners understand the concepts covered in Chapter 9 - Patterns on Pg. 74 of the SCERT Textbook. - A detailed mapping showing the topics covered has been included at the bottom of the document. - Some textbook questions will be addressed through the project as part of classwork or homework. Please make sure to complete the remaining questions after the project concludes. Do upload pictures of the art gallery to the project submission form!
Resources required:	Thread, paper, colours, glue

Day 1 -

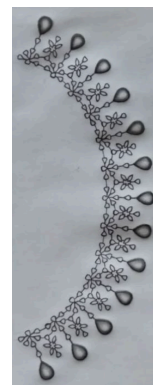
Learners will define patterns, explore patterns in shapes, numbers and letters, and start designing their jewellery item.

Time	Activity and Description
10 minutes	Project Introduction: (Entire Class) Show a Naga shawl to the learners and ask them to observe it closely for one minute. - Ask them to look for designs or elements that repeat, and then discuss the ones they spot with their partners. - If needed, highlight one such repeating design to guide their observation. For example, in the given image, red blocks repeat at regular intervals along the scarf.  After taking responses from 2-3 pairs, the teacher says: - <i>Designs or elements that repeat themselves are called patterns.</i> - <i>Patterns are all around us! We can find them in our clothes, buildings, houses, and even in nature.</i> - <i>Can you spot any patterns in our classroom?</i>

	(Allow learners a minute to observe and then take responses. For example, patterns in bricks or flooring.) - <i>In this project, you will work in groups to make jewellery using different kinds of patterns!</i> - <i>What kind of jewellery do men and women wear in Nagaland?</i> Allow pairs a minute to think and then take 3-4 responses. - <i>Men and women from different Naga tribes wear different kinds of traditional jewellery. Men often wear necklaces, earrings, and headgear made of a variety of materials such as carnelian, glass beads, bronze, shells, ivory, pearls or feathers. Women wear bead necklaces, bangles, and earrings. Each tribe, such as Konyak, Angami, or Ao, has its special jewellery style.</i> - <i>In this project, you will use materials such as thread, paper, colours, and any other waste materials.</i> - <i>At the end of the project, you will set up a jewellery market and sell the items you have created! Each group will set up their own stall.</i> - <i>The Leading Question for the project is: How can we use patterns in math to make jewellery?</i> Your jewellery market will be a success if you can: - <i>Make a different type of jewellery from other groups (like necklaces, anklets, or bracelets).</i> - <i>Use at least one number pattern in your design.</i> - <i>Use at least one tessellation in your design.</i> - <i>Use waste or recycled materials (apart from what the teacher gives you).</i> - <i>Explain why your design is special or meaningful to your group.</i> Finally, put up the Leading Question and Project Criteria on a chart on the classroom wall so that learners can refer to them at any time during the project.		
15 minutes	Patterns in Shapes, Letters & Numbers: (Group Work) Divide the class into groups of 3-4 learners and inform them that they will work in the same group for the entire project. If possible, try to ensure that each group includes: - Both boys and girls - Learners with different strengths and abilities - Learners from different tribes or backgrounds Teacher says: - <i>Do you think patterns exist in math?</i> (Allow groups a few seconds to discuss and then take responses) - <i>Let us begin the project by exploring some patterns and discovering the rules they follow.</i> Follow the steps in the table below to help learners explore patterns in shapes, letters and numbers. <table border="1"> <tr> <td>Step 1</td><td>Draw the figure below on the board.</td></tr> </table>	Step 1	Draw the figure below on the board.
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	Ask them to work in pairs to: - Draw the next figure in the pattern - Share how they identified what this figure would be. After taking responses, explain: 1. In each figure, the design made by the black dots in the previous figure rotates towards the left. This is the rule of the pattern. 2. Based on this rule, the next figure in the pattern will be:
	Step 2 Write the following patterns on the board: 1. 3, 6, 9 ... 2. Ab, Bc, Cd ... Ask learners to work in pairs to: - Write the next term in each pattern. - State the rules of the patterns. (Ans: 1. 12 (Rule: Each term is 3 more than the previous term) 2. De (Rule: Each letter in every term shifts one position forward in the alphabet)
	Step 3 Write the following patterns on the board: 1. 12, 10, 8 ... 2. AbB, BcC, CdD ... Ask them to work in pairs to: - Write the next term in each pattern. - State the rules of the patterns. (Ans: 1. 6 (Rule: Each term is 2 less than the previous term) 2. EfF (Rule: Each letter in every term shifts one position forward in the alphabet)
	Differentiation Tip: To challenge learners, ask them to find the rule and write the next term in more complex patterns, such as: - 666, 655, 644, 633... (-11) - 25, 50, 100, 175... (+25, +50, +75, +100, etc)
5 minutes	Choosing the Jewellery Type: (Group Work) Teacher says:

	- Now, let us think about what type of jewellery we want to make and what patterns we want to include in it! To help learners choose and start designing their jewellery: <u>First</u>, ask them to think of a type of jewellery they want to design. - If needed, suggest ideas like a bracelet, an anklet, a headgear or a necklace. - Make sure each group picks a different type of jewellery so there is enough variety in the jewellery market on the final day. <u>Next</u>, ask learners to sketch their jewellery, using at least one meaningful pattern. For example, if the group finds beads beautiful, they can create a repeating pattern of paper beads in their design.
Homework	Answer Q1 on Pg. 87 of the Math Textbook.

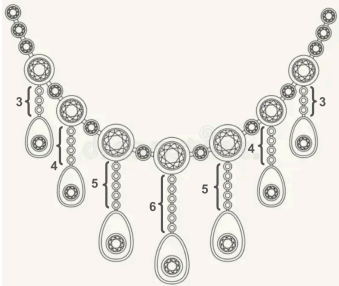


Day 2 –

Learners will explore patterns in square and triangular numbers and enhance their jewellery designs by including a mathematical pattern in it.

Time	Activity and Description		
5 minutes	Recap: (Entire Class) Use the sample answers on Pg. 198 to help pairs check each other's answer to the homework question. Ask a learner to read out the Leading Question. Then, ask groups to discuss and share what they have done to answer it so far. After taking responses, the teacher says: - So far, you have explored patterns in shapes, letters, and numbers, and you have started designing your jewellery. - Today, you will explore patterns in square and triangular numbers and update your designs to include at least one of these patterns.		
15 minutes	Patterns in Square & Triangular Numbers: (Group Work) Follow the steps in the table below to help learners explore patterns in square and triangular numbers. <table border="1"> <tr> <td>Step 1</td><td> Write this pattern on the board: 1, 4, 9 ... Ask them to work in pairs to: - Write the next term in the pattern. - State the rule of the pattern. After taking responses, ask learners to refer to the figures on Pg. 77, as you explain: </td></tr> </table>	Step 1	Write this pattern on the board: 1, 4, 9 ... Ask them to work in pairs to: - Write the next term in the pattern. - State the rule of the pattern. After taking responses, ask learners to refer to the figures on Pg. 77, as you explain:
Step 1	Write this pattern on the board: 1, 4, 9 ... Ask them to work in pairs to: - Write the next term in the pattern. - State the rule of the pattern. After taking responses, ask learners to refer to the figures on Pg. 77, as you explain:		

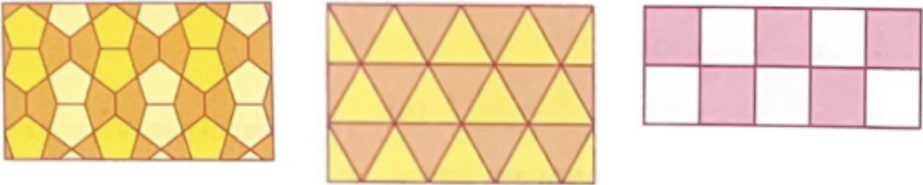
	1. These numbers can be arranged in a square. 2. Based on this rule, the next figure in the pattern will be 16:
	Step 2 Write this pattern on the board: 1, 3, 6 ... Ask them to work in pairs to: - Write the next term in the pattern. - State the rule of the pattern. After taking responses, ask learners to refer to the figures on Pg. 78, as you explain: 1. These numbers can be arranged in a triangle. 2. Based on this rule, the next figure in the pattern will be 10:
	Step 3 Write the following patterns on the board: 16, 25, 36 ... 10, 15, 21... Ask them to work in pairs to: - Write the next term in each pattern. - State the rules of the patterns. (Ans: 49 (Rule: Each term can be arranged in a square) 28 (Rule: Each term can be arranged in a triangle)

	Differentiation tip: To challenge learners, ask them to find the rule and write the next term in more complex patterns, such as: - 1, 8, 27... (Each term is a square number multiplied by the position of the term) - 1, 6, 18 ... (Each term is a triangular number multiplied by the position of the term)								
10 minutes	Improving Jewellery Designs: (Group Work) Teacher says: - <i>Now, you will improve your jewellery designs to include at least one number pattern in them.</i> If needed, show them the example where the number of dangling beads: - increases by one up to the centre (3, 4, 5, 6), and then - decreases by one from the centre to the right (6, 5, 4, 3).  Differentiation tip: Ask learners to include square or triangular numbers in their jewellery designs and show a clear pattern. For example, the number of dangling beads could be organised like this: <table> <tr> <td><i>To Include Square Numbers</i></td><td><i>To Include Triangular Numbers</i></td></tr> <tr> <td>- 1 red + 9 white</td><td>- 1 red + 6 white</td></tr> <tr> <td>- 4 red + 6 white</td><td>- 3 red + 4 white</td></tr> <tr> <td>- 9 red + 1 white</td><td>- 6 red + 1 white</td></tr> </table>	<i>To Include Square Numbers</i>	<i>To Include Triangular Numbers</i>	- 1 red + 9 white	- 1 red + 6 white	- 4 red + 6 white	- 3 red + 4 white	- 9 red + 1 white	- 6 red + 1 white
<i>To Include Square Numbers</i>	<i>To Include Triangular Numbers</i>								
- 1 red + 9 white	- 1 red + 6 white								
- 4 red + 6 white	- 3 red + 4 white								
- 9 red + 1 white	- 6 red + 1 white								
Homework	Answer Q2 and Q3 on Pg. 87 of the Math Textbook.								

Day 3

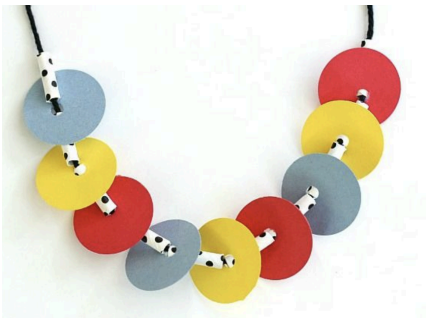
Learners will include tessellations in their jewellery designs and finalise the designs based on peer feedback.

Time	Activity and Description
5 minutes	Recap: (Entire Class) Use the sample answers on Pg. 198 to help pairs check each other's answer to the homework question. Ask a learner to read out the Leading Question. Then, ask groups to discuss and share what they have done to answer it so far. After taking responses, the teacher says: - <i>So far, you have included a mathematical pattern in your jewellery design.</i> - <i>Today, you will add tessellations and start making your jewellery!</i>
15 minutes	Tessellations: (Group Work) Follow the steps in the table below to help learners understand tessellations and include them in their jewellery designs.

	Step 1 Ask learners to look at the figures shown below on Pg. 85 and discuss in pairs: What is common to all of them?  After taking responses, the teacher says: - <i>In each of these figures, a base design repeats continuously without any gaps or overlaps. This type of repeating design is called a tessellation.</i> - <i>Where can you find tessellations around us?</i> (Take responses, such as - in a chessboard, in floor tiles, and in brickwork) Step 2 Ask learners to draw a tessellating pattern of their choice. Give them one minute to do this. Once they are done, ask them to share their patterns with their group members. Group members will check each pattern to see if it shows a tessellation. They should look for a base design that repeats without any gaps or overlaps. Step 3 Ask each group to check if their jewellery design already includes any tessellations. - If not, ask them to tweak their design so that it includes at least one tessellating pattern. - If needed, show the included example. 
10 minutes	Peer Feedback: (Group Work) Teacher says: - <i>Now, you will exchange your jewellery with another group and exchange feedback on your designs.</i> Pair each group with another group. They will take turns giving feedback using these pointers: - Is the type of jewellery different from their own? - Does the design include at least one number pattern? - Does the design include at least one tessellation? - Can the design be made more attractive or improved in any other way? After the feedback exchange, each group will improve their design based on the suggestions received.
Homework	Bring any waste materials that you may want to use to make your jewellery.

Day 4 –

Learners will make their jewellery items and plan for the jewellery market.

Time	Activity and Description
5 minutes	Recap: (Entire Class) Use the sample answers on Pg. 198 to help pairs check each other's answer to the homework question. Ask a learner to read out the Leading Question. Then, ask groups to discuss and share what they have done to answer it so far. After taking responses, the teacher says: - <i>So far, you have finalised your jewellery designs.</i> - <i>Today, you will make jewellery based on your designs!</i>
15 minutes	Making Jewellery: (Group Work) Distribute materials (thread, paper, colours, and glue) to each group. Ask groups to also bring out any additional materials they collected.  <u>First</u>, ask each group to discuss and decide: - How many jewellery pieces do they want to make and sell? Based on this number, they should divide the work fairly among themselves. - For example, if a group of 4 decides to make 8 necklaces, each person will make 2. <u>Next</u>, they will plan how to create it. For example, if they decide to make necklaces: - Make paper beads or other decorative shapes - Colour or design them creatively - Cut them out - String them into the thread <u>Finally</u>, each member will begin making their assigned number of jewellery items, using the group's design plan. When time is up, ask everyone to pause and prepare for the next part of the project. Let them know they can finish any incomplete jewellery pieces at home.
10 minutes	Planning for the Jewellery Market: (Group Work) Follow the steps below to help learners plan their jewellery market: <u>First</u>, ask each group to think about what they will need to set up their stall. They can share ideas such as benches, mats, signboards, or display cloth.. <u>Next</u>, have each group decide how much their jewellery will cost. Keep it simple by using prices in multiples of ₹5 (like ₹5, ₹10, ₹15, etc.). <u>After that</u>, once prices are decided, the class will agree on a simple fake currency design (e.g., round paper coins with ₹5 written on them). Each group must make enough currency to buy

	all their products. For example, if a group has made 8 necklaces priced at ₹10 each, they should prepare fake currency worth ₹80. <u>Finally</u>, ask groups to think about anything else they may need, such as posters, group name boards, matching tags, or decorations to attract buyers.
Homework	- Divide the task of making fake currency among group members and create the total amount your group needs. - Complete any unfinished jewellery items.

Day 5 –

Learners will set up their jewellery markets and sell their products!

Time	Activity and Description
10 minutes	<u>Setting up the Jewellery Market: (Entire Class)</u> Groups will now set up their jewellery stalls and get ready for the event. Encourage them to divide the tasks involved in selling their jewellery among group members. For example: - 1-2 members can explain the patterns used in the jewellery. - 1-2 members can invite people to visit the stall. - 1-2 members can act as cashiers and keep track of how much money the stall earns.
15 minutes	<u>Presentation: (Group Work)</u> The teacher will collect the fake currency from each group and hand it out to visitors as they enter the jewellery market area. Visitors will then walk around the stalls, listen to presentations, and purchase any jewellery items they like.
5 minutes	<u>Reflection: (Group Work)</u> Teacher says: - <i>Congratulations on a successful project!</i> - <i>Let us now reflect on our project journey.</i> Groups will reflect on the following questions: - How much money did your group earn? - How many jewellery items did you sell? - Which group earned the most? What do you think helped them succeed? - Did any groups sell out completely? What do you think they did differently? - What is something new you learned during this project? - Did your group face any disagreements? How did you work through them? - What part of the project felt easy? What part was more challenging? Once each group is done, take at least one response from each.

Additional enrichment activities:	Learners can calculate the cost of their jewellery by assuming a price of materials used (e.g., ₹1 for string, ₹2 for each colour, ₹4 for each paper bead, etc.). They will multiply the unit price by the number of materials to find the total cost. Then, they can also add a profit margin to decide the selling price.
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Modifications for simplification	If learners find it difficult to set up stalls or make multiple pieces of their jewellery, they can instead display their designs in an exhibition-style showcase.
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ASSESSMENT CRITERIA

A majority of my learners were able to:

- ☐ Recognise and extend patterns in shapes and numbers.
- ☐ Identify patterns in special number sets like triangular and square numbers.
- ☐ Illustrate tessellations through examples.
- ☐ Set up stalls and sell the jewellery items that they created.

PROJECT DETAILS

Subjects Covered:	Math, Art
Age Group:	10-11 year-olds
Total Time Required:	In class: 30 minutes a day for 5 days At home: 10 minutes a day for 2 days
Leading Question	Can we design our own Naga-inspired shawl using art and math?
Learning Outcomes:	Knowledge-based Outcomes: 1. Recognise and extend patterns in shapes and numbers. 2. Identify patterns in special number sets like triangular and square numbers. 3. Observe and describe patterns in arithmetic operations (addition, subtraction, multiplication, division). 4. Illustrate regular and irregular tessellations through examples. 21st Century Skill Outcomes: 1. Think critically while deciding how to include number patterns and tessellations meaningfully in their jewellery designs. 2. Collaborate effectively while dividing tasks such as designing, making jewellery, setting up the stall, and creating fake currency, as well as exchanging feedback with peers. 3. Be creative while designing original jewellery pieces using recycled materials and drawing inspiration from cultural patterns, colours, and shapes. 4. Communicate effectively while presenting their jewellery designs to others, explaining the mathematical patterns used, and engaging visitors during the jewellery market event. Socio-Emotional Learning Outcomes: <u>Relationship Management:</u> RM.1.2 Demonstrate cooperation and teamwork to promote group effectiveness.
Previous Learning	Arithmetic Operations (add, subtract, multiply, divide)

Supervision Required	Medium
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CHAPTER-PROJECT MAPPING

Corresponding SCERT Nagaland Chapter: **Chapter 9 - Patterns**

SCERT Topic	SCERT Sub-Topic	Coverage
Design	Design	Yes
Importance of Patterns	Importance of Patterns	Yes
Patterns in Numbers and Shapes	Patterns in Numbers and Shapes	Yes
Patterns in Square Numbers	Patterns in Square Numbers	Yes
Patterns in Triangular Numbers	Patterns in Triangular Numbers	Yes
Sequences of Odd Numbers Between Consecutive Square Numbers	Sequences of Odd Numbers Between Consecutive Square Numbers	Yes As a tip
Patterns Through Play and Learn	Patterns Through Play and Learn	Yes As a tip
Border Strip and Tiling Patterns	Border Strip and Tiling Patterns	Yes