# Theme 5: Why Do We Need Systems?



10 Periods (40 minutes each)

Learn Better (Main Coursebook), 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, Maths Lab, Mental Maths, Quiz, Quick Maths, Slideshow, Test Generator

# Curricular Goals and Objectives (NCF)

### To enable the students to:

- to identify symmetrical patterns in objects, nature and traditional designs.
- to explore rotation through quarter, half and full turns using shapes and real objects.
- to recognise and create patterns using numbers, shapes and real-life examples.
- to draw and match nets of 3D shapes with their corresponding solid forms.
- to sketch and identify top, front and side views of 3D objects.
- to connect symmetry and patterns to art, architecture and everyday surroundings.
- to build spatial understanding through hands-on projects and collaborative activities.

SHOULD DO

5 MIN.

SHOULD DO

5 MIN.

# Methodology

# Period 1

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

**Teacher**: Today, we are starting a new chapter - Symmetry, Patterns and Nets. We will explore how objects around us have balanced designs and patterns.

**Teacher**: Look at your surroundings. Do you see any patterns on your clothes, floor tiles or objects?

**Teacher**: Yes, patterns are everywhere. What do you think makes a pattern balanced?

**Teacher**: Correct, symmetry helps create balance. Let us explore how symmetry works in real life.

### **Confirming better**



**Teacher**: Now, let us read the 'Confirming better' section. Who will read aloud?

 $\ensuremath{\textbf{Teacher}}$  : Thank you. When we say we

respect our ancestors, it means we value their knowledge, traditions and contributions.

**Teacher**: This reminds us to respect our ancestral designs and patterns. Can you think of any traditional patterns that have symmetry? **Teacher**: Yes, rangoli, mehndi and temple designs. Why do you think symmetry is used in art and architecture?

Teacher: Great answer. Symmetry makes things look

**Teacher**: We will begin a new chapter, Symmetry, Patterns and Nets. 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.

К	W	L

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

**Teacher**: You all did an amazing job 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.

### Kinaesthetic

**Teacher**: Everybody, please open page 92 in your Main Coursebook. Who will read and explain the activity?



92



Play yoga mirror. Do a simple yoga pose and your partner will mirror it to create a reflection.



(Scaffold the students to complete the activity.)

Teacher: Well done. What did you notice?

Teacher: Yes, your partner mirrored your movement. That is how symmetry works.

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

### Auditory



(92)

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

1	E Auditory* 3
	Listen to your teacher carefully. Answer the questions.

Teacher: Maya was folding paper to make a box. She noticed the lines on the paper matched perfectly when folded in half, showing symmetry. She cut the paper into a pattern of squares and triangles, which fit together like a net to form the box. Her friends helped her check the pattern for mistakes before they finished.

- 1. How did Maya know her paper showed symmetry when folded?
- 2. What shapes did Maya use to make the net for the hox?

Teacher: Great effort, everyone. Now, let us explore the pictorial activity.

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

### Pictorial

Teacher: Open your books to page 92. Look at the pictures. What do we need to do here?





Teacher: Correct. We will draw lines of symmetry for these images.

Teacher: Let us take the first one. Where do you think the line of symmetry should be?

Teacher: Yes, exactly in the middle. Let us draw the lines for the rest.

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

### **Differentiated Activities**

### 110 km/hr

Draw two shapes on grid paper, then reflect one shape along a vertical or horizontal line to create a symmetrical image.

### 80 km/hr



Draw three simple shapes and draw their lines of symmetry.

### 40 km/hr



Find five classroom objects that have symmetry.

### Home Task

Look around your home and find five objects that have symmetry. Draw each object and show its line of symmetry in your notebook. Write one sentence about each object describing its symmetry.

# Period 2

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



Teacher: Yesterday, we explored symmetry in objects around us. Can you recall where we saw symmetry?

Teacher: Yes, in rangoli, butterflies and buildings. Can anyone explain what a line of symmetry is?

Teacher: Correct. A line of symmetry divides a shape into two identical halves. Today, we will explore more about symmetry in patterns and letters.

Teacher: Let us play a quick game. I will say an object and you tell me if it is symmetrical or not. Ready?

Teacher: A butterfly.

Teacher: Yes, symmetrical.

Teacher: A chair.

Teacher: It depends on the design, but most chairs are not perfectly symmetrical.

Teacher: A heart shape.

Teacher: Yes, if folded in the middle, both halves match.

Teacher: Well done. Now, let us move on to an interesting discussion.

### Interacting better

Teacher: Let us do an interesting activity today. Open your books to the 'Interacting better' section. What do you see in the task?





Teacher: Yes, we need to draw a 3D shape and identify the plane shapes that form it.



**Teacher**: Can someone name a 3D shape we see around us?

**Teacher**: Correct. A cube is a 3D shape. What plane shapes make up a cube?

**Teacher**: Yes, squares. A cube has six square faces. Now, let us try drawing one.

**Teacher**: Great job. Now, think of a different 3D shape. What if we draw a cylinder? What plane shapes make it?

**Teacher**: Correct. A cylinder has two circles and a rectangle that wraps around.

**Teacher**: Now, work with your partner. One of you will draw a 3D shape and the other will identify the plane shapes in it.

**Teacher**: Well done. Who wants to share what their partner drew?

**Teacher**: Excellent observations. This shows how 3D objects are made of plane shapes. Let us give ourselves a big round of applause. Let us move to read a story. (Use CRM signs to settle the class.)



You may show **Animation** given on digital platform. **Teacher**: Before we start reading, look

MUST DO

at the title and pictures. What do you think this story is about?

**Teacher**: Yes, it seems to be about patterns and symmetry. Do you think patterns can tell us something about culture? **Teacher**: Absolutely. Traditional patterns in clothing and architecture are part of a community's identity. Let us begin reading.

(Students take turns reading.)

**Teacher**: Who can explain what happened in this part of the story?

Teacher: Yes, the shawl has symmetrical designs, just like

natural patterns in flowers and leaves. Why do you think nature follows symmetry?

**Teacher**: Correct. Symmetry helps in balance and growth. Look at a tree, a starfish or even our own body. Symmetry is everywhere.

Teacher: What was your favourite part of the story?

**Teacher**: Good. Now, let us apply what we learnt to symmetry in shapes.

#### Symmetry

**Teacher**: Everyone please open page 94 in the Main Coursebook Let us read and understand 'Symmetry'. What do you see in the pictures?





**Teacher**: Yes, there are different objects like the Taj Mahal, a butterfly, a leaf and a ladybug. What do they have in common?

**Teacher**: Correct. They all have symmetry. When we divide them into two halves, both sides look the same. This is called a symmetrical shape.

**Teacher**: Let us take a closer look at symmetry. Can anyone define a line of symmetry?

**Teacher**: Yes, it is a line that divides a shape into two identical halves. If you fold the shape along this line, both sides will match perfectly.

**Teacher**: Can a shape have more than one line of symmetry?

**Teacher**: Correct. A square has four lines of symmetry, while a rectangle has only two.

**Teacher**: Look at the images in your book. Can you find shapes with one, two and multiple lines of symmetry?

**Teacher**: Well done. Let us practise drawing symmetry lines in the next exercise.

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



**Teacher**: Open your books to Exercise 1. Look at the shapes. What do we need to do here?



**Teacher**: Yes, we have to draw lines of symmetry for these shapes. Let us do the first one together.



Teacher: Where should we draw the line of symmetry for this star?

(Students respond and draw.)

Teacher: Great job. Now, complete the rest of the shapes in your book.

() You may show the Infographics given on the digital platform.



Teacher: Now, let us explore symmetry in letters. Look at the letters given. What do we need to do?



Teacher: Correct. We have to divide them into two equal halves using dotted lines.

Teacher: Can you name some letters with vertical symmetry?

Teacher: Yes. A, H, M and W. What about letters with horizontal symmetry?

Teacher: Good. Letters like C and E can have horizontal symmetry. Let us now complete this Exercise 2.

Teacher: Well done, everyone. Let us give ourselves a big round of applause for our effort today. See you in the next class.

### **Differentiated Activities**

#### 110 km/hr

Find five more letters that have symmetry and draw their symmetrical halves. Identify if they have vertical, horizontal or both lines of symmetry.

#### 80 km/hr



Write your name in capital letters and mark the lines of symmetry in each letter. If a letter does not have symmetry, put a cross next to it.

#### 40 km/hr

Work with a partner. One of you will say a letter aloud and the other will decide if it has symmetry. If it does, point to where the line of symmetry would be. Take turns choosing and identifying letters.

#### Home Task

Find five English capital letters that have symmetry. Draw each letter and show its line or lines of symmetry in your notebook. Try to find at least one letter that has more than one line of symmetry.

# Period 3

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

Teacher: Yesterday, we explored SHOULD DO symmetry in objects and letters. Can you recall how we find the line of symmetry in a shape?



**Teacher**: Yes, we divide the shape into two equal halves. Today, we will learn about turning shapes and how they move in different ways.

Teacher: Let us play a quick game. I will name an object, and you tell me what happens if we rotate it.

Teacher: A clock's hands turning 90 degrees. What type of turn is that?

Teacher: Correct, a quarter turn.

Teacher: A door opening halfway. What kind of turn is that?

Teacher: Yes, a half turn or 180 degrees.

Teacher: Well done. Now, let us explore this further.

(Use CRM signs to settle the class.)

#### **Turning Shapes**



on Turning Shapes. Look at the images of the umbrella and letter L. What do you observe?



Teacher: Yes, the shape changes position but remains the same. This is called a turn.

**Teacher**: What happens when we turn a shape by one right angle?

**Teacher**: Correct, that is a quarter turn, which is 90 degrees. **Teacher**: What happens if we turn it by two right angles?

Teacher: Yes, that is a half turn, which is 180 degrees.

**Teacher**: Can we turn a shape and bring it back to the same position?

**Teacher**: Absolutely. A complete turn or 360 degrees brings the shape back to where it started.

(Discuss the different turns by rotating the objects.)

**Teacher**: Let us try this with our hands. Hold your hand up and turn it 90 degrees to the right. Now, turn it 180 degrees. What do you notice?

**Teacher**: Let us try this with real objects. Look at this book. If I turn it 90 degrees, how does it look?

Teacher: Now, if I turn it 180 degrees, what do you notice? Teacher: Good. Let us try to rotate different classroom objects and observe their turns.

(Rotate objects like a bottle, pencil or eraser while students describe the type of turn.)

### Poster



**Teacher**: Look at the poster on the board. It shows Lines of Symmetry and Turning Shapes.



Teacher: Who can explain what flip, slide and turn mean? Teacher: Good. Flip means reflection, slide means moving a shape without rotating it and turn means rotating the shape.

**Teacher**: Now, let us look at symmetry. How many lines of symmetry does a square have?

**Teacher**: Yes, four. What about a triangle with equal sides? **Teacher**: Correct, it has three lines of symmetry.

**Teacher**: Let us observe the patterns in the poster and discuss how different objects turn or stay the same.

**Teacher**: Some shapes, like a square, look the same even after a quarter turn or a half turn. This is also an important property of symmetry and rotation.

You may show the **Maths Lab** given on the digital platform.

### Understanding better

Teacher: Now, look at the 'Understanding better' section.

Read the first statement. Is it true that all symmetrical shapes have more than one line of symmetry?



**Teacher:** No, some shapes, like a rectangle, only have two lines of symmetry.

**Teacher**: Let us read the next statement. Does an asymmetrical shape have any lines of symmetry?

**Teacher**: No, asymmetrical shapes do not have equal halves. Let us move on to exercise.



**Teacher**: Open your books to Exercise 3. We will complete only questions (a) to (c) today.



**Teacher**: Look at the first shape. What happens when we rotate it by a quarter turn? What happens when we rotate it by a half turn?

Teacher: Great. Now, do the same for the next two shapes.



**Teacher**: Well done, everyone. You all worked hard today. Let us give ourselves a big round of applause. See you in the next class.

#### **Differentiated Activities**

#### 110 km/hr

Find three objects in the classroom that would look the same after a half turn or two half turns. Draw them in your notebook and label the type of turn.

#### 80 km/hr

Work with a partner. One of you will draw a shape and rotate it by 90 degrees or 180 degrees. The other person will guess the type of turn. Take turns drawing and guessing.

#### 40 km/hr

Work with a partner. One of you will rotate an object on your desk and the other will observe and say whether it made a quarter turn, half turn or two half turns. Take turns rotating and observing.

#### Home Task

Solve questions (d) and (e) of Exercise 3 given on page 96 in the Main Coursebook.

### Period 4

Teacher: Good morning students. How are you today?

**Teacher**: Yesterday, we learnt about turning shapes. Can you recall what happens when we make a half turn?



**Teacher**: Yes, the shape rotates 180 degrees. What about a quarter turn?

**Teacher**: Correct, it rotates 90 degrees. Today, we will explore patterns and how they appear in nature and numbers.

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

**Teacher**: Well done. Patterns are everywhere. Now, let us explore them further.

#### Patterns

PATTERNS

**Teacher**: Open your book to page 96. Let us learn about patterns. Look at the pictures. What do you see?





Patterns can be created by repeating a design. Some of the real-life examples of patterns are given below.



**Teacher**: Yes, a saree design, a spider web, a succulent plant and a honeycomb. What do they have in common? **Teacher**: Correct. They all have repeating designs. That is what makes them patterns.

Teacher: Can you think of other real-life objects that have

patterns?

**Teacher**: Great. Now, let us explore patterns with an activity.

**Teacher**: Today, as we are learning about symmetry and patterns, let us explore how these are used in real life.



**Teacher**: Have you ever seen traditional Indian paintings or designs on fabrics?

**Teacher**: Yes, those beautiful patterns are often found in art forms like Madhubani and Kalamkari.

**Teacher**: Madhubani art, from Bihar, is full of repeated patterns and symmetrical shapes.

**Teacher**: Similarly, Kalamkari art from Andhra Pradesh uses floral patterns and borders that often have symmetry.

**Teacher**: Can you think of any designs at home - maybe on sarees, bedsheets or pots - that show repeating patterns or symmetry?

**Teacher**: Wonderful. These art forms show us how patterns and symmetry are used creatively in our culture.

**Teacher**: Now, let us observe the pictures of these artworks and see if we can spot lines of symmetry and repeating patterns.

#### Number Patterns

Teacher: Look at the example in your book. It shows ice cream sticks forming a pattern. What do you notice?       MUST DO	
Number patterns Let us use ice cream slicks to understand a number pattern. A few have been used to form the following patterns.	
Here, we observe the number of ice-cream sticks used to form 1 triangle, 2 triangles, 3 triangles and so on.	7
3 ice cream sticks 5 ice cream sticks 7 ice cream sticks 9 ice cream stick	:ks
Number of ice-cream -3 5 7 9 sticks used	
Pattern followed $\longrightarrow$ +2 +2 +2 +2	96
, The number of ice-cream sticks used to draw the next pattern is 9 + 2 = 11.	U.

**Teacher**: Yes, the number of sticks increases. What is the pattern followed here?

**Teacher**: Correct, +2 each time. If the last number is 9, what will come next?

**Teacher**: Yes, 11, because we added 2 again. Patterns like this help us understand sequences in nature and numbers

(4) Find the	pattern an	d write the	next numb	oer.	CC
a. 2	4	6	8	10	
b. 99	96	93	90	87	
<b>c.</b> 82	77	72	67	62	
d. 10	20	40	80	160	<b>(1</b> )

**Teacher**: Open your books to Exercise 4. We will complete it together. MUST DO

**Teacher**: Look at the first pattern. What do you observe? Does it increase or decrease?

**Teacher**: Yes, the numbers increase. Now, check how much is added each time. What is the pattern rule? **Teacher**: Correct, the pattern follows +3 each time. Now, apply the rule to find the missing number.

Teacher: Now, let us look at the next pattern. What do you



#### notice?

Teacher: Yes, this time the numbers are decreasing. What is the pattern rule here?

(Students discuss and respond.)

Teacher: Good thinking. The pattern decreases by -2 each time. Complete the missing numbers using this rule. Teacher: Well done, everyone. You all explored patterns

in an exciting way. Let us give ourselves a big round of applause. See you in the next class.

### **Differentiated Activities**

#### 110 km/hr

Look around the classroom. Find a pattern in an object, such as the floor tiles, windows or a design on clothing. Draw the pattern in your notebook and describe how it repeats.

#### 80 km/hr

Work with a partner. One of you will say a number pattern aloud, such as 2, 4, 6, 8... The other person will identify the rule and continue the pattern for five more numbers. Take turns creating and solving patterns.

#### 40 km/hr

In small groups, take turns saying a number aloud. The next person must say the next number in a simple pattern (for example, adding 1 or 2). Continue the sequence until everyone has had a turn.

#### Home Task

Create a number pattern at home using objects like buttons or pencils. Write down the pattern and its rule in your notebook.

# Period 5

Teacher: Good morning students. How are you today?

Teacher: Yesterday, we learnt about SHOULD DO patterns. Can you recall where we see patterns in nature?



Teacher: Yes, in honeycombs, spider webs and flower petals. Today, we will learn about nets of 3D shapes and how they unfold into 2D shapes.

Teacher: Let us play a quick game. I will name a shape, and you tell me if it is flat (2D) or solid (3D). Ready?

Teacher: A cube.

Teacher: Yes, it is a 3D shape.

Teacher: A triangle.

Teacher: Correct, it is a 2D shape.

Teacher: A cylinder.

Teacher: Yes, it is a 3D shape. Well done. Now, let us learn about nets.

(1) You may show the **Slideshow** given on the digital platform.

We have learnt about plane and solid shapes. Shapes, such as a cube, cuboid, cone and sphere, are solid shapes. Some examples of plane shapes are a square,

NETS

rectanale, trianale and circle Look at this matchbox. It is cuboid in shape. But when we observe each face of the matchbox, it is rectangular in shape.



side base side

If we open the cover of the matchbox along its edges, what do we observe? There are 6 rectanales.

A net is a 2D representation of a 3D shape by

This representation of unfolding a three-dimensional shape to get a two-dimensional shape is called a net.

unfolding the solid shape it represents. Let us consider another example.

A cube is a three-dimensional shape. The nets of a cube are given below



Teacher: Open your book to the page 97. Look at the matchbox example. What do you observe? MUST DO ID MIN.

**Teacher**: Yes, when we unfold it, it becomes six rectangles. **Teacher:** What do we call this unfolded shape?

Teacher: Correct, it is called a net. A net is a 2D representation of a 3D shape.

Teacher: Let us look at another example. A cube is a 3D shape. How many faces does it have?

Teacher: Yes, six. Look at the nets of a cube in your book. What do you notice?

Teacher: Correct. The net of a cube is made up of six squares. When folded, it forms a cube.

Teacher: Can a cone have a net?

**Teacher**: Yes. The net of a cone includes a circle for the base and a curved triangle for the side.

Teacher: Now, let us do an activity to understand this better.

(I) You may show the **Explainer Video** given on the digital platform.

Teacher: I will draw different 3D shapes and their nets on the board. Your task is to match the 3D shape with its correct net.



(Draw nets of a cube, cuboid, cone and cylinder on the board, mixed up.)

Teacher: Now, come one by one and match the nets to the correct 3D shape by drawing a line between them.

Teacher: Well done. Now, discuss with your partner. How did you decide which net belonged to which shape?

Teacher: Great thinking. This helped us see how 3D shapes unfold into 2D nets.



Understanding better

Nets





Teacher: Now, look at the 'Understanding better' section in your book. Read the first question aloud.

Teacher: How many faces does the net of a cube have? Teacher: Yes, six. Now, read the second question.

Teacher: How many turns will the letter 'I' make to look the same?

Teacher: Correct. The letter 'I' looks the same after a half turn and a full turn.

(19 You may show the Mental Maths given on the digital platform.



Teacher: Open your books to Exercise 5. What do we need to do? Teacher: Yes, we have to find and

draw the nets of different 3D shapes. Let us start with the first one.

5 MIN.

**Teacher**: What shape is this?

Teacher: Correct, it is a cuboid. What faces make up the net of a cuboid?

Teacher: Good. Now, draw the net of a cuboid in your notebook.

Teacher: Let us move to the next shape. What is this?

Teacher: Yes, it is a cylinder. What does its net look like?

Teacher: Correct. A cylinder's net includes two circles and a rectangle. Now, draw the net in your book.

Teacher: Well done, everyone. You worked well in understanding nets. Let us give ourselves a big round of applause. See you in the next class.

#### **Differentiated Activities**

#### 110 km/hr

Work independently. Choose any one 3D shape from your book. Draw its net in your notebook and explain to your partner how it folds into the 3D shape.

#### 80 km/hr

Work in pairs. One student will describe a 3D shape without showing it. The other student will guess the shape and explain what its net looks like. Then, switch roles.

#### 40 km/hr



Work in small groups. Match the nets that the teacher has drawn on the board with the correct 3D shapes. Once matched, discuss with your group why the net belongs to that shape.

#### Home Task

Find three 3D objects at home. Draw their nets in your notebook.

### Period 6

Teacher: Good morning students. How are you today?

Teacher: Yesterday, we learnt about SHOULD DO nets of 3D shapes. Can you recall what a net is?



**Teacher**: Yes, a net is a flat shape that can be folded into a 3D shape. Today, we will learn how a 3D shape looks from different angles.

Teacher: Let us play a quick game. Look at the classroom objects. If I look at this chair from the front, what shape do I see?

**Teacher:** Good. What if I look at it from the top?

**Teacher**: Well done. This shows that a 3D shape can look different from different views.

#### **Drawing 3D Shapes**



Teacher: Open your books to page 97. Look at the section on 'Drawing 3D Shapes'. What do you observe in the figures?

MUST DO ID MIN

Teacher: Yes, the same object looks different depending on whether we see it from the top, front or side.

Teacher: Let us take an example. If I place a book on the table and look from above, what shape do I see?

Teacher: Correct. The top view is a rectangle. Now, if I look at the book from the front, what shape will I see?

Teacher: Yes, still a rectangle, but with a different height. What about the side view?

Teacher: Excellent. This helps us understand how 3D objects can look different from different views.

Teacher: Now, let us do an exciting COULD DO activity. I will draw three objects on the board - a bottle, a box and a



cone. You will work with a partner to decide how each object looks from the top, front and side.

Teacher: Discuss with your partner and complete the drawing in your notebook. Draw how each object looks



#### from different views.

Teacher: Well done. Now, let us move on to exercise.



**Teacher**: Open your books to page 98 and find Exercise 6. What do we need to do?

to do? **Teacher**: Yes, we have to identify the top, front and side views of different objects.

MUST DO

**Teacher**: Let us start with the first one. What object is this? **Teacher**: Correct, it is an airplane. Look at the given views. Which one is the top view?

**Teacher**: Good. The top view is how an airplane looks from above. Now, which is the front view?

**Teacher**: Yes, the front view shows the airplane facing forward. Now, identify the side view.

**Teacher**: Well done. Now, apply the same thinking to the next objects. Work on the exercise and check with your partner.

**Teacher**: Well done, everyone. You all worked well in identifying different views of 3D shapes. Let us give ourselves a big round of applause. See you in the next class.

#### **Differentiated Activities**

#### 110 km/hr



Observe a classroom object, like a box or a bottle. Draw how it looks from the top, front and side views in your notebook.

#### 80 km/hr

Work with a partner. One of you will describe an object's shape without showing it. The other will guess the object and draw what they think its front view and top view look like. Then, switch roles.

#### 40 km/hr

In small groups, look at classroom objects. Take turns pointing at an object and saying whether you are looking at its top, front or side view. Discuss in your group why the views are different.

#### Home Task

Find any 3D object at home, like a box or a bottle. Try drawing its top, front and side views in your notebook.

# Period 7

Teacher: Good morning students. How are you today?

**Teacher**: In the previous period, we learnt how 3D shapes look different from different angles. Can you recall what the top view of a car looks like?



**Teacher**: Yes, it looks like a flat outline of the car. What about the front view?

**Teacher**: Correct, the front view shows the headlights and windshield. Today, we will connect what we have learnt to real-life objects.

### Connecting better

**Teacher**: Open your books to page 98 and find the section 'Connecting better'. Who will read and explain the section?



Connecting Detter

Teacher: What did Ryan notice about the building?

**Teacher**: Yes, he identified that the Rajya Sabha has one line of symmetry. How is this connected to what we learnt? **Teacher**: Correct, buildings like shapes, can be symmetrical. Many famous structures have lines of symmetry in their design.

**Teacher**: Can you think of another building that looks symmetrical?

**Teacher**: Great. Now, let us recall everything we have learnt in this chapter.

#### **Recalling better**

Teacher: Open your books to Recalling better' section. Read the list of key learnings from this chapter.



 Recalling Detter
 CINC

 In this chapter, I have learnt
 a shape can have more than one line of symmetry.

 a shape can be rotated to form a quarter turn, half turn and complete turn.
 b patterns can be created by repeating a design.

 a net is a 2D representation of a solid shape which is made by unfolding the solid shape it represents.
 a solid shape can look different when viewed from the top, front and side.

**Teacher**: Now, let us recall what we have learnt by answering some questions. Think carefully before you answer.

Teacher: What is a line of symmetry?

**Teacher**: Correct, a line of symmetry divides a shape into two identical halves.

**Teacher**: Can a shape have more than one line of symmetry? Give an example.

**Teacher**: Yes, a square has four lines of symmetry, while a rectangle has only two.



Teacher: What does it mean when a shape rotates?

**Teacher**: Yes, a shape can turn by a quarter turn, half turn or full turn. What happens in a half turn?

Teacher: Correct, the shape rotates 180 degrees.

Teacher: What did we learn about patterns?

**Teacher**: Yes, patterns are created by repeating designs. Can you name a pattern that we see in nature?

**Teacher**: Good thinking. Now, let us apply what we learnt in an activity.

### **Decoding better**

**Teacher**: Open your books to the 'Decoding better'. We will learn to draw nets for real objects.





Teacher: Look around you. Can you see any cuboid-shaped objects?

(Guide the students to complete the activity using of the instructions given on the 'Decoding better' section.)

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

### Solving better

**Teacher**: Open your books to the 'Solving better' section. Let us answer these questions together.



(99)

Solving Detter
LOTS
Answer the following questions in one word in your notebook.

A How many small squares are joined together to form a cube?

Which two shapes combine to form a cone?

- c. How many lines of symmetry does a square have?
- d. Which letters in the English alphabet have more than one line of symmetry?

**Teacher**: The first question is, how many small squares are joined together to form a cube? Think about the number of faces a cube has.

**Teacher**: Yes, a cube is made up of six square faces. Now, look at the second question. Which two shapes combine to form a cone?

(Discuss the next questions in the similar manner.)

**Teacher**: Well done, everyone. You all worked hard today. Let us give ourselves a big round of applause. See you in the next class.

### **Differentiated Activities**

### 110 km/hr



Find a real-life object with symmetry, a pattern or a 3D shape in the classroom. Draw it and explain how it relates to what we have learnt.

#### 80 km/hr

Work in pairs. One student will describe a 3D shape or a symmetrical object. The other student will guess what it is and explain how they identified it.

#### 40 km/hr

Look at the objects in your book. Point to the ones that have symmetry, follow a pattern or represent 3D shapes. Discuss with your group why they belong in these categories.

### Home Task

#### **Book of Project Ideas**

Create a project by following the given instructions and bring it to the next class:

- Make one hexagon using 6 matchsticks.
- Add more hexagons, sharing sides, to form a pattern.
- Count and record the matchsticks used.
- Try creating patterns with triangles or squares.
- Write a short note on your observations.

# Period 8

Teacher: Good morning students. How are you today?

**Teacher**: Yesterday, we discussed patterns and matchstick hexagons. Did you notice any interesting patterns in your project?

**Teacher**: Open your books to page 99

and find the section Learning better.



MUST DO

**Teacher**: Great. Today, we will revise everything we have learnt in this chapter through some fun exercises.

### Learning better

et us start with Exercise A.	$\bigcirc$
Earning Detter	CBA
A Tick (1) the correct answer.	
1. How many lines of symmetry does the letter A have?	
a. 2 b. 1 c. 0 d. 5	(99)
2. The next term for the sequence 80, 77, 74, 71 is	
a. 68 b. 66 c. 72 d. 70	
3. The line that divides a shape into two identical halves is called the _	
a. symmetrical b. half turn	
c. point of intersection d. line of symmetry	100
4. Which shape looks the same even after turning it?	
a b. < c.	
5. The net of a cube has square faces.	
a. 7 b. 5 c. 6 d. 8	100

**Teacher**: Read question 1. How many lines of symmetry does the letter A have? Think before you answer.

**Teacher**: Correct, the answer is one. Now, look at question 2. Can you find the next term in the sequence? What is the pattern?



Teacher: Good. The pattern decreases by three each time, so the next number is 68.

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

() You may show the I Explain given on the digital platform.



Teacher: Now, turn to Exercise B. Look at the images given. What do we have to do?



Teacher: Yes, we need to draw the lines of symmetry. Let us start with the airplane. Where do you think its line of symmetry will be?

Teacher: Correct, it has a vertical line of symmetry. Now, look at the palm tree. Where can you draw the line of symmetry?

Teacher: Well done. Complete the remaining figures in your book.

() You may show the Quick Maths given on the digital platform.



Teacher: Look at Exercise C. Here, we need to draw how the shapes look after quarter, half and three-fourth turns.



Teacher: Let us take the first example. What happens when we turn a pencil one-fourth turn?

Teacher: Yes, it moves 90 degrees. Now, what happens in a half turn?

(Draw the shapes on the blackboard.)

Teacher: Good. A half-turn rotates the shape 180 degrees. Now, complete the remaining questions in the notebook. (Use CRM signs to settle the class.)



Teacher: Let us solve Exercise D. Look at the cube aiven. Which of the three nets can form this cube?



Teacher: Correct. The net should have six square faces arranged properly. Now, do the same for the cuboid.

### **Book of Project Ideas**

**Chapter 8: Symmetry, Patterns** and Nets

#### Theme 5: Why Do We Need Systems?

PRO 21st CS

- Take matchsticks and glue.
- In your notebook, make a hexagon using 6 matchsticks. •
- Repeat this process to make 2 hexagons, then repeat it again to make 3 hexagons as shown.
- Write down the number of matchsticks used and the pattern followed.
- Similarly, you can create patterns for other shapes.

Teacher: Now, let us discuss your COULD DO matchstick pattern project.



Teacher: Who faced difficulty while making hexagons? What challenges did you find?

Teacher: What pattern did you notice when adding more hexagons? How many matchsticks did you use in total? (Students reflect and answer.)

Teacher: Did anyone try making triangles or squares instead? How was the pattern different?

(Students share their observations.)

Teacher: Well done, everyone. You did an amazing job today. Let us give ourselves a big round of applause. See you in the next class.

### **Differentiated Activities**

#### 110 km/hr



Find three real-life objects around you that have symmetry. Draw them in your notebook and mark their lines of symmetry. Write one sentence

explaining where you see symmetry in daily life.

#### 80 km/hr

Work in pairs. One student will draw a simple shape (like a square, rectangle or triangle) on a piece ot paper. The other student will fold it to check if it has symmetry. Switch roles and discuss the results.

#### 40 km/hr

Look at the given shapes on the board. Stand up if you think the shape has symmetry. Once the shape is identified, work in small groups to trace a finger along the line of symmetry in the air together.

### Home Task

Find a real-life object at home that has a line of symmetry or follows a pattern. Draw it in your notebook and write a short note about it.



Bring a piece of chart paper, coloured paints, a straw and a small cloth or tissue for the 'Creating better' activity in the next class. Ensure all materials are ready for the handson symmetry activity. Also, bring your 'Little Book' for the 'Revising better' activity.

### Period 9

Teacher: Good morning students. How are you today?

**Teacher**: Let us start with a quickthinking game. I will name an object, and you will tell me if it has symmetry, a pattern or neither.



Teacher: A butterfly.

Teacher: Yes, it has symmetry. What about a clock?

**Teacher**: Good thinking. Some clocks have symmetry, but the numbers on them may not always be symmetrical. Now, a tree?

**Teacher**: That depends. Some trees are symmetrical, but others grow in different directions. Great answers. Now, let us explore symmetry through an art activity.

### Creating better

**Teacher**: Open your books to the 'Creating better' section. What do you see?





- Take a piece of chart paper and fold it in half, then open it again.
- Drop blobs of coloured paint over one side of the paper.
- Use a straw to create a half butterfly shape.
- Fold the other side of the paper over the top of the paint blobs.
- Gently rub the top of the paper using your hands.
- Carefully open the paper again to reveal your butterfly. Leave it to dry.

**Teacher**: Yes, we are going to make a symmetrical butterfly using paper and paint. Let us follow the steps together.

(Guide the students to complete the activity.)

### Thinking better

**Teacher**: Open your books to 'Thinking better.' What do you need to do?



better.' What do you need to do?





(101)

156

**Teacher**: Yes, you will draw the nets of the given shapes. Think carefully about how they unfold. Start working in your notebooks.



In Maya's school, there is a system for borrowing books from the library. Students are required to return books within two weeks to ensure everyone has a chance to read them. However, Maya notices that her classmate Rohan has kept a library book for over a month and has not returned it yet. What should Maya do?

Ignore Rohan's actions.

 Remind Rohan about the library book borrowing system and advise him to return the book. **Teacher**: Well done. Now, let us move to 'Choosing better'. Read the problem about Maya and the library book.

**Teacher**: What do you think Maya should do? Discuss with a partner.

**Teacher**: Should she ignore Rohan's actions or remind him of the rules?

**Teacher**: Correct, reminding him politely about the borrowing system is the right approach. Great thinking.

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

### Revising better

**Teacher**: Open your 'Little Book' to complete 'Revising better' section. We will now complete this activity together.



Revising better Revise symmetry and rotational symmetry from this lesson in your Little Book.

**Teacher**: Take a moment to read the instructions. This will help us reflect on everything we have learnt about symmetry, rotational symmetry and patterns.

**Teacher**: Let us start by recalling - what is a line of symmetry? Think and write it in your book.

**Teacher**: Now, look at the next part. Can you name a shape that has more than one line of symmetry? Write your answer.

**Teacher**: Good. Moving on, let us think about rotational symmetry. Which shape looks the same even after turning? Write an example in your book.

**Teacher**: Now, take a minute to look at all your answers. Are they correct? Does anything need to be changed? **Pledging** better

**Teacher**: Now, let us take a moment for 'Pledging better'. **Teacher**: Read the pledge in your book. What does it mean to follow rules that keep us safe and organised? (Students discuss.)

**Teacher**: Yes, rules help maintain order and fairness. Let us all say the pledge together.

(Students recite the pledge.)

### **Book of Holistic Teaching**



#### C) Social Studies

Look at the beautiful pattern formed by the wind. Identify the landform.



(Refer to the Book of Holistic Teaching, page 21 under the title 'Symmetry.' Complete the activities mentioned in



(15)

this section and ensure 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.)

Teacher: Well done, everyone. You all participated actively. Let us give ourselves a big round of applause. See you in the next class.

#### **Differentiated Activities**

#### 110 km/hr



Find a real-life object that has both symmetry and a pattern. Draw it in your notebook and explain how the pattern is formed.

#### 80 km/hr

Work in pairs. One student will trace a shape in the air and the other will guess whether it has a line of symmetry or rotational symmetry. Take turns and discuss your answers.

#### 40 km/hr

Look at different cut-out shapes given to your group. Try folding them in different ways to find their lines of symmetry. Count how many lines each shape has and share your findings.

#### Home Task

Find three symmetrical objects at home and create a simple pattern using one of them. Draw and explain how the pattern follows symmetry.

# Period 10

Teacher: Good morning students. How are you today?

Teacher: Let us begin with a quick recall game. I will say a term and you have to tell me something we learnt about it.



Teacher: Symmetry.

Teacher: Yes, symmetry means an object can be divided into two identical halves. What about patterns?

Teacher: Correct. Patterns repeat in a sequence and can be found in designs, nature and numbers. Now, nets what do we know about them?

Teacher: Right, nets are 2D representations of 3D shapes that help us understand how solid shapes unfold. Well done. Now, let us apply this knowledge to our worksheets.

#### Worksheet 1

<b>8</b> .	Symmetry, Pc	systems? atterns	Wo	rksheet
	and Nets	~		
A. Fill in t	he blanks.			
1. A line	of symmetry divides an	object into two	halv	es.
2. An ap	ple half eaten is an exa	imple of a	·	
3. A circ	le has	lines of symmetry.		
4. When degre	an object takes quarte e.	r turns, it makes an ar	ngle of	
5. The ne	et of a cube has	equal squ	ares.	
P. Tiels (		not be divided into the		
1. et			3.	
ч.	5.		6.	
C. The gi answe	iven object has er.	lines of sym	metry. Tick (🗸) th	e correct
1. 3	2. Infini	ite	$\langle \rangle$	
з. О	4. 1			(:
	2			

Teacher: Read the first statement - what is the missing word?

Teacher: Correct. A line of symmetry divides an object into two equal halves. Now, let us move to the next question.

Teacher: An apple half eaten is an example of a ...?

Teacher: Yes, it is an asymmetrical shape because both halves are not identical. Complete the rest of the exercise on your own.

Teacher: Now, let us move to Exercise B. Look at the objects and tick the ones that cannot be divided into two equal halves.

Teacher: Well done. Finally, in Exercise C, we need to count the lines of symmetry in the given shape. How many lines of symmetry does the given shape have?

Teacher: Good thinking. Now, tick the correct option and check your answer.

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

#### Worksheet 3



Teacher: Now, turn to Worksheet 3 on page 36. Let us start with Exercise A. What happens when we turn a shape,

MUST DO IS MIN.

three-fourths clockwise?

**Teacher**: Good. When we turn a shape <sup>3</sup>/<sub>4</sub> turn, it rotates 270 degrees. Look at the options and mark the correct answer.

Teacher: Now, let us move to Exercise B – Patterns. What do you notice in the given pattern?

Teacher: Yes, it follows an alternating light-dark pattern. Complete the missing parts.

Teacher: Lastly, in Exercise C, you have to identify the correct net for the given shape. Think about how a shape unfolds before you tick the correct answer.

Teacher: Now, let us look at the 'Activity Box' on the right side of the worksheet.

**Teacher**: What is the activity about?

Teacher: Yes, you will make a toothpaste box using the net given on page (i) of your workbook.

Teacher: Think about what we learnt about nets. How will the flat shape fold to form a 3D box?

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 job, everyone. See you in the next class. Have a wonderful day ahead.

#### **Differentiated Activities**

#### 110 km/hr

Create a new symmetrical design using shapes like circles, triangles and squares. Fold a piece of paper in half, draw half of the design, then open it to check if it is symmetrical.

#### 80 km/hr

Work with a partner. One student will hold up a classroom object and the other will decide whether it has symmetry, a pattern or neither. Take turns explaining your choices.

#### 40 km/hr

Look at the objects placed on your table. Sort them into two groups - symmetrical and asymmetrical. Discuss with your group why you placed each object in its category.

#### Home Task

Solve worksheet 2 given on page 35 in the Workbook.

# Learning Outcomes

#### The students will:

Domain	Learning Outcome	
Physical Development	<ul> <li>able to draw lines of symmetry and perform object rotations showing quarter, half and full turns.</li> </ul>	
Socio-Emotional and Ethical Development	<ul> <li>participate actively in group activities, listen to peers and completes shared tasks respectfully.</li> </ul>	
Cognitive Development	<ul> <li>identify symmetrical shapes, create pattern sequences and match nets to 3D shapes with accuracy.</li> </ul>	
Language and Literacy Development	<ul> <li>use correct mathematical vocabulary such as symmetry, pattern, net and rotation while explaining tasks.</li> </ul>	
Aesthetic and Cultural Development	<ul> <li>observe and discuss symmetry in traditional patterns such as rangoli, mehndi and temple designs.</li> </ul>	
Positive Learning Habits	<ul> <li>engage consistently in class activities, follow instructions independently and maintain neat and organised work.</li> </ul>	

#### **Starry Knights**

Did you enjoy teaching symmetry to the learners? Share an activity that you enjoyed doing with the learners and received an excellent response.

159

Reward yourself with a star.

# Answers a

#### Theme 5: Why Do We Need Systems? Lesson-8: Symmetry, Patterns and Nets

#### Main Coursebook 🗸

#### Kinaesthetic

Accept all the relevant responses.

#### Auditory

- 1. Maya knew her paper showed symmetry because the lines matched perfectly when folded in half.
- 2. squares and triangles

#### Interacting better

Accept all the relevant responses.





#### Understanding better(page no - 97)

- 1. 6
- 2. 1
- 5. Accept all the relevant responses.
- 6. a. Front, side, top b. Top, side, front
  - c. Front, top, side d. Front, side, top

#### Solving better

- a. 6 b. Triangle and circle
- c. 4 d. H, I, X

#### Learning better



- C. Accept all the relevant responses
- D. 1. b 2. a 3. b 4. b

#### Thinking better

Accept all the relevant responses

#### **Choosing better**

• Remind Rohan about the library book borrowing system and advise him to return the book.

 $\checkmark$ 

#### Students' Worksheets «

#### Worksheet 1

- A. 1. equal 2. symmetrical
  - 3. infinite 4. 90 5. six
- **B**. 5
- C 2

#### Worksheet 2

- A. 1. 🗸 3. 🗹 5. 🗹 6. 🗸 B. 2
- c. Accept all the relevant responses

#### Worksheet 3

- A. 3. 🗸
- B. Accept all the relevant responses.
- C. 1. a 2. b 3. a 4. a 5. c

#### Book of Holistic Teaching

- A. ff. ff
- B. Conical flask
- C. Desert

### Book of Project Ideas 4

#### Making better

(160)

Accept all the relevant responses.

----