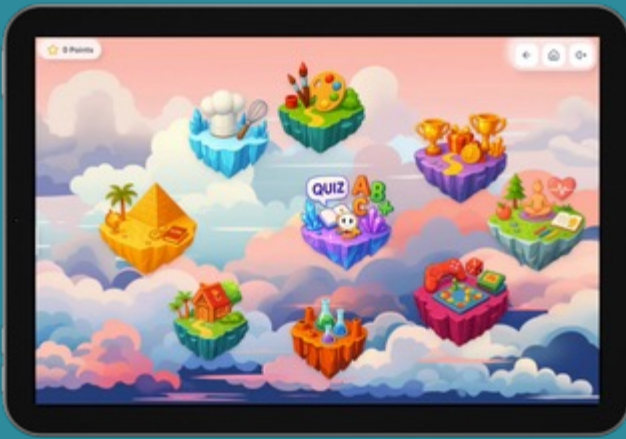


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Symmetry - Year 4

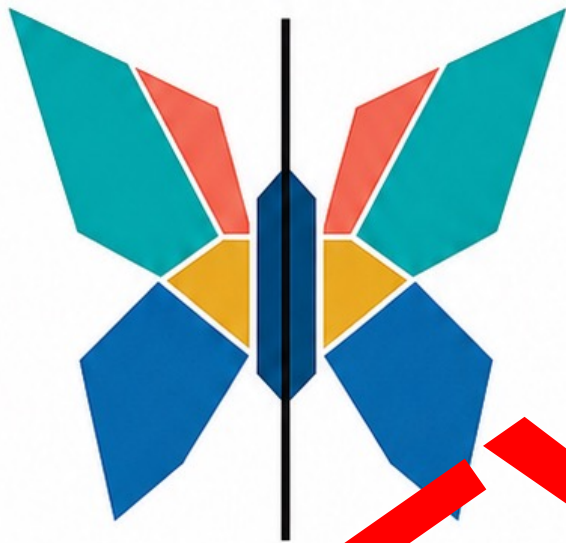
Table of Contents	
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Worksheet 1: Symmetry Snapshot	
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Worksheet 3: Rotational Symmetry Lab	
Worksheet 4: Transformation Pattern Detective	
Worksheet 5: Tessellation Investigation	
Worksheet 6: Symmetry in Art & Design	
Quiz: Symmetry	
Assessment: Symmetry Architect Assessment	
Rubric: Symmetry — Year 4 Rubric	



SYMMETRY AT A GLANCE

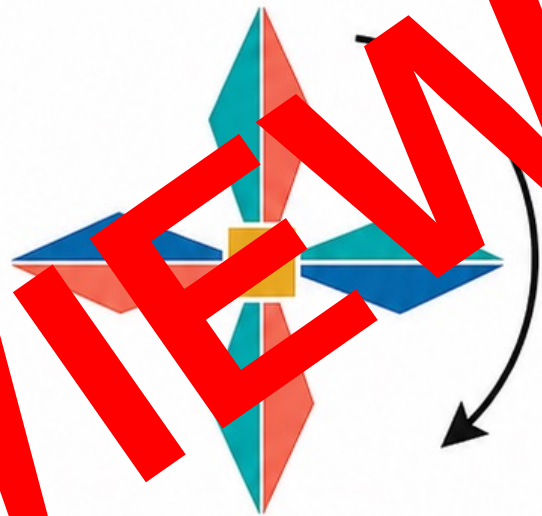
LINE SYMMETRY

matching halves across
a mirror line

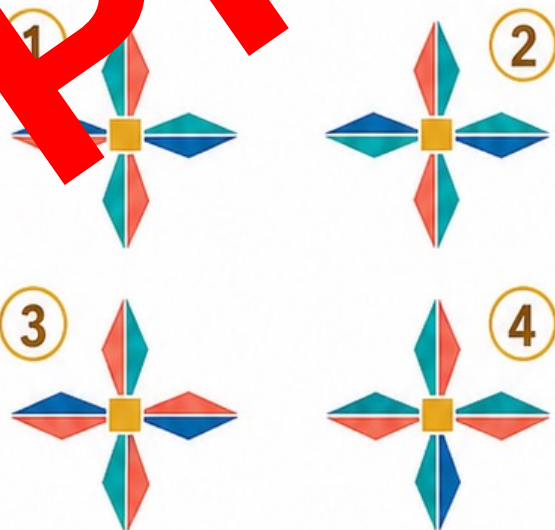


ROTATIONAL SYMMETRY

a shape matches itself
before a full turn

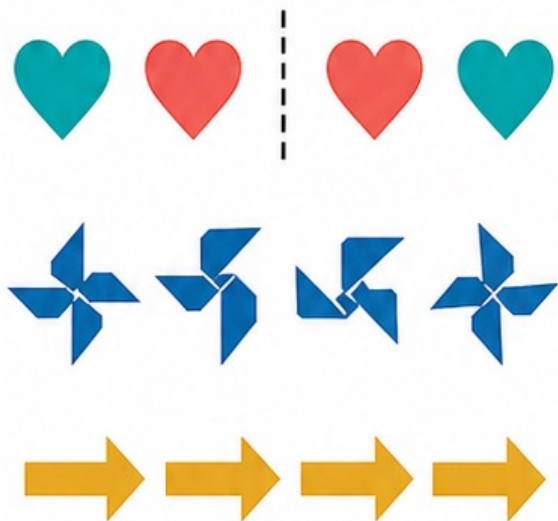


ORDER
the number of matching
positions in one full turn



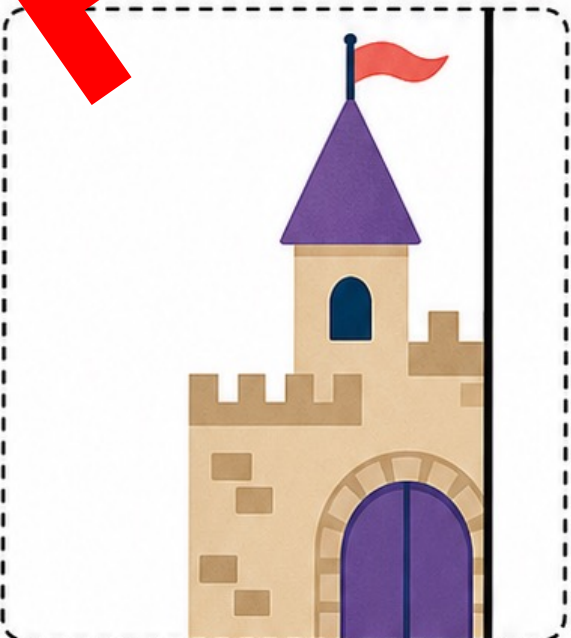
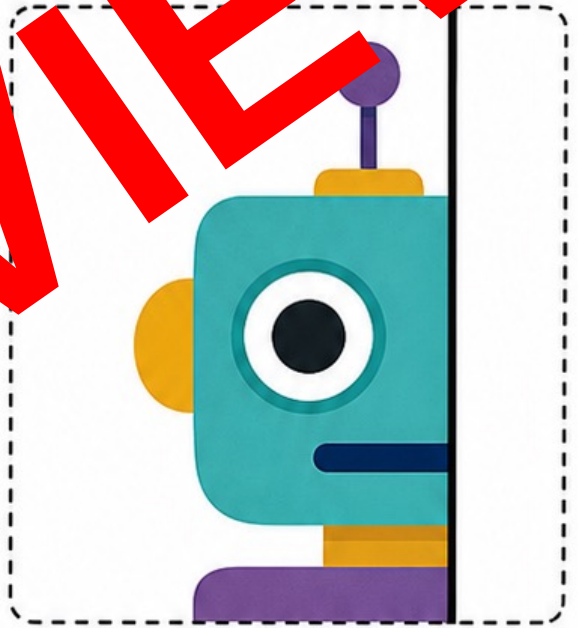
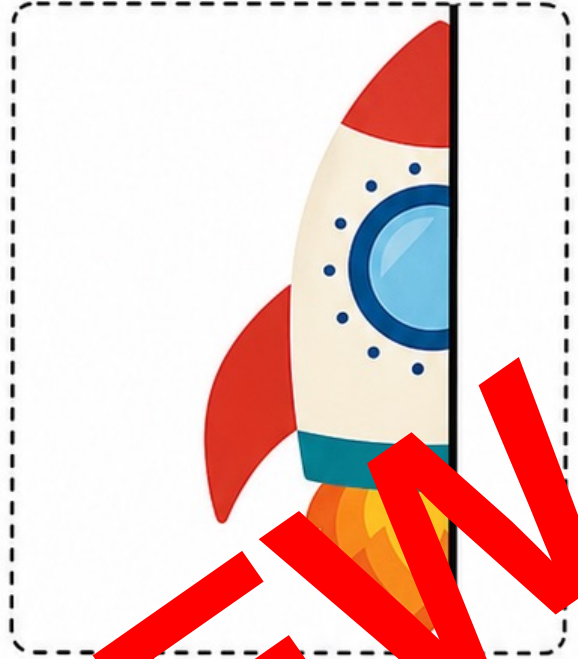
PATTERN BUILDERS

reflection • rotation • translation



MIRROR MATCH – LEFT HALVES

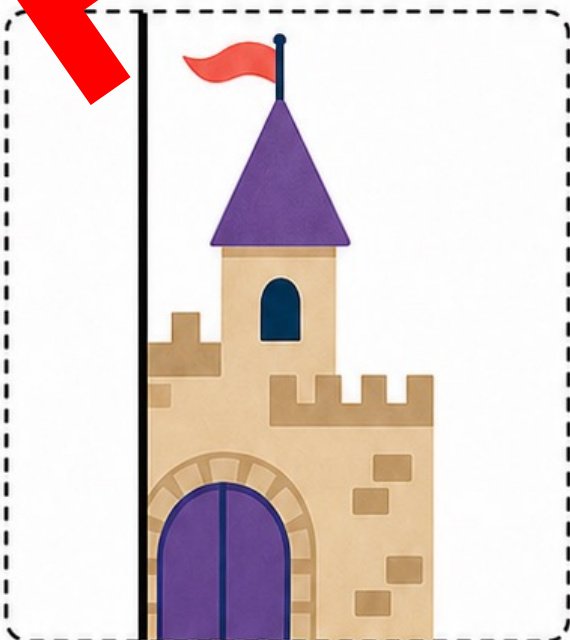
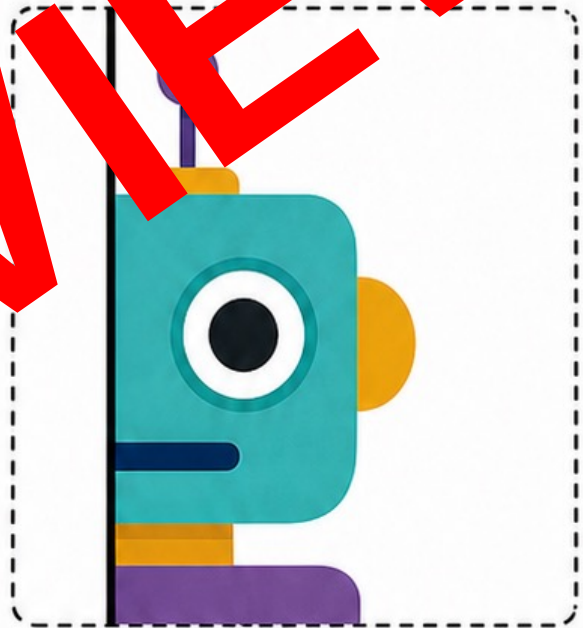
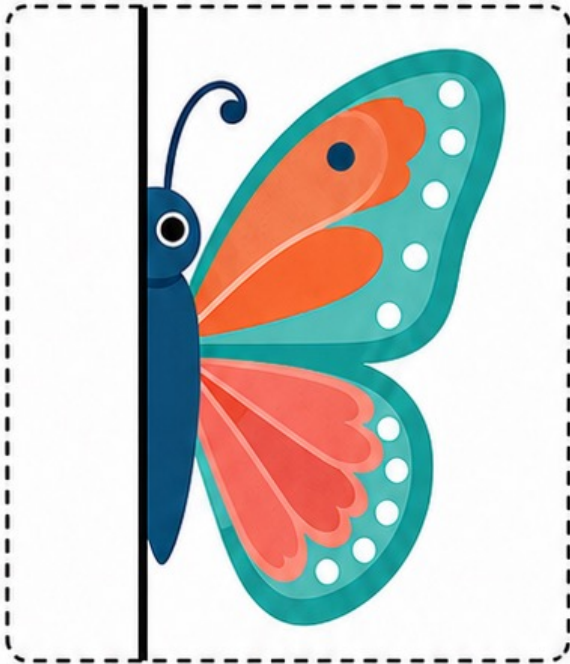
Cut out the six cards. Match each left half with its reflected right half.



PREVIEW

MIRROR MATCH – RIGHT HALVES

Cut out the six cards. Match each right half with its reflected left half.



PREVIEW

+ TURN • FLIP • SLIDE CHALLENGE +

Choose a card. Make the move. Explain the transformation.

Quarter-turn
clockwise



Slide 3 spaces



Make a reflection



Explain your rule



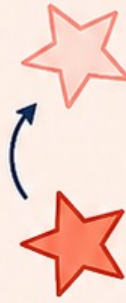
Half-turn



Three-quarter
turn



Make a rotation



Create a pattern



Quarter-turn
anticlockwise



Order 2



Make a translation



Spot rotational
symmetry



Reflect
vertically



Order 4



Clockwise or
anticlockwise?



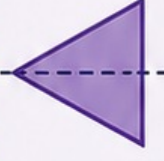
Spot line
symmetry



Reflect
horizontally



Find a mirror line



Name the
transformation

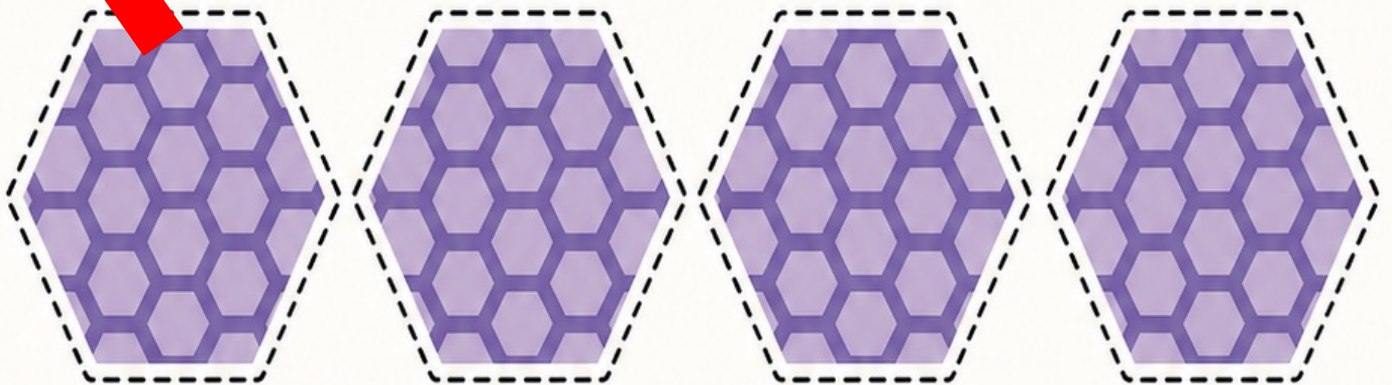
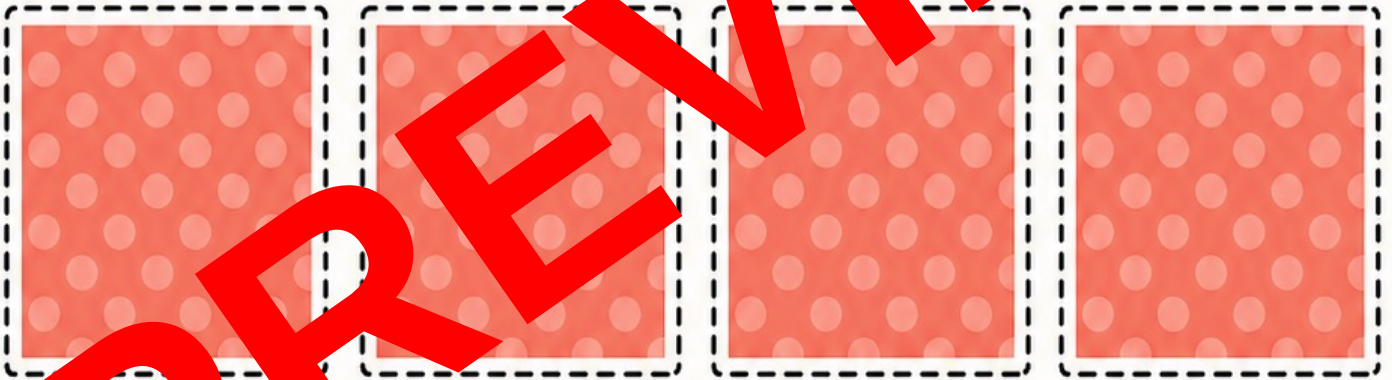
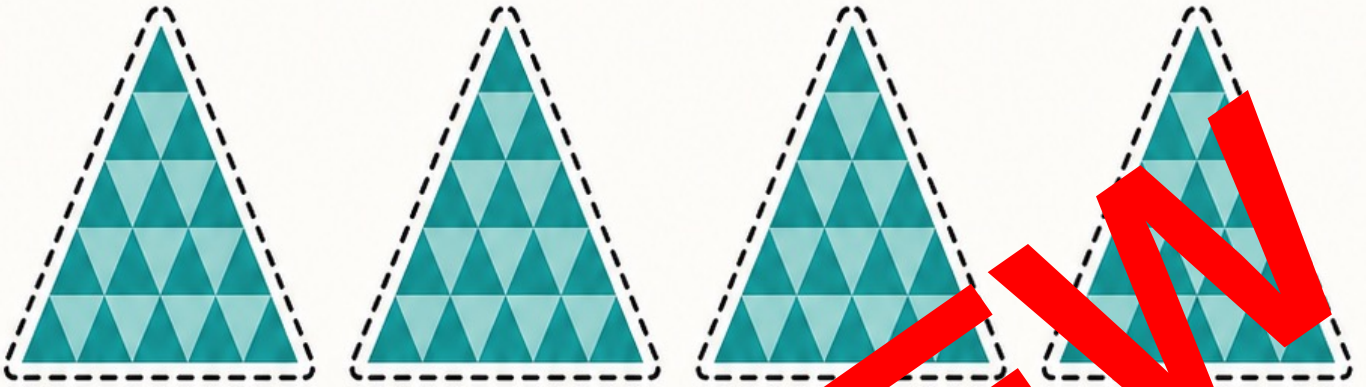


Challenge a partner



TESSELLATION TILE LAB

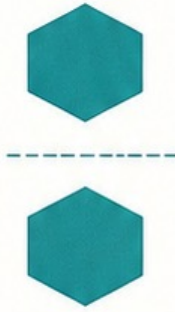
Cut out the tiles. Arrange them with no gaps or overlaps.



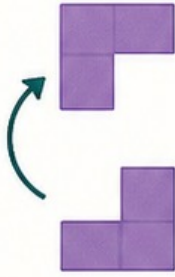
TESSELLATION TILE LAB – PATTERN MAT

Build a repeating pattern showing where you used reflection, rotation or translation.

REFLECTION



ROTATION



TRANSLATION



My repeating rule:

A transformation I used:

Checked for gaps:

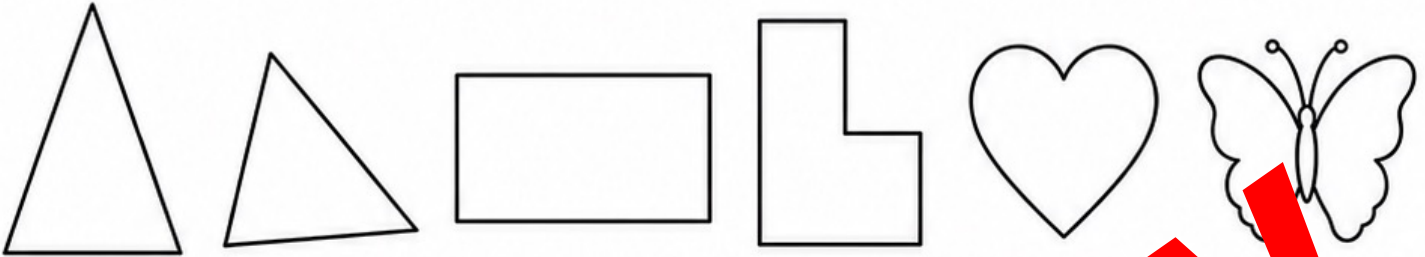


PREVIEW

Name: _____

SYMMETRY SNAPSHOT

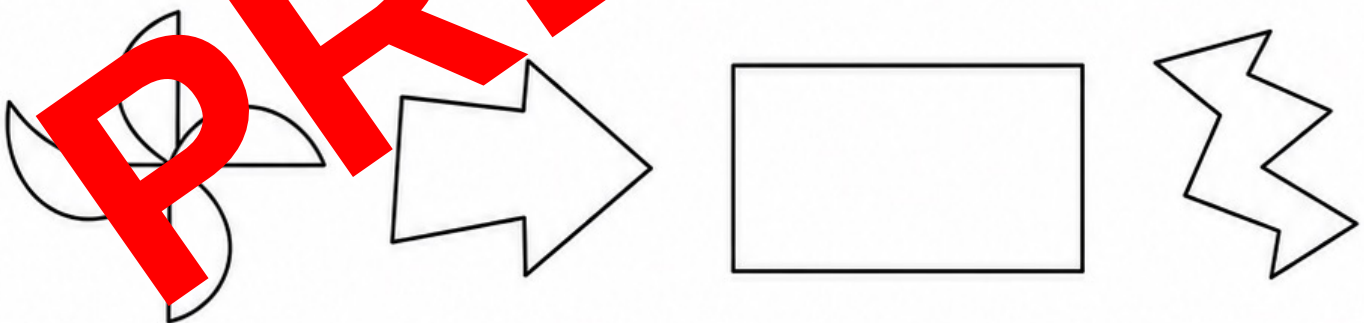
1. Circle the shapes with line symmetry.



2. Draw every line of symmetry.



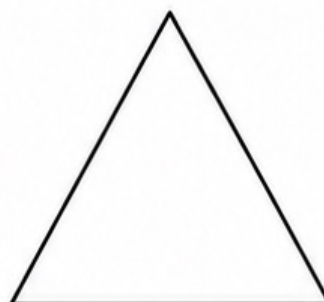
3. Tick the shapes with rotational symmetry.



4. Write the rotational order.



square

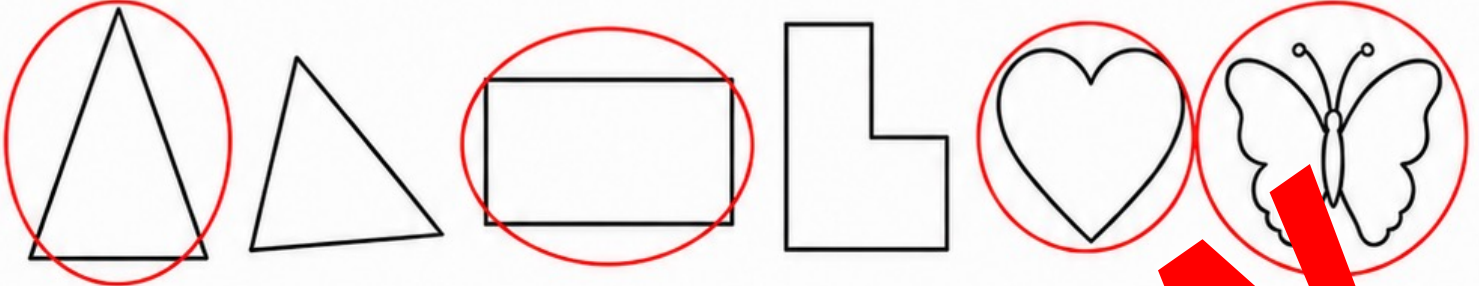


equilateral triangle

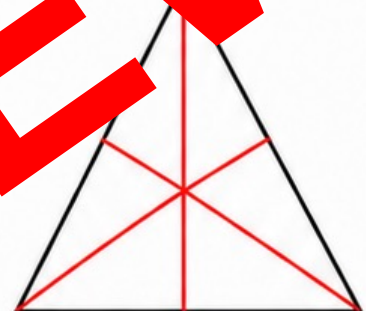
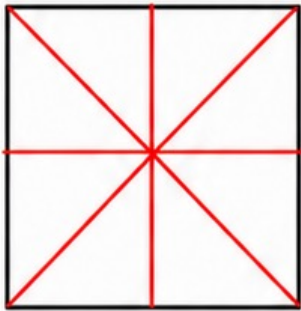
Name: **ANSWERS**

SYMMETRY SNAPSHOT

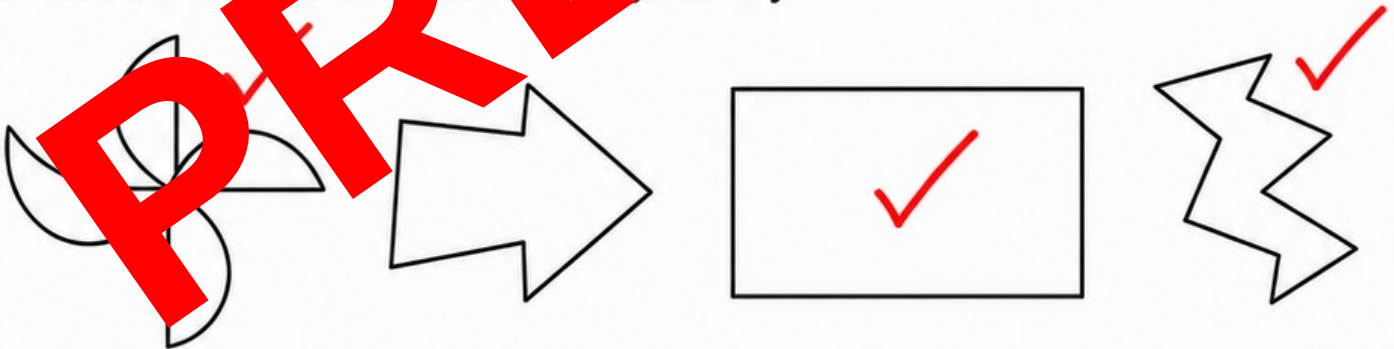
1. Circle the shapes with line symmetry.



2. Draw every line of symmetry.



3. Tick the shapes with rotational symmetry.

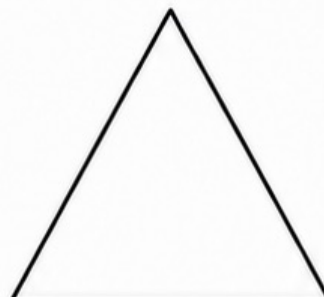


4. Write the rotational order.



square

4



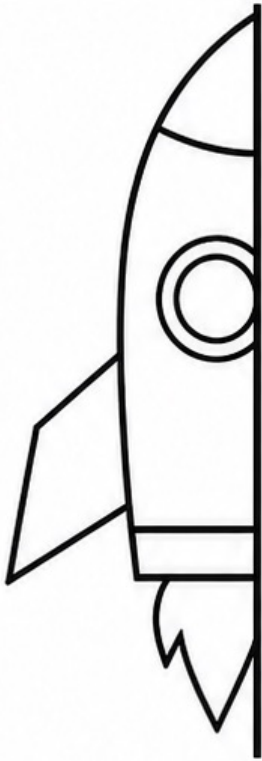
equilateral triangle

3

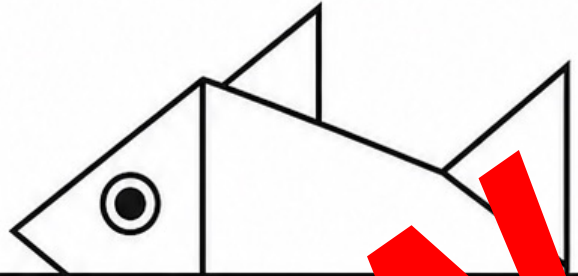
LINE SYMMETRY LAB – COMPLETE THE HALF

Name: _____

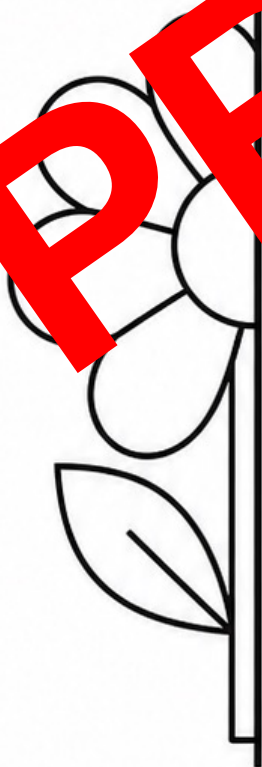
Draw the missing half so each picture is symmetrical.



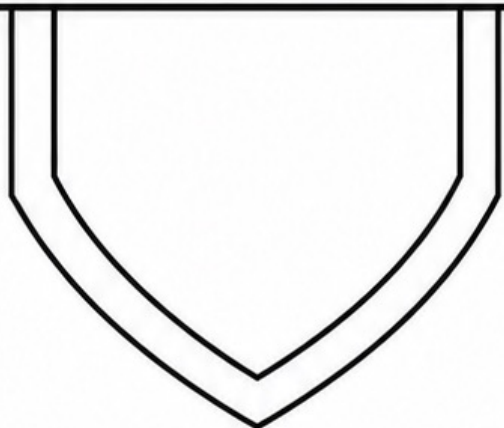
vertical mirror line



horizontal mirror line



vertical mirror line

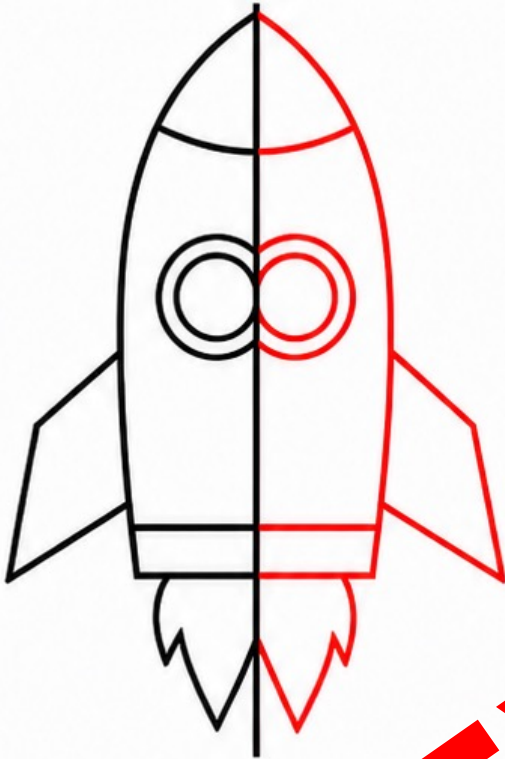


horizontal mirror line

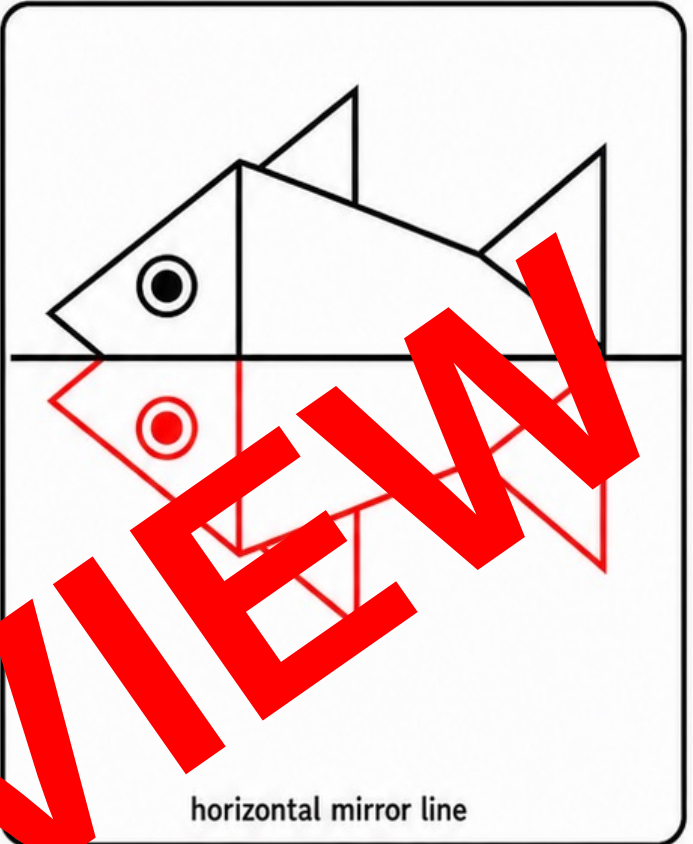
LINE SYMMETRY LAB – COMPLETE THE HALF

Name: ANSWERS

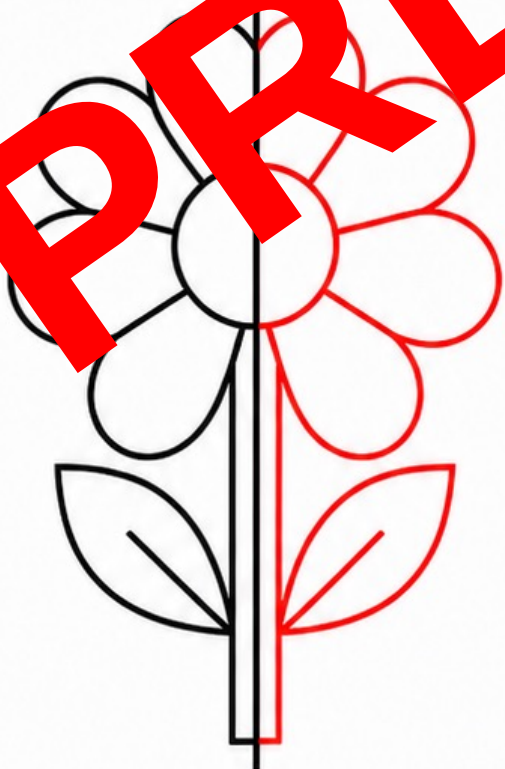
Draw the missing half so each picture is symmetrical.



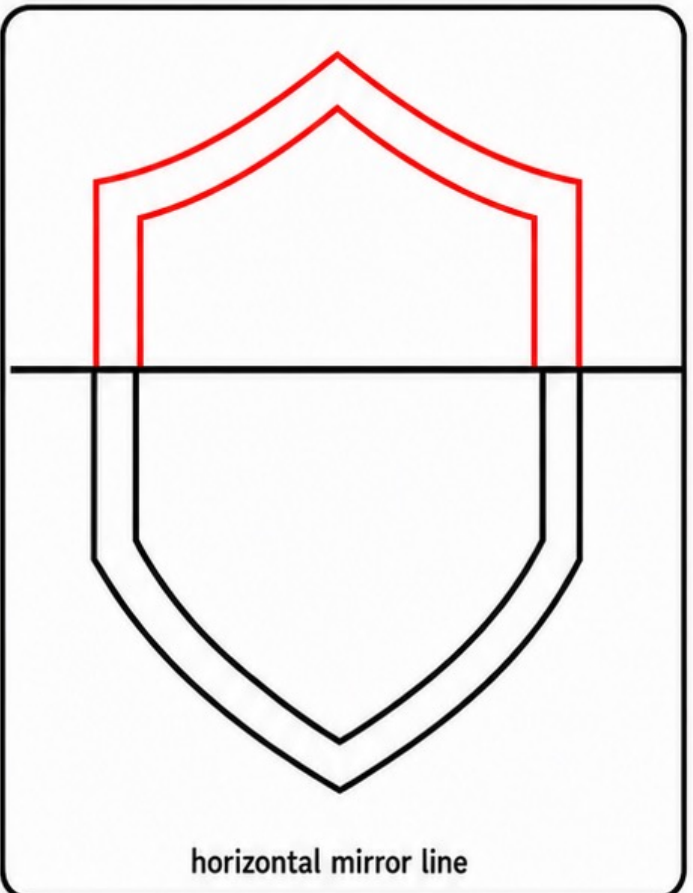
vertical mirror line



horizontal mirror line



vertical mirror line

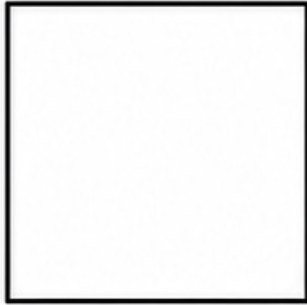


horizontal mirror line

Name: _____

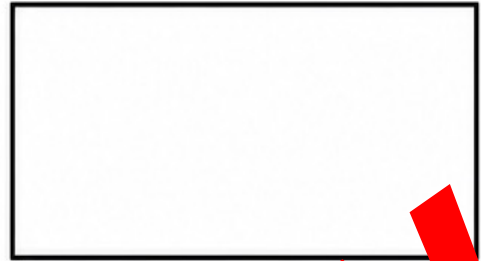
LINE SYMMETRY LAB — COUNT THE LINES

Draw every line of symmetry. Write the number of lines.



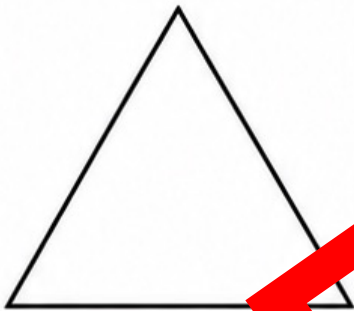
square

Number: _____



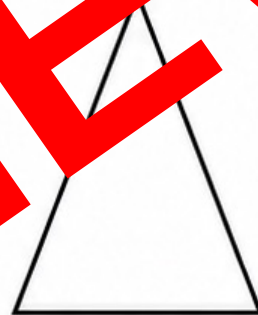
rectangle

Number: _____



equilateral triangle

Number: _____



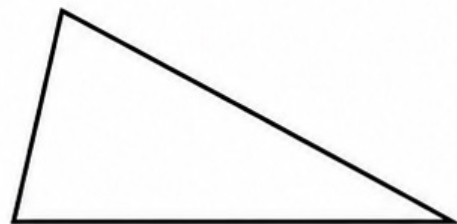
isosceles triangle

Number: _____



regular pentagon

Number: _____



scalene triangle

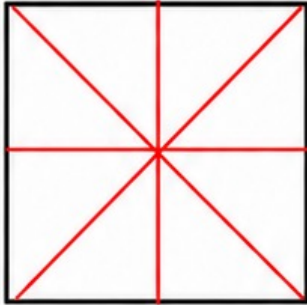
Number: _____

Which shape has the most lines of symmetry? Explain.

Name: ANSWERS

LINE SYMMETRY LAB — COUNT THE LINES

Draw every line of symmetry. Write the number of lines.



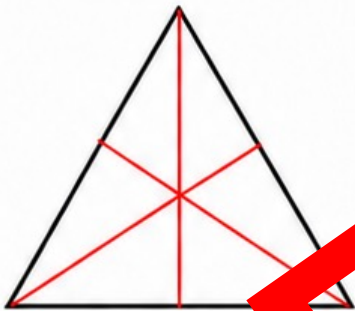
square

Number: 4



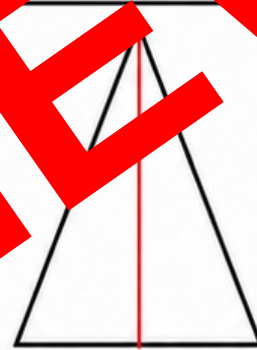
rectangle

Number: 2



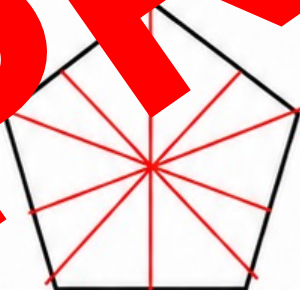
equilateral triangle

Number: 3



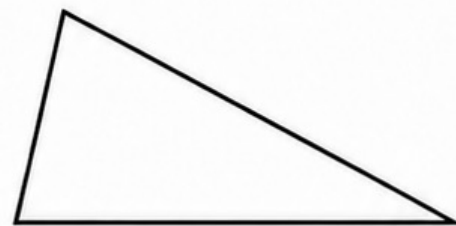
isosceles triangle

Number: 1



regular pentagon

Number: 5



scalene triangle

Number: 0

Which shape has the most lines of symmetry? Explain.

The regular pentagon has the most: 5 lines of symmetry.

Name: _____

ROTATIONAL SYMMETRY LAB – FIND THE ORDER

Decide whether each shape has rotational symmetry. If it does, write its order.

square



☐ Yes

☐ No

Order: _____

rectangle

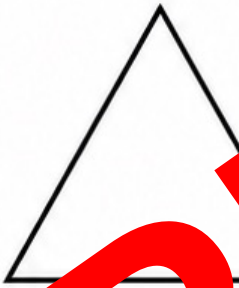


☐ Yes

☐ No

Order: _____

equilateral triangle

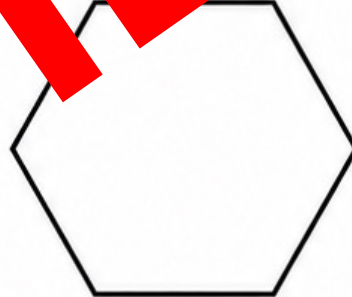


☐ Yes

☐ No

Order: _____

regular hexagon



☐ Yes

☐ No

Order: _____

five-pointed star

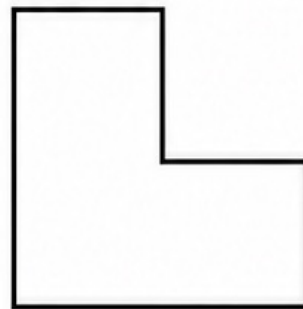


☐ Yes

☐ No

Order: _____

irregular L-shape



☐ Yes

☐ No

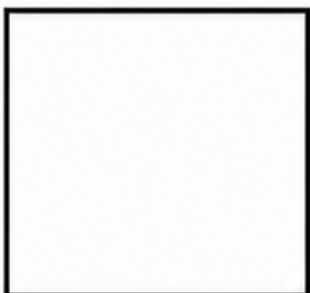
Order: _____

Name: **ANSWERS**

ROTATIONAL SYMMETRY LAB – FIND THE ORDER

Decide whether each shape has rotational symmetry. If it does, write its order.

square



☒ Yes

☐ No

Order: **4**

rectangle

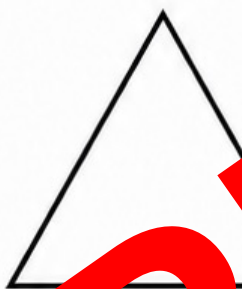


☒ Yes

☐ No

Order: **2**

equilateral triangle

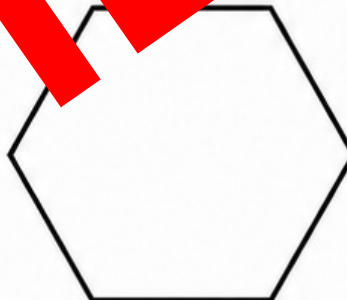


☒ Yes

☐ No

Order: **3**

regular hexagon



☒ Yes

☐ No

Order: **6**

five-pointed star

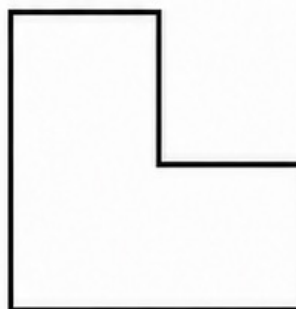


☒ Yes

☐ No

Order: **5**

irregular L-shape



☐ Yes

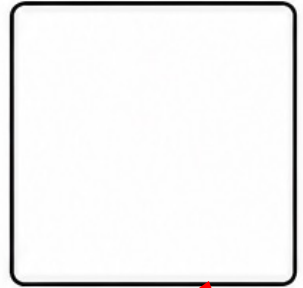
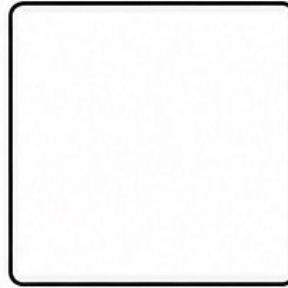
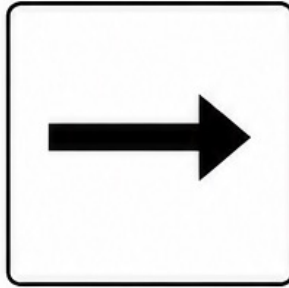
☒ No

Order: **-**

ROTATIONAL SYMMETRY LAB — COMPLETE THE TURN

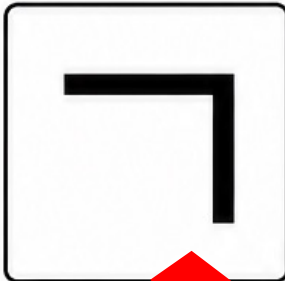
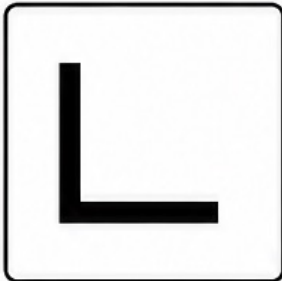
Name: _____

1.



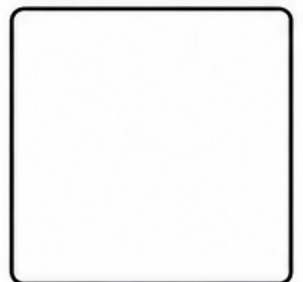
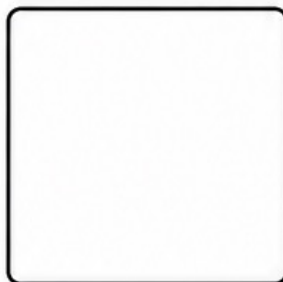
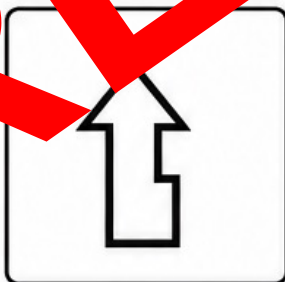
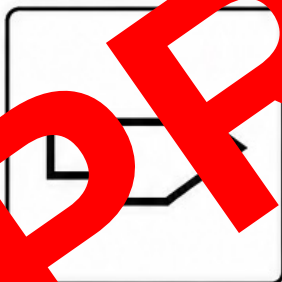
Rule: _____

2.



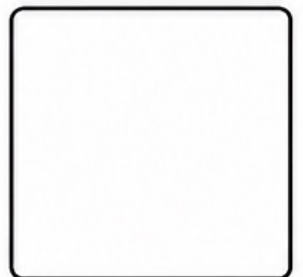
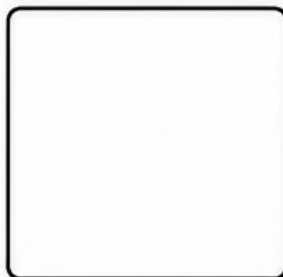
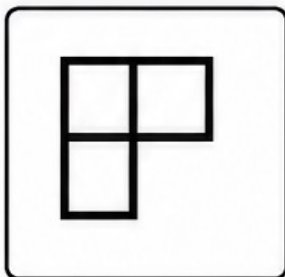
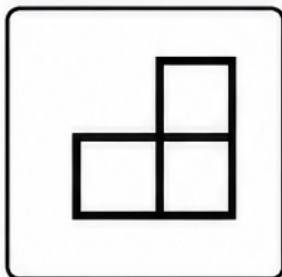
Rule: _____

3.



Rule: _____

4.

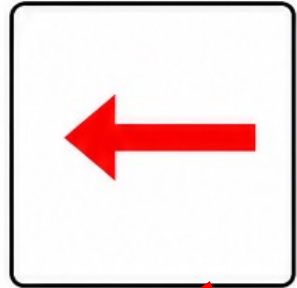
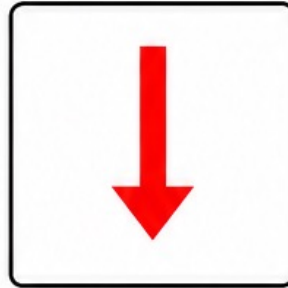
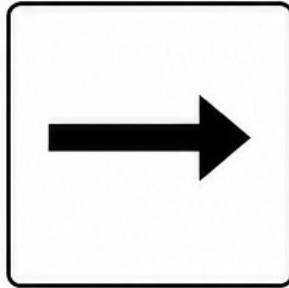


Rule: _____

ROTATIONAL SYMMETRY LAB — COMPLETE THE TURN

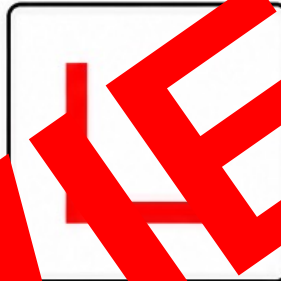
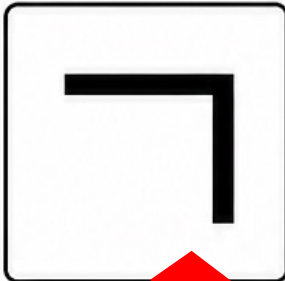
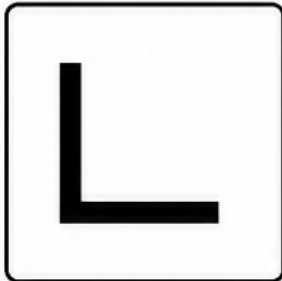
Name: ANSWERS

1.



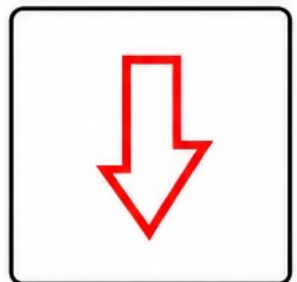
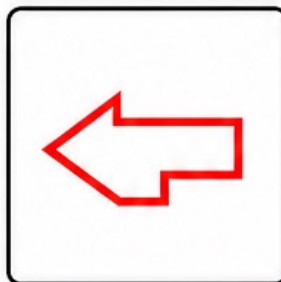
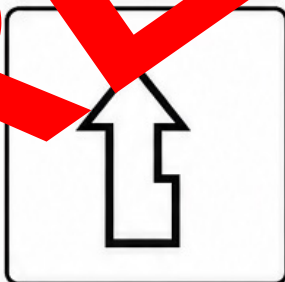
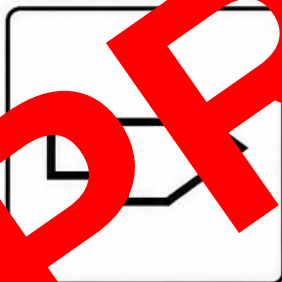
Rule: quarter-turn clockwise

2.



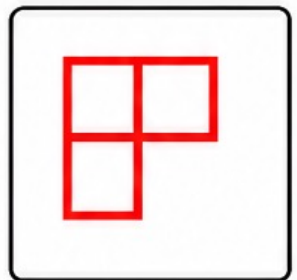
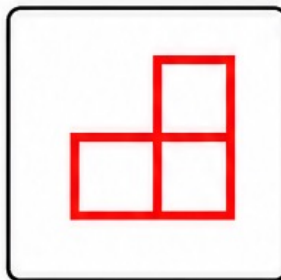
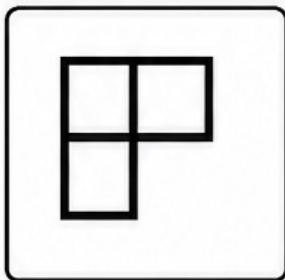
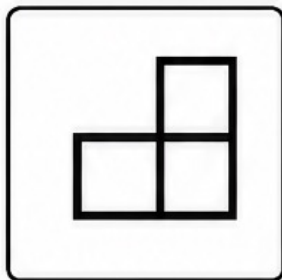
Rule: half-turn

3.



Rule: quarter-turn anticlockwise

4.

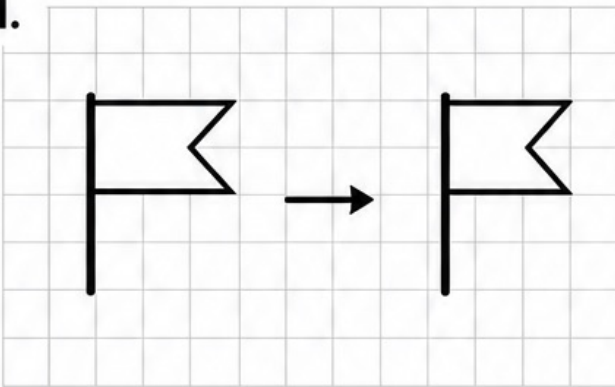


Rule: half-turn

TRANSFORMATION PATTERN DETECTIVE – NAME THE MOVE

Name: _____

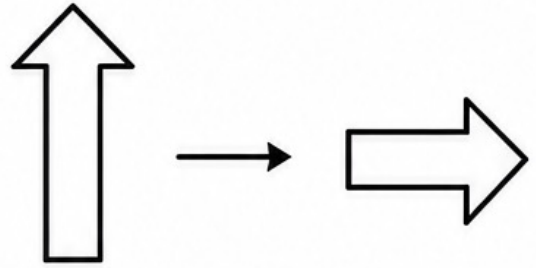
1.



Move: _____

Detail: _____

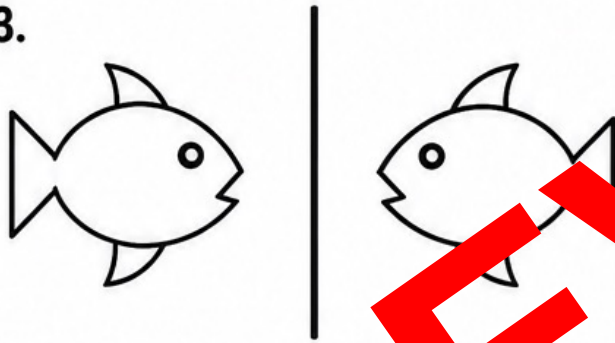
2.



Move: _____

Detail: _____

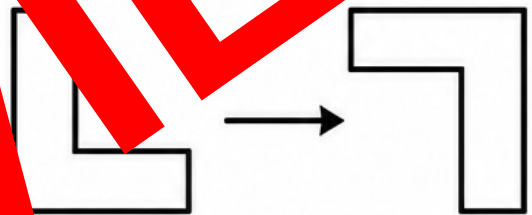
3.



Move: _____

Detail: _____

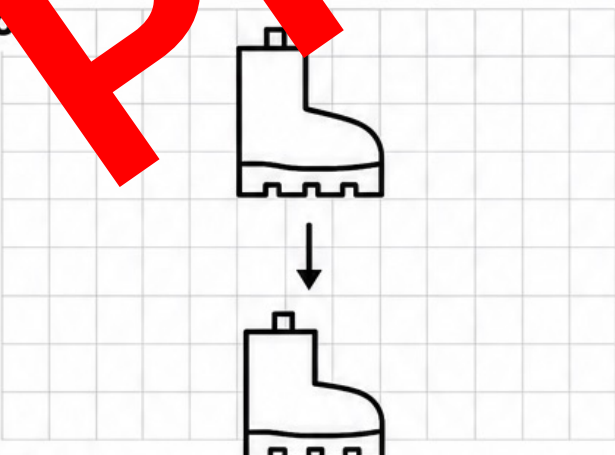
4.



Move: _____

Detail: _____

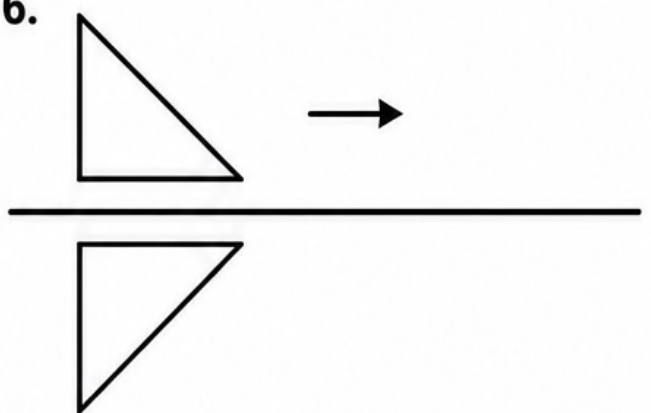
5.



Move: _____

Detail: _____

6.



Move: _____

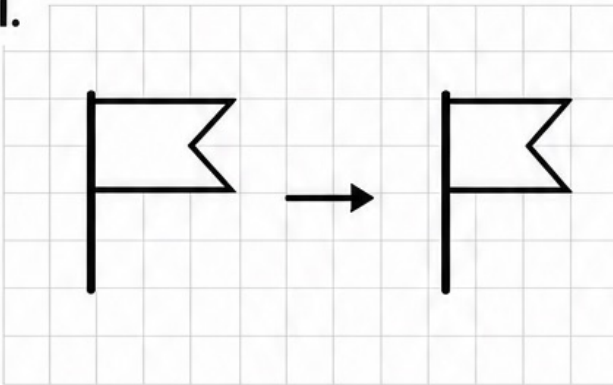
Detail: _____

reflection • rotation • translation • clockwise • anticlockwise • spaces

TRANSFORMATION PATTERN DETECTIVE – NAME THE MOVE

Name: ANSWERS

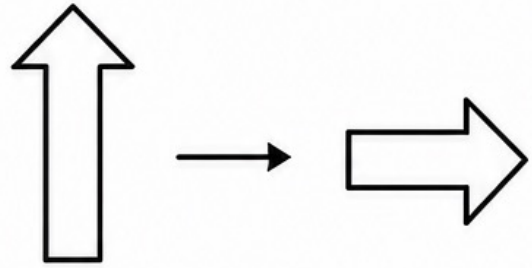
1.



Move: translation

Detail: right

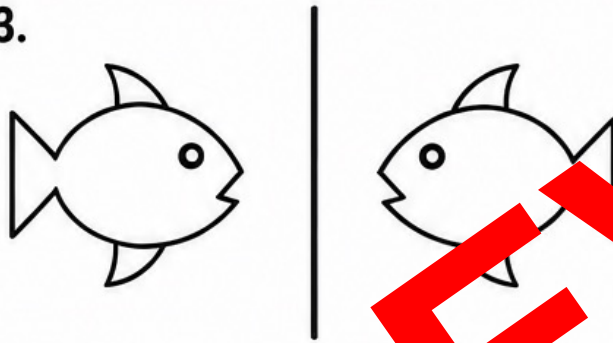
2.



Move: rotation

Detail: quarter-turn clockwise

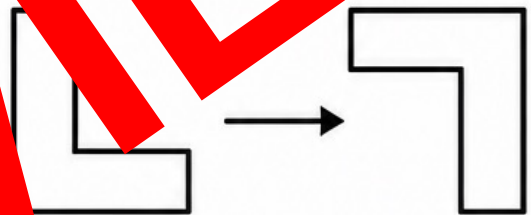
3.



Move: reflection

Detail: vertical mirror line

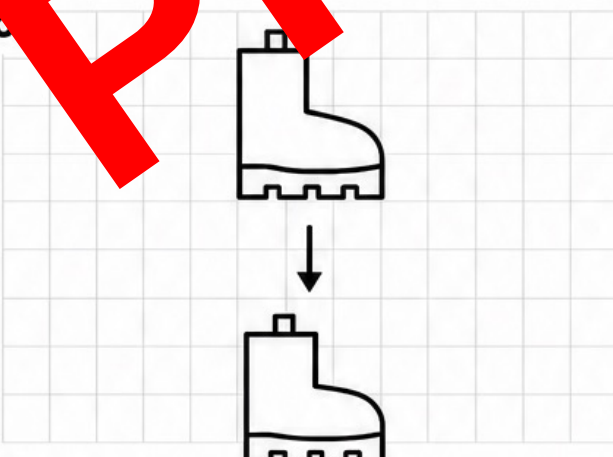
4.



Move: rotation

Detail: half-turn

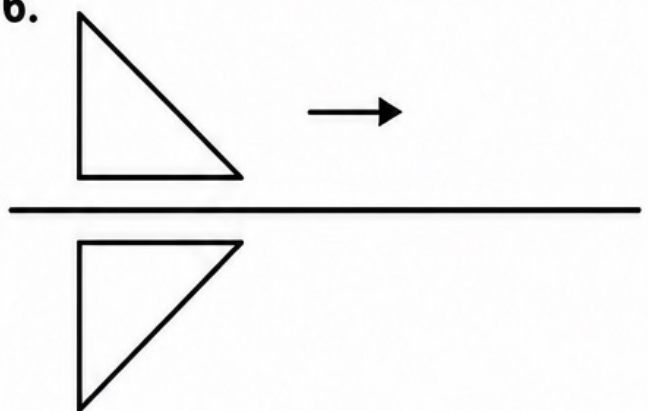
5.



Move: translation

Detail: down

6.



Move: reflection

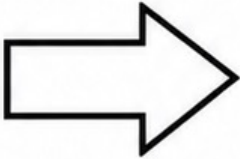
Detail: horizontal mirror line

reflection • rotation • translation • clockwise • anticlockwise • spaces

TRANSFORMATION PATTERN DETECTIVE — CONTINUE THE RULE

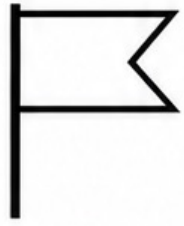
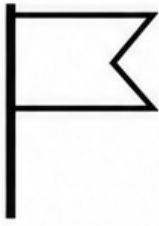
Name: _____

1.

			
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Rule: _____

2.

			
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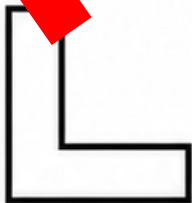
Rule: _____

3.

			
---	---	--	--

Rule: _____

4.

			
---	---	--	--

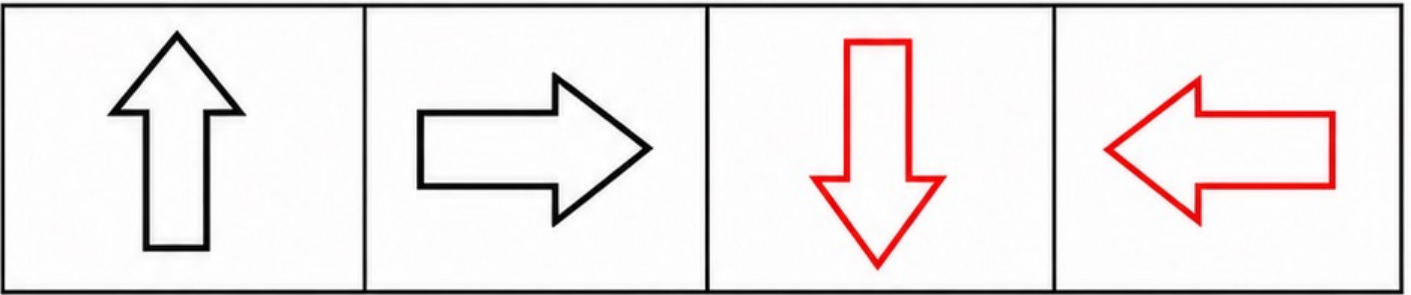
Rule: _____

Challenge: Describe how you know your rule will repeat.

TRANSFORMATION PATTERN DETECTIVE — CONTINUE THE RULE

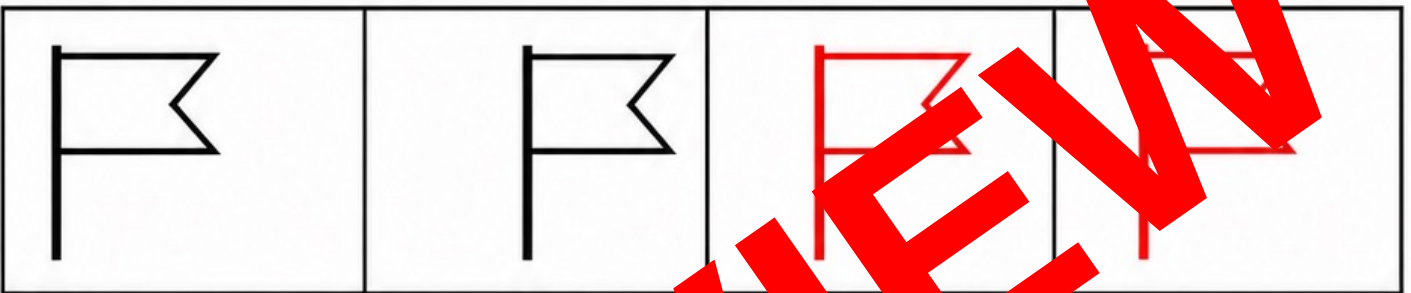
Name: ANSWERS

1.



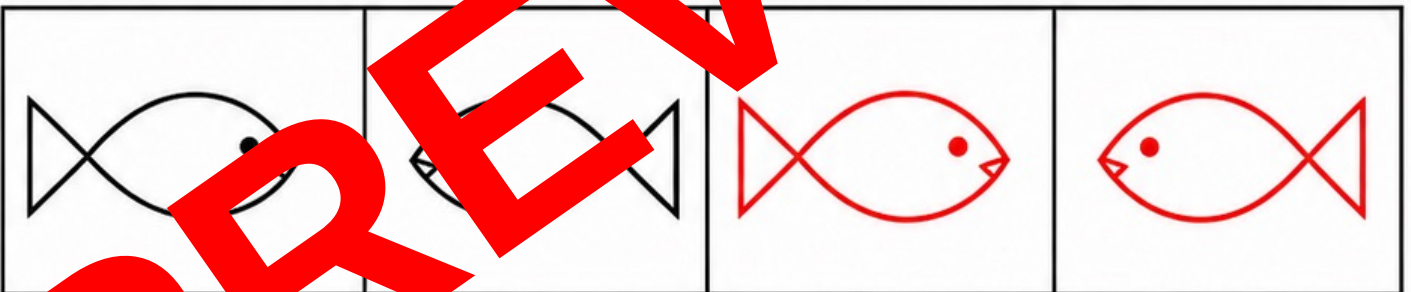
Rule: quarter-turn clockwise

2.



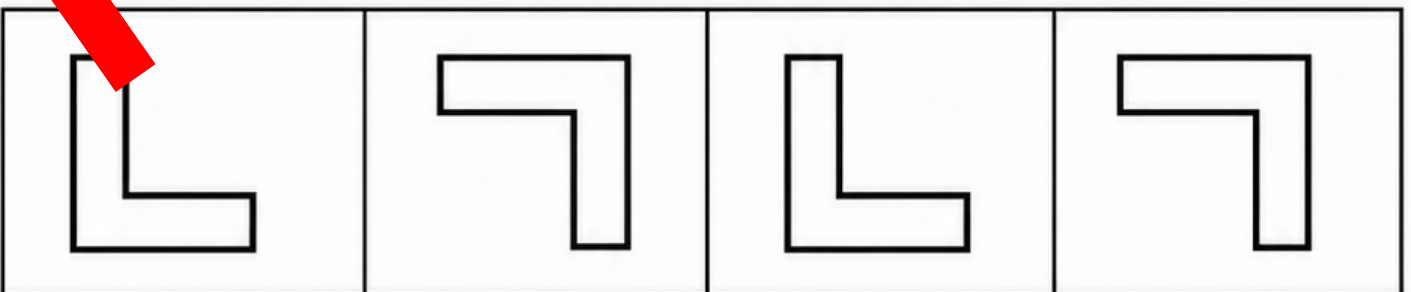
Rule: translation to the right

3.



Rule: vertical reflection

4.



Rule: half-turn rotation

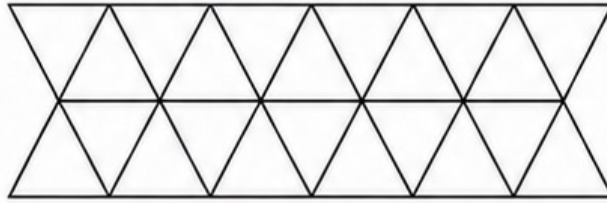
Challenge: Describe how you know your rule will repeat.

The same transformation repeats at every step.

TESSELLATION INVESTIGATION — GAPS OR NO GAPS?

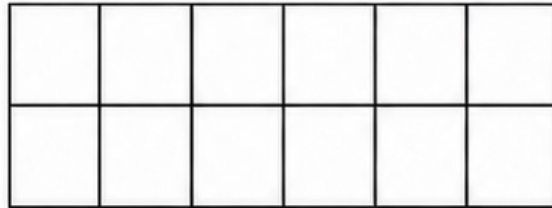
Name: _____

1. Equilateral triangles



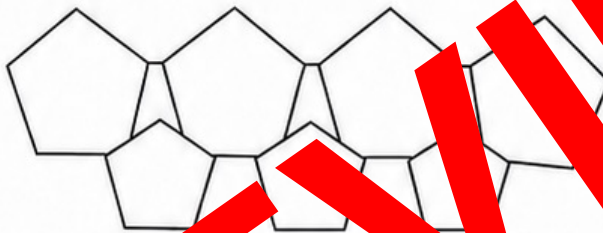
- ☐ tessellates alone
- ☐ does not tessellate alone

2. Squares



- ☐ tessellates alone
- ☐ does not tessellate alone

3. Regular pentagons



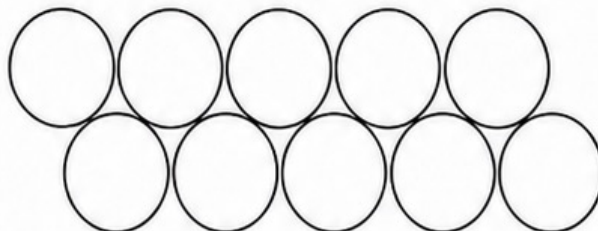
- ☐ tessellates alone
- ☐ does not tessellate alone

4. Regular hexagons



- ☐ tessellates alone
- ☐ does not tessellate alone

5. Circles



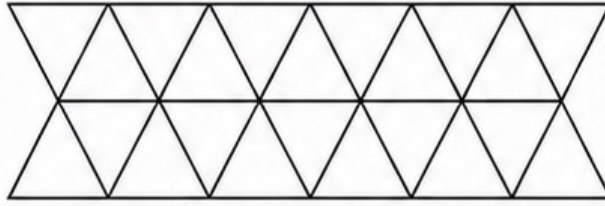
- ☐ tessellates alone
- ☐ does not tessellate alone

Explain one choice:

TESSELLATION INVESTIGATION – GAPS OR NO GAPS?

Name: ANSWERS

1. Equilateral triangles

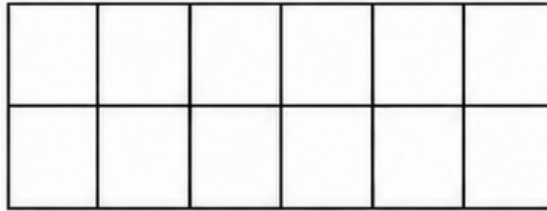


tessellates alone



does not tessellate alone

2. Squares

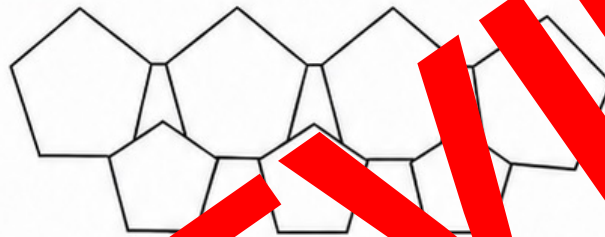


tessellates alone



does not tessellate alone

3. Regular pentagons

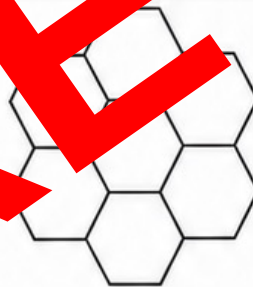


tessellates alone



does not tessellate alone

4. Regular hexagons

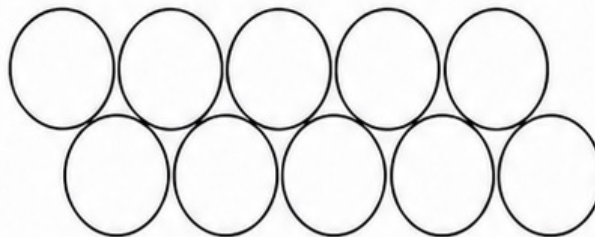


tessellates alone



does not tessellate alone

5. Circles



tessellates alone



does not tessellate alone

Explain one choice:

Regular hexagons share full edges, so they cover the plane with no gaps or overlaps.

TESSELLATION INVESTIGATION — CREATE A PATTERN

Name: _____

Create a two-colour tessellation.

Use a repeating rule.

Label one reflection, rotation or translation.



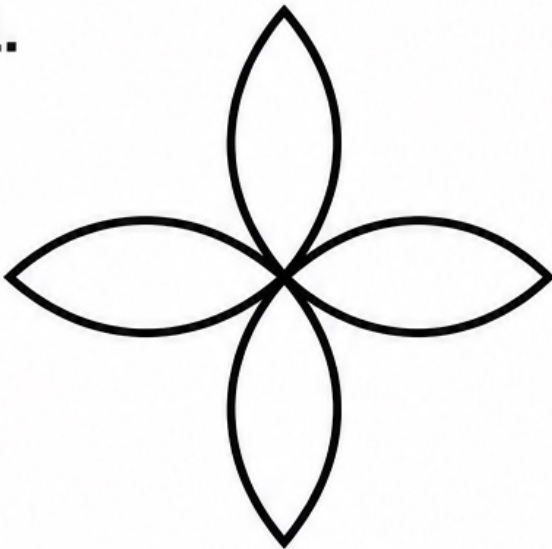
My repeating rule: _____

Transformation I labelled: _____

SYMMETRY IN ART & DESIGN – ANALYSE

Name: _____

1.



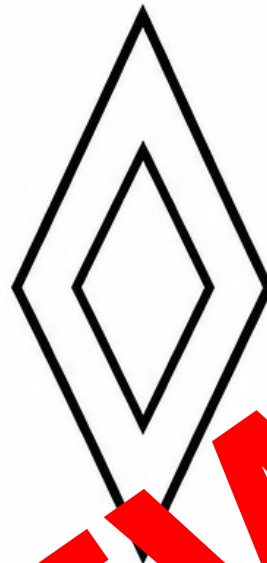
Line symmetry? Yes / No

Number of lines: _____

Rotational symmetry? Yes / No

Order: _____

2.



Line symmetry? Yes / No

Number of lines: _____

Rotational symmetry? Yes / No

Order: _____

3.



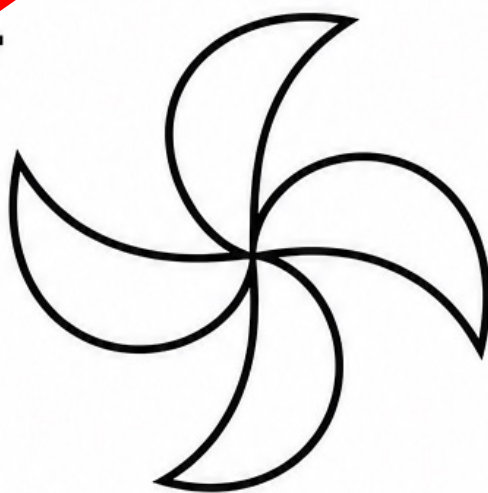
Line symmetry? Yes / No

Number of lines: _____

Rotational symmetry? Yes / No

Order: _____

4.



Line symmetry? Yes / No

Number of lines: _____

Rotational symmetry? Yes / No

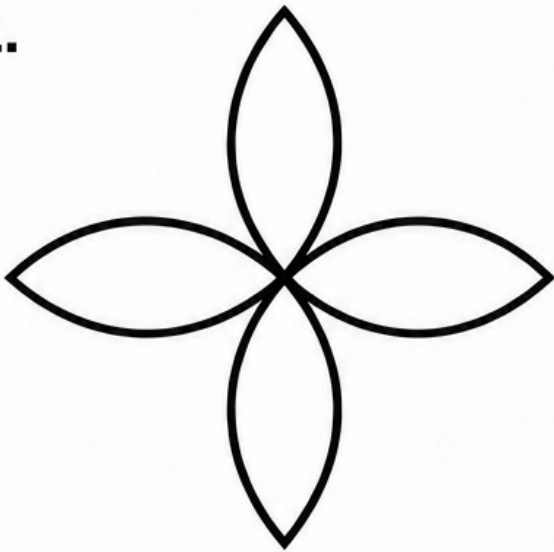
Order: _____

Which motif has rotational symmetry but no line symmetry? _____

SYMMETRY IN ART & DESIGN – ANALYSE

Name: ANSWERS

1.



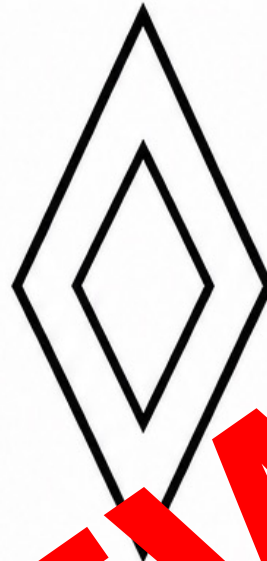
Line symmetry? Yes[✓] / No

Number of lines: 4

Rotational symmetry? Yes[✓] / No

Order: 4

2.



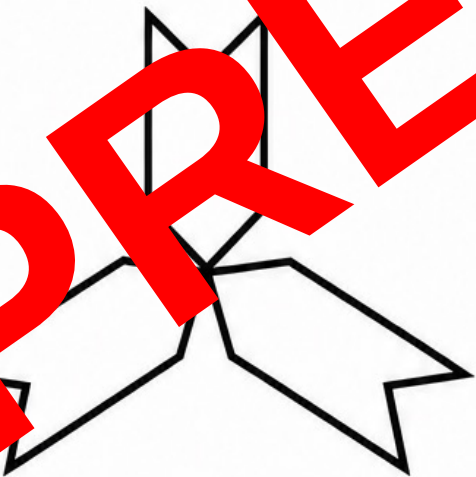
Line symmetry? Yes[✓] / No

Number of lines: 2

Rotational symmetry? Yes[✓] / No

Order: 2

3.



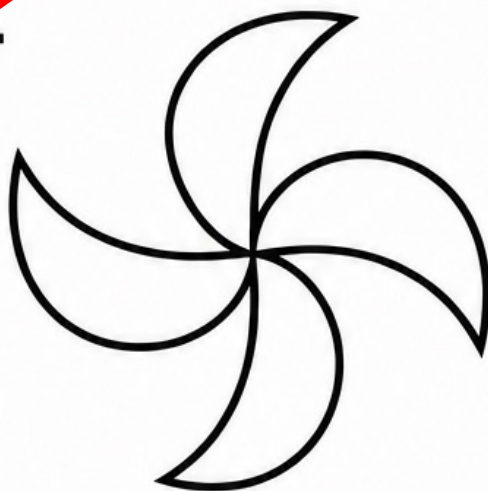
Line symmetry? Yes[✓] / No

Number of lines: 3

Rotational symmetry? Yes[✓] / No

Order: 3

4.



Line symmetry? Yes / No[✓]

Number of lines: 0

Rotational symmetry? Yes[✓] / No

Order: 4

Which motif has rotational symmetry but no line symmetry? 4

SYMMETRY IN ART & DESIGN — CREATE

Name: _____

- Create an original motif.
- Use at least two lines of symmetry.
- Make the rotational order 4.
- Explain how your design matches after a quarter-turn.



My lines of symmetry: _____

My rotational order: _____

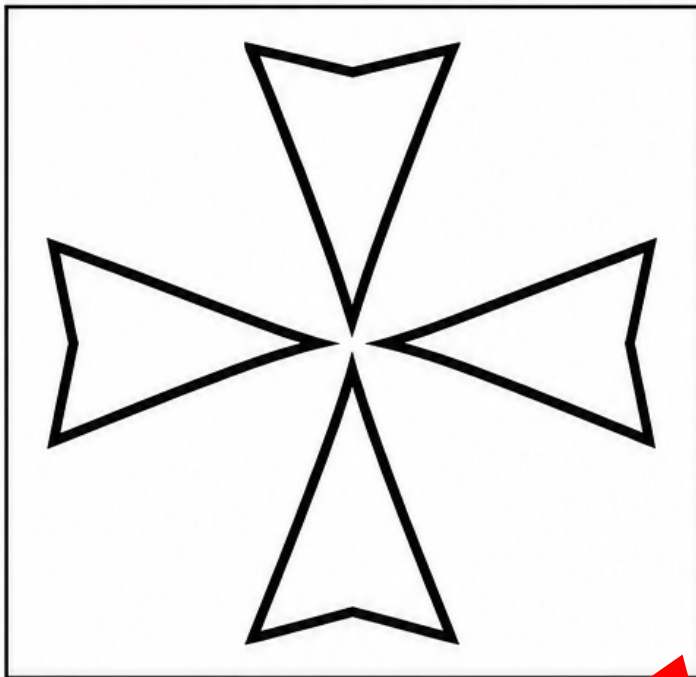
Quarter-turn explanation:

SYMMETRY ARCHITECT ASSESSMENT – ANALYSE

Name: _____

Date: _____

A designer is testing a new square floor tile.



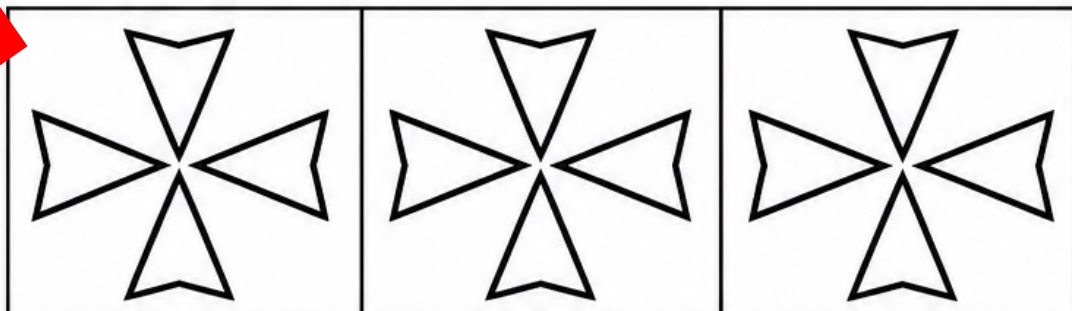
1. Draw every line of symmetry on the tile. [2 marks]



2. Does the tile have rotational symmetry? Explain. [2 marks]

3. State the rotational order. [1 mark]

The designer repeats the tile in a straight row. Name the transformation used and describe its direction. [2 marks]



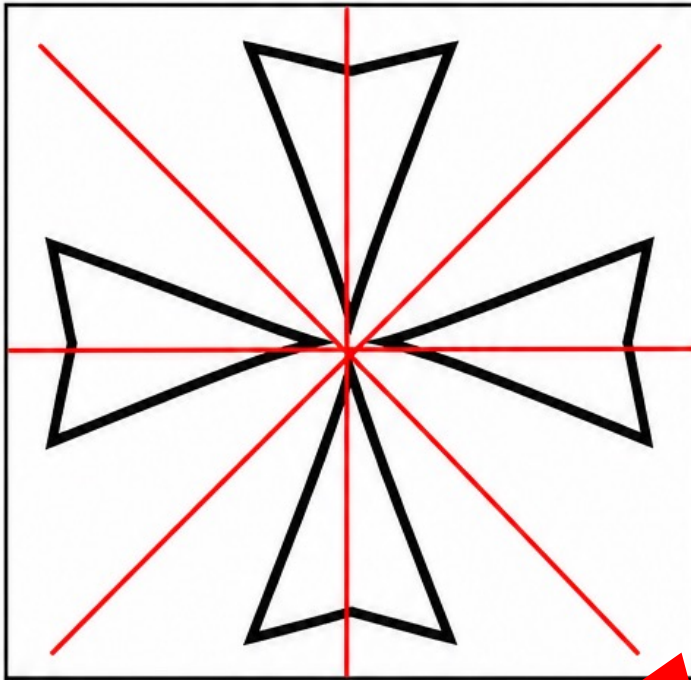
Total: ____ / 7

SYMMETRY ARCHITECT ASSESSMENT – ANALYSE

Name: **ANSWERS**

Date: _____

A designer is testing a new square floor tile.



1. Draw every line of symmetry on the tile. [2 marks]

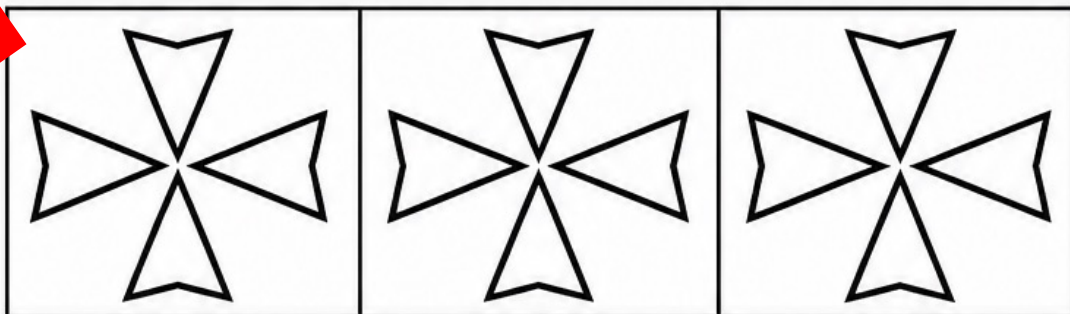


2. Does the tile have rotational symmetry? Explain. [2 marks]

Yes. The tile matches after each quarter-turn.

3. State the rotational order. [1 mark]

The designer repeats the tile in a straight row. Name the transformation used and describe its direction. [2 marks]



Translation to the right. The tile keeps the same orientation.

Total: **7** / 7

SYMMETRY ARCHITECT ASSESSMENT – CREATE & EXPLAIN

Name: _____

Date: _____

Design a floor pattern that meets every requirement.

- ☐ at least one line of symmetry
- ☐ rotational order 4
- ☐ a repeating tessellating pattern with no gaps or overlaps
- ☐ clear labels for the transformations used



My repeating rule: _____

Transformations used: _____

How I know the design matches after a quarter-turn:

Teacher score: ____ / 8

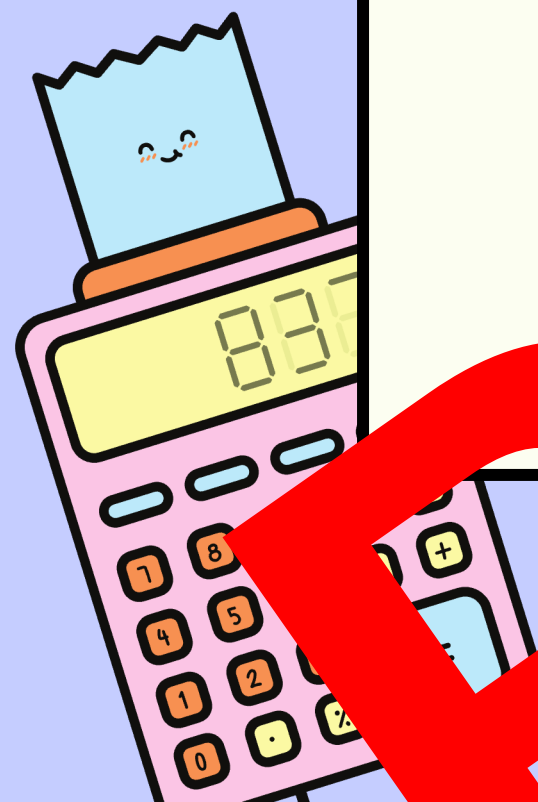
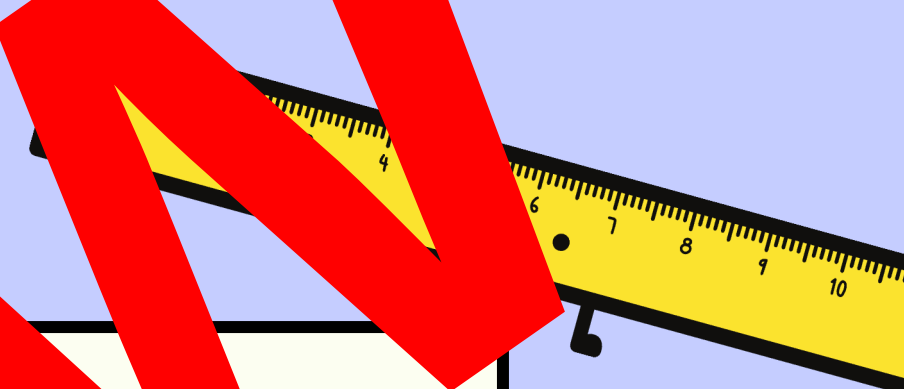
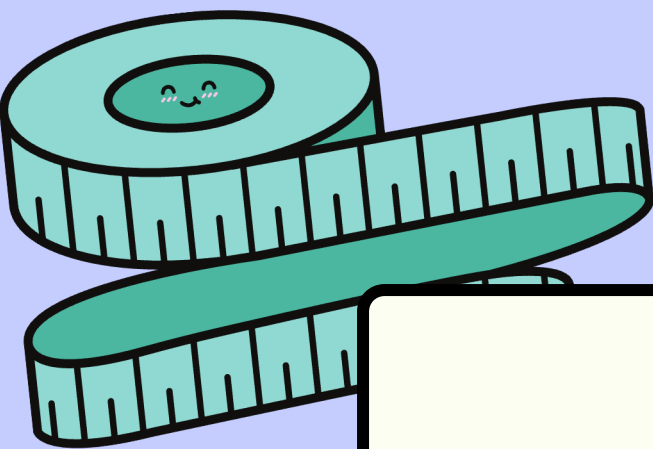
SYMMETRY — YEAR 4 RUBRIC

Student: _____

Date: _____

	BEGINNING	DEVELOPING	ACHIEVING	CONFIDENT	EXCEEDING
Line symmetry	Needs support to identify lines	Identifies some lines	Draws all lines in familiar shapes	Explains symmetry in own designs	Justifies lines in complex designs
Rotational symmetry	Needs support to recognise turns	Recognises matching turns	States correct rotational order	Explains quarter- and half-turn matches	Justifies order in complex designs
Transformation language	Uses informal movement words	Names one transformation	Names reflection, rotation and translation	Adds accurate direction and turn	Compares transformations precisely
Pattern and tessellation	Needs support to continue patterns	Continues a simple rule	Creates a repeating no-3 pattern	Uses transformations deliberately	Designs and evaluates complex patterns
Mathematical explanation	Gives little explanation	Gives a partly clear reason	Explains using key vocabulary	Uses evidence from the design	Justifies and checks every claim

Symmetry



Learning Goal

We are learning to

- recognise and create rotational symmetry
- create patterns using reflection and rotation



What Is Symmetry?

A symmetrical shape or design matches itself in a structured way.

The matching happens across a line or after a turn.



Line Symmetry

A mirror line divides a shape into two matching halves.

Each point is the same distance from the line.



How Many Lines?

A shape can have zero, one, or several mirror lines.
Count only lines that make two exact matching halves.



Reflection

Reflection is a flip across a mirror line.
The line may be vertical, horizontal or diagonal.



Rotational Symmetry

A shape has rotational symmetry if it matches itself before one full turn is complete.



Rotational Order

The order is the number of matching positions in one full turn.

Square: 4 Rectangle: 2 Equilateral triangle: 3



Describing Turns

Quarter-turn = 90°

Half turn = 180°

Three-quarter turn = 270°

Always state clockwise or anticlockwise.



Three Transformations

Translation = slide

Reflection = flip

Rotation = turn

Describe the direction or amount as well.



Read the Pattern

Compare each side:

- Did the position change?

- Did the orientation change?

- Which direction or turn was used?



Build a Pattern

Choose one precise rule.

Repeat it the same way at every step.

Check that the pattern can continue.



Tessellations

A tessellation covers a surface with repeated shapes.

There are no gaps and no overlaps.



Which Shapes Tessellate?

Tessellate alone: equilateral triangles, squares, regular hexagons.

Do not tessellate alone: regular pentagons and circles.



Art and Nature

Symmetry appears in flowers, leaves and geometric art.

Analyse the lines and turns while copying cultural designs.



Create and Explain

Plan a motif with line symmetry and rotational order.
Create it, label the transformations and explain the match.



Review

Can you:

- identify line and rotational symmetry?
- state rotational order?
- describe and create a repeating rule?





Well Done!

Symmetry Quiz



Question 1

Image or Fossil?

A figure with one mirror line has line symmetry.



Answer 1

True.

A mirror line divides the figure into matching halves.



Question 2

Which shape has rotational order 4?

- A. Rectangle
- B. Square
- C. Equilateral triangle
- D. Regular hexagon



Answer ?

Square

It matches after each quarter-turn four times in one full turn.



Question 3

What transformation is a flip across a line?



Answer ?

reflection.

Every point moves to the opposite side of the mirror line.



Question 11

Which describes a half-turn clockwise?

- A. 45° clockwise
- B. 90° clockwise
- C. 180° clockwise
- D. 360° clockwise



Answer II

C. A rotation of 180° clockwise.



Question 5

True or False?

Every shape with line symmetry has rotational symmetry.



Answer 5

False

An isosceles triangle has line symmetry but no rotational symmetry before a full turn.



Question 6

What is the rotational order of an equilateral triangle?



Answer

3.

It matches after turns of 120° , 240° and 360° .



Question 3

Which regular shape does not tessellate alone?

A. Equilateral triangle

B. Square

C. Regular hexagon

D. Regular pentagon



Answer 3

D. Regular pentagons

Regular pentagons leave gaps when used alone.



Question 8

Describe this repeating rule:

up arrow, right arrow, down arrow, left arrow



Answer 8

A quarter turn clockwise at each step.



Question 1

True or False?

A tessellation covers a surface without gaps or overlaps.



Answer a

PREVIEW



Question 10

Which statement means a figure has rotational order 4?

- A. It has one mirror line
- B. It has exactly four matching positions in one full turn
- C. It slides right
- D. It has four colours



Answer 10

B. It has exactly four matching positions in one full turn.

The smallest matching turn is 90° .





Well Done!