Lesson-6: Symmetry and Patterns

9 Periods (40 minutes each)

Learn Better (Main Course Book), Stay Ahead (Workbook), Book of Holistic Teaching, Book of Project Ideas, CRM signs, Poster

Animated Activities, Animation, Dictionary, eBook, Explainer Video, HOTS, I Explain, Infographic, Mental Maths, Quiz, Slideshow, Test Generator

Curricular Goals and Objectives (NCF)

To enable the students:

• to recognise and apply symmetry in nature, art and daily life.

• to identify, extend and create repeating patterns using logical reasoning.

• to explore symmetry through kinaesthetic, auditory and pictorial activities.

• to understand the connection between mathematics, art and cultural patterns.

• to develop problem-solving skills through coding, decoding and geometric transformations.

• to analyse and construct tessellations in real-world contexts.

• to foster curiosity, collaboration and accuracy in creating symmetrical designs.

Methodology

Period 1

Teacher: Good morning students. How are you?

Teacher: Before we begin today's lesson, look around the classroom. What patterns do you notice?
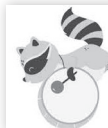
SHOULD DO 05 MIN.

Teacher: Think about the floor tiles, your notebooks or even your clothes. Do you see any repeating designs or symmetrical shapes?

(Encourage students to observe and share their findings.)

Teacher: Excellent. Patterns and symmetry are all around us. Today, we will explore how they work and how they help us in our daily life.

Confirming better

Confirming better I am honest. **PLH** 59

Teacher: Before we dive into the chapter, let us reflect on an important value – 'I am honest.'

Teacher: Why is honesty important?

MUST DO 05 MIN.

Teacher: Yes, honesty helps us build trust and good relationships.

(Encourage students to share examples of honesty in daily life.)

Teacher: We will begin a new chapter 'Symmetry and Patterns'. We are going to use a KWL chart to help us organise our thoughts and learning. I have made a KWL format on the blackboard. Please take out your notebooks and draw the same format in your notebooks.

SHOULD DO 10 MIN.

K	W	L

Teacher: Take a few minutes to think and write. If you have any questions, feel free to ask.

Teacher: You all did amazing work in this activity. Let us move to Re-KAP activities. We will use Kinaesthetic, Auditory and Pictorial activities today to make our learning exciting. Let us start with the Kinaesthetic activity.

MUST DO 10 MIN.

Kinaesthetic

Kinaesthetic

Make groups of two. Draw a vertical line down the middle of your paper. On one side of the line, draw half of a simple shape (e.g., half a butterfly, half a star). Let your partner draw on the other side of the line, the other half to make the shape. Share your drawings with the other groups and discuss how each side looks the same.

59

Teacher: Everybody, please open page 59 in your Main course book. Who will read and explain the activity?

(Scaffold the students to complete the activity.)

Teacher: Your partner will draw the other half of the shape on the opposite side of the line, ensuring it mirrors your part.

Teacher: Once completed, compare your drawings with other groups and discuss how each shape maintains symmetry.

Auditory

Teacher: Now, listen carefully as I read out a set of questions.

Teacher: Patterns and symmetry exist everywhere in nature. For example, zebras have stripes on their coats that are formed unique repeating patterns. These stripes help the zebra hide from others animals. Sunflowers also have special patterns. The petals of a sunflower follow certain patterns. These patterns help attract bees and other insects that help the plants grow.

MUST DO
05 MIN.

1. How do zebra stripes help the zebra?

2. Why do sunflowers have patterns?

You may show the **Dictionary** given on the digital platform.

Pictorial

Teacher: Look at the image in your book. Find the missing piece that completes the pattern and maintains symmetry.

MUST DO
05 MIN.

Pictorial · PS

Find the missing piece of the picture. Write the correct number in the given circles.

1	2	3
4	5	6
7	8	9
10	11	12

59

Teacher: Write the correct number in the given circles.

(Scaffold the students to complete the activity.)

Teacher: That was an amazing class. You all participated so well today.

Teacher: Let us all give a huge round of applause for everyone's effort. See you in the next class.

Differentiated Activities

110 km/hr

Create a pattern using different shapes and colours. Repeat the pattern at least three times and explain the sequence you followed.

80 km/hr

Observe a pattern in your surroundings (for example, floor tiles, wallpapers or clothing designs). Draw the pattern and extend it by adding the next two steps.

40 km/hr

Identify the next shape in this pattern: ▲●▲●___? (Fill in the missing shape).

Home Task

Look at a rangoli, embroidery or decorative design at home. Draw a part of the pattern and extend it in your notebook.

Period 2

Teacher: Good morning, students. How are you today?

Teacher: Let us recall what we learnt in the last class. Can anyone tell me what a pattern is?

SHOULD DO
05 MIN.

Teacher: Yes, a pattern is a sequence that repeats in a predictable way.

Teacher: Now, let us look around the classroom. Can you find any patterns?

Teacher: Well done! Patterns can be found in tiles, windows and even in our clothes.

Interactive better

Teacher: Observe the patterns made on the floors of your classroom and home.

MUST DO
5 MIN.

Interacting better · ICL

Observe the patterns made on the floors of your classroom and home. Are the shapes in the pattern without gaps? Discuss your answer with your partner.

60

Teacher: Are the shapes in the pattern placed without gaps? Discuss with your partner.

MUST DO
15 MIN.

Maria goes to the mall with her mother.

50% OFF

Mumma, look at these shawls! They have such pretty patterns!

Yes, Maria. Patterns can be very beautiful. Do you see the small dots on this one?

Yes, and this one has big dots also! I love it!

Mumma, how are patterns made?

Well, Maria, in the old times, all these patterns were made by hand. It took a lot of time and effort to create each one.

Wow! What about now?

Now, with technology, many patterns are printed using machines. It is much faster. It shows how we are evolving with time.

That is amazing!

60

Teacher: Let us read a story about Maria and her mother visiting a mall. Look at the patterns in the shawls, clothes and decorations.

(Ask students to read and explain the story.)

Teacher: Patterns are all around us. Some patterns are made by hand, while others are printed using machines.

Teacher: Can you think of patterns that are made by hand? Yes, rangoli, embroidery and weaving are great examples.

Teacher: What about patterns made by machines? Yes, carpets, wallpapers and digital designs are printed quickly and precisely.

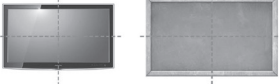You may show the **Animation** given on the digital platform.

Symmetry

SYMMETRY

In our day-to-day lives, we see many objects whose halves are mirror images of each other. Look at the pictures provided.

All the pictures are divided such that their two halves are of equal shape and size. Such figures are called **symmetrical figures**. The line that divides a figure into two equal halves is called the **line of symmetry**. Here, the dotted lines represent the lines of symmetry.
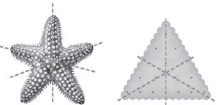
Figures may have one or more lines of symmetry.
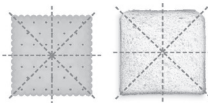
Symmetry in real-life

2 lines of symmetry   3 lines of symmetry

4 lines of symmetry   many lines of symmetry

(61)

Teacher: Now, let us talk about symmetry. Open your book to page 61.

Teacher: Symmetry means that a shape can be divided into two equal halves, which are mirror images of each other.

MUST DO
05 MIN.

Teacher: If you fold a shape along its line of symmetry, both sides should match perfectly.

Teacher: Let us look at some examples. Look at the butterfly and the leaf. Can you see the line of symmetry?

Teacher: What other objects can you think of that have symmetry? For example, a butterfly, star and heart all have lines of symmetry.

Teacher: (After some responses) Yes, symmetry is when both sides of a shape or object are identical or mirror images of each other. For example, the butterfly has one line of symmetry down the middle and the leaf has one line of symmetry too. Great observations.

You may show the **I Explain** given on the digital platform

Symmetry in Geometrical Shapes

Symmetry in Geometrical Shapes

A rectangle has two lines of symmetry.   A square has four lines of symmetry.   A circle has many lines of symmetry.   **(61)**
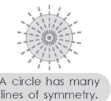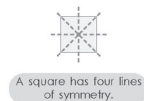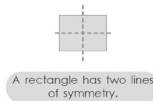
Teacher: Now, let us focus on geometrical shapes.

Teacher: Open your books to page 61, Symmetry in Geometrical Shapes.

Teacher: A rectangle has two lines of symmetry. Can anyone draw a rectangle and show where the lines of symmetry would be?

MUST DO
05 MIN.

Teacher: A square has four lines of symmetry and a circle has many lines of symmetry.

Teacher: What other shapes can you think of that might have symmetry? How many lines of symmetry do they have?

Teacher: (After some responses) Yes, a rectangle has two lines of symmetry, a square has four and a circle has many. Other shapes, like triangles and stars, have different numbers of symmetry lines. Well done, everyone!

① Draw as many lines of symmetry as possible in the given shapes. Write the number of lines in the blank spaces.

a. _____   b. _____   c. _____

d. _____   e. _____   f. _____   **(61)**

Teacher: Now, let us turn to Exercise 1.

Teacher: Open your books to page 61. Look at the shapes provided.

MUST DO
05 MIN.

Teacher: Draw as many lines of symmetry as you can in each shape.

Write the number of lines of symmetry in the blank spaces next to each shape.

Teacher: I will give you a few minutes to complete this. Let us see who can find all the lines of symmetry!

Teacher: Let us go through the answers together.

Teacher: Let us have a huge round of applause. See you in the next class.

Differentiated Activities

110 km/hr

Draw a symmetrical pattern using triangles, circles and hexagons. Fold your paper along the line of symmetry to check if both halves match.

80 km/hr

Identify symmetrical objects in the classroom, such as a mirror, clock or book. Draw them and mark their lines of symmetry.

40 km/hr

Draw and colour the symmetrical halves of a butterfly and star in your book.

Complete question (e) and (f) of Exercise 1 given on page 61 in the Main Course Book.

Period 3

Teacher: Good morning, students. How are you today?

Teacher: Let us take a few minutes to recall what we learnt in our previous class. Can anyone tell me what a pattern is?

SHOULD DO
05 MIN.

Teacher: Yes, a pattern is a sequence of shapes, numbers or objects that repeat in a predictable way.

Teacher: Can anyone find a pattern around the classroom? What shapes or objects do you see?

Reflection

REFLECTION

Rohan is standing in front of the mirror. Look at the image formed in the mirror in the picture.

When you place anything in front of a mirror, you see its reflection in the mirror. The reflection of the object is called its **mirror image**. You can also flip an object horizontally or vertically to get its mirror image.

62

Teacher: Let us now talk about reflection. Open your books to page 62.

MUST DO
05 MIN.

Teacher: Reflection occurs when an object is placed in front of a mirror. The image we see in the mirror is called its mirror image.

Teacher: Look at the example on page 62. Can anyone tell me what happens when we flip the object horizontally or vertically? Yes, it gives us the mirror image.

Teacher: Now, let us look at the different shapes. Can anyone draw the mirror image of the given shapes?

Teacher: (After discussion) The mirror image of a letter or shape looks exactly like the object but in reverse. For example, the letter D has a mirror image that looks like a backward D.

You may show the **Animated Activities** given on the digital platform.

Processing better

Processing *better*

The mirror image of some objects looks the same as the object, while some do not have the same mirror image.

8	8	4	�
Real Image	Mirror Image	Real Image	Mirror Image

The digit 8 shows reflection symmetry, but digit 4 does not.

62

Teacher: Let us now discuss the 'Processing better' section.

MUST DO
05 MIN.

Teacher: Look at the examples in your

book. Which figure shows a mirror image?

2 **Draw the mirror image of the following figures.**

a. D   b. 9
c. ₹   d. H

62

Teacher: Now, let us complete Exercise 2.

Teacher: Draw the mirror image of the following figures in your book.

Teacher: Great work, everyone! Let us now move on to Patterns.

Patterns

PATTERNS

We see patterns everywhere around us. A **pattern** is a definite order of shapes, numbers or letters in repetition. Look at the different patterns given below.

The repetition of shapes can be used to make designs.

62

Teacher: Now, let us talk about patterns. Turn to page 62 in your books. We see patterns everywhere around us. A pattern is a sequence of shapes, numbers or letters that repeat in a predictable order.

MUST DO
05 MIN.

Teacher: Look at the different examples of patterns in the book. Can anyone tell me what kind of patterns you can see?

Teacher: Yes, we can see shapes like circles and squares repeating or numbers like 2, 4, 6, 8.

Teacher: How do we know if something is a pattern? Think about it - what is the rule or sequence that makes it a pattern?

Teacher: For example, the sequence 2, 4, 6, 8 repeats by adding 2 each time. That is the rule of the pattern.

Understanding better

Understanding *better*

Who am I?

1. I have no sides, no vertices and many lines of symmetry.

2. I have 4 equal sides and 4 lines of symmetry.

62

Teacher: Let us try this 'Who am I?' riddle.

Teacher: Clue 1: 'I have no sides, no vertices and many lines of symmetry.'

Teacher: Yes, it is a circle.

MUST DO
05 MIN.

Teacher: Clue 2: 'I have 4 equal sides and 4 lines of symmetry.'

Teacher: Yes, it is a square.

Teacher: Great work! Let us now discuss other shapes with symmetry.

④ Complete the following patterns.
a.
b.
c.
62
63

Teacher: Let us now complete Exercise 4 together.

Teacher: You will see several patterns. Each pattern follows a specific rule and we need to determine the next item in the series.

(Guide the students to complete the exercise.)

📖 You may show the **Explainer Video** given on the digital platform.

Number Patterns

Number Patterns
Number patterns follow a specific rule. The rule helps us identify the next number in the series. By understanding number patterns, you can easily find missing numbers and recognise relationships between different numbers. Let us understand with the help of an example.

Example 1: Write the next number in the pattern.
88, 77, 66, 55, _____
Here, the rule to find each number in the pattern is to subtract 11 from the previous number.
88 − 11 = 77, 77 − 11 = 66, 66 − 11 = 55, 55 − 11 = 44.
Thus, the required number in the pattern is 44. **63**

Teacher: Let us now look at Number Patterns. What are number patterns?

Teacher: Number patterns follow a specific rule. This rule helps us find the next number in the series.

MUST DO
05 MIN.

Teacher: For example, look at the following pattern: 88, 77, 66, 55, ___. The rule here is to subtract 11 from each number.

Teacher: So, the next number will be 44 because 55 − 11 = 44.

Teacher: Now, let us answer the question in 'Understanding better' section.

Understanding better

Understanding *better*

Answer the following questions.
1. Name any one letter whose mirror image is the same in reflection.
2. Does every object look the same in the mirror? Say yes or no. **63**

Teacher: Let us move to 'understanding better.' Name any one letter whose mirror image is the same in reflection.

MUST DO
05 MIN.

Teacher: Yes, the letter A is a good example.

(Discuss the questions with students.)

📖 You may show the **Mental Maths** given on the digital platform

⑤ Complete each pattern. ICL
a. 6, 10, 14, 18, 22, _____, _____, _____
b. 37, 42, 47, 52, 57, _____, _____, _____
c. 1A, 3B, 5C, 7D, 9E, _____, _____, _____ **63**

Teacher: Let us now complete Exercise 5.

Teacher: In this exercise, you will complete the number patterns provided. For example:

MUST DO
05 MIN.

Teacher: a. 6, 10, 14, 18, 22, ___. What is the rule here?

Teacher: Yes, we add 4 to each number. The next number is 26.

Teacher: Complete the rest of the patterns and check the rules behind each one.

Teacher: Let us have a huge round of applause. See you in the next class.

Differentiated Activities

110 km/hr

Create a number pattern where the rule involves subtracting a number greater than 10. For example, create a pattern like 100, 85, 70, 55, ___. What comes next?

80 km/hr

Create a pattern using shapes like circles, squares and triangles. For example, circle, square, triangle, circle, square, ___. What comes next?

40 km/hr

Complete the pattern using simple shapes like circles and squares. Draw the next two shapes in the sequence.

Home Task

Solve Exercise 3, given on page 62 in the Main Course Book.

Period 4

Teacher: Good morning students. How are you?

Teacher: Good morning, students! How are you today?

Teacher: Before we dive into today's exciting lesson, let us recall what we learnt last time. Can anyone tell me what a pattern is?

SHOULD DO
05 MIN.

Teacher: Yes, a pattern is a sequence of repeated shapes or numbers. It could be something as simple as alternating colours or numbers!

Teacher: Now, let us make it fun! Look around the classroom. Look closely at the objects around you - do you notice any repeating designs or sequences? What do you see?

Teacher: Awesome! I see patterns too, in the tiles and the shapes on the wall.

Coding And Decoding

> **CODING AND DECODING**
> We use the process of coding and decoding to write secret messages in a particular pattern.
>
> | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
> |---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
> | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 |
>
> Each letter is given a code. You can write different messages by following the code.
> **For example:** 8 15 23 1 18 5 25 15 21 means HOW ARE YOU. **63**

Teacher: Now, let us move on to 'Coding and Decoding'.

Teacher: This is where you will become secret agents. You will use a special code to send secret messages. Each

MUST DO 10 MIN.

letter corresponds to a number, as shown in the table. For example, 8 15 23 1 18 5 25 15 21 means HOW ARE YOU.

Teacher: Please open your books to page 63 and look at the code provided.

(Discuss more examples with students.)

> 6 Decode the following messages. Use the code given above.
>
> a. 7 15 15 4 13 15 18 14 9 14 7
>
> b. 12 5 20 21 19 16 12 1 25 **63**
>
> c. 23 8 1 20 1 18 5 25 15 21 4 15 9 14 7 **64**

Teacher: Let us now decode some secret messages using the code from page 63.

MUST DO 05 MIN.

Teacher: The first one is: 7 15 15 4 13 15 18 14 9 14 7.

Teacher: What is the decoded message? Yes, it means GOOD MORNING Well done!

Teacher: The second one is: 12 5 20 21 21 19 16 16 25.

Teacher: You are all excellent code-breakers.

> 7 Code the following messages. Use the same code given in the previous page.
>
> a. GO GREEN
>
> b. MERRY CHRISTMAS
>
> c. SAVE WATER SAVE LIFE **64**

Teacher: Let us now turn the tables. We will encode secret messages.

MUST DO 05 MIN.

Teacher: Please open your books to page 64 and look at Exercise 7.
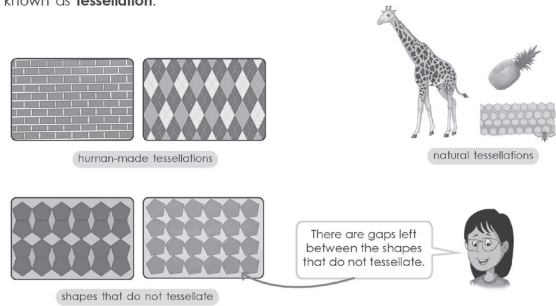
Teacher: First, let us encode GO GREEN.

Teacher: Use the code provided to write the numbers for each letter.

Teacher: Now, let us do the same with MERRY CHRISTMAS and SAVE WATER SAVE LIFE. I want you to encode these messages on your own.

Tessellation

> **TESSELLATIONS**
> A repeating pattern of shapes that perfectly fit together, with no overlaps or gaps, is known as **tessellation**.
>
> human-made tessellations
>
> natural tessellations
>
> There are gaps left between the shapes that do not tessellate.
>
> shapes that do not tessellate **64**

Teacher: Now, let us explore something fun - Tessellation.

Teacher: A tessellation is a pattern of shapes that fit together perfectly, without any gaps or overlaps.
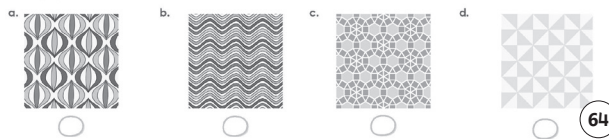
MUST DO 05 MIN.

Teacher: Look at the examples on page 64. Some tessellations are found in nature, like the honeycomb or the scales on a fish. Isn't that amazing?

Teacher: Let us now open Exercise 8 on page 64, where we will work on identifying tessellations.

> 8 Tick (✓) the boxes that show tessellation.
>
> a.　　b.　　c.　　d. **64**

Teacher: Who will read and explain Exercise 8?

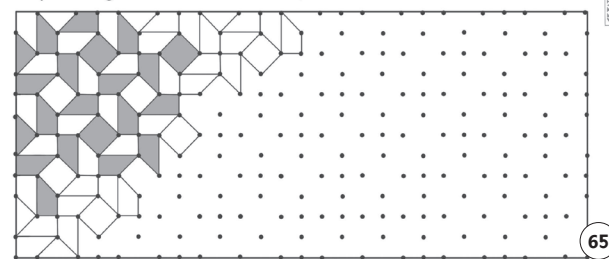**Teacher**: Tick the boxes that show tessellations.

Teacher: Look closely at the patterns in the boxes. Which ones fit together without any gaps or overlaps? Take a

MUST DO 05 MIN.

moment to decide and then mark your answers.

(Use **CRM signs** to settle the class.)

> 9 Complete the given tessellation and colour, as shown. **65**

Teacher: Open your books to page 65. Who will explain Exercise 9?

Teacher: Complete the tessellation and colour it as shown.

MUST DO 05 MIN.

Teacher: Look at the pattern provided and continue it with the same shapes. After completing the tessellation, colour the shapes as shown.

Teacher: Let us see who can create the most colourful tessellation!

Teacher: Well done students. Let us have a huge round of applause. See you in the next class.

Differentiated Activities

110 km/hr

Create a tessellation using hexagons, triangles or squares. Ensure the shapes fit perfectly with no gaps.

80 km/hr

Complete a tessellation using squares and triangles. Continue the pattern and colour the shapes.
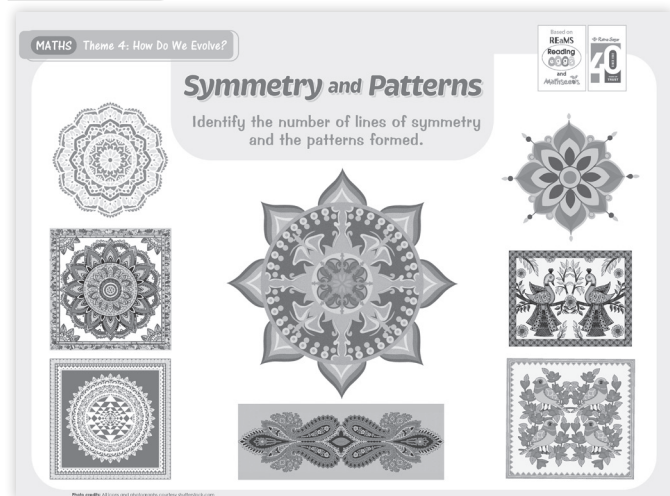
40 km/hr

Complete a simple tessellation using circles and squares. Colour the shapes and ensure they fit together properly.

Home Task

Write a letter to a friend using the code from today's lesson. Encode your message using the same number - letter code shown in the book. Bring your encoded letter in the next class.

Period 5

MATHS Theme 4: How Do We Evolve?

Symmetry and Patterns

Identify the number of lines of symmetry and the patterns formed.

Teacher: Good morning, students. How are you today?

Teacher: Before we begin, let us observe the poster on the wall.

SHOULD DO 05 MIN.

Teacher: Do you observe any symmetry or pattern in the poster?

(Discuss the poster with the students.)

Teacher: Great ideas! Let us keep this in mind as we move forward today.

Connecting better

Connecting *better*

Maria and her mother walked home from the mall after buying shawls. Maria asked, "Mom, why do we say 'a shawl' instead of 'an shawl'?" Her mother explained, "We use 'a' before words that start with a consonant sound, like 'shawl.' 'An' is used before vowel sounds, like 'an apple.' 'The' is used for specific things, like 'the shawl we bought today.'

HoLB **65**
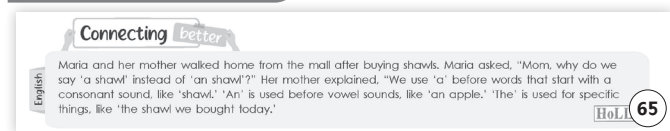
Teacher: Let us move to 'Connecting better' section.

Teacher: Who will read and explain the section?

MUST DO 05 MIN.

Teacher: What do you think is the reason?

Teacher: (Wait for student responses) Yes, we say a before words that start with a consonant sound, like shawl and we use an before words starting with a vowel sound, like an apple.
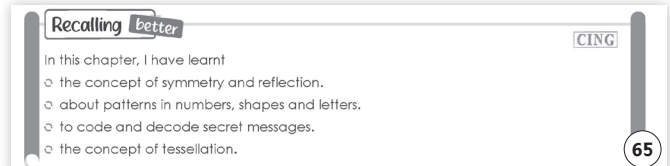
Teacher: This is an example of how language follows patterns, just like symmetry and designs do. Great observations, everyone.

(Use CRM signs to settle the class.)

MUST DO 15 MIN.

Recalling better

Recalling *better*

CING

In this chapter, I have learnt
- the concept of symmetry and reflection.
- about patterns in numbers, shapes and letters.
- to code and decode secret messages.
- the concept of tessellation.

65

Teacher: Now, let us recall what we have learnt. Open your books to page 65 and look at the 'Recalling better' section.

Teacher: What is symmetry? Can anyone explain?

Teacher: (Wait for responses) Yes, symmetry means when a shape can be divided into two equal halves and both halves are mirror images of each other.

Teacher: How do we create symmetrical shapes?

Teacher: To create symmetry, we often fold a shape along a line and both sides should match perfectly. Can anyone think of shapes that have symmetry?
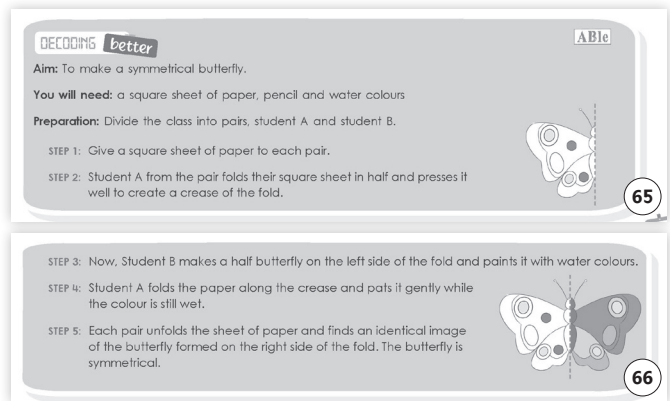
Teacher: (Wait for responses) Yes, the butterfly and star are good examples.

Teacher: Now, can anyone give an example of a tessellation?

Teacher: (Wait for responses) Yes, tessellations are patterns of shapes that fit together perfectly without gaps. A great example is the honeycomb.

Teacher: Wonderful answers, everyone! Let us move to the next part of our lesson.

Decoding better

DECODING *better*

ABle

Aim: To make a symmetrical butterfly.

You will need: a square sheet of paper, pencil and water colours

Preparation: Divide the class into pairs, student A and student B.

STEP 1: Give a square sheet of paper to each pair.

STEP 2: Student A from the pair folds their square sheet in half and presses it well to create a crease of the fold.

65

STEP 3: Now, Student B makes a half butterfly on the left side of the fold and paints it with water colours.

STEP 4: Student A folds the paper along the crease and pats it gently while the colour is still wet.

STEP 5: Each pair unfolds the sheet of paper and finds an identical image of the butterfly formed on the right side of the fold. The butterfly is symmetrical.

66

Teacher: Let us now move on to 'Decoding better.' Open your books to page 65.

MUST DO 10 MIN.

Teacher: Today, we will be making a symmetrical butterfly.

Teacher: Let us try this out in pairs and remember, symmetry is all about balance.

(Guide students to complete the activity.)

You may show the **eBook** given on the digital platform.

Learning better

Learning better　　　　CBA

A Tick (✓) the correct answer.

1. Which of the following letters do not have any line of symmetry?
   a. H　　　b. F　　　c. I　　　d. X

2. Which of the following shows a reflection image of the given figure?
   a.　　　b.　　　c.　　　d.

3. Write the next three numbers for 6, 11, 16, 21, _____, _____, _____.
   a. 28, 35, 43　　　b. 13, 18, 23
   c. 26, 31, 36　　　d. 26, 33, 39

66

4. Which one of these shapes is divided into mirror halves by the dotted line?
   a.　　　b.　　　c.　　　d.

5. A _____ is a repeating pattern of shapes with no overlaps or gaps.
   a. coding　　　b. decoding
   c. symmetry　　　d. tessellation

66

Teacher: Please open your books to page 66 and look at the 'Learning better' section. Let us go through the questions one by one.

Teacher: Now, look at the first question. Who will read and explain the first question?

Teacher: Take a moment to look at each of the letters carefully. Do you see any line of symmetry? Which of these letters do you think does not have any line of symmetry?

Teacher: Discuss with your partner and make your choice. After you have chosen, we will talk about the correct answer.

(Guide the students to complete the exercise in the similar way.)

Teacher: Let us have a huge round of applause. See you in the next class.

Differentiated Activities

110 km/hr

Design a tessellation using hexagons, triangles and circles. Ensure the shapes fit together perfectly without any gaps. Afterward, share your design with another pair and explain the sequence of your pattern.

80 km/hr

Look around the classroom for a symmetrical pattern. Draw the pattern and continue it by adding the next two steps. Compare your pattern with your partner and discuss the differences.

40 km/hr

Draw a pattern using circles and squares. Decide together with your partner which shape will come next and check if both partners are following the same sequence.

Home Task

Complete the questions given in the 'Solving better' section given on page 66 in the Main Course Book.

Period 6

Teacher: Good morning, students. How are you today?

Teacher: Before we start today's lesson, let us play a quick game. I will give you clues about shapes and you will try to guess what they are.

Teacher: Here is your first clue: I am a shape that has four equal sides and four right angles. What shape am I? (Square)

Teacher: Great! Now for the second clue: I am a shape with three sides. What shape am I? (Triangle)

Teacher: Here is another one: I am a shape with no corners and am perfectly round. What am I? (Circle)

Teacher: Let us try another one: I am a shape with four sides but opposite sides are equal. What shape am I? (Rectangle)

B Write true or false.

1. The line of symmetry divides a figure into two equal halves. _____
2. A rectangle has two lines of symmetry. _____
3. The digit 4 shows reflection symmetry. _____
4. A pattern is a definite order of shapes, numbers or letters without any repetition. _____
5. The pattern formed on the honeycomb is an example of human-made tessellation. _____

67

Teacher: Please open your books to page 67 and look at Exercise B.

Teacher: Write true or false for each statement and explain your reasoning.

Teacher: Let us go through the first statement:

Teacher: The line of symmetry divides a figure into two equal halves.

Teacher: Think about what symmetry means. A line of symmetry divides a figure into two parts that are exactly the same.

Teacher: Is this statement true or false? What is your reasoning?

Teacher: Discuss with your partner and then we will go over the answer together.

(Guide students to complete the exercise in the similar way.)

C Are the following flags symmetrical? If yes, then draw the line(s) of symmetry.

1.　　　2.　　　3.　　　4.

67

Teacher: Let us move on to Exercise C.

Teacher: Who will explain the question?

Teacher: Look at the four flags given: India, USA and Italy.

Teacher: Discuss with your partner if you think these flags have symmetry. If they do, draw the line(s) of symmetry on the flags.

Teacher: Once you are done, we will review your answers. (Use **CRM signs** to settle the class.)

D. Complete the given tiling pattern. Also, colour the pattern.

67

Teacher: Now, look at Exercise D.

Teacher: Complete the given tiling pattern and colour the pattern.

MUST DO
05 MIN.

Teacher: The shapes are arranged in a certain sequence. Follow the sequence to complete the pattern.

Teacher: Once you finish, colour the pattern neatly.

Teacher: When you are done, we will look at your designs together.

E. Write the next three numbers/letters in the following patterns.

1. 101, 201, 301, 401, _____, _____, _____
2. 8, 88, 888, 8888, _____, _____, _____
3. A2, B4, C6, D8, _____, _____, _____
4. 9, 18, 27, 36, _____, _____, _____
5. 68, 63, 58, 53, _____, _____, _____

67

Teacher: Let us move on to Exercise E.

Teacher: Write the next three numbers or letters in the patterns given.

MUST DO
10 MIN.

Teacher: The first pattern is 101, 201, 301, 401, ____, ____, ____.

Teacher: What do you notice about the numbers? What comes next in the pattern?

Teacher: Similarly, there are other patterns to complete. Take your time to solve them and when you are done, we will check the answers together.

📖 You may show the **Slideshow** given on the digital platform

G. Read the code given below. Decode the following messages.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52

1. 24 10 40   42 38   32 2 36 40 50
_____   _____   _____

2. 38 2 44 10   46 2 40 10 36   38 2 44 10   24 18 12 10
_____   _____   _____   _____

3. 16 2 44 10   2   28 18 6 10   8 2 50
_____   _____   _____   _____

68

Teacher: Please look at Exercise G on page 67. Decode the following messages using the code provided at the top of the page. Each number

MUST DO
10 MIN.

represents a letter of the alphabet. For example, the number 2 corresponds to A, 4 corresponds to B and so on.

Teacher: Let us start with the first set of numbers: 24 10 40.

Teacher: Look at the code chart. The number 24 corresponds to L, 10 corresponds to E and 40 corresponds to T.

Teacher: So, the decoded message for 24 10 40 is L E T.

Teacher: Now that we have completed the first one together, I want you to continue decoding the remaining messages on your own. Use the code chart to help you and write down your answers.

Teacher: Once you have finished, we will review the answers together.

Teacher: Well done, everyone. Let us have a huge round of applause for your hard work today. See you in the next class.

Differentiated Activities

110 km/hr

Work with a partner to create a symmetrical pattern using triangles, stars and hexagons. Each student will draw one half of the pattern and then fold the paper to check if both halves match.

80 km/hr

Observe the objects in your classroom, such as a clock or mirror. Draw one of the objects and discuss with your partner where the line of symmetry is. Then, draw the reflection on the other side.

40 km/hr

Work with your partner to mirror the shape of a letter or object. Draw one half of the shape and then fold the paper to see if it creates a symmetrical reflection.

Home Task

Solve Exercise F given on page 68 in the Main Course Book.

Bring flowers, leaves and chalk for the 'Creating better' activity, which will be done in next class.

Period 7

Teacher: Good morning, students. How are you today?

Teacher: Before we start today's lesson, let us play a quick warm-up activity based on patterns.

SHOULD DO
05 MIN.

Teacher: Look around the classroom. Can anyone spot any patterns?

Teacher: Patterns can be shapes, colours or even numbers that repeat. Let us see if you can find any.

Teacher: I will show you a few patterns and I want you to tell me what comes next.

Teacher: First pattern: Red, Blue, Red, Blue, _____

Teacher: What comes next in the pattern? Yes, it is Red. Now, let us try another one.

Teacher: Next pattern: Circle, Square, Circle, Square, _____

Teacher: What comes next in this pattern? Yes, it is Circle. Well done.

Teacher: Now for a fun challenge: What is the next shape in this pattern? Triangle, Square, Triangle, Square, _____

Teacher: Yes, it is Triangle. Great work.

Teacher: Now that we are warmed up and thinking about patterns, let us move on to today's lesson.

Creating better

Creating *better*   ArtI 21st CS

Flower Rangoli Pattern

- Take fallen leaves and flowers, chalk
- Gather fallen leaves and flowers. Pick different colours and sizes.
- Find a clean spot on the ground. Make sure it is smooth and free of dirt.
- Use chalk to draw a simple shape like a circle or star on the ground.
- Put the leaves along the lines of your drawing. Use big leaves for the outside and small ones for the inside.
- Fill the spaces between the leaves with flowers. You may use whole flowers or just the petals.
- Add more leaves and flowers to make your design colourful and pretty. Fix any parts that do not look right.
- Look at your rangoli from different angles to make sure it looks nice and even.
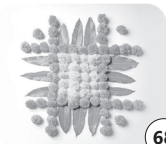
68

Teacher: Please open your books to the 'Creating better' section on page 68.

MUST DO
15 MIN.

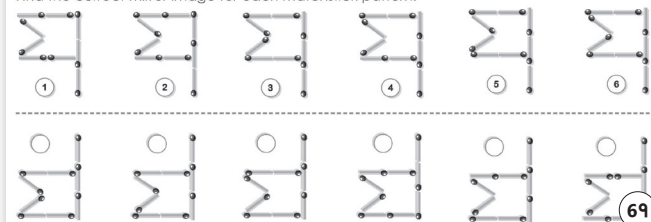**Teacher**: In this activity, you will create your own 'Flower Rangoli Pattern'.

(Guide the students to complete the activity.)

Thinking better

Thinking *better*   21st CS HOTS

Think and write the answer in your notebook.

Find the correct mirror image for each matchstick pattern.

① ② ③ ④ ⑤ ⑥

69

Teacher: Now, let us move on to 'Thinking better' on the same page.

MUST DO
05 MIN.

Teacher: Look at the patterns made with matchsticks.

Teacher: You are asked to find the correct mirror image for each matchstick pattern.

Teacher: Think carefully about how each pattern would look if reflected in a mirror.

Teacher: Write the correct answers in your notebooks. We will check them together once you are done.

Choosing better

Teacher: Now, let us move on to 'Choosing better' given on page 69.

Teacher: You have some free time in the evening. What will you do?

Choosing *better*   LSV

You have free time in the evening. What will you do?

- Help your parents in the kitchen
- Make cards for the help
- Watch TV

69

Teacher: Think about which activity you enjoy the most and why. Write down your answer in your book.

Revising better

Revising *better*   DBL

What is your favourite pattern? Use it to make a card in your Little Book. Write a note too.

69

Teacher: Let us now look at 'Revising better.'

Teacher: You need to draw your favourite pattern and make a card in your Little Book.

MUST DO
05 MIN.

Teacher: Write why it is your favourite. Think about what makes it special to you.

Teacher: Take your time to create the card and write your note.

Teacher: This will also be your home task. Finish it by the next class.

Pledging better

Pledging *better*   SDGs

In my own little way, I pledge to reflect on my mistakes and grow from them.

SDG 4: QUALITY EDUCATION

69

Teacher: Let us move to 'Pledging better' now.

Teacher: Think about Quality Education. It is about learning and growing in school.

Teacher: How can you contribute to Quality Education?

Teacher: Let us take a pledge to reflect on your mistakes and grow from them.

Teacher: You can promise to be responsible, help your friends or use your knowledge to help others.

Teacher: Repeat after me : In my own little way, I pledge to reflect on my mistakes and grow from them.

Book of Holistic Teaching

Theme 4: How Do We Evolve?

Chapter 6: Symmetry and Patterns

Ⓐ **English**   HoLL MDA

Underline the articles in the given sentences.

1. Symmetry is when the two sides of something look the same.
2. Tessellations are patterns made of shapes that fit together without any gaps or overlaps, like a repeating design.

Ⓑ **Science**

Patterns and symmetry are important in nature, especially in animals like peacocks and certain

13

fish. Male peacocks have symmetrical, colorful tail feathers that help them attract mates. Similarly, some fish have bright, patterned scales that they display to attract potential partners.

1. How do the symmetrical patterns on a peacock's tail feathers help the peacock?

2. Why do some fish have bright, patterned scales?

C Social Studies

Draw a globe in your notebook. Make lines of symmetry on it.

(14)

(Refer to the Book of Holistic Teaching, page 13,14 under the title 'Symmetry and Patterns.' Complete the activities mentioned in this section and ensure

COULD DO
10 MIN.

that the students complete them. These activities are designed to enhance their holistic understanding and engagement with the topic. Provide any necessary support and materials to help the students successfully finish the activities.)

Differentiated Activities

110 km/hr

Create a pattern using circles, squares and triangles. Draw at least five shapes in a sequence and explain the rule behind the pattern to your partner.

80 km/hr

Look at the numbers in the pattern: 2, 4, 6, 8. In pairs, figure out the rule for the pattern and then write the next three numbers in the sequence. Discuss the rule with your partner.

40 km/hr

In pairs, work together to complete the pattern: 5, 10, 15, ____, ____. Take turns drawing the next numbers in the sequence and share your reasoning.

Home Task

What is your favourite pattern? Use it to make a card in your Little Book. Write a note too.

Period 8

Teacher: Good morning, students. How are you today?

Teacher: Today, we are going to do something a little different for our warm-up. I want you to look around the classroom carefully.

SHOULD DO
05 MIN.

Teacher: Can you find any objects with repeating patterns or shapes?

Teacher: For example, look at the tiles on the floor, your notebooks or even the designs on your clothes.

Teacher: Share with me what kind of patterns you see.

Teacher: Now, think about what makes something symmetrical. Can anyone give me an example of something that is symmetrical?

Teacher: Yes, a butterfly is a great example. A butterfly has two halves that look exactly the same when divided down the middle.

You may show the **Infographic** given on the digital platform

Worksheet 1

Theme 4: How Do We Evolve?

6. Symmetry and Patterns

Worksheet 1

A. Fill in the blanks.

1. 12, 24, 48, 96, ____, ____

2. The letter 'X' has _____ lines of symmetry.

3. A square has _____ lines of symmetry.

4. The reflection of the object is called _____.

5. The line which divides a figure into two equal halves is called _____.

B. Is the dotted line a line of symmetry in the following figures? Write **Y** for Yes and **N** for No.

C. Complete the given tessellation pattern. Also, colour the tessellation shapes.

(27)

Teacher: Please open your books to Worksheet 1 on page 27.

MUST DO
15 MIN.

Teacher: Let us begin with Exercise A, where you need to fill in the blanks.

Teacher: Look at the number sequence: 12, 24, 48, 96. What do you notice about these numbers?

Teacher: Yes, each number is double the previous one. So, what comes next?

Teacher: The next number is 192. Now, continue with the rest of the blanks on your own.

Teacher: When you finish, we will discuss the answers.

Teacher: Now, move on to Exercise B, where you need to decide if the dotted line is a line of symmetry for the figures.

Teacher: Remember, a line of symmetry divides a figure into two equal parts. Think about how each shape might be folded to see if both sides match.

Teacher: Once you finish this, we will go over the answers together.

Teacher: In Exercise C, you will complete the tessellation pattern. Tessellations are patterns that fit together without any gaps.

Teacher: Take your time to colour the shapes neatly after you finish the pattern.

You may generate additional practice worksheets using the **Test Generator** given on digital platform.

Worksheet 2

A. Write **true** or **false**.

1. A square has 2 lines of symmetry. _____
2. The letter D has one line of symmetry. _____
3. The digit 8 shows reflection symmetry. _____
4. Taj Mahal is a symmetrical monument. _____
5. The pattern on pineapple is an example of natural tessellation. _____

B. Draw the symmetrical half of each of the following shapes.

C. Observe and complete the following patterns.

1. 23, 26, _____, _____, 35, 38
2. 110, 120, 130, _____, _____
3. 90, 81, 72, 63, _____, _____
4. ZYY, ZY, ZYY, ZY, _____, _____
5. AB11, CD22, EF33, GH44, _____, _____

(28)

Teacher: Now, turn to Worksheet 2 on page 28.

MUST DO — 15 MIN.

Teacher: First, let us look at Exercise A.

Teacher: Write true or false for each statement.

Teacher: For example, 'A square has 2 lines of symmetry.' What do you think?

Teacher: Yes, this statement is false. A square actually has 4 lines of symmetry.

Teacher: Now, complete the rest of Exercise A.

Teacher: In Exercise B, draw the symmetrical half of each shape.

Teacher: Remember, symmetry means that one half is a mirror image of the other.

Teacher: Take your time to complete these drawings and think carefully about where to draw the line of symmetry.

Teacher: Finally, in Exercise C, you need to observe and complete the given patterns.

Teacher: Look at the number sequences carefully. What do you notice about how the numbers are changing?

Teacher: Complete the missing numbers and we will discuss the answers together once you are finished.

You may show the **HOTS** given on the digital platform

Doubt Session

Teacher: Now, we will have a doubt session.

Teacher: If you are unsure about any of the questions or need help with any part of the worksheets, feel free to ask.

COULD DO — 05 MIN.

Teacher: Is there any part of the chapter on symmetry or patterns that is unclear to anyone?

Teacher: If you do not understand something, let us discuss it together.

Teacher: You can raise your hand and ask about anything you are not sure about.

Teacher: Let us take a moment to clear up any doubts you might have.

Teacher: Well done, everyone. You did a fantastic work today. Let us give a big round of applause for all the hard work you put in today. See you in the next class.

Differentiated Activities

110 km/hr

In pairs, create a number pattern where each number is multiplied by 2 starting from 3. Write the next five numbers. Once you finish, share your answers with your partner and check if your patterns match.

80 km/hr

Identify a symmetrical object in the classroom, like a leaf or butterfly. Draw it and mark the line of symmetry. Afterward, share your drawings with your partner and compare the symmetry lines.

40 km/hr

Draw and colour the symmetrical halves of a heart and star. Then, fold the paper to see if both halves match perfectly.

Home Task

Find an object at home with symmetry, such as a door, window or book. Draw one half of the object and complete the other half to create a symmetrical design. Colour your drawing and describe the symmetry in your notebook.

Period 9

Teacher: Good morning students. How are you?

Warm-up based on previous class

SHOULD DO — 05 MIN.

Worksheet 3

A. Read the following statements. Name the shape, letter or digit each statement is about.

1. A letter with no line of symmetry. _____
2. A letter with one line of symmetry. _____
3. A shape with two lines of symmetry. _____
4. A digit with two lines of symmetry. _____
5. A shape with many lines of symmetry. _____

B. Draw the mirror image of the following figures.
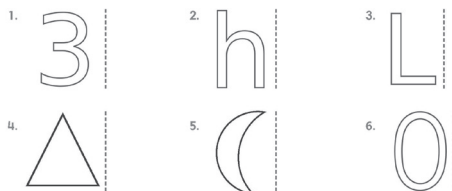
C. Complete the given tessellation pattern. Also, colour the tessellation shapes.

(29)

Teacher: Please open Worksheet 3 on page 29 in the Workbook.

MUST DO — 15 MIN.

Teacher: In Exercise A, read the statements and name the shape, letter or digit that matches the description.

Teacher: For example, the first statement says, 'A letter with no line of symmetry.' Which letter fits this description?

Teacher: Now, complete the rest of the statements on your own.

Teacher: In Exercise B, you need to draw the mirror image of each given figure.

Teacher: Look carefully at each figure. To draw the mirror image, think about how the figure would look if it were reflected in a mirror.

Teacher: In Exercise C, you will complete the tessellation pattern and colour it.

Teacher: Tessellation is when shapes fit together without gaps. Complete the pattern and colour the shapes neatly.

Teacher: Once you are done, we will go over the answers together.

Book of Project Ideas

Chapter 6: Symmetry and Patterns

Theme 4: How Do We Evolve?

- Talk about what symmetry is and show examples in nature and objects. **PRO** **21st CS**
- Get coloured paper, scissors, glue, a ruler, a pencil, and an optional mirror.
- Fold a piece of coloured paper in half.
- Draw half of a symmetrical shape (like a butterfly or heart) on one side of the fold.
- Cut along the lines while the paper is still folded.
- Unfold the paper to see the full symmetrical shape.
- Arrange the symmetrical shapes on a large sheet of paper.
- Glue the shapes to make a colourful collage.
- Share your collage with the class.
- Discuss how you used symmetry and patterns in your design.
- Use a mirror along the fold to see how symmetry works. (9)

(For project Ideas, please refer to the book of Project Ideas, page 9 under the title 'Symmetry and Patterns.' This

COULD DO — 15 MIN.

project should be assigned to the students to work on. Ensure that the students understand the project requirements and provide any necessary guidance or materials they might need. Encourage them to explore and learn about symmetry and patterns through this engaging project.)

You may show the **Quiz** given on the digital platform

SHOULD DO — 05 MIN.

Teacher: Now, let us fill in the last column of the KWL chart.

Teacher: In this column we will write what we have learnt in this chapter.

Teacher: Think about the topics, have we learnt and write them in the 'L' column of the chart.

(Wait for students to fill in the chart.)

Teacher: Let us all give a huge round of applause to everyone for their hard work and creativity. Great work, everyone. See you in the next class. Have a wonderful day ahead.

Differentiated Activities

110 km/hr

Design a symmetrical building using different shapes like rectangles, triangles and squares. Once you complete the structure, fold the paper along the line of symmetry to check if both halves match. Discuss your design choices with your partner.

80 km/hr

In pairs, pick a random object like a balloon or a cup. Draw the symmetrical reflection of that object. Challenge your partner to guess what the original object was, based on the reflection you drew.

40 km/hr

Using a mirror, draw half of a simple shape (like a heart or star) on a piece of paper. Place the mirror along the line you drew and check if the other side matches. Discuss how symmetry works in this process with your partner.

Learning Outcomes

The students will:

Physical Development	• identify and create symmetrical shapes using drawing, folding and construction techniques.
Socio-Emotional and Ethical Development	• demonstrate honesty, collaboration and ethical decision - making while working in groupes
Cognitive Development	• identify, analyse and create patterns and symmetrical designs to enhance logical thinking.
Language and Literacy Development	• effectively communicate their observations and reasoning about symmetry and patterns during discussions.
Aesthetic and Cultural Development	• describe and discuss the role of symmetry and patterns in art, architecture and cultural designs from different traditions.
Positive Learning Habits	• build perseverance through creating symmetrical patterns, develop curiosity by exploring symmetry in cultural designs and enhance appreciation for symmetry in art, architecture, and nature.

Starry Knights

Hope you fell motivated to execute the activities in the class. Describe on anecdote when you felt too tried to teach but felt motivated by the learners' interest.

Reward yourself with a STAR.