

Unit 6 Geometry: 2-D Shapes

Introduction

In Unit 1, students learned to identify circles and recognize the difference between straight and curved sides. In this unit, students learn to identify, describe, compare, and manipulate circles, squares, rectangles, and triangles.

In Unit 1, students were introduced to sorting objects with only one attribute that is different. In this unit, students sort objects with several attributes that are different and they sort the same objects in different ways. They also predict how other people have sorted objects and they learn to change their prediction based on increasing evidence as more objects are sorted. Students sort geometric shapes by both geometric and non-geometric attributes. Students also learn to identify geometric shapes within designs, and they compose and decompose geometric shapes. Although not a direct prerequisite, this practice of composing and decomposing concrete shapes prepares students for the more sophisticated practice of composing and decomposing numbers, which students do in Unit 13.

Meeting Your Curriculum

Alberta—All lessons in this unit are required.

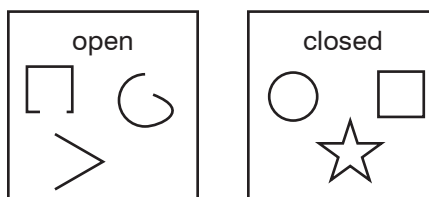
British Columbia—All lessons in this unit are required.

Manitoba—All lessons in this unit are required.

Ontario—Lessons G1-7 and G1-8 are optional. All other lessons in this unit are required.

Vocabulary. The new terminology in this grade is often more difficult for students than the actual concepts that they are learning. Being able to recognize the new words on paper will help students focus on the concepts. The most important terms that students will learn in this unit are the following: square, rectangle, triangle, open, closed.

As you teach each new term, add it to the word wall on a card that also includes visual examples. When students need to recognize the word (for example, when doing AP Book exercises), point them to the word wall. **EXAMPLES:**



NOTE: Students do not need to learn the names of all the shapes they encounter. Shapes such as hexagons, rhombuses, and trapezoids are referred to by their proper names in the lesson plans for your reference.

Materials. Many lesson plans in this unit require standard 1-inch pattern blocks and attribute blocks. We have provided BLMs to help you create these manipulatives. If you do not have pattern blocks, you can copy **BLM Pattern Blocks** (p G-45) onto coloured paper according to the colours of actual pattern blocks (green triangles, orange squares, red trapezoids, yellow hexagons, wide blue rhombuses, and narrow brown rhombuses). **BLM Attribute Blocks** (pp G-46–50) provides many different shapes with various geometric and non-geometric attributes, such as designs, colours (shades of black), sizes, curved and straight sides, and so on. We recommend that you cut out these shapes and have one or two full sets. To help them last longer, you might laminate the sheets or paste them onto thicker material. You will need these throughout the unit.

In addition to the BLMs provided at the end of this unit, the following Generic BLMs, found in section K, are used in Unit 6:

BLM Sorting into Two Groups (p K-2)
BLM Rectangles and Not Rectangles (p K-11)
BLM Sorting Circle (p K-1)
BLM Fruit and Vegetable Cards (p K-3)
BLM Animal Cards (p K-4)
BLM Vehicle Cards (p K-5)
BLM 2 cm Grid Paper (p K-6)

Assessment. The assessment checklist for this unit can be found in section L.

G1-1 Sides and Corners

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CURRICULUM REQUIREMENT

AB: required
BC: required
MB: required
ON: required

VOCABULARY

closed
corner
curved
line
open
shape
side
straight

Goals

Students will identify, trace, and count the sides and the corners of shapes.
Students will recognize open and closed shapes.

PRIOR KNOWLEDGE REQUIRED

Can count to 10
Knows that a circle curves the same everywhere
Can identify straight lines

MATERIALS

masking tape (or yarn and clear tape)
number cards
pattern blocks or **BLM Pattern Blocks** (p G-45)
large paper square or rectangle
attribute blocks or **BLM Attribute Blocks** (pp G-46–50)
BLM Tracing Shapes (p G-51)
several containers with lids

NOTE: In advance, create several polygons on the floor using masking tape, or yarn and clear tape.

Review curved and straight lines. Draw on the board a circle, an oval, and a square. Curve your hands the same way as the circle at different places and SAY: The circle curves the same way everywhere. Repeat for the oval, but SAY: The oval curves a lot here and only a little over here. Then straighten your hand and align it with the square's edges, one at a time, as you SAY: These lines don't curve at all—they are straight. Write on the board:

A B

Pointing to the A, SAY: All of these lines are straight. Trace your finger over each straight line in the A and each time, SAY: This is a straight line. Pointing to the B, SAY: One of these lines is straight, but the other two are not. Have volunteers trace the straight line and the curved lines.

Exercises: Are all of the lines straight?

a) D b) T c) Q d) V e) O

Answers: a) no, b) yes, c) no, d) yes, e) no

Introduce corners. Draw any type of angle on the board. Explain to students that corners are created when two lines meet. Tell students that the figure you just drew has one corner. Ask students to feel the edges

of their AP Books and demonstrate doing so yourself. ASK: How does a corner feel different from the rest? (it's pointy)

ACTIVITY 1 (Essential)

1. Using one of the polygons on the floor that you prepared in advance, let students guess how many corners it has. Then ask volunteers to stand at the corners and ask another volunteer to count how many students are standing. Was the guess right? Repeat for more polygons. Then solve the problem a different way: instead of counting volunteers, label the corners with number cards (1, 2, 3, and so on) and have students verify that the answers are the same. Have different volunteers count the vertices in different ways and explain how they did so. For example, "I numbered them from left to right (or from here to there)," or "I started at the top and went around this way."

Draw a triangle on the board and ask students to identify and count the corners of this shape. Encourage volunteers to put a number in each corner once it has been counted. Repeat with other shapes. Raise the bar by increasing the number of corners.

Give each student a pattern block (e.g., from **BLM Pattern Blocks**) to use in the following exercise.

Exercise: Count the corners of your shape.

ACTIVITY 2 (Optional)

2. **A game for pairs.** Students play in pairs. Player 1 closes his eyes. Player 2 places a pattern block in Player 1's hands. Player 1 guesses the number of corners on the shape by feel, then opens his eyes to check the guess. Players switch roles and repeat. Students can play this game until they are good at it.

Introduce sides. Show your students a large paper square or other rectangle. Run your finger over each of the sides in turn and explain that these edges of the shape are called sides. Draw a square, and draw arrows pointing to each side. Draw a rectangle that is not a square and invite volunteers to mark the sides.

Counting sides by labelling each side with a number. Draw a rectangle on the board:



Ask students how they could count the sides of the rectangle. Start counting the sides and number them as you go. Allow different volunteers to number the sides differently, for example by starting with a different side or by using a different order, but always ending with "4." Repeat with a

triangle and a pentagon. (Students don't need to know the names of these shapes yet.)

ACTIVITY 3 (Essential)

3. Give students several attribute blocks (e.g., from **BLM Attribute Blocks**) or pattern blocks and ask them to count the sides of each shape. Do not use shapes with curved sides for this activity unless your students are comfortable with them.

Tracing shapes. Have students complete **BLM Tracing Shapes**. Then ask them to identify the corners of the shapes. ASK: How do you know that these are corners? Point out that the corners are the places where they had to make a sharp turn when tracing the shape, because each next side goes in a different direction.

Introduce open and closed shapes. Show students several containers with lids, some open and some closed. Have students tell you which containers are open and which are closed. Demonstrate how you can reach into the open containers but not the closed containers. Point to the door. ASK: Is the door open or closed? Does that make it easy or hard to leave or come into the room? Draw on the board:



SAY: Pretend these are two rooms. Pointing to each shape in turn, ASK: Is the room open or closed? (open, closed)

In the following exercises, students can signal thumbs up for yes and thumbs down for no.

Exercises: Is there an opening or gap?



Answers: a) yes, b) no, c) no, d) yes

When students are done, have volunteers point out the openings in each of the shapes with openings. Tell students that shapes are called open shapes when there is an opening and closed shapes when there is no opening or gap.

Extensions

1. How many corners does a circle have? Explain how you know.
Hint: Do you have to stop and turn when tracing a circle?

Answer: Zero or none, because you never have to stop and turn when tracing a circle.

2. In advance, write “all straight (\ | —)” and “all curved (~)” in the sorting circles on **BLM Sorting into Two Groups** (p K-2) and photocopy it for students. Give each student a copy and explain that they will need to sort by whether the lines in each part are all straight or all curved.

a) Have students sort the letters.

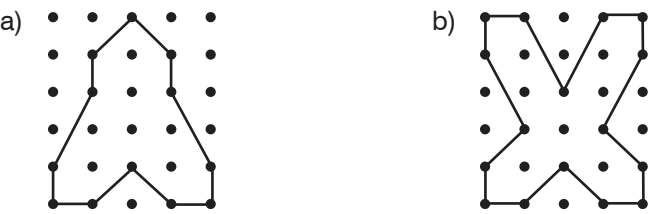
A C E F H K L O S Z

b) Have students sort the numbers. Explain that some numbers can't be put into either group, because they have both curved and straight lines.

0 1 2 3 4 5 6 7 8 9

Answers: a) straight lines only: A, E, F, H, K, L, Z; curved lines only: C, O, S; b) straight lines only: 1, 4, 7; curved lines only: 0, 3, 6, 8; both (outside both groups): 2, 5, 9

3. Copy the shape onto dot paper (e.g., from **BLM Dot Paper**, p G-52). Count the sides and the corners.



Answers: a) 12 sides and 12 corners, b) 16 sides and 16 corners

4. Complete **BLM Finding Closed Shapes** (p G-53).

Answers

X	X	○
○	○	X
X	○	X

nobody wins

G1-2 Squares

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CURRICULUM REQUIREMENT

AB: required
BC: required
MB: required
ON: required

VOCABULARY

closed
corner
curved
open
side
square
straight

Goals

Students will identify squares that are oriented horizontally (not tilted), regardless of size, colour, or design.

Students will identify non-squares that have more or less than four sides, curved sides, or are open.

PRIOR KNOWLEDGE REQUIRED

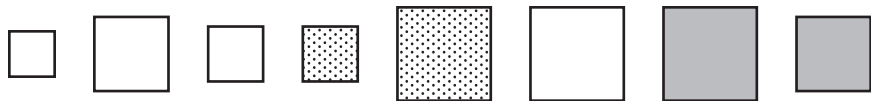
Knows the word “shape” and what it means

MATERIALS

large paper square, equilateral triangle, pentagon, and hexagon
coloured chalk
attribute blocks or **BLM Attribute Blocks** (pp G-46–50)

NOTE: In advance, divide the board in two. Label one side “squares” and label the other side “not squares.” Over the course of the lesson, you will fill one side of the board with squares and the other side with shapes that are not squares.

Being a square does not depend on size, colour, or design. Show students a large paper square and ask them if they can name the shape. (Some students will be able to identify it as a square from their previous experience.) Draw on the “squares” side of the board several squares (all with a horizontal side) of different sizes, colours, and designs. For each new square, change only one attribute at a time, so that the next square is either bigger, smaller, darker, lighter, has a different design, etc. Each time, ask students how this square is different from the last. For example, you can use the sequence of pictures below. (bigger, smaller, has dots, bigger, no dots, grey, smaller)



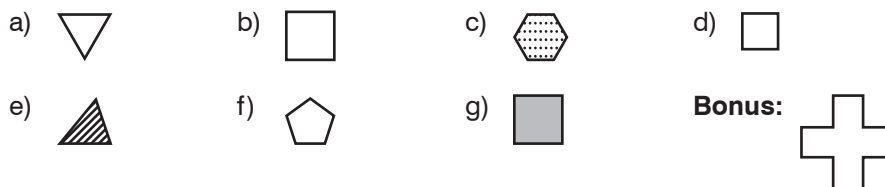
SAY: These shapes are all squares, even though some of them are bigger and some are smaller. Some are grey and some are white. Some have dots and some do not.

Exercises

- Draw a square.
- Colour it or make a design.
- Compare your square to a partner’s square. How are they different?

Squares have four sides. Pointing to each square on the board, ASK: How many sides does this square have? (4) SAY: Squares have four sides. Show students a paper equilateral triangle. Have a volunteer count the sides. (3) ASK: Is this a square? (no) How do you know? (it only has three sides) Repeat for a paper pentagon (five sides) and a paper hexagon (six sides). Add these shapes to the “not squares” side of the board.

Exercises: Is the shape a square? Explain to a partner how you know.



Answers: a) no, it has 3 sides; b) yes, it has 4 sides and it looks like a square; c) no, it has 6 sides; d) yes, it has 4 sides and it looks like a square; e) no, it has 3 sides; f) no, it has 5 sides; g) yes, it has 4 sides and it looks like a square; Bonus: no, it has 12 sides

Add the non-squares from the previous exercises to the “not squares” side of the board.

Squares have straight sides. Pointing to each square on the board, ASK: Are the sides straight like this (show “straight” with your hand) or curved like this (show “curved” with your hand)? (the sides are all straight) SAY: Squares have straight sides. Draw on the board:



Pointing to the first shape, ASK: Is this shape a square? (no) How do you know? (it has curved sides) Does it have four sides? (yes) Count the sides as a class. SAY: It has four sides, just like squares do, but its sides are curved, so it is not a square. Repeat for the second shape (it has two curved sides, so it is not a square).

Exercises: Is the shape a square? Explain to a partner how you know.



Answers: a) no, it has curved sides; b) yes, it has a design, but it's still a square; c) no, it has a curved side; d) no, it has curved sides; e) yes, it has thick sides, but it's still a square

Add the non-squares from the previous exercises to the “not squares” side of the board.

ACTIVITY (Essential)

Give each student an attribute block (e.g., from **BLM Attribute Blocks**), but omit any non-square quadrilaterals. Ask students to sort themselves into “squares” and “not squares.” If students have trouble recognizing squares, encourage them to turn the block so that it has a horizontal side.

Squares are closed shapes. Pointing to the squares on the board, ASK: Is this shape open or closed? (closed) PROMPT: Is there an opening? (no) SAY: Squares are closed shapes, not open.

Exercises

1. Is the shape a square? Explain your answer to a partner.



Answers: a) no, it is open; b) yes, it is closed and it looks like a square; c) yes, it is closed and it looks like a square; d) no, it is open

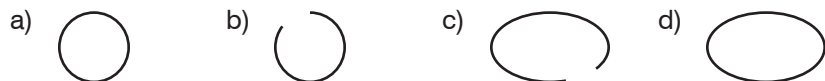
2. What do you need to do to make the shape a square?



Answers: a) close up the opening, b) straighten the bottom side

Circles are closed. Draw a circle on the board and remind students that circles curve the same everywhere. Show this by curving your hand the same way and matching it with the shape on the board. SAY: Circles are closed shapes. If it is open, it's not a circle, even if it almost looks like one.

Exercises: Is the shape a circle? Explain your answer to a partner.



Answers: a) yes, it is closed and curved the same way everywhere; b) no, it is open; c) no, it is open, or no, it doesn't curve the same way everywhere; d) no, it doesn't curve the same way everywhere

CONNECTION

Technology—Teach students to use a computer program to draw squares and circles, and manipulate them (that is, move them, scale them, and add colour or designs).

Extensions

1. Use **BLM Finding Closed Shapes** (p G-53).
 - a) Pretend the pictures on the BLM are paths. Start anywhere on the path and trace along a closed path with your finger. Can you get back to where you started by going along the path without turning around, or do you have to turn around to get back to where you started? Try it for all the closed shapes. Is the answer the same for all the closed shapes? Now try it for all the open shapes. What is the answer for the open shapes?
 - b) Try to colour all the shapes and stay inside the lines. What kind of shapes is this easier for, open shapes or closed shapes? Why?
 - c) Try to cut out all the shapes. Which kind of shapes can you cut out, open shapes or closed shapes?

Answers

- a) On closed paths, you can get back to where you started without turning around. On open paths, you have to turn around to get back to where you started.
 - b) Colouring inside an open shape is harder. Sample explanation: because there are no lines to guide you in places
 - c) You can cut out closed shapes. When you cut along an open shape, nothing comes out.
2.
 - a) Count the corners on the squares on AP Book 1.1 p 139. How many corners do squares have?
 - b) Explain to a partner why the shape is not a square.



Answers: a) 4, b) there are no pointy corners

G1-3 Rectangles

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CURRICULUM REQUIREMENT

AB: required
BC: required
MB: required
ON: required

VOCABULARY

curved
narrower
rectangle
shorter
side
square
straight
taller
wider

Goals

Students will identify rectangles that are oriented horizontally, regardless of size, colour, or design.
Students will identify non-rectangles that have more or less than four sides, curved sides, are open, or have sides that don't go straight up from the bottom side.

PRIOR KNOWLEDGE REQUIRED

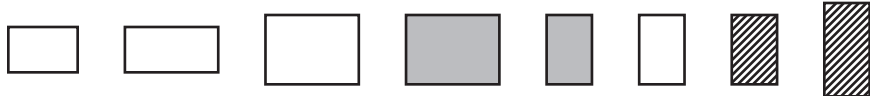
Knows the word "shape" and what it means

MATERIALS

large paper rectangle
coloured chalk
attribute blocks or **BLM Attribute Blocks** (pp G-46–50)
overhead projector
transparency of **BLM Rectangles and Not Rectangles** (p K-11)
BLM Rectangles and Not Rectangles (p K-11)

NOTE: In advance, divide the board into two. Label one side "rectangles" and label the other side "not rectangles." Over the course of the lesson, you will fill one side of the board with rectangles and the other with shapes that are not rectangles. You will also need attribute blocks from **BLM Attribute Blocks** that match the shapes on **BLM Rectangles and Not Rectangles**.

Being a rectangle does not depend on size, colour, or design. Show students a large paper rectangle and ask them if they can name the shape. (Some students will be able to identify it as a rectangle from their previous experience.) Repeat for the classroom door. Draw on the "rectangles" side of the board several rectangles (all with a horizontal side) of different sizes, colours, and designs. For each rectangle, change only one attribute at a time, so that the next rectangle is either taller, shorter, wider, narrower, darker, lighter, has a design, etc. Each time, ask students how this rectangle is different from the last. For example, you can use the sequence of pictures below. (wider, taller, darker or grey, narrower, lighter, has stripes, taller)



If some students say that some rectangles are longer or bigger, ask them whether they mean longer from side to side or from top to bottom. Encourage them to use the words "wider" and "narrower" for side to side and "taller" and "shorter" for top to bottom. SAY: These shapes are all rectangles, even though some of them are taller and some are shorter. Some are wider and some are narrower. Some are grey and some are white. Some have stripes and some do not.

Exercises

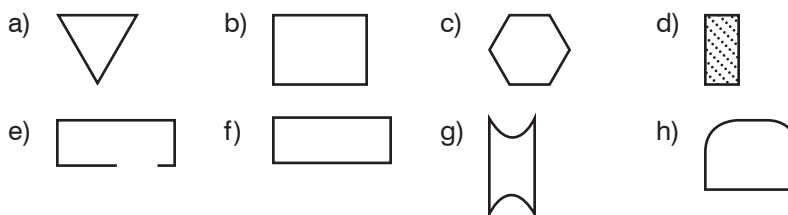
- Draw a rectangle.
- Colour it or make a design.
- Compare your rectangle to a partner's rectangle. How are they different?

Rectangles have four sides, have straight sides, and are closed.

Pointing to each rectangle on the board, ASK: How many sides does this rectangle have? (4) Are the sides straight like this (show “straight” with your hand) or curved like this (show “curved” with your hand)? (all the sides are straight) SAY: Rectangles have straight sides and rectangles have four sides, just like squares. Rectangles are also closed shapes, so if a shape is open, it is not a rectangle, even if it almost looks like one.

Exercises

- Is the shape a rectangle? Explain to a partner how you know.



Answers: a) no, it has 3 sides; b) yes, it looks like a rectangle; c) no, it has 6 sides; d) yes, it looks like a rectangle, just dotted; e) no, it is open; f) yes, it looks like a rectangle; g) no, it has curved sides; h) no, it has a curved side; Bonus: no, it has 12 sides

- What do you need to do to make the shape a rectangle?



Answers: a) close up the opening, b) straighten the bottom side

ACTIVITY (Essential)

Give each student an attribute block from BLM Attribute Blocks (but not including squares and not including quadrilaterals that are not rectangles) and ask them to sort themselves into “rectangles” and “not rectangles.” If students have trouble recognizing rectangles, encourage them to turn the block so that it has a horizontal side.

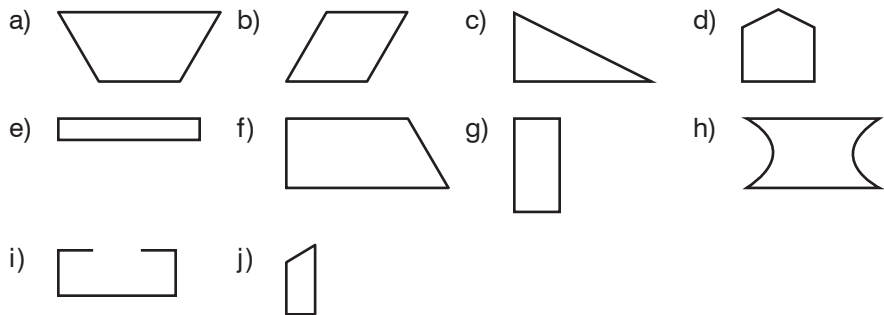
Recognizing non-rectangles. Project a transparency of BLM Rectangles and Not Rectangles. Tell students that the top shapes are rectangles and the bottom shapes are not. SAY: Look at all the rectangles. The top and

CONNECTION

Technology—Teach students to use a computer program to draw rectangles of different sizes and shapes, and to manipulate them (that is, move them, scale them, and add colour or designs).

bottom sides go straight across like this (place your arm in a horizontal position) and the left and right sides go straight up like this (place your arm in a vertical position). Point to each shape on the bottom, and ASK: Is the shape a rectangle? PROMPTS: Do the sides go straight up, or do they go up and to the side? Do the top and bottom sides go straight across? SAY: When the top and bottom sides go straight across and the left and right sides go straight up and down, it is a rectangle.

Exercises: Is the shape a rectangle? Explain to a partner how you know.

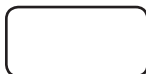


Answers: a) no, the sides don't go straight up; b) no, the sides don't go straight up; c) no, it has 3 sides; d) no, it has 5 sides; e) yes, the top and bottom go straight across and the sides go straight up; f) no, only one of the sides goes straight up; g) yes, the top and bottom go straight across and the sides go straight up; h) no, the sides that go up are curved; i) no, it is open; j) no, the top side doesn't go straight across

Provide students who struggle with identifying rectangles with BLM Rectangles and Not Rectangles and the matching attribute blocks from BLM Attribute Blocks. Ask students to match the shapes to the shapes on the BLM. When students are able to match the rectangles without trying non-rectangles to fit into the rectangle outline, they have mastered the concept of a rectangle. Encourage students to turn the attribute blocks so that the bottom side goes straight across.

Extensions

- Provide students with attribute blocks and **BLM Sorting into Two Groups** (p K-2) (Label the groups "square rectangles" and "not square rectangles.") Ask them to place all the square rectangles into one circle and all the not square rectangles into the other. All shapes that are not squares and not rectangles should be placed outside both circles.
- Count the corners on the rectangles on AP Book 1.1 p 140. How many corners do rectangles have?
 - Explain to a partner why this shape is not a rectangle.



Answers: a) 4, b) There are no pointy corners.

G1-4 Squares and Rectangles

Pages 141–143

CURRICULUM REQUIREMENT

AB: required
BC: required
MB: required
ON: required

VOCABULARY

corner
equal
longer
rectangle
same
shorter
side
square

Goals

Students will understand that rotated squares and rectangles are still squares and rectangles.
Students will compare side lengths of rectangles to determine if the rectangle is a square.

PRIOR KNOWLEDGE REQUIRED

Knows the word “shape” and what it means
Can identify sides and corners
Can identify squares and rectangles
Knows the concepts long, short, longer, short

MATERIALS

large paper square
BLM Matching Squares (p G-54)
scissors
large paper rectangle
BLM Matching Rectangles (p G-55)
pattern block squares
BLM Pattern Blocks (p G-45)
BLM Finding the Squares (p G-56)
BLM Is It a Square? (p G-57)
letter-sized sheet of paper

Being a square does not depend on rotation. Show students a large paper square in a horizontal position. ASK: What shape is this? (a square) Carefully trace the paper square on the board so that the bottom side is horizontal. ASK: Is the shape I traced a square? (yes) Turn the paper a little and repeat. Point out that the shape is still the same square, just turned. Repeat several times, increasing the angle of rotation, until the square is “standing” on a corner. Emphasize that the shape did not change—you only turned it.

In the following exercise, students trace the squares on the top half of the BLM, cut them out, and find the matching squares on the bottom half of the BLM by turning the squares.

Exercise: Complete **BLM Matching Squares**.

Being a rectangle does not depend on rotation. Show students a large paper rectangle in a horizontal position. ASK: What shape is this? (a rectangle) Carefully trace the paper rectangle on the board so that the bottom side is horizontal. ASK: Is the shape I traced a rectangle? (yes) Turn the paper a little and repeat. Point out that the shape is still the same rectangle, just turned. Repeat several times, increasing the angle of

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rotation, until the rectangle is “standing” on a corner. Emphasize that the shape did not change—you only turned it.

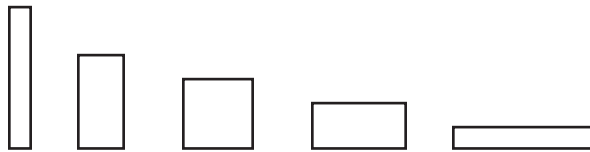
In the following exercise, students trace the rectangles on the top half of the BLM, cut them out, and find the matching rectangles on the bottom half of the BLM by turning the rectangles.

Exercise: Complete BLM Matching Rectangles.

Squares have all sides the same length. Give each student a pattern block square and **BLM Pattern Blocks**. Have students place their square in the outline of a square on the BLM to see that it matches. Then have students turn the square so that the top is on the side. ASK: Does the square still fit exactly? (yes)

SAY: In a square, the length from side to side is the same as the length from top to bottom. ASK: What is the length from side to side called? (width) What is the length from top to bottom called? (height) SAY: A square is as wide as it is tall.

A square is a special kind of rectangle. Draw on the board:



Pointing to each shape in turn, ASK: Is this shape taller or wider or as tall as it is wide? (taller, taller, as tall as it is wide, wider, wider) Tell students that these shapes are all rectangles, but one of them is also a square.

ASK: Which one is a square? (the middle one) Pointing to the middle one, SAY: This rectangle is a square because it is as wide as it is tall. Write “square” on the board.

Give students **BLM Finding the Squares** and a pattern block square. Students rotate the pattern block squares to check whether the rotated image on the page matches the pattern block square and cross out the shapes that are not squares. Tell students all sides have to match, so one side matching isn’t enough. They might need to lift their finger off the shape to see whether all sides match or not. The letters on the remaining shapes form the word square, providing an opportunity for self-checking.

Using folding to check if a shape is a square. Give students **BLM Is It a Square?** Have students cut out the shapes, excluding the two mystery shapes. Ask them to compare the top and bottom sides by folding. Demonstrate how to do this with a letter-sized sheet of paper. ASK: Are the sides equal? (yes for all shapes) Repeat for the left and right sides. (yes for all shapes) Then demonstrate how to compare the top side to one of the other sides by folding, using the sheet of paper, as shown below:



CONNECTION

Technology—Teach students to use a computer program to stretch or shrink a square in one direction to make a different rectangle, or vice versa.

ASK: Are these sides equal? (no) Have them check for their shapes (some will be equal and some won't). SAY: You can use folding to check if a shape is a square. When all the sides are the same, the shape is a square. Have students sort their rectangles into squares and not squares, then cut out the mystery shapes and sort those into the correct category by using folding.

Identifying squares by indirect comparison of sides. Draw several rectangles (including some squares) on the board—some should be slightly rotated, so that it is hard to say whether the rectangles are squares or not. SAY: I want to check whether these rectangles are squares or not, so I want to check if all the sides are the same. ASK: Can I fold one of the sides to check? (no) Can I cut it out? (no) What can I do? Record students' ideas and do an indirect comparison. For example, copy a line the same length as one side on a piece of paper and compare it to all the other sides, or trace the rectangle, cut it out, and turn it to see if it still fits.

Squares and rectangles in the real world. Point to various objects around the room (doors, windows, books, and so on) and ask if these shapes look like squares or other rectangles. Have volunteers identify other objects that involve squares and other rectangles.

Applying knowledge of squares. Teach students how to create a square from a sheet of paper by folding and cutting. ASK: How do you know that the shape you made is a square?

Extensions

NOTE: Extensions 1–4 should be done in order.

1. **Square corners.** Show students a large paper square, a large paper equilateral triangle, and a large paper right trapezoid and place them each so that one side is horizontal, as shown below:



Pointing to each shape in turn, ASK: Is this a square? (yes, no, no) Show students a small paper square or a pattern block square. ASK: Is this a square? (yes) Show students how the corners of the pattern block square all fit into the paper square perfectly, but they're too big for the triangle corners. Then repeat for the trapezoid. (the corners of the pattern block square are too big for one corner, too small for another, and it fits two corners)

Provide students with a pattern block square. Have students try to fit the pattern block square corner into the rectangles on AP Book 1.1 p 142. ASK: Which rectangles have corners like the square? (all of them do) Tell students that all the corners of a rectangle fit the square corners exactly, and they can use that to check if turned shapes are rectangles or not. Provide **BLM Attribute Blocks (4)** (p G-49) and have students use their pattern block squares to find all the rectangles. Have students colour all the rectangles.

2. Does the shape have two longer sides and two shorter sides? Does it have square corners?



Answers: a) yes, no; b) yes, no

3. Explain to a partner how the shapes in Extension 2 are the same as rectangles and how they are different.

Sample answer: They have two longer sides and two shorter sides, but they don't have square corners.

4. Explain how the shape is the same as a square and how it is different.



Answers: a) it is the same because it has all square corners, it is different because it has longer and shorter sides; b) it is the same because the sides are all equal, it is different because it has no square corners

5. a) Use a computer program to stretch a circle in one direction only. What shape do you get? Repeat for a square.
b) An oval is to a circle as a _____ is to a square. Explain why you think that.

Answers: a) oval and rectangle, b) rectangle

Sample explanation: b) because an oval is a stretched circle; because a circle and square are as wide as they are tall, but rectangles and ovals are not

G1-5 Triangles

Pages 144–146

CURRICULUM REQUIREMENT

AB: required
BC: required
MB: required
ON: required

VOCABULARY

corner
side
triangle

JOURNAL



Have students trace different attribute block triangles in their journals and create a picture or design incorporating these triangles.

CONNECTION



Technology—Teach students to use a computer program to draw triangles of different sizes and shapes, and to manipulate them (that is, move them, scale them, and add colour or designs).

Goals

Students will identify triangles.

PRIOR KNOWLEDGE REQUIRED

Knows the word “shape” and what it means
Can identify sides and corners

MATERIALS

large paper equilateral triangle
coloured chalk

BLM Triangles and Not Triangles (p G-58)

paper shapes or attribute blocks from **BLM Attribute Blocks** (pp G-46–50)

BLM Finding the Triangles (p G-59)

geoboards

dot paper or **BLM Dot Paper** (p G-52)

BLM Matching Triangles and Not Triangles (p G-60)

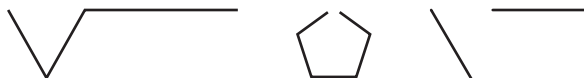
old catalogues, magazines, and newspapers

scissors and glue

Introduce triangles. Introduce triangles as you did squares and rectangles: identify a large paper equilateral triangle by name (triangle); trace the triangle on the board and draw more equilateral triangles of different sizes, colours, designs; rotate a triangle. Emphasize that being a triangle does not depend on design, colour, size or rotation.

Introduce non-equilateral triangles. Give students the top half of **BLM Triangles and Not Triangles**. Explain to students that all these shapes are called triangles even though they look quite different. To explore these differences, ASK: How do the triangles change in each row? (they get taller, fatter, they bend to the right, and so on) Students can also show with their hands or whole bodies how the triangles change.

Triangles have three sides and three corners. Review sides and corners with your students as necessary. Invite volunteers to count the corners and the sides on some triangles from the board. ASK: What do you notice? (they all have three sides and three corners) Draw on the board:



Invite volunteers to check the number of sides and corners in these figures. ASK: Are these triangles? Explain that all triangles have three sides and three corners. If a shape has a different number of sides or corners, it is not a triangle.

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AT HOME



Bake cookies in the shape of various geometric figures, such as circles, triangles, squares, and rectangles. See Letter to Parents (p G-75).

Give students the bottom half of BLM Triangles and Not Triangles. Explain that these shapes are not triangles. Hold up some paper shapes or attribute blocks (e.g., from **BLM Attribute Blocks**), both triangles and not triangles, and ask students where they should be placed on the BLM. Provide students with **BLM Finding the Triangles**. Students have to decide which shape in each pair or group of three is a triangle. (The letters in the triangles produce the word “beaver.”)

Exercises: What do you need to do to make the shape a triangle?



Answers: a) close up the opening, b) straighten the top side

ACTIVITY 1 (Essential), ACTIVITIES 2–6 (Optional)

1. Give students one attribute block each and have them sort themselves into “triangles” and “not triangles.”

NOTE: Activities 2–6 can be done at stations.

2. Give students various attribute blocks (squares, other rectangles, triangles, and other shapes with straight sides only from BLM Attribute Blocks) and ask them to sort the shapes into triangles and not triangles.

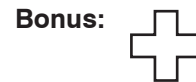
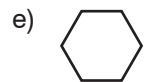
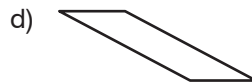
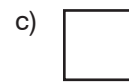
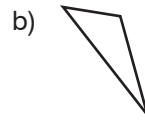
Variation: Include shapes with curved sides and ask students to sort the shapes into triangles, squares, other rectangles, circles, and other shapes.

3. Have students create triangles on geoboards. Ask students to move one corner of the triangle. Is the resulting shape still a triangle? Encourage students to make more changes to their triangles, so that the resulting shapes have sides of different lengths. Have students draw at least three of the triangles they created on dot paper or **BLM Dot Paper**.
4. For students who struggle with identifying triangles, provide **BLM Matching Triangles and Not Triangles** and the matching attribute blocks from BLM Attribute Blocks. Ask students to match the shapes to the BLM. When all shapes are matched successfully, hold up one of the shapes (say, the dotted triangle) and ask students to describe the shape. (it is large, it is dotted) ASK: Can a triangle have dots? (yes) Do the dots change its shape? (no) Is it still a triangle? (yes) Repeat with other shapes. When students are able to match the triangles without trying non-triangles to fit into the triangle outline, they have mastered the concept of a triangle.

5. Place students in groups of 2 to 4 and have them use their bodies to create the shapes studied to date (circle, oval, square, rectangle, triangle). If done at a station, you can have cards with pictures of shapes face down. Students turn over the top card to decide what shape to make. If done as a whole class, call each shape out and give students a minute or so to create the shape. Look for communication, cooperation, and respectful behaviour.
6. **Collages and posters.** Invite students to make collages or posters for one of the shapes they learned about. They can look for examples of that shape in old catalogues, magazines, and newspapers. They can also look for particular shapes in everyday objects and add drawings to their collages or posters. For example, students could create a poster with the title “What Looks Like a Square?” or “I See Squares.”

Extensions

1. Count the sides and corners of the closed shape.



Answers: a) 3 sides, 3 corners; b) 3 sides, 3 corners; c) 4 sides, 4 corners; d) 4 sides, 4 corners; e) 6 sides, 6 corners; Bonus: 12 sides, 12 corners

2. Draw a closed shape with 5 sides. How many corners does it have?

Answer: 5

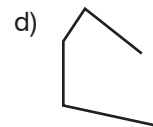
3. Draw a closed shape with 8 corners. How many sides does it have?

Answer: 8

4. Sara draws a closed shape with 20 corners. How many sides does her shape have?

Answer: 20

5. Count the sides and corners of the open shape.



Answers: a) 2 sides, 1 corner; b) 3 sides, 2 corners; c) 4 sides, 3 corners; d) 5 sides, 4 corners

6. Draw an open shape with 6 sides. How many corners does it have?

Answer: 5

7. Draw an open shape with 8 corners. How many sides does it have?

Answer: 9

8. Lewis draws an open shape with 12 corners. How many sides does his shape have?

Answer: 13

G1-6 Differences and Sorting

Pages 147–150

CURRICULUM REQUIREMENT

AB: required
BC: required
MB: required
ON: required

VOCABULARY

colour
data
design
group
pattern
shape
size
sort
sorting circle

Goals

Students will identify attributes of data and sort shapes according to self-created rules.

PRIOR KNOWLEDGE REQUIRED

Can identify sides and corners in shapes
Can identify triangles, rectangles, squares, circles, and ovals
Knows the attributes of geometric shapes

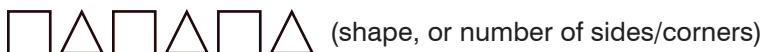
MATERIALS

coloured chalk
BLM Cards for Sorting Different Ways (p G-61)
BLM Sorting Shapes Two Ways (p G-62)
BLM Attribute Spinner (p G-63)
attribute blocks or **BLM Attribute Blocks** (pp G-46–50)

Describing how patterns change. Write on the board several words describing how patterns can change, including colour, size, and shape. Make sure students understand the meaning of each word. Use pictures to illustrate as required. Draw on the board the pattern below and ASK: What changes in the pattern? (colour)



Repeat with more patterns:



Describing differences. Draw on the board a large red square and a small red triangle. ASK: How are these shapes different? How many things are different? (two differences: size and shape) Repeat with a small red triangle and a large blue pentagon. (three differences: size, shape, and colour) Draw a large red square. Ask students to draw a shape that is different in only one way (EXAMPLES: a large blue square, a large red triangle, a small red square). Allow various students to draw and explain their answers to the class. Show examples of wrong answers and have students explain why they are wrong (EXAMPLE: a small blue square differs from a large red square in two ways: size and colour).

Continue comparing objects. Start with a small red rectangle and a large blue square. ASK: What does the red rectangle have that the square does not? (two longer sides and two shorter sides) Add stripes to one of the shapes and ask what attribute was changed. (design) Repeat with several more pairs of geometric shapes, including a triangle and a rectangle

(number of sides and corners) and a shape with four curved sides and a square (straight and curved sides).

Sorting objects with many differences. In advance, cut out the cards from **BLM Cards for Sorting Different Ways**. Draw two sorting circles on the board and label them according to each pair of labels in the exercises below. For each part, read the labels aloud and have students signal where each card should go by pointing to the correct circle. As you increase the number of shapes, students may forget what the sorting rule is. If you notice students struggling, ask volunteers to remind you what the sorting rule is and which circle has which label.

Exercises: Sort the cards.

- a) rectangle or not rectangle: C, F, G, J
- b) circle or not circle: A, I, J, L
- c) striped or not striped: F, G, H, I, J, K
- d) triangle or not triangle: B, D, E, G, H, K
- e) design or no design: D to L

Answers: a) rectangle: F, G; not rectangle: C, J; b) circle: I, L; not circle: A, J; c) striped: F, I, J; not striped: G, H, K; d) triangle: H, K; not triangle: B, D, E, G; e) design: F, G, H, I, J; no design: D, E, K, L

Sort, remix, and sort again. Change the labels on the sorting circles on the board to “closed” and “open,” then read the labels aloud. Hold up each card from BLM Cards for Sorting Different Ways and have students tell you whether the shape is open or closed. ASK: Which group do I put it in? Students can point to their answers: A (open), B (open), C (open), D (closed), E (closed), F (closed), G (closed), H (closed), I (closed), J (closed), K (closed), L (closed). When finished, SAY: We sorted these shapes by open or closed, but we can also sort them another way. Some of these shapes have curved lines and some of them have straight lines. Change the labels on the sorting circles to “all lines curved” and “all lines straight,” then read the labels aloud. Take away all the cards and have students sort them as they did before, according to the new labels: A (curved), B (straight), C (straight), D (curved), E (curved and straight, place outside circles), F (straight), G (straight), H (straight), I (curved), J (curved), K (straight), L (curved). SAY: When two things are different, you can sort them in different ways.

Exercises

1. Complete **BLM Sorting Shapes Two Ways**.

Answers: squares: C, D; not squares: A, B, E, F; triangles: A, E, F; not triangles: B, C, D

2. Sort the cards from BLM Cards for Sorting Different Ways your own way. Then mix up the cards and sort them another way.

ACTIVITIES 1–3 (Optional)

1. Give each pair of students an attribute spinner (see **BLM Attribute Spinner**). Player 1 draws a shape. Player 2 spins the spinner and draws a shape that differs from Player 1's shape only by the attribute spun. Player 1 now spins and draws a shape that differs from Player 2's shape only by the attribute spun. Players continue spinning and drawing until they arrive back at the shape they started with.

Variation: Each player spins and draws a shape that shares only the spun attribute with the first shape; the other three attributes must differ.

2. Play “I Spy” using attributes studied so far and shapes around the room.
3. This activity is best done at four stations. Provide attribute blocks from **BLM Attribute Blocks** at each station. Tell students that if they can sort the same objects many ways, then they can use the objects for whatever they want to use them for.

Station 1: Sort the blocks into “blocks with designs” and “blocks without designs.” Then make a picture using only the blocks with designs.

Station 2: Sort the blocks into “rectangles” and “not rectangles.” Then make a city using the rectangles as the buildings.

Station 3: Sort the blocks into “circles,” “triangles,” and “other shapes.” Then use the circles for faces and triangles for hats to make a picture of people wearing hats. Students may wish to use the non-design side of the circles, but use the design side of the triangles.

Station 4: Decide what kinds of blocks you need to make a picture. Then sort the blocks and make your picture.

Extensions

1. Find as many differences as you can. Take turns describing the differences with a partner.



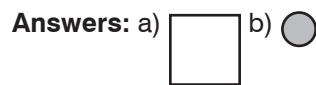
Sample answers: a) colour, sleeve length, buttons, collar; b) number of holes, number of sides, shape, size, straight or curved sides; c) colour, size, shape, number of sides or corners, straight or curved sides

2. What two things change in the pattern? Describe how each changes.



Answers: a) shape and size; shape: circle, square, square, repeat; size: small, small, big, repeat; b) colour and number: one white, two grey, three black, repeat

3. For each pattern in Extension 2, draw the next term.



4. For each shape, pick a reason why that shape does not belong with the other two.



Sample answers: the first shape is wider than it is tall, the other two are as wide as they are tall; the second shape has straight sides and the other two have curved sides; the third shape is open and the other two are closed

G1-7 Sorting Rules

Pages 151–152

CURRICULUM REQUIREMENT

AB: required
BC: required
MB: required
ON: optional

VOCABULARY

circle
corner
rectangle
side
sort
sorting circle
square
triangle

Goals

Students will describe sorting and deduce how different groups were sorted.

PRIOR KNOWLEDGE REQUIRED

Can identify sides and corners in shapes
Can identify triangles, rectangles, squares, circles, and ovals
Knows the attributes of geometric shapes
Can use sorting circles to sort

MATERIALS

short red pencil, a long blue pencil, and a blue marker
red marker and a yellow marker
picture book and a notebook
coloured chalk
BLM Attribute Blocks (3) (p G-48)
sorting circle or **BLM Sorting Circle** (p K-1)
scissors

Describing what data have in common. Show students a short red pencil and a long blue pencil. ASK: Which word describes both these objects? (pencils) Replace the red pencil with a blue marker. Ask students which words describe the objects now. (blue, writing tools)

For the following exercises, show students the objects in parts a) and b), and draw on the board the shapes in part c).

Exercises: What is the same about these?

- a) red marker, yellow marker b) picture book, notebook
c) rectangle, triangle, circle

Sample answers: a) they are markers; b) they are books, rectangles, or made of paper; c) they are shapes and closed

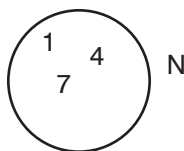
Describing how objects were sorted (one circle). Draw a sorting circle on the board. Draw a small, red isosceles triangle (two sides of the same length) and a large, red square inside the circle. ASK: How are these shapes the same? (red, closed, straight sides) Pick one of the answers as the name of the sorting group and ask volunteers to draw a shape inside the circle and a shape outside it.

Erase all the shapes from inside and outside the sorting circle. Draw a small red square and a large red rectangle that is not a square inside the circle. ASK: What could we call this group? (red, no design, 4 sides, 4 corners, straight sides, etc.) Accept and record all possible correct answers.

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SAY: How can we figure out which of these names is the one I was thinking of using? Explain that you will add more shapes to the circle until they get the name you have in mind. (4 sides) Add a blue square inside the circle. ASK: Can “red” be the name of the group? Why not? Remove “red” from the list. Continue adding shapes and eliminating possible names from the list. EXAMPLES: add a rectangle with a design and remove “no design”; add an open shape with 4 sides and 3 corners and remove “4 corners.” ASK: Does the name “4 sides” fit the group? (yes) Ask volunteers to add a shape outside the newly named circle.

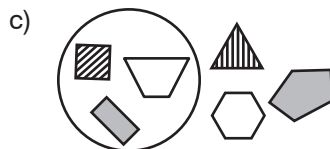
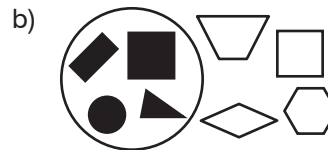
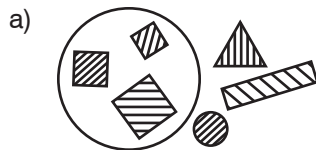
Determining the sorting rule. Draw on the board:



ASK: What is the same about the things inside the circle that is different about the thing outside the circle? (they are numbers) SAY: You just found one way these might have been sorted: numbers go inside the circle and anything else goes outside the circle. Draw various shapes or symbols on the board and have students signal thumbs up if it goes inside the circle and thumbs down if it goes outside the circle: 8 (inside), m (outside), R (outside), 3 (inside), triangle (outside), question mark (outside). Draw each shape or symbol where students tell you it goes.

Draw a circle with 1, 4, and 7 inside the circle and 8 outside the circle. ASK: Can the sorting rule be numbers inside the circle? (no) Why not? (8 is outside the circle and 8 is a number) Tell students to signal thumbs up when they think they know the rule. Slowly add more objects inside the circle (square, triangle, other rectangle, T, M, H, k, L, X, Y, z, Z) and outside the circle (C, circle, 0, S, oval, heart) until all students signal that they know the rule. Then have a volunteer tell you the rule. (straight lines inside, curved lines outside)

Exercises: What is the sorting rule?



Sample answers: a) squares, b) black, c) has four sides

ACTIVITY (Essential)

Give each pair of students **BLM Attribute Blocks (3)** and a sorting circle, such as from **BLM Sorting Circle**. Have students cut out the shapes (students don't have to cut along the lines). Player 1 thinks of a sorting rule and places two shapes inside the circle according to that rule. Player 2 guesses the rule and confirms or adjusts the guess by placing more shapes inside or outside the circle.

NOTE: While doing the AP Book pages, if some students have trouble writing words, you can have them work with a partner and do the page orally, taking turns and verifying each other's answers.

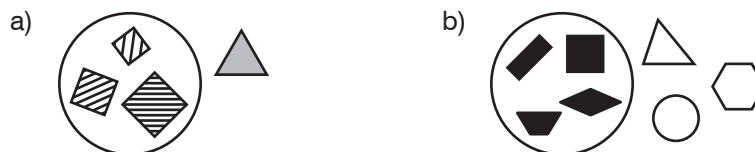
Extensions

1. What might the sorting rule be?



Answers: a) has a horizontal side, b) has a square corner

2. Name different ways the shapes might have been sorted.



Sample answers: a) squares or striped, b) dark or four sides

G1-8 Sorting Rules—Many Groups

Pages 153–154

CURRICULUM REQUIREMENT

AB: required
BC: required
MB: required
ON: optional

VOCABULARY

circle
corner
data
group
oval
rectangle
shape
side
sort
sorting circle
square
triangle

Goals

Students will describe and deduce how different groups were sorted.

PRIOR KNOWLEDGE REQUIRED

Can identify sides and corners in shapes
Can identify triangles, rectangles, squares, circles, and ovals
Knows the attributes of geometric shapes
Can use sorting circles to sort

MATERIALS

attribute blocks or **BLM Attribute Blocks** (pp G-46–50)
BLM Fruit and Vegetable Cards (p K-3)
BLM Animal Cards (p K-4)
BLM Vehicle Cards (p K-5)

Review determining a sorting rule. Display several attribute blocks (e.g., from **BLM Attribute Blocks**) and draw a sorting circle on the board. Think of a rule, such as “shapes with stripes” and place two striped shapes inside the circle. Explain to students that they have to guess your rule, but instead of saying what the rule is, they have to add a shape inside or outside the pattern, according to the rule. Invite a volunteer to add a shape, then ask the rest of the class whether the shape the volunteer added and its placement agree with the rule they thought of. If the shape is placed correctly according to your rule (striped inside the circle or not striped outside the circle), invite another volunteer to repeat the task. (If not, say that your rule was different and move the shape according to the rule.) Continue until all shapes are sorted and ask students to share their rules with the class.

Mix up the shapes and repeat the game with a more geometrical attribute, such as the number of sides.

Describe how objects were sorted (two circles). Guide students to deduce sorting rules, as above, for objects sorted into two groups. Start with simple attributes (EXAMPLES: colour, size, type of object), then move to geometric attributes (EXAMPLES: curved or straight sides, 3 corners or 4 corners). Then repeat for objects sorted into three or four groups, such as “striped,” “dots,” and “plain” or “3 sides,” “4 sides,” and “5 sides.”

For the following exercises, you will need **BLM Fruit and Vegetable Cards**, **BLM Animal Cards**, and **BLM Vehicle Cards**. Draw two sorting circles on the board and place cards into the circles as described in each part.

Exercises: How were these sorted?

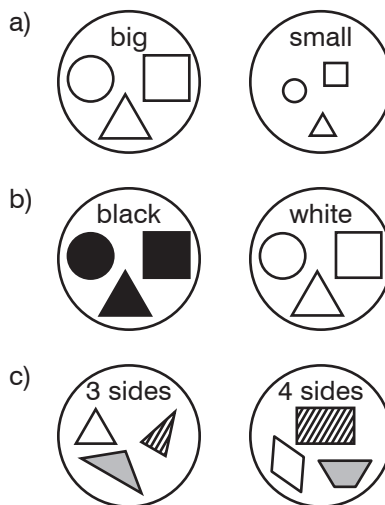
- a) Circle 1: corn, strawberry, broccoli
Circle 2: car, truck, bus
- b) Circle 1: three cars
Circle 2: three trucks
- c) Circle 1: banana, strawberry, apple
Circle 2: corn, carrot, broccoli
- d) Circle 1: dog, cat, bunny
Circle 2: lion, tiger, elephant

Sample answers: a) food and not food or food and ways to go somewhere; b) cars and trucks; c) fruits and vegetables; d) pets and not pets, pets and wild animals, or small and big animals

Select volunteers based on a particular attribute (EXAMPLES: type of footwear; colour of shirt) and have them stand before the rest of the class. Invite the other students to guess what the students have in common. The student who correctly guesses can select a new group of students according to a secret attribute, which the class then has to guess. Then continue with two groups of volunteers (EXAMPLE: students with red shirts and students with blue shirts).

Sorted by ____. Write “red, blue, green” on the board and read each word aloud. ASK: Which word describes all three words together? Write “colours” on the board, so that it represents a title for the previous three. Repeat with large and small (size); has dots, has stripes, no design or plain (design); square, other rectangle, circle, triangle (shape).

Exercises: What were these objects sorted by?



Answers: a) size, b) colour, c) number of sides

NOTE: Students who have trouble writing the words on the AP Book pages can describe their answers to a partner.

Extension

Show students cards from the game Set™ or cards from **BLM Finding 3 Cards** (p G-64–66), and ask students to say what categories can be used to sort the cards (e.g., shape, colour, number of shapes, design) and then sort the shapes using those categories.

Have groups of students play the card game Set™ co-operatively. Students take turns trying to find “sets” (three cards where each attribute is either the same for all three cards or different for all three cards) and place their sets in a single pile to total at the end. You could tell them when to start and stop, giving them the same amount of time each round. Do their scores improve each time? Include only the solid shapes (no stripes or blanks) until students are very comfortable finding sets, or use BLM Finding 3 Cards, which only have three attributes that are different instead of four (surrounding shape, inside shape, and number of inside shapes).

G1-9 Identifying Shapes

Pages 155–158

CURRICULUM REQUIREMENT

AB: required
BC: required
MB: required
ON: required

VOCABULARY

bottom
circle
narrow
pattern block
rectangle
square
top
triangle
wide

Goals

Students will identify and describe shapes within other shapes.
Students will select the shapes used to make a given composite shape in order to reproduce the composite shape.

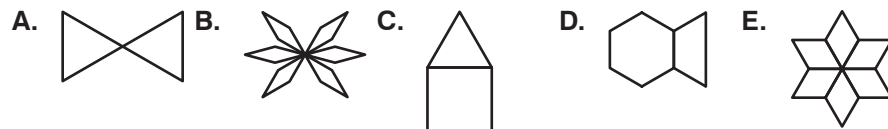
PRIOR KNOWLEDGE REQUIRED

Can name and draw basic geometric shapes (square, triangle, circle, rectangle)

MATERIALS

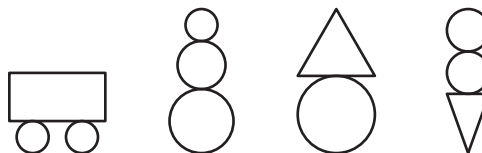
pattern blocks or **BLM Pattern Blocks** (p G-45)
cards with pattern block pictures
sheets of paper with eight squares, e.g., traced from **BLM 2 cm Grid Paper** (p K-6)

NOTE: In advance, make cards with the following pattern block pictures on them. Ensure that the pictures use the actual size of pattern blocks (e.g., from **BLM Pattern Blocks**) and that all internal lines are visible.



You will also need to draw eight squares oriented horizontally (for example, trace squares from **BLM 2 cm Grid Paper**) and make a copy for each student.

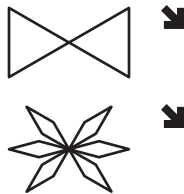
Identifying shapes in pictures where the shapes intersect only at a point. Draw on the board:



Pointing to each picture in turn, ASK: What shapes did I use to make this picture? (1 rectangle and 2 circles; 3 circles; a triangle and a circle; two circles and a triangle) What is the picture of? (sample answers: a car, a snowman, a person wearing a hat, an ice cream cone) What are the circles supposed to be? (wheels; the head, stomach, and legs; the head; scoops of ice cream) Pointing to the third picture, ASK: What shape is used for the hat? (a triangle) Pointing to the fourth picture, ASK: What is the triangle in this picture? (the cone)

Introduce pattern block shapes. Give each student one of each kind of pattern block (e.g., from **BLM Pattern Blocks**). Show students all six

pattern block shapes and SAY: These are pattern block shapes. You already know the names of some of these blocks. Show students the triangle and have volunteers name the shape. Repeat for the square. Show students the trapezoid, and SAY: This is called a trapezoid. Show me a trapezoid. (students hold up their trapezoid pattern blocks) ASK: What colour is the trapezoid? (red) SAY: You can call it the red block. Repeat for the hexagon (the yellow block). Then show students the two rhombuses. SAY: These blocks look a lot alike, but the brown one is thinner.



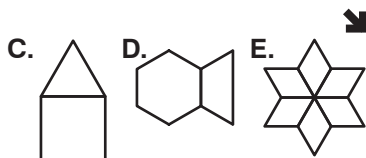
Show students card A that you prepared in advance. (see margin) SAY: This is a bow. Show me the pattern block shape I used to make the bow. (the triangle) ASK: How many triangles did I use? (2) Have two volunteers place their triangles on the picture. Give students back their triangles.

Show students card B. (see margin) SAY: This is a flower. Show me the pattern block shape I used to make the flower. (the brown rhombus) How many did I use? (6) Count them together to verify. Have six volunteers fit their rhombus into the picture. Demonstrate how using the blue rhombus won't fit perfectly into the outline, because the corners are too wide.

For the following exercise, provide students with pattern blocks and direct them to AP Book 1.1 p 156.

Exercise: Use pattern block shapes to cover the pictures.

Identifying shapes in pictures where the shapes share a side. SAY: This time, I'm going to make it a bit harder to tell what shape I'm using because the shapes will sometimes touch at more than one point. Show students cards C to E. (see margin)

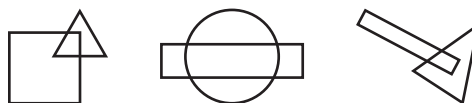


Pointing to card C, SAY: Show me the two shapes I used to make this house. (students show the triangle and the square) ASK: What part of the house does the triangle show? (the roof) What part of the house does the square show? (the main part, the walls) Have volunteers trace along the triangle and the square with their fingers. Have a volunteer fit their square into the picture and another volunteer fit their triangle into the picture. Repeat with the hexagon and trapezoid that make a fish on card D, and for six blue rhombuses that make a flower on card E. Demonstrate also how the brown rhombuses don't fit because the corners are too narrow and would leave gaps.

For the following exercise, direct students to AP Book 1.1 p 157.

Exercise: Use pattern block shapes to cover the pictures.

Identifying shapes that overlap in pictures. Draw on the board:



Pointing to the first picture, ASK: What shapes did I use in this picture? (a triangle and a square) Which shape is at the top? (the triangle) Which shape is at the bottom? (the square) Have volunteers trace the triangle and

the square with their fingers. Point out how, when they get to the part that overlaps, they have to ignore the part that is the other shape. Repeat for the second picture (a circle and a rectangle) and the third picture (a rectangle and a triangle).

For the following exercises, direct students to AP Book 1.1 p 158.

Exercises: Find the shapes that match the pattern blocks and make them fit exactly.

- | | | |
|-------------------|------------------|-------------------|
| a) 1 square | b) 3 triangles | c) 1 yellow block |
| d) 2 brown blocks | e) 3 blue blocks | f) 1 red block |

Recognizing shapes within real-life objects. Draw on the board:



ASK: What are these pictures of? (an A, a hanger) Can you see a triangle in the A? Have several volunteers trace the triangle. Repeat for the coat hanger.

Exercises

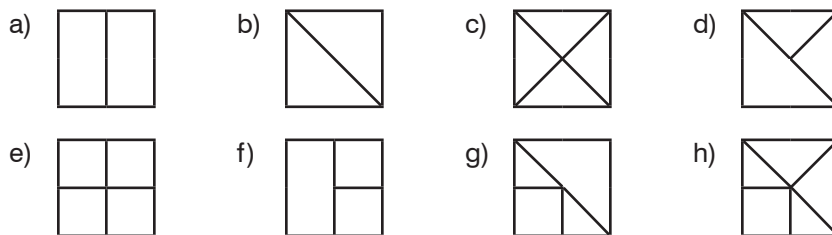
- Draw a capital Q. Trace the circle using a different colour.
- Draw a small b. Trace the circle using a different colour.

Bonus: Draw a 9 like it appears on a calculator. Trace the square using a different colour. What other calculator numbers, up to 10, have a square?

Answer: Bonus: 6 and 8

A geometric version of subitizing. Give each student a copy of the paper showing eight squares oriented horizontally (not tilted) that you prepared in advance. SAY: I am going to hold up pictures and I want you to copy what's inside the square on your sheet after I take the picture away. Hold up each picture in the following exercises for two seconds and then take it away. After students have had a chance to draw the picture (the square outline is already drawn, so they only have to draw what is inside), show it again and let them correct any mistakes. For parts a) to d), have volunteers describe the shapes they see in each picture. For parts e) to h), have partners take turns describing the shapes they see in each picture to each other.

Exercises: Draw what is inside the square. What shapes do you see?

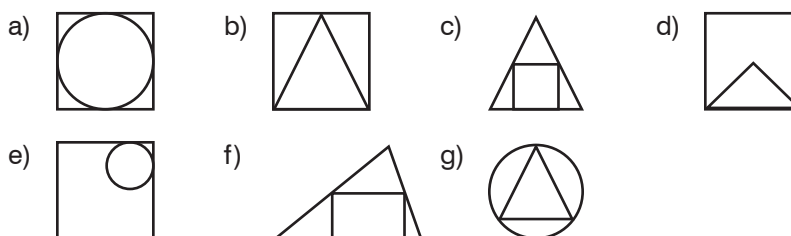


Answers: a) two rectangles, b) two triangles, c) four triangles, d) three triangles, e) four squares, f) one tall rectangle and two squares, g) three triangles and one square, h) four triangles and one square

NOTE: Although not expected at this grade level, some students might see composite shapes within the shapes. For example, in part e), the tall rectangles that consist of two smaller squares.

Extensions

1. Name the inside shape.



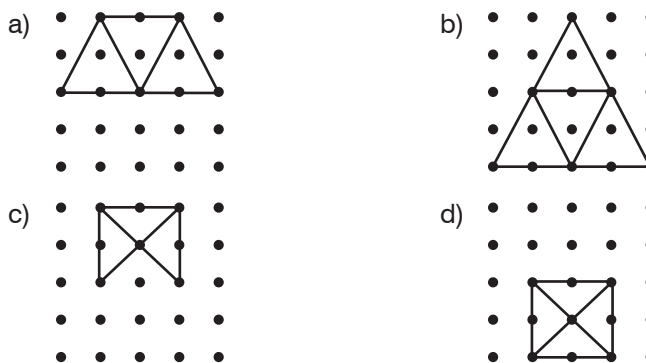
Answers: a) circle, b) triangle, c) square, d) triangle, e) circle, f) rectangle, g) triangle

2. In the first picture, there are five squares: one big square and four small squares. How many squares are in the second picture? Describe them.



Answer: There are 8 squares: 6 small ones and 2 big ones.

3. Have students copy the shape on dot paper or **BLM Dot Paper** (p G-52). Ask them to count the number of triangles they see in each shape.



Answers: a) 3, b) 5, c) 5, d) 8

4. How many triangles are in this picture? Describe them to a partner.



Sample answer: There are 8 triangles: 6 small ones and 2 big ones

G1-10 Composing Shapes

Pages 159–160

CURRICULUM REQUIREMENT

AB: required
BC: required
MB: required
ON: required

VOCABULARY

bottom
length
narrow
pattern block
shape
side
square
top
triangle
wide

Goals

Students will compose shapes from given smaller shapes.
Students will describe pictures and designs.

PRIOR KNOWLEDGE REQUIRED

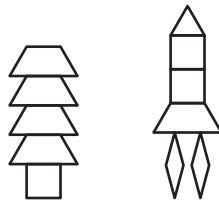
Can identify basic shapes in pictures where the shapes share a side

MATERIALS

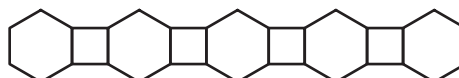
pattern blocks or **BLM Pattern Blocks** (p G-45)
cards with pattern block pictures
20 pattern block squares per student
scissors (optional)

NOTE: Students will each need at least 20 pattern block squares in this lesson. If you do not have enough, prepare a sheet of paper with 20 pattern block squares on it (for example, traced from **BLM Pattern Blocks**) and make a copy for each student and have students cut out the squares.

You will also need to make cards with the following pattern block pictures on them. Ensure that the pictures use the actual size of pattern blocks and that all internal lines are visible.



Comparing pattern block sides. Give each student one of each pattern block to use throughout the lesson. Show students a pattern block square and triangle, and have them find the same shapes from their collections. ASK: Are the sides of the square and the sides of the triangle the same length? (yes) Have students show this by putting the sides together to check. ASK: Are all three sides of the triangle the same length as the sides of the square? (yes) Have students check this directly. ASK: Are all four sides of the square the same length as the sides of the triangle, or just the one side you checked? (all sides) Have students check this directly. Show students a red trapezoid and ASK: Which sides are the same length as the square sides? (all sides except for the longer one) Repeat for a hexagon (all sides), and each rhombus (all sides). SAY: Most of the pattern block sides are all the same length. You can use this to make nice designs. Demonstrate with hexagons and squares, as shown below:





Exercise: Create a design using pattern blocks. Put sides that match together.

Making pictures using pattern block shapes. Show students the card with the picture shown in the margin. SAY: This is a tree. Show me the two different pattern block shapes I used to make this picture. (students show trapezoid and square) ASK: What is the square at the bottom supposed to be? (the tree trunk) What did I use for the top part of the tree? (trapezoids or the red blocks) Have volunteers place four trapezoids and one square onto the picture. ASK: How could I make the top part of the tree taller? (add another trapezoid, or red block) Have several volunteers do so. ASK: What if I want to make the trunk taller—then what would I add? (another square) Have several volunteers do so. SAY: I can make the trunk taller by adding squares and make the top part taller by adding red trapezoids. Have volunteers take back their pattern blocks.



Show students the card with the picture shown in the margin. SAY: This is a rocket. Show me the four different pattern block shapes I used to make this picture. (students show the triangle, square, trapezoid, and brown rhombus) Have volunteers place their shapes on the picture to verify. ASK: What are the two brown narrow rhombuses in the picture? (the fire) Demonstrate placing the blue wide rhombus that doesn't fit. ASK: What shape would I add if I wanted to make the rocket taller? (another square) SAY: Let's make a really tall rocket by adding many squares. Do so as a class, starting with the rhombuses and trapezoid, then adding many squares, then adding a single triangle at the top.

SAY: In both these pictures, you used many of one shape to show part of the picture. You can use many red trapezoids to show the top part of the tree and you can use many squares to show the main part of the rocket.

Exercises

- Make a tall tree by using many red trapezoids and two squares at the bottom for the trunk.
- Make a tall building by using many squares.
- Make a long caterpillar by using many yellow hexagons.
- Make a long train by using many squares.

CONNECTION



Literacy

SAY: You can also make letters using many squares. ASK: When you write your name, is the first letter capital or small? (capital)

For the following exercises, give each student 20 pattern block squares.

Exercise: Make the first letter of your name using pattern block squares.

Bonus: Use different pattern block shapes to make the first letter of your name.

Describing designs. Show students the first design below, created from pattern blocks:



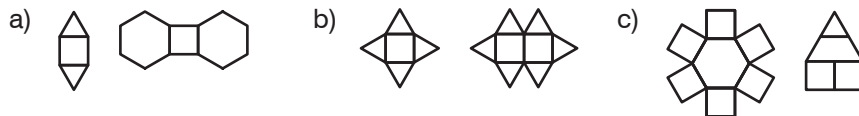
Ask students to describe the design. PROMPTS: How many blocks are used in this design? (3) Which shapes are on the top? (a triangle and the blue rhombus) Which shape is on the bottom? (the red trapezoid) Repeat for the second design. (the yellow hexagon is in the middle with triangles all around it)

Exercises

Partner A: Describe the first picture to your partner.

Partner B: Describe the second picture to your partner.

Switch roles and repeat.



Sample answers: a) first picture: the square is between two triangles on top and bottom, second picture: the square is between two hexagons (yellow shapes) on both sides; b) first picture: there is one square and four triangles all around it, second picture: there are two squares in the middle and triangles all around; c) first picture: there is a yellow hexagon in the middle and squares around it, second picture: there is a triangle on top, then a red trapezoid in the middle and then two squares on the bottom

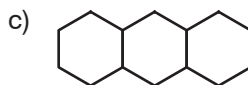
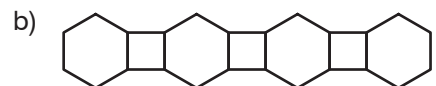
CONNECTION

Technology—Have students make pictures using geometric shapes using a computer program and then describe their picture to a partner.

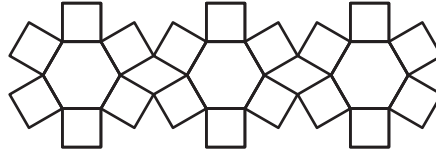
When students are done the exercises, take up the last shape and challenge students to describe it even more precisely. ASK: What shape do the two shapes on top make together? (a triangle) SAY: The triangle and the trapezoid together make a larger triangle. ASK: What shape do the two bottom squares make together? (a rectangle)

Extensions

1. Build the picture using pattern blocks, then continue the pattern.



Bonus: Create the pattern. What pattern block shapes fit between the flowers?



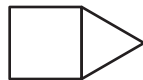
Answer: Bonus: blue rhombus

2. Evan makes a snake 3 yellow hexagons long.
Mandy makes a snake 2 hexagons long.
They put their snakes together.
Now how long is their snake?
Hint: Make the snakes.

Answer: 5 hexagons long

3. Aki and Ronin each draw a shape made from a square and a triangle.

Aki's shape



Ronin's shape



Trace along the outside of both shapes with your finger.

- a) How many sides does Aki's shape have?
- b) How many sides does Ronin's shape have?

Answers: a) 5, b) 7

G1-11 Decomposing Shapes

Pages 161–162

CURRICULUM REQUIREMENT

AB: required
BC: required
MB: required
ON: required

VOCABULARY

corner
narrow
pattern block
rectangle
shape
side
square
triangle
wide

Goals

Students will decompose 2-D shapes into other 2-D shapes.

PRIOR KNOWLEDGE REQUIRED

Can compose larger shapes from smaller shapes
Can identify triangles, squares, and rectangles

MATERIALS

3 paper squares per student
scissors
pattern blocks (at least 6 triangles, 1 hexagon, 3 trapezoids, and 6 blue rhombuses per student)
overhead projector
BLM Shapes and Pictures (p G-67)
BLM Pattern Block Boat (p G-68)
divider (e.g., an upright open binder) per pair of students

Dividing a whole shape into smaller parts. Give each student three paper squares. Tell students to pretend that one of the paper squares is a sandwich and they want to cut it into two triangles. Draw on the board:



Have students cut one paper square into two triangles. Then tell students they can't eat their sandwich without a napkin. Tell students that another paper square is a napkin. Have them fold their napkin to make a triangle. Then have students unfold the napkin. ASK: How many triangles do you see? (2) ASK: Can you make other shapes just by folding the paper a different way? (yes) Have students do so with their third paper square. ASK: How many sides and corners do your shapes have? Have many students share different folds. EXAMPLES:



2 rectangles



a triangle and a shape with 5 sides

Comparing pattern block corners. Show students a blue rhombus and a hexagon. Demonstrate how some of the corners of the blue rhombus match the corners of the hexagon, but not all of them (some corners are too small), as shown below:



fits perfectly



too small

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Give each student the following pattern blocks to use throughout the lesson: 6 triangles, 1 hexagon, 3 trapezoids, and 6 blue rhombuses. Have students find their blue rhombus and hexagon and try matching the corners themselves.

In the following exercises, encourage students to say whether the corners of the blocks that don't fit are too wide or too narrow, or whether the wider or narrower corners fit.

Exercises: Find the 2 shapes. Do any corners match?

- a) the blue block and the triangle
- b) the red block and the triangle
- c) the red block and the yellow block
- d) the square and the yellow block
- e) the square and the triangle
- f) the brown block and the red block

Bonus: Work with a partner to check: Which shapes have all corners the same?

Answers: a) yes, the narrower corners; b) yes, the narrower corners; c) yes, the wider corners; d) no, they are too narrow; e) no, they are too wide; f) no, the narrow ones are too narrow and the wide ones are too wide; Bonus: the square, the triangle, and the yellow block

Creating given shapes from simple 2-D shapes. Place two pattern block triangles side by side on the overhead projector so that students see the shadow of a rhombus on the screen. (Make sure students do not see the individual triangles—you might want to cover the projector with a sheet of paper while you arrange the shapes.) Ask students to find a pattern block that has the same shape as the shadow. When students have identified the correct shape, place a blue rhombus on the overhead to show that it does in fact produce the same shape. Explain that you used two other shapes to produce the shape of the shadow. Reveal the triangles. Ask students to place two triangles so that they produce the same shape as the rhombus. (They can use the blue rhombus pattern block to help them.)

Students can signal their answers to the following exercise by showing you the shape.

Exercise: Add a third triangle to your picture so that it shares a side with one of the triangles. Now what pattern block shape have you made?

Answer: the red trapezoid

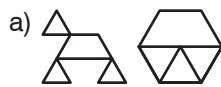
Have volunteers show you how the red trapezoid fits exactly over the three green triangles.

Making different pictures with the same pattern blocks. Tell students to use all their triangles to make a long row of triangles. ASK: Is this another pattern block shape? (no) Show students the hexagon and have students make a hexagon using all their triangles.

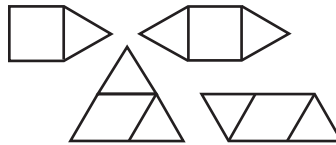
Exercises: Make two different pictures using the same pattern blocks.

- a) one trapezoid and three triangles
- b) two trapezoids and a hexagon
- c) two blue rhombuses, a trapezoid, and a hexagon

Selected sample answer



Making the same picture with different pattern blocks. Place two different pattern blocks side by side on the overhead projector (again, don't let students see the individual shapes). Ask students to choose two pattern blocks and place them so that the figure they create has the same shape as the shadow. When students are comfortable working with two blocks, make shapes with three blocks, then four blocks. **EXAMPLES:**



Encourage multiple solutions whenever possible. Have volunteers show different ways.

Exercises

1. Cover the yellow block.
 - a) Use only triangles.
 - b) Use only blue blocks.
 - c) Use only red blocks.
 - d) Use a triangle, a blue block, and a red block.
2. Make the shape.



- a) Use only blue blocks.
- b) Use a yellow block and 6 triangles.
- c) Use 3 red blocks and 3 triangles.

Bonus

- Cover the flower on **BLM Shapes and Pictures** in two or more different ways.
- Cover the boat on **BLM Pattern Block Boat**. Record how many of each shape you used. Check with a partner to see what they used.

ASK: Can you use squares to cover the yellow block? (no) Why not? (the corners don't fit) Repeat for the star shape in Exercise 2. (no, the corners don't fit) ASK: What shapes have corners that fit the square? (the square) SAY: When making pictures with pattern blocks, if you need to make the yellow shape or the red shape, you can use triangles, but you can't use squares.

Exercises

- Can you use squares to make the blue shape?
- Can you use triangles to make the blue shape?
- Can you use squares to make the brown shape?
- Can you use triangles to make the brown shape?

Answers: a) no, b) yes, c) no, d) no

Set a divider (e.g., an upright, open binder) between each pair of students. Student 1 creates a design from pattern blocks and describes the design to Student 2, who re-creates the design according to the description. Partners compare their designs and switch roles.

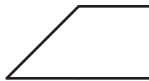
Extensions

- Tangram.** Give students **BLM Tangram** (p G-69). Have students cut out the shapes and use them to solve the following sequence of puzzles.

- Create a square using only one of the shapes, then two.

Bonus: Create a square using three triangles.

- Create a square using four triangles. (Hint: One of the large triangles is not needed.)
- Find two ways to create this shape using only two shapes:



- Distribute **BLM Tangram Puzzles** (pp G-70–73). The pictures are made of tangram shapes. Have students match their shapes to the outlines on the BLM to create the pictures.
- Make the task a little more difficult: instead of matching shapes to the outlines on BLM Tangram Puzzles, give students small versions of the pictures from **BLM Tangram Puzzles (5)** (p G-74) and

have them create the shapes from the pictures. Ask students to start by identifying the largest triangle in each picture and placing the largest triangle from their set of shapes in the same position. Then have them add the other shapes one by one, identifying the exact position of each new shape in relation to the shapes already in place.

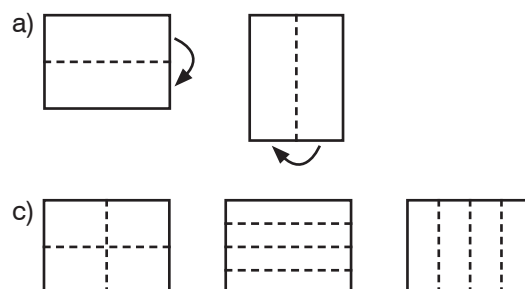
- f) Have students use their shapes to create a picture of their own. Then trace along the outside of their picture and give it to a partner to fill in as a tangram puzzle.

Selected sample answers:

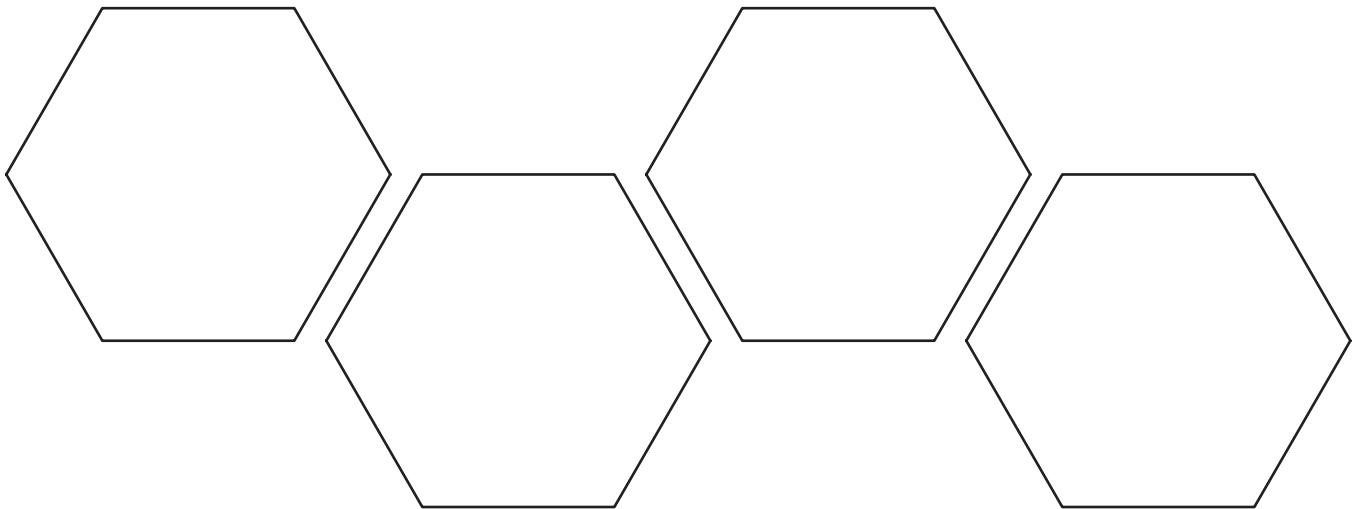
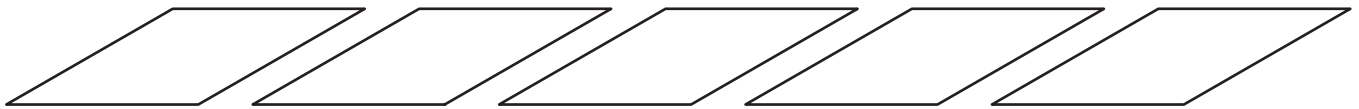
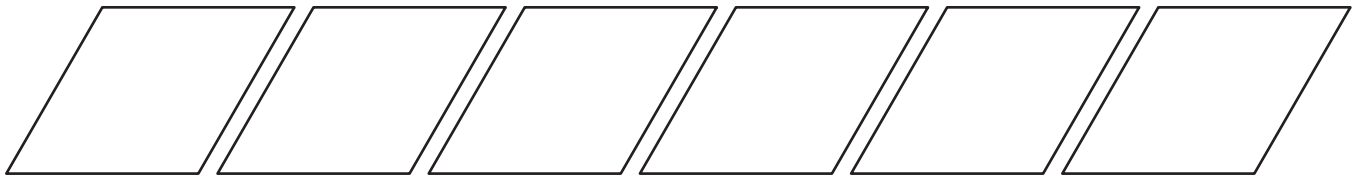
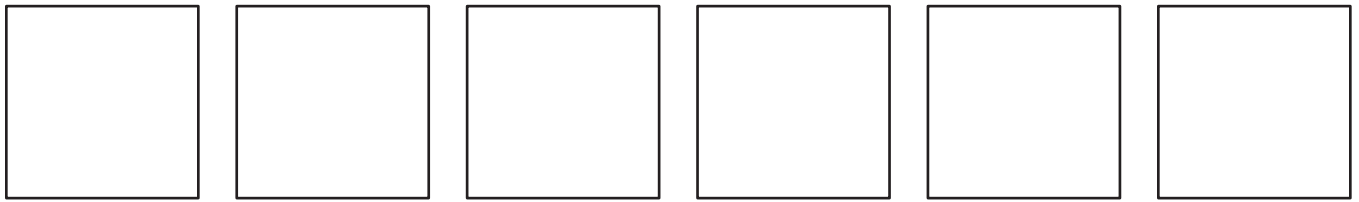
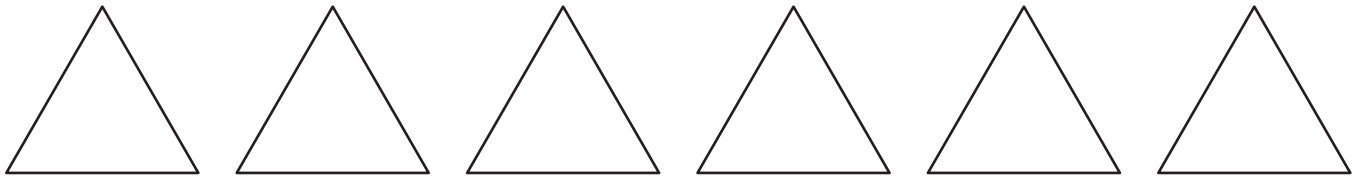


2. Give each student a (rectangular) magazine page with pictures on it. Show students how they can create triangles by folding a rectangle diagonally and then cutting along the fold. They should continue folding and cutting the resulting triangles to make more triangles. Have students make as many triangles as they can in three minutes and then reassemble the rectangles using the pictures as a guide. **NOTE:** If students find it difficult to fold the magazine page diagonally, they can place a ruler along the diagonal joining the vertices, and then fold the page against the ruler to help make a crease.
3. **Folding rectangles in different ways.** Give students three rectangular sheets of paper.
 - a) Fold one sheet in two, so that the opposite sides line up, then unfold it.
 - b) Find a partner whose rectangles look different. Discuss why they are different.
 - c) Fold another sheet in two (just as they did before) and fold it in two again, so that opposite sides line up.
 - d) Check with a partner who did it a different way and try to come up with a third way, together.

Selected sample answers:



Pattern Blocks

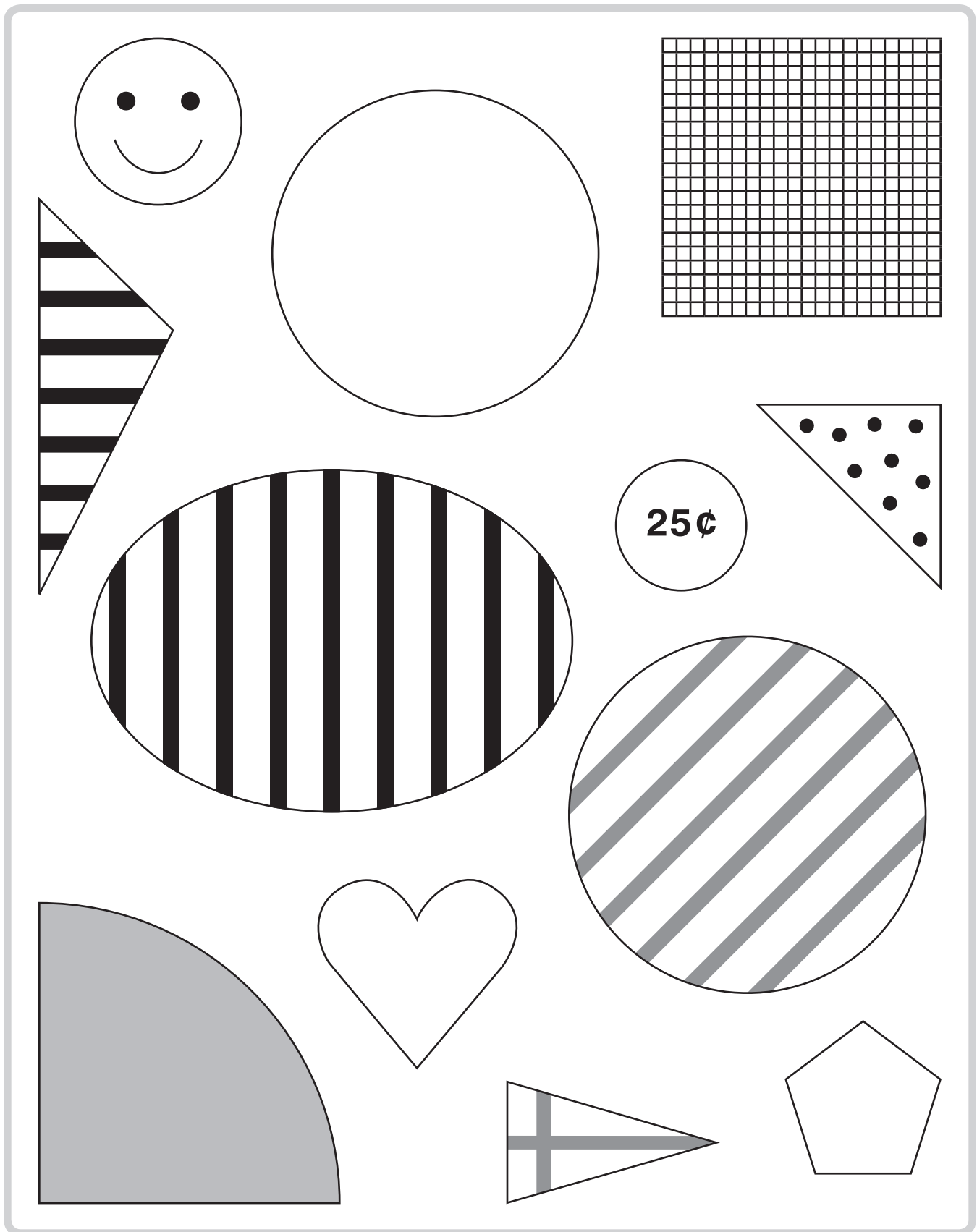


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Attribute Blocks (I)

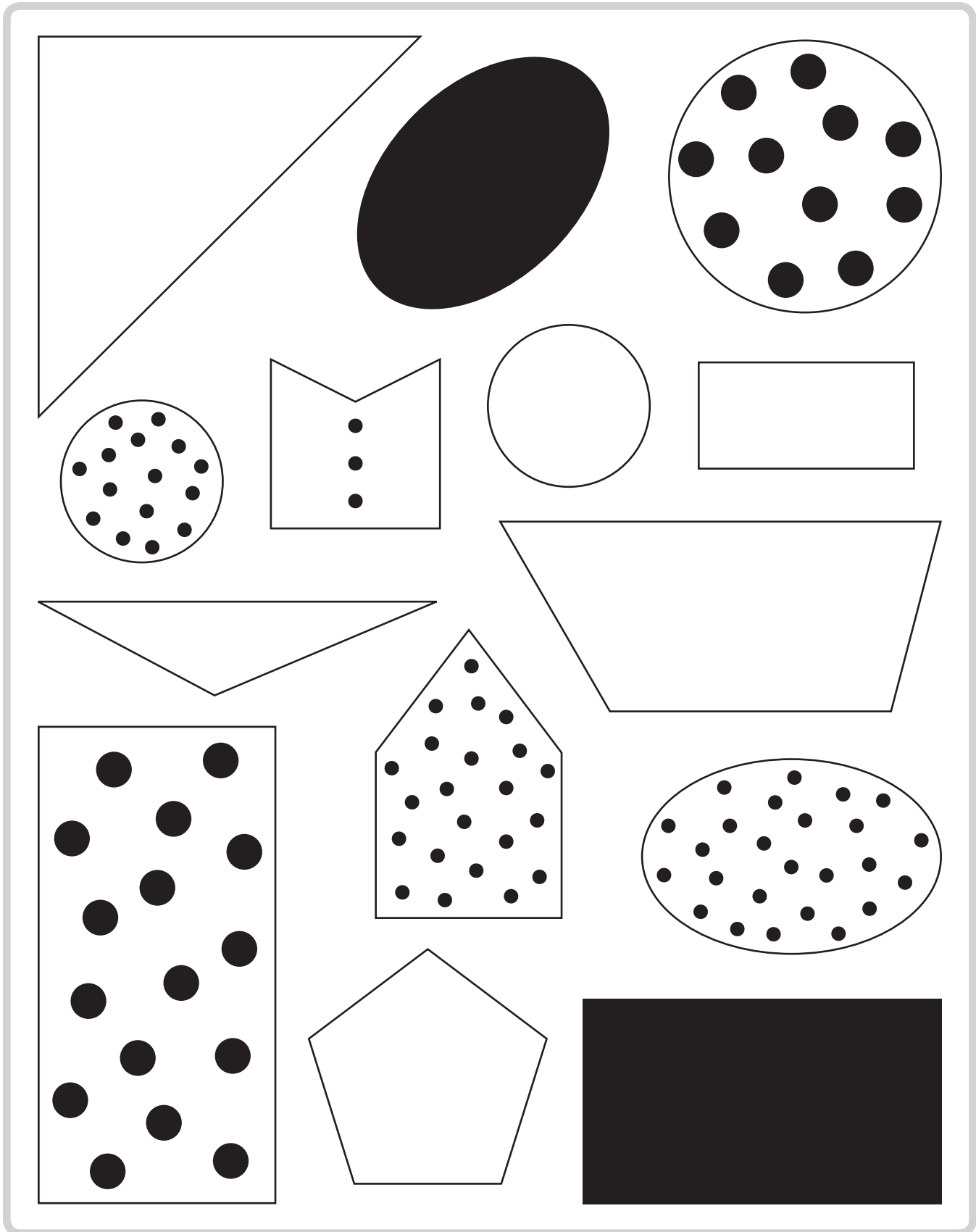


Attribute Blocks (2)



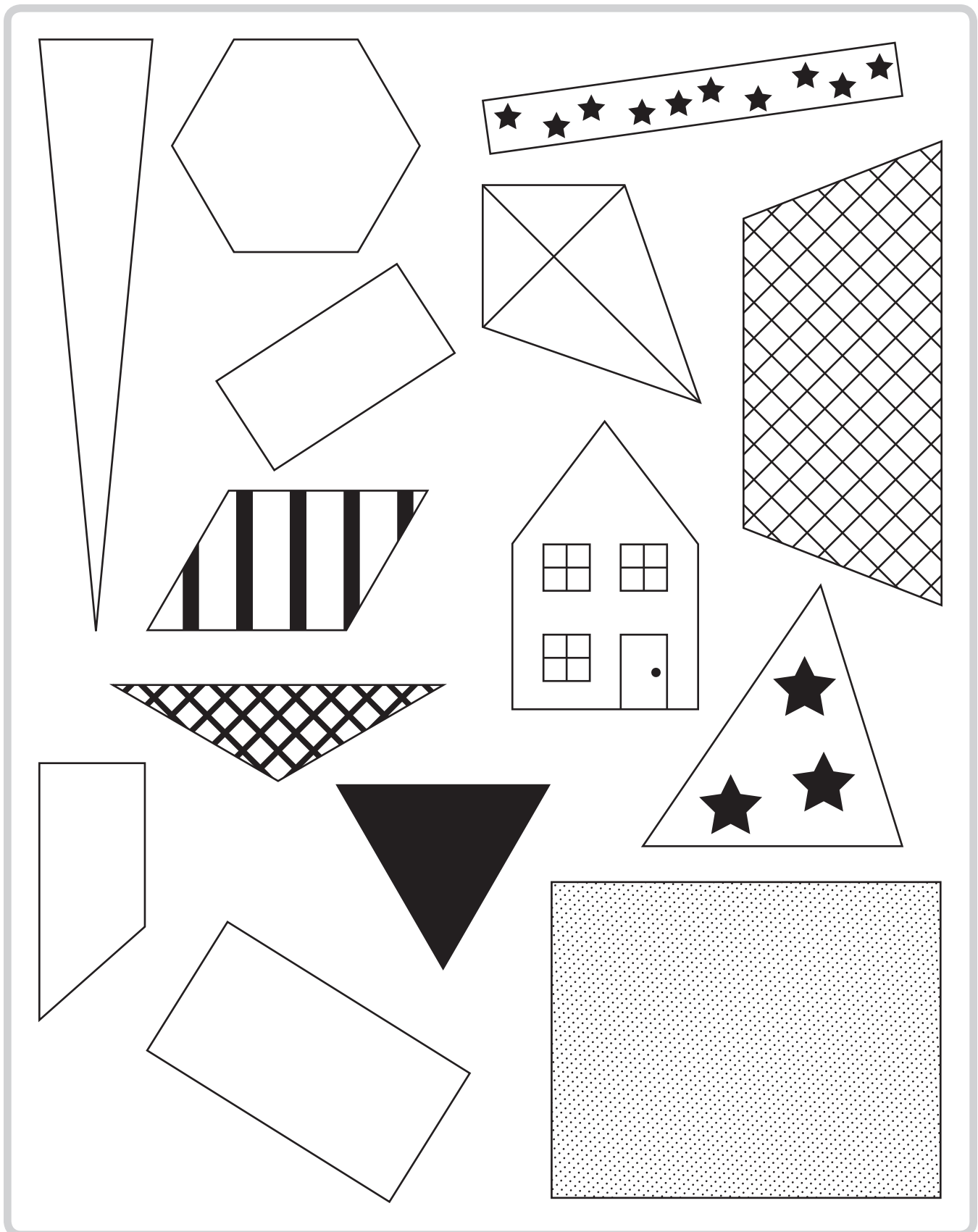
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Attribute Blocks (3)



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Attribute Blocks (4)



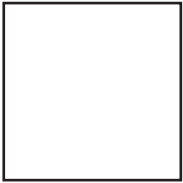
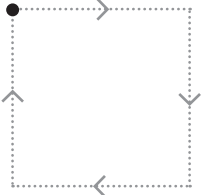
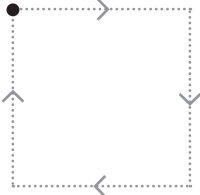
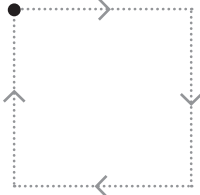
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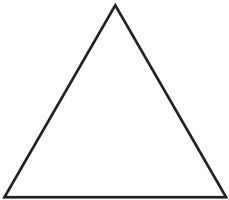
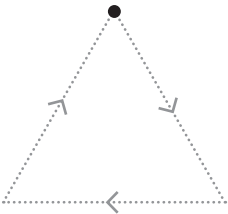
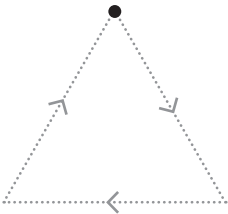
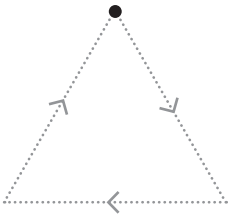
Attribute Blocks (5)

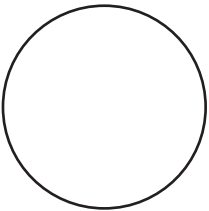
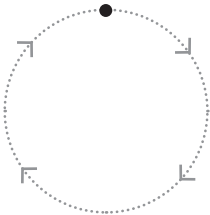
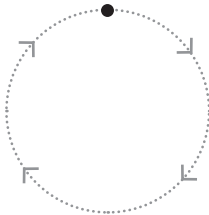
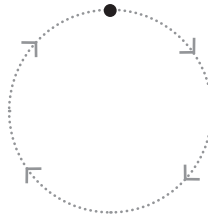






Tracing Shapes

☐ Trace the shape. Start from the dot.

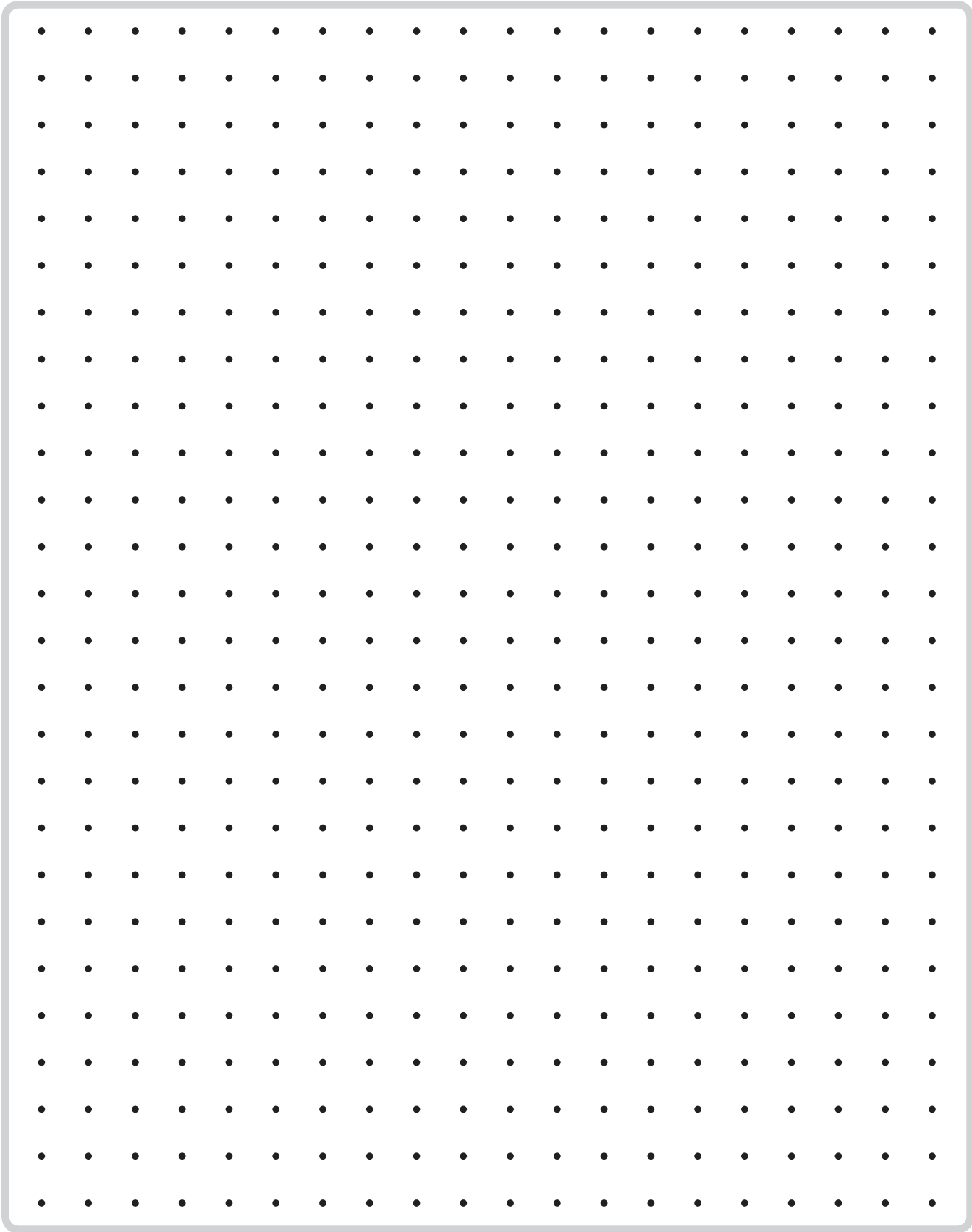
			
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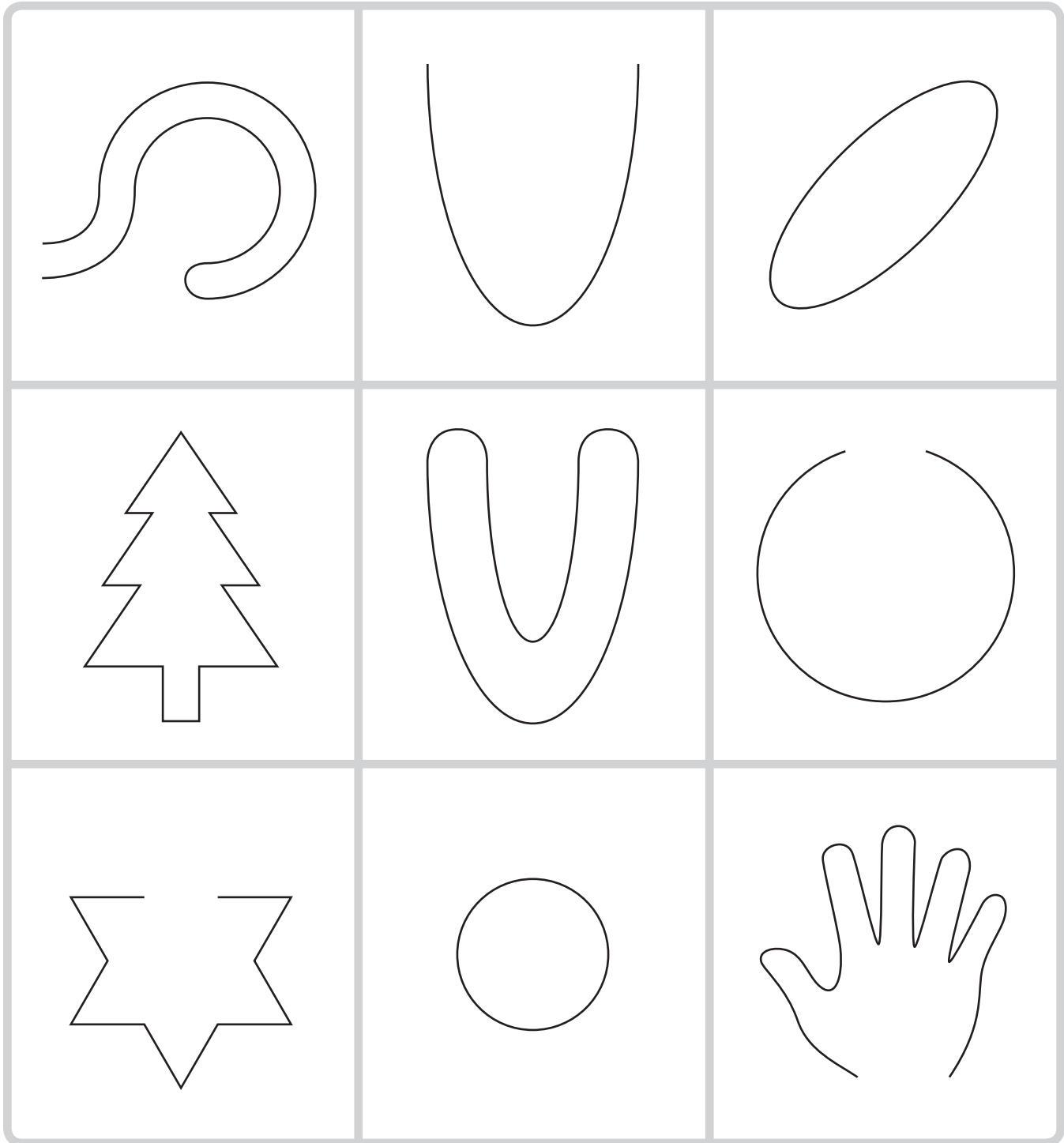
			
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Dot Paper



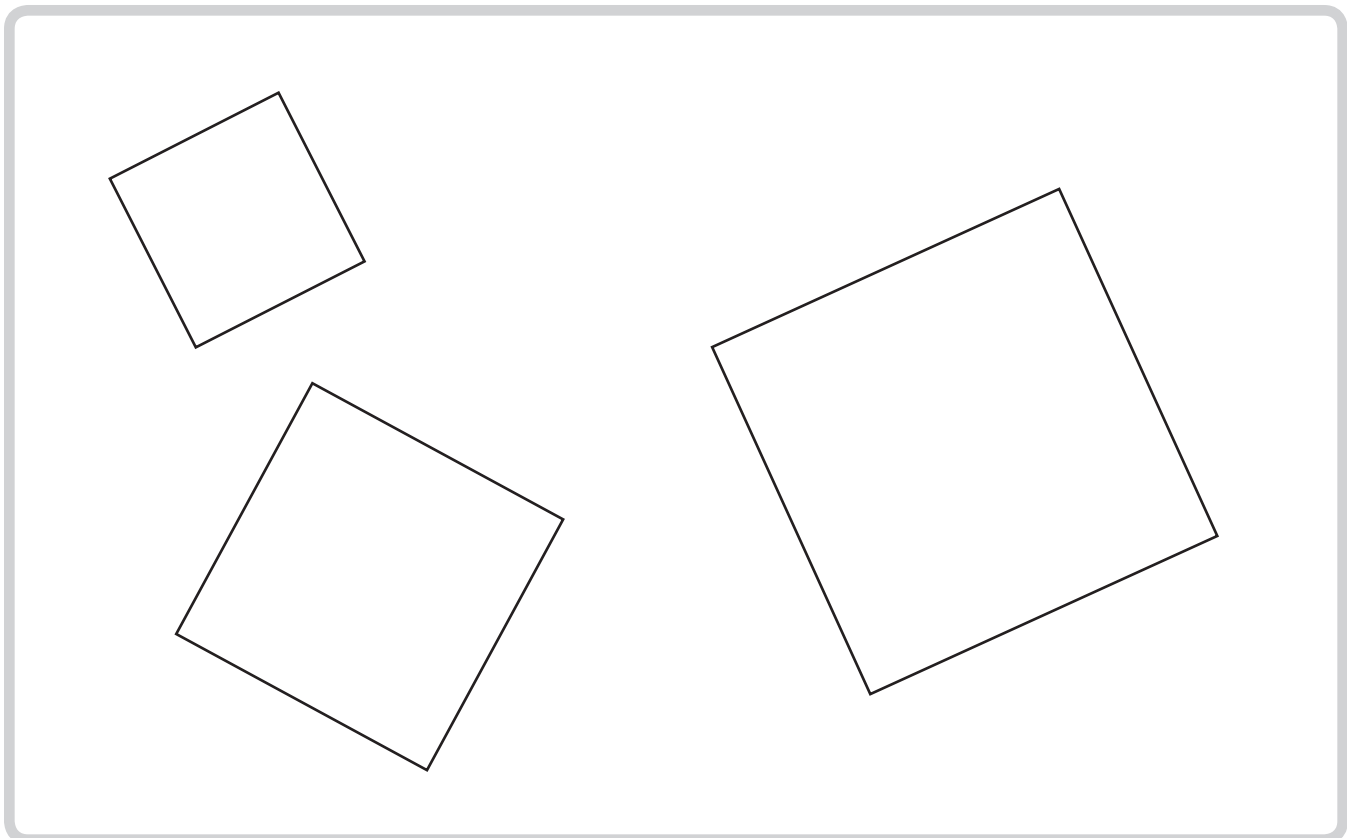
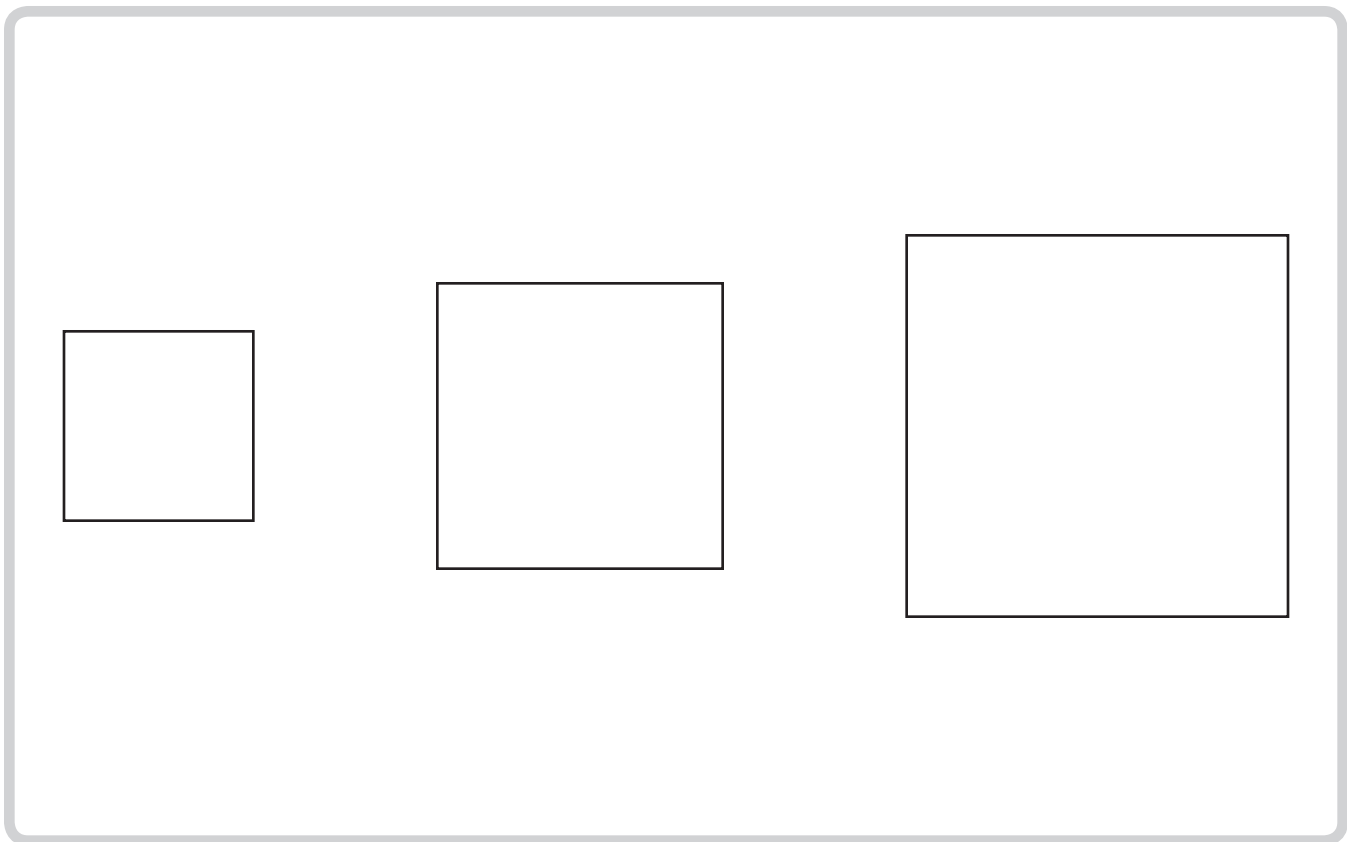
Finding Closed Shapes

- ☐ Put an X on the shapes that are **not** closed.
- ☐ Circle the closed shapes.



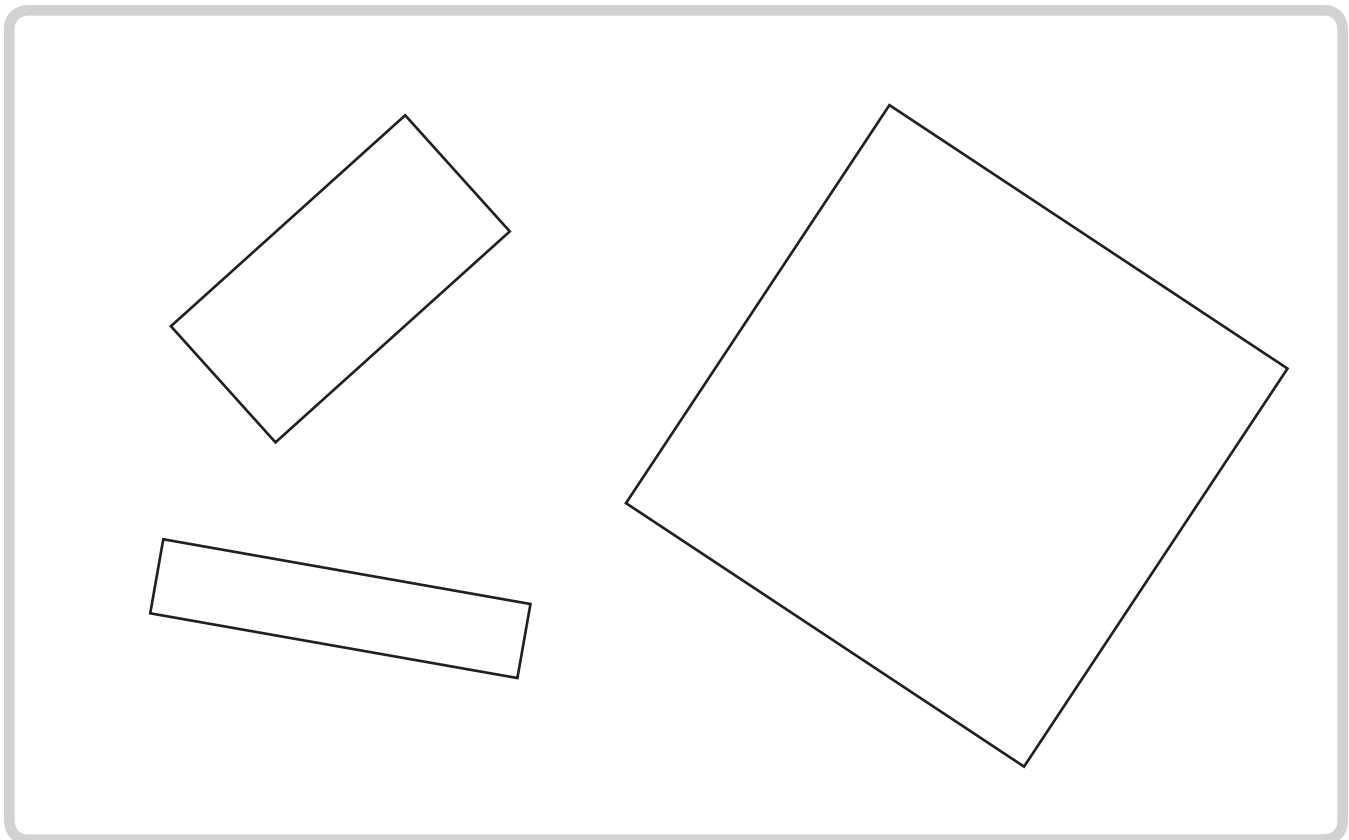
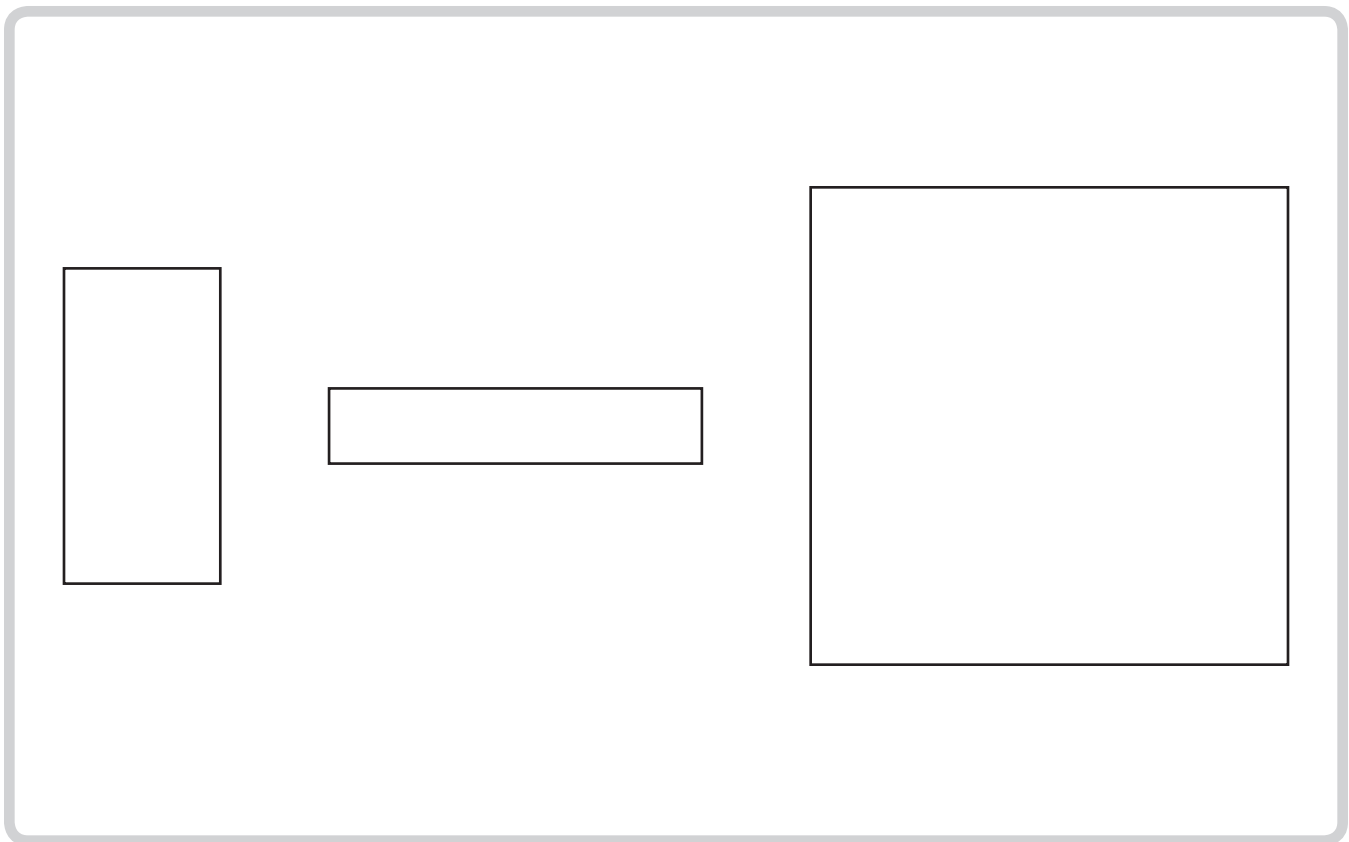
Who wins: X, O, or nobody: _____

Matching Squares



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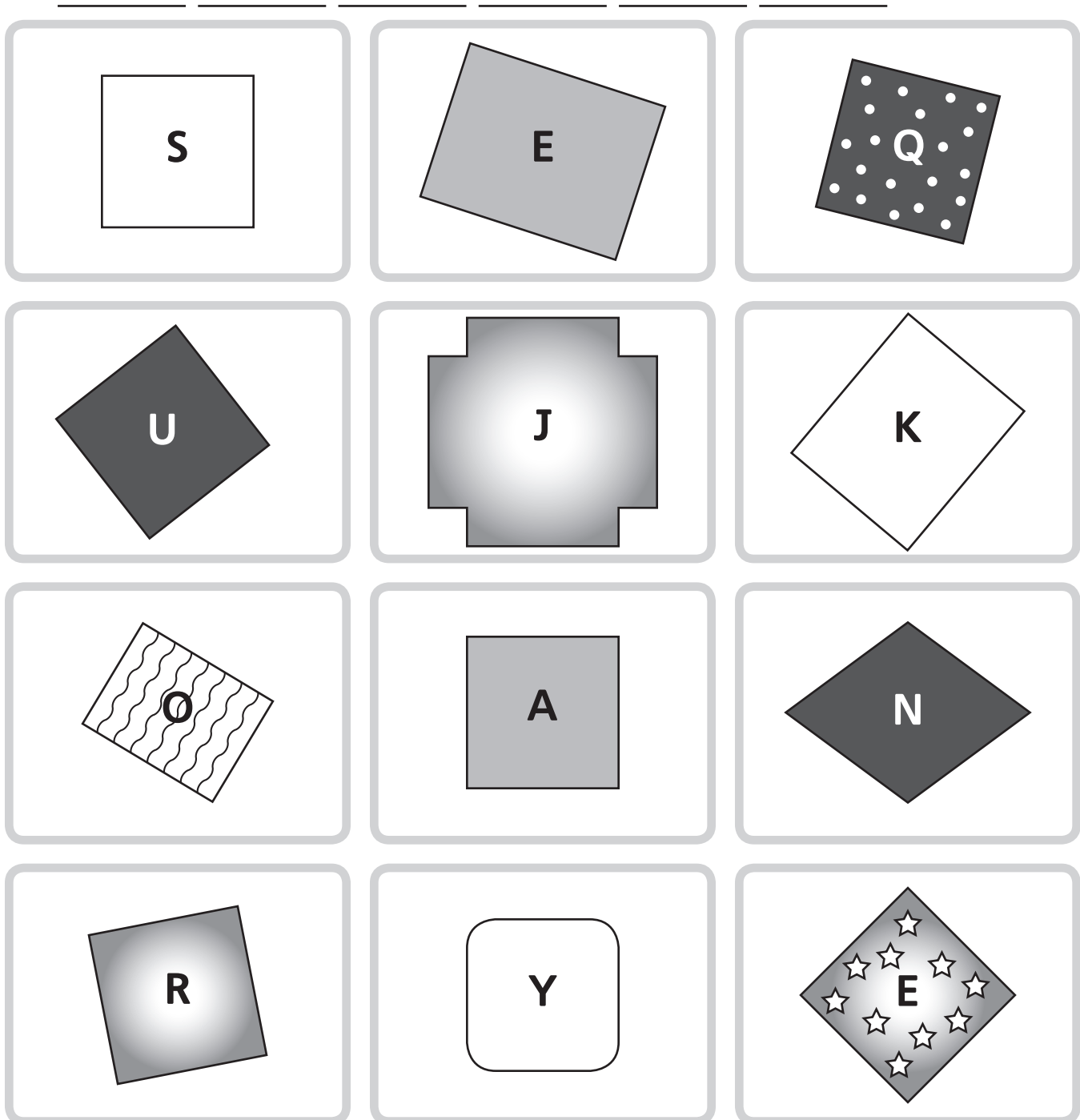
Matching Rectangles



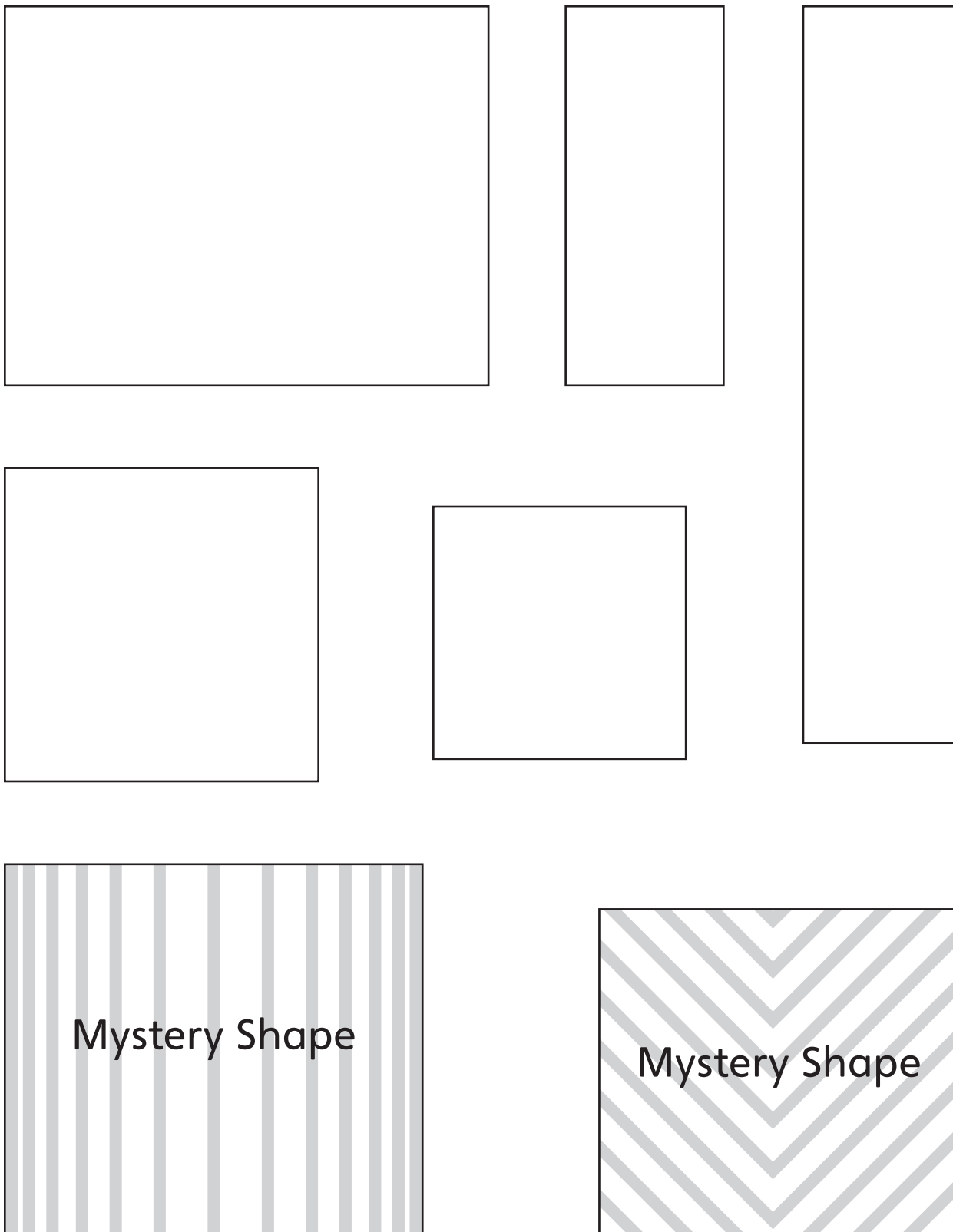
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Finding the Squares

- ☐ Place a pattern block square on each shape.
- ☐ Turn the square to see if it matches.
- ☐ Cross out the shapes that are **not** squares.
- ☐ Write the letters that are left:

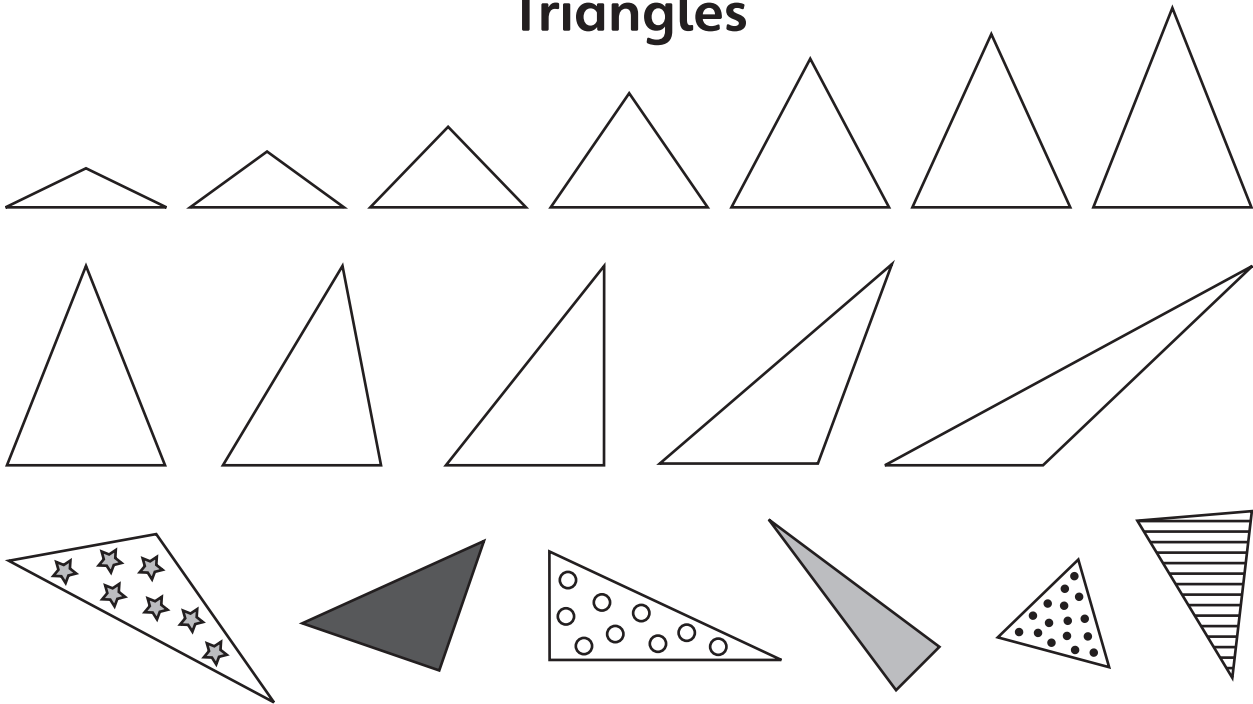


Is It a Square?

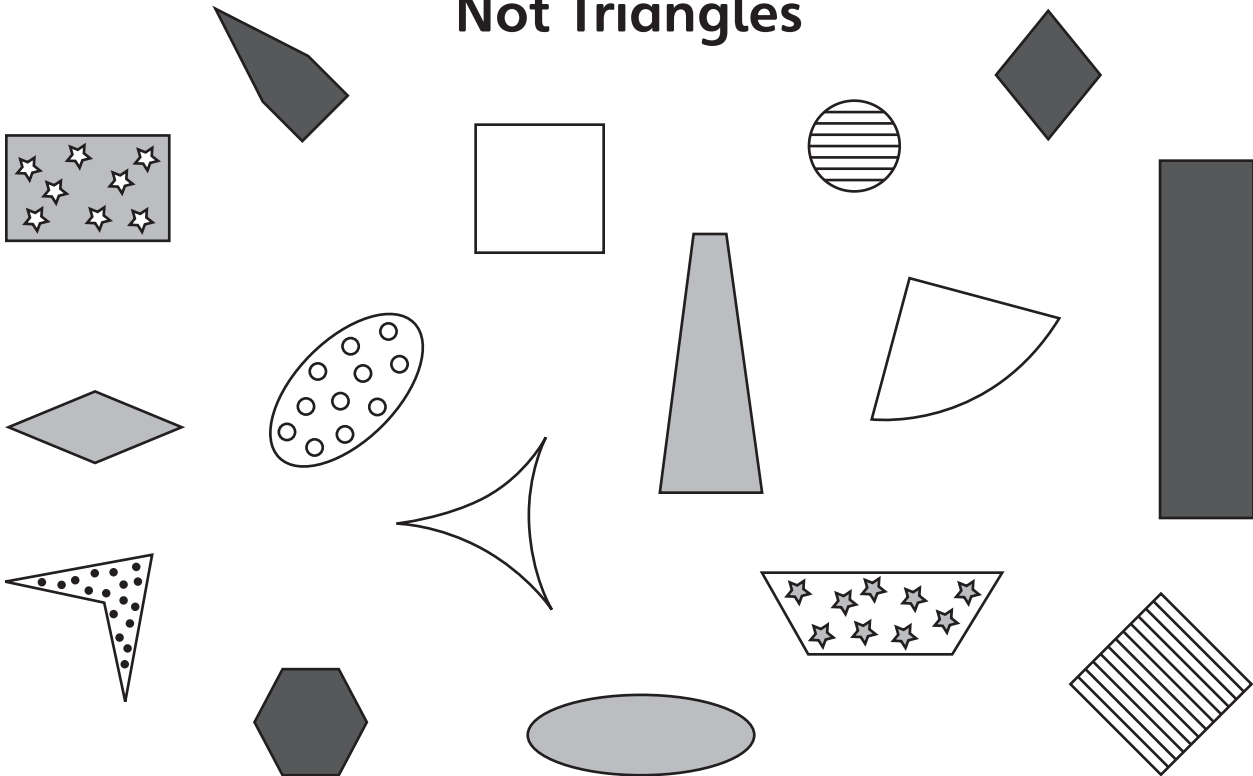


Triangles and Not Triangles

Triangles



Not Triangles

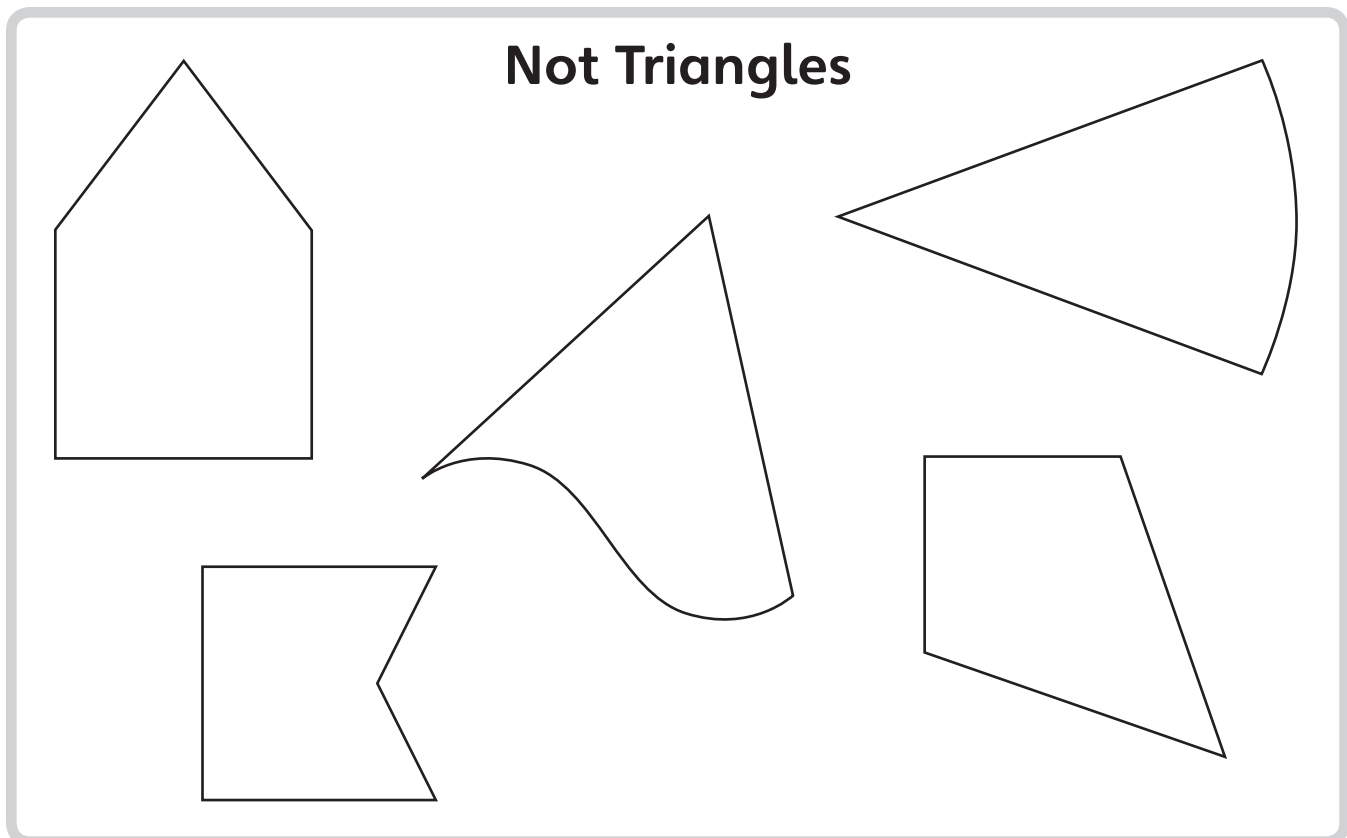
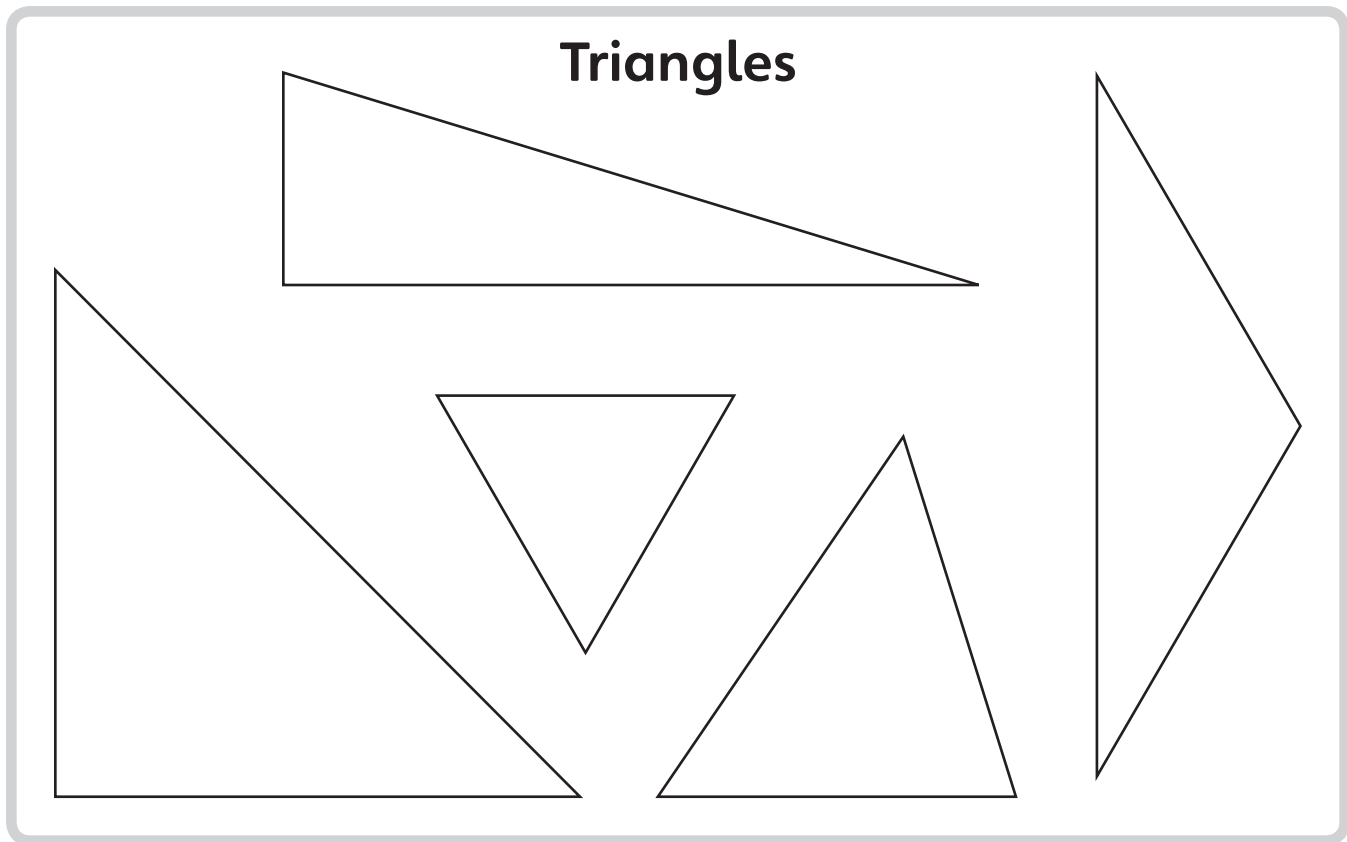


Finding the Triangles

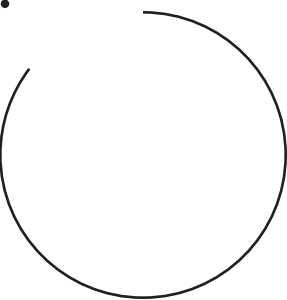
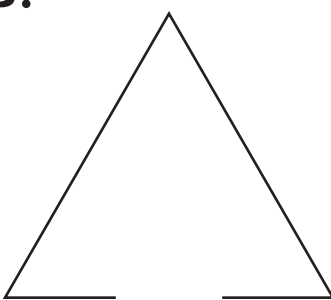

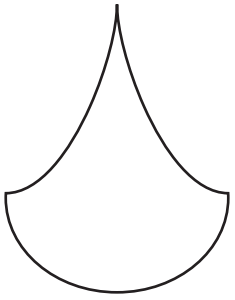
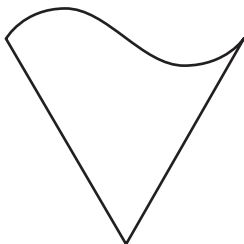
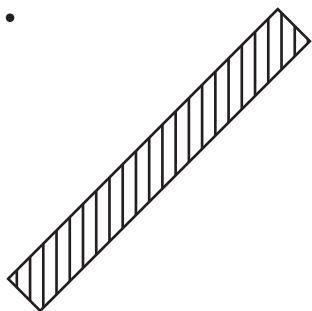
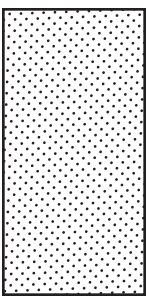
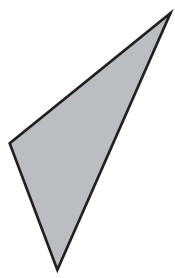

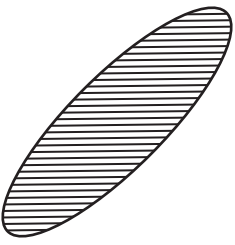
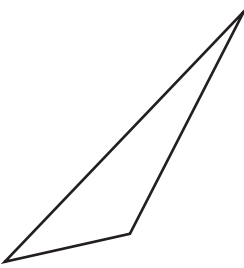
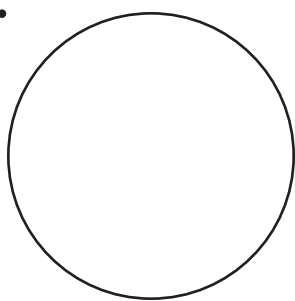
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<div data-bbox="447 643 644 802">e</div> <div data-bbox="803 632 980 811">d</div>	
<div data-bbox="374 882 491 1086">o</div> <div data-bbox="626 887 800 1079">a</div> <div data-bbox="942 887 1052 1079">k</div>	
<div data-bbox="366 1145 466 1349">v</div> <div data-bbox="626 1145 744 1349">a</div> <div data-bbox="881 1156 1058 1336">n</div>	
<div data-bbox="331 1417 522 1603">r</div> <div data-bbox="631 1417 793 1603">e</div> <div data-bbox="881 1422 1095 1603">d</div>	
<div data-bbox="326 1676 522 1871">j</div> <div data-bbox="638 1672 782 1877">a</div> <div data-bbox="852 1712 1100 1835">r</div>	

What is the word? b _____

Matching Triangles and Not Triangles



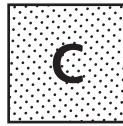
Cards for Sorting Different Ways

<p>A.</p> 	<p>B.</p> 	<p>C.</p> 
<p>D.</p> 	<p>E.</p> 	<p>F.</p> 
<p>G.</p> 	<p>H.</p> 	<p>I.</p> 
<p>J.</p> 	<p>K.</p> 	<p>L.</p> 

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Sorting Shapes Two Ways

☐ Sort two ways.



squares

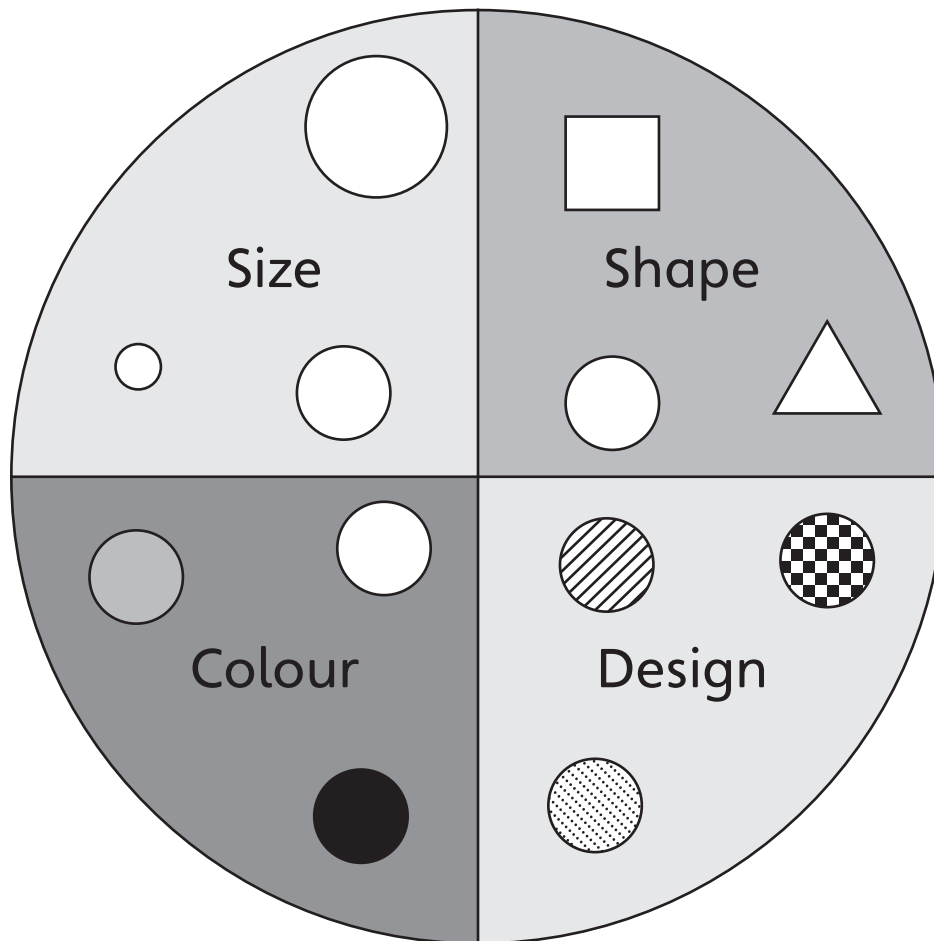
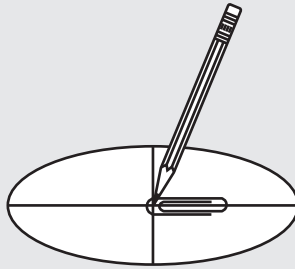
not squares

triangles

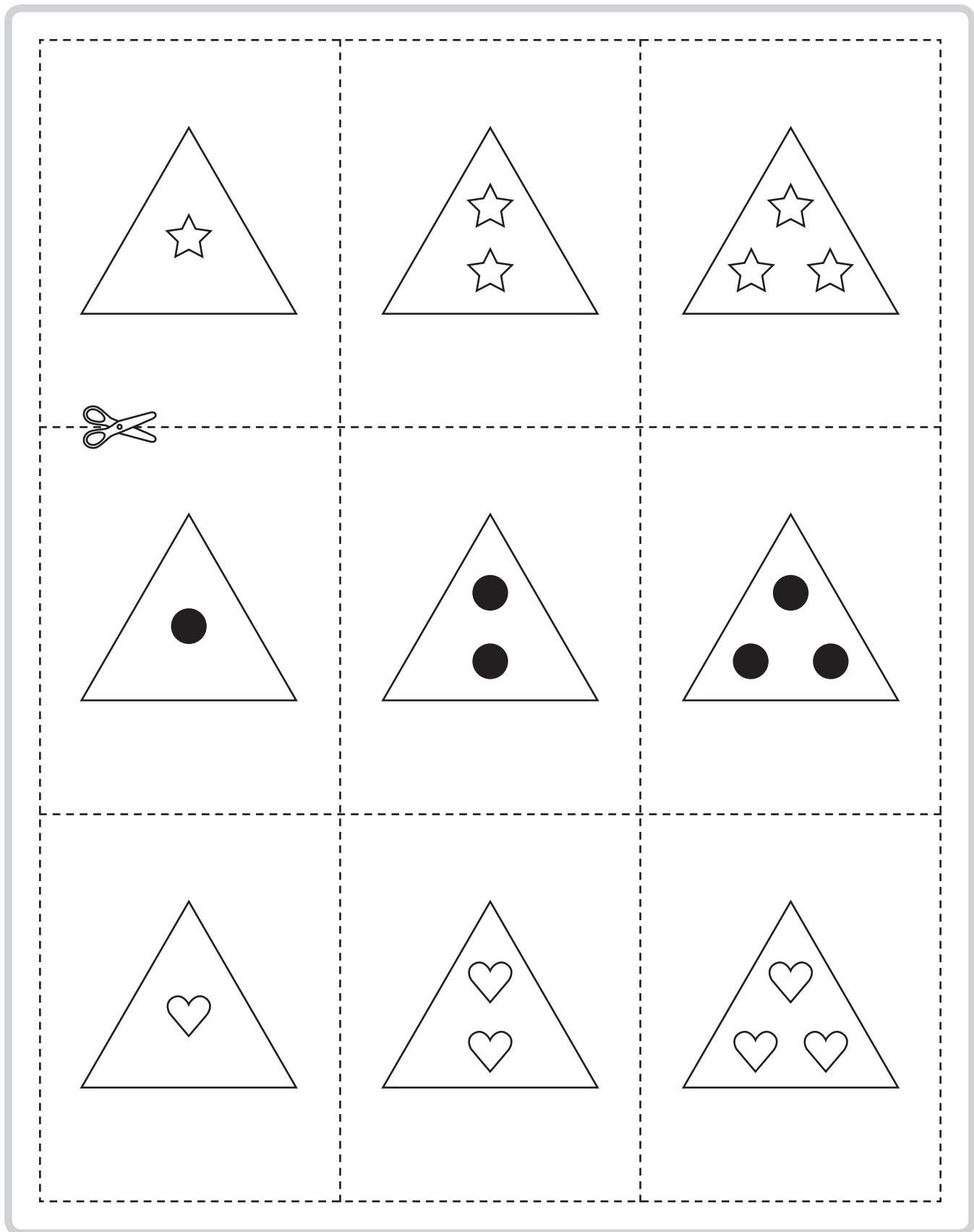
not triangles

Attribute Spinner

- ☐ Use a pencil and a paper clip.
- ☐ Hold the pencil down in the middle.
- ☐ Hold the paper clip to the pencil tip.
- ☐ Spin the paper clip.

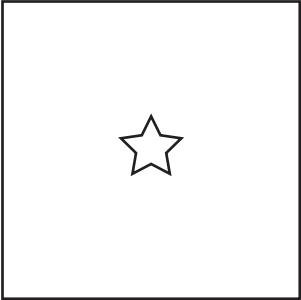
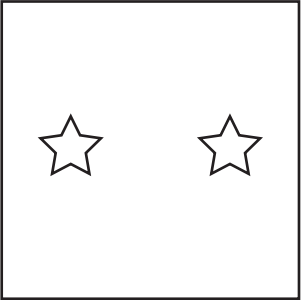
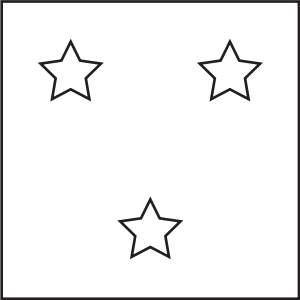

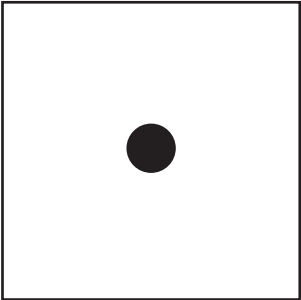
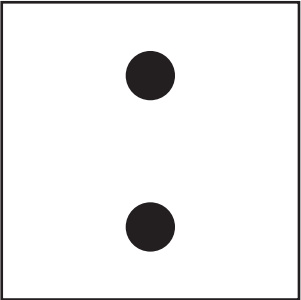
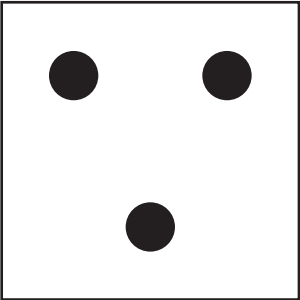
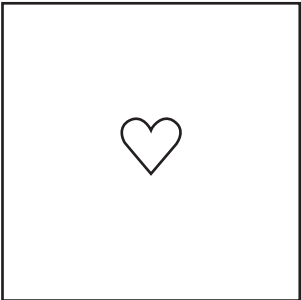
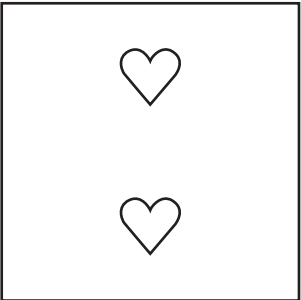
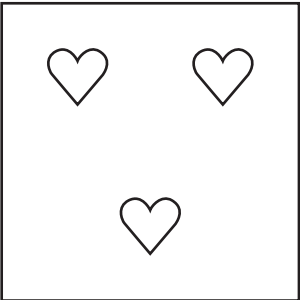


Finding 3 Cards (I)



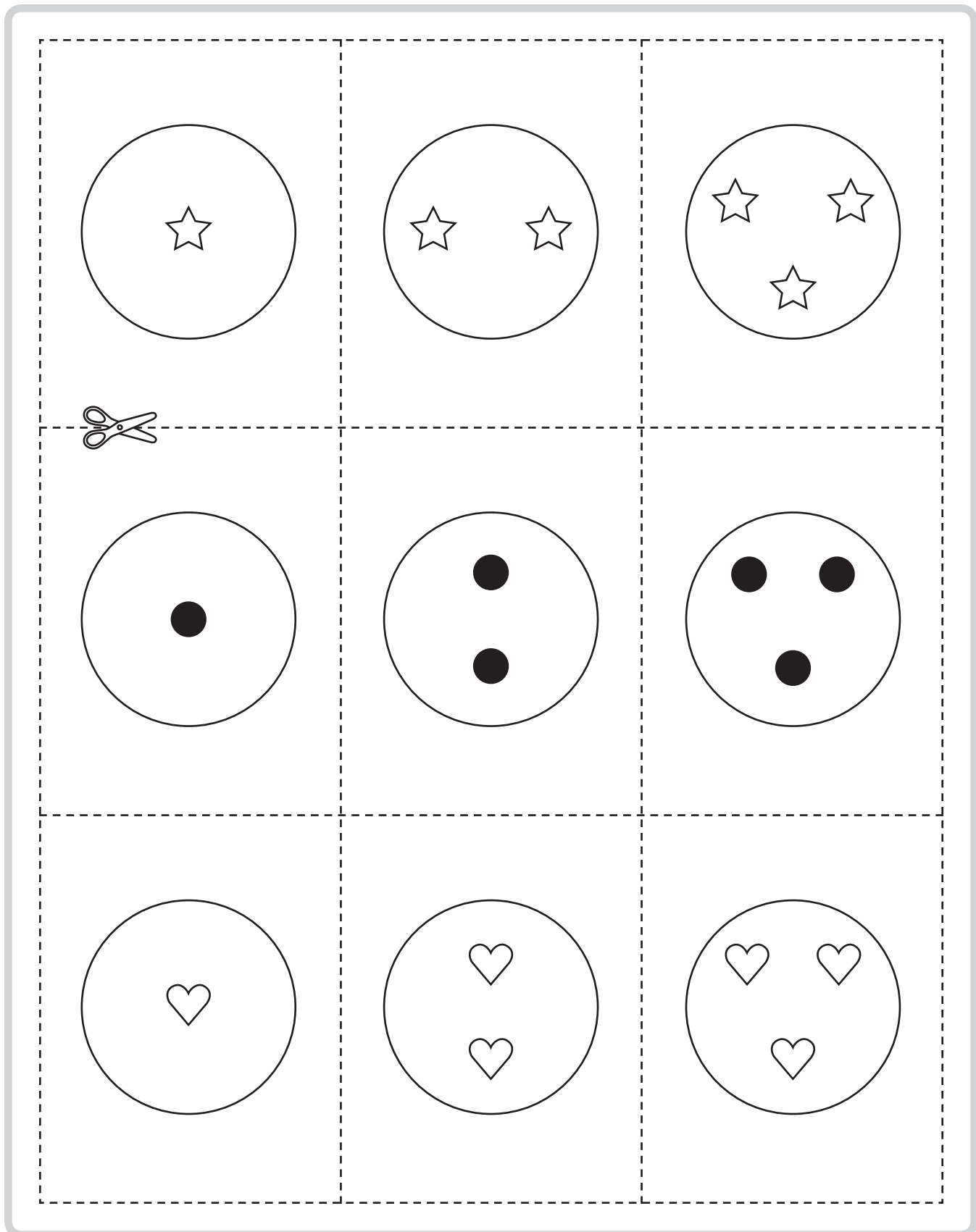
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Finding 3 Cards (2)

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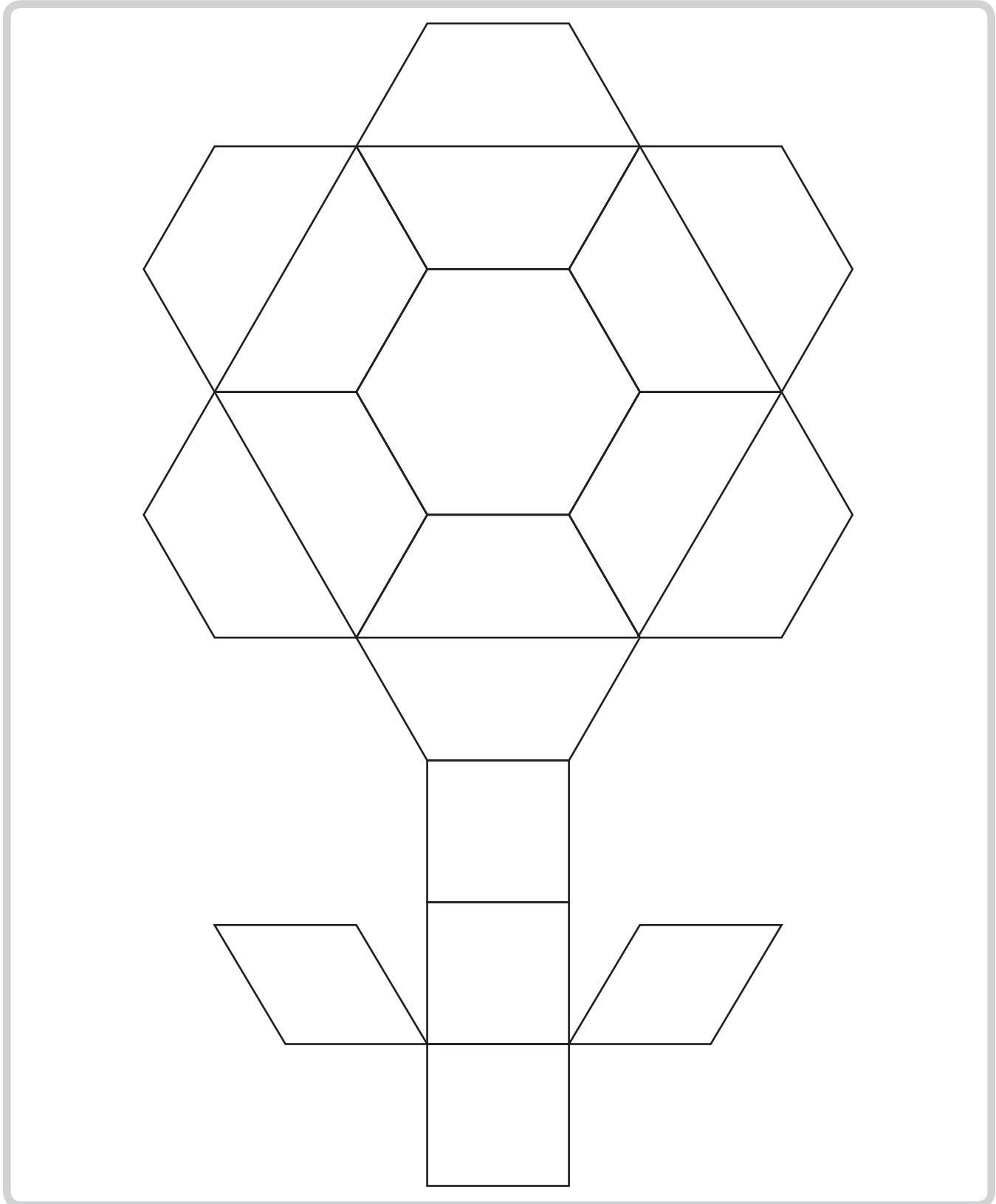
Finding 3 Cards (3)



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Shapes and Pictures

☐ Cover the flower with pattern blocks in two ways.





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Pattern Block Boat


- ☐ Cover the shape using pattern blocks.
- ☐ Look at a partner's picture.

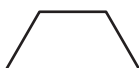
I used:


_____ 

_____ 


_____ 


_____ 


_____ 


_____ 

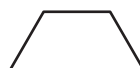
My partner used:

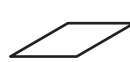
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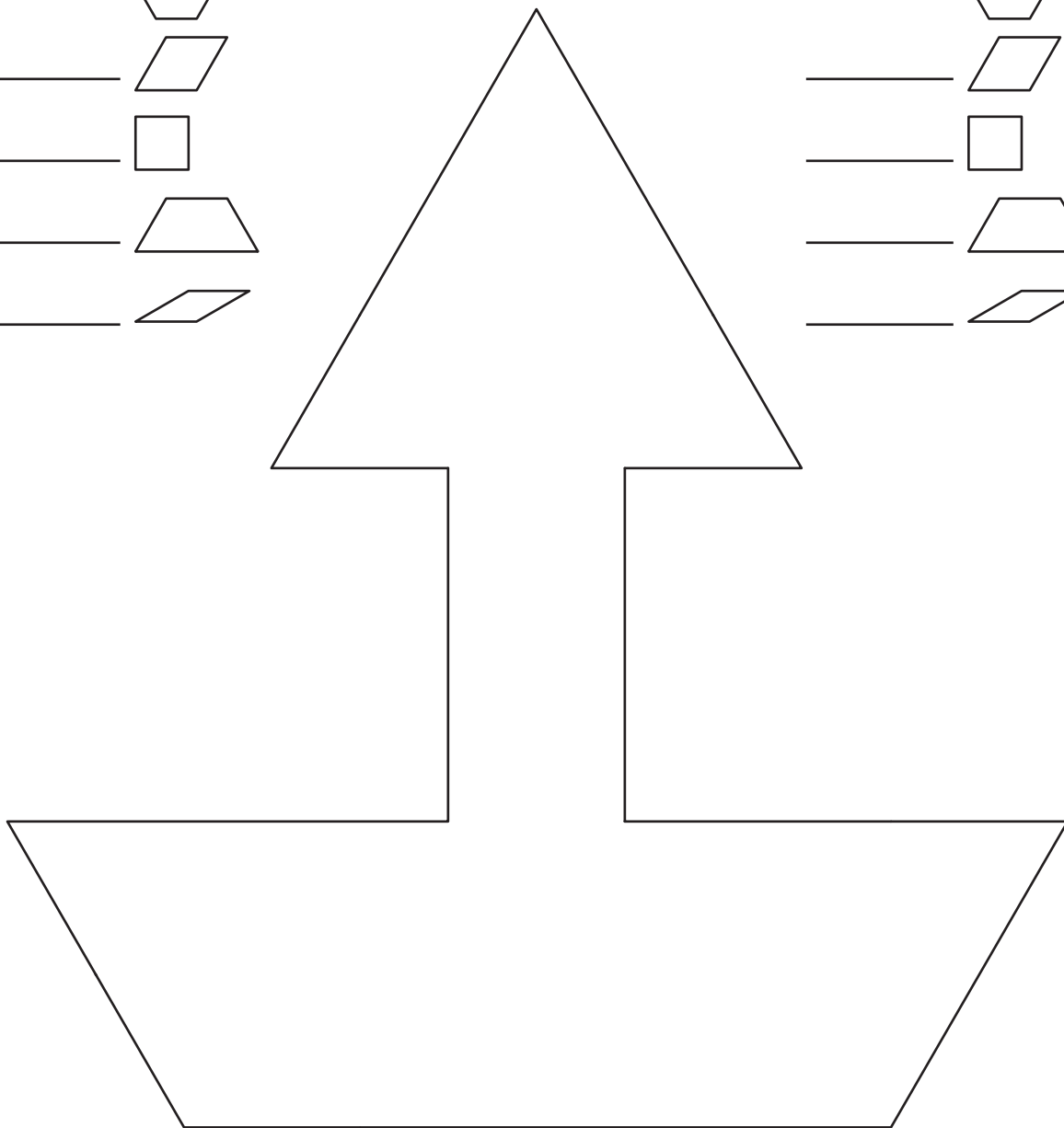
_____ 

_____ 

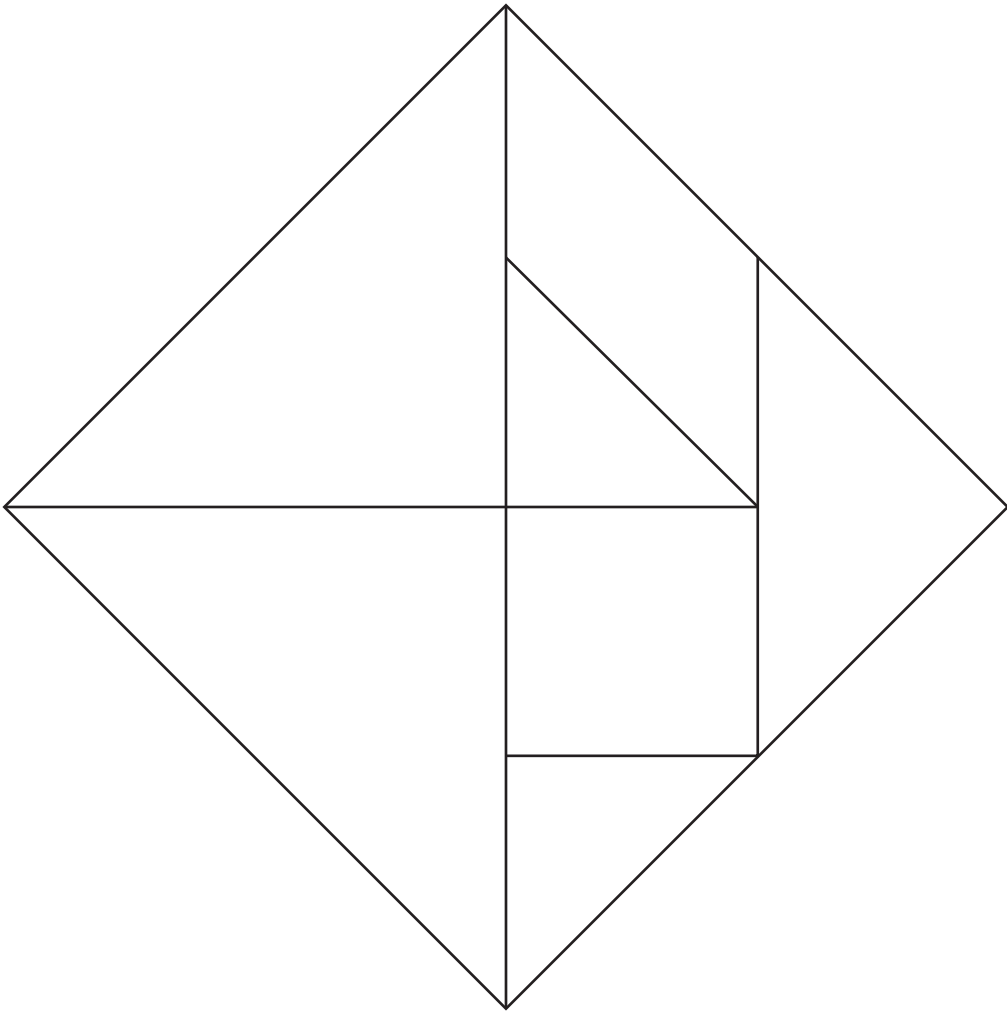
_____ 

_____ 

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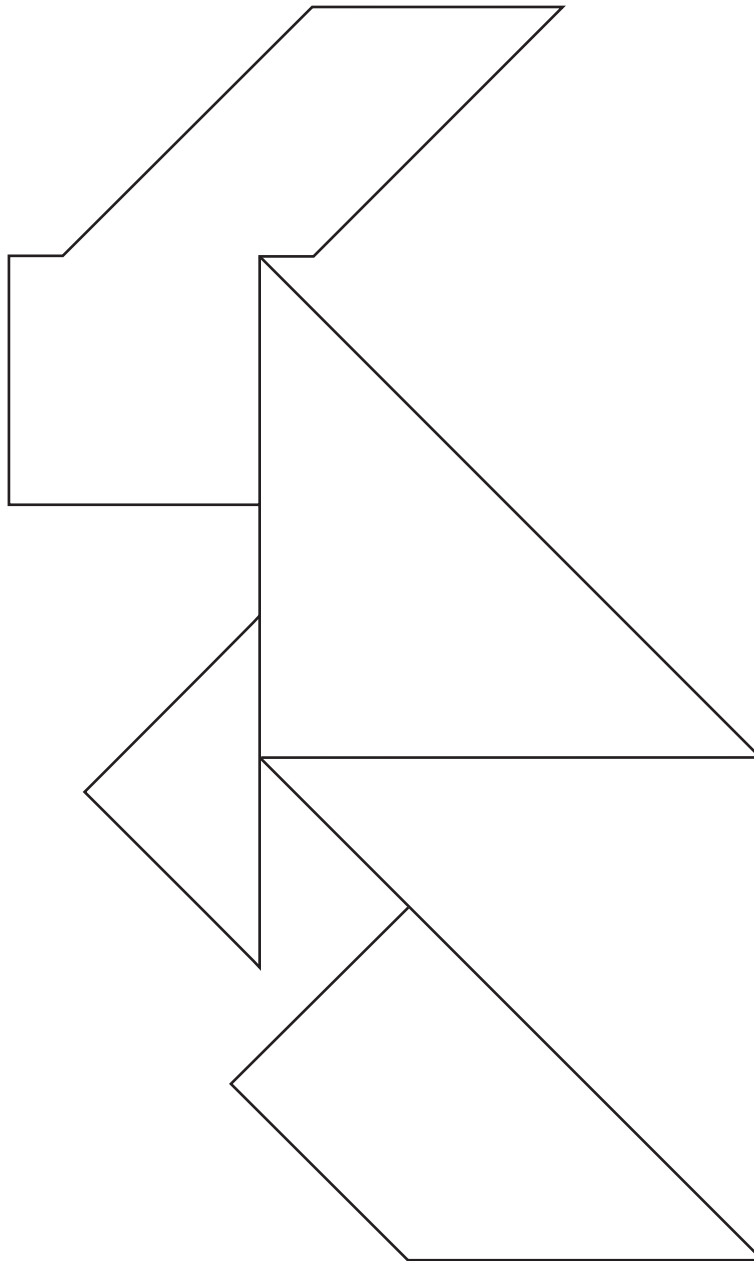


Tangram



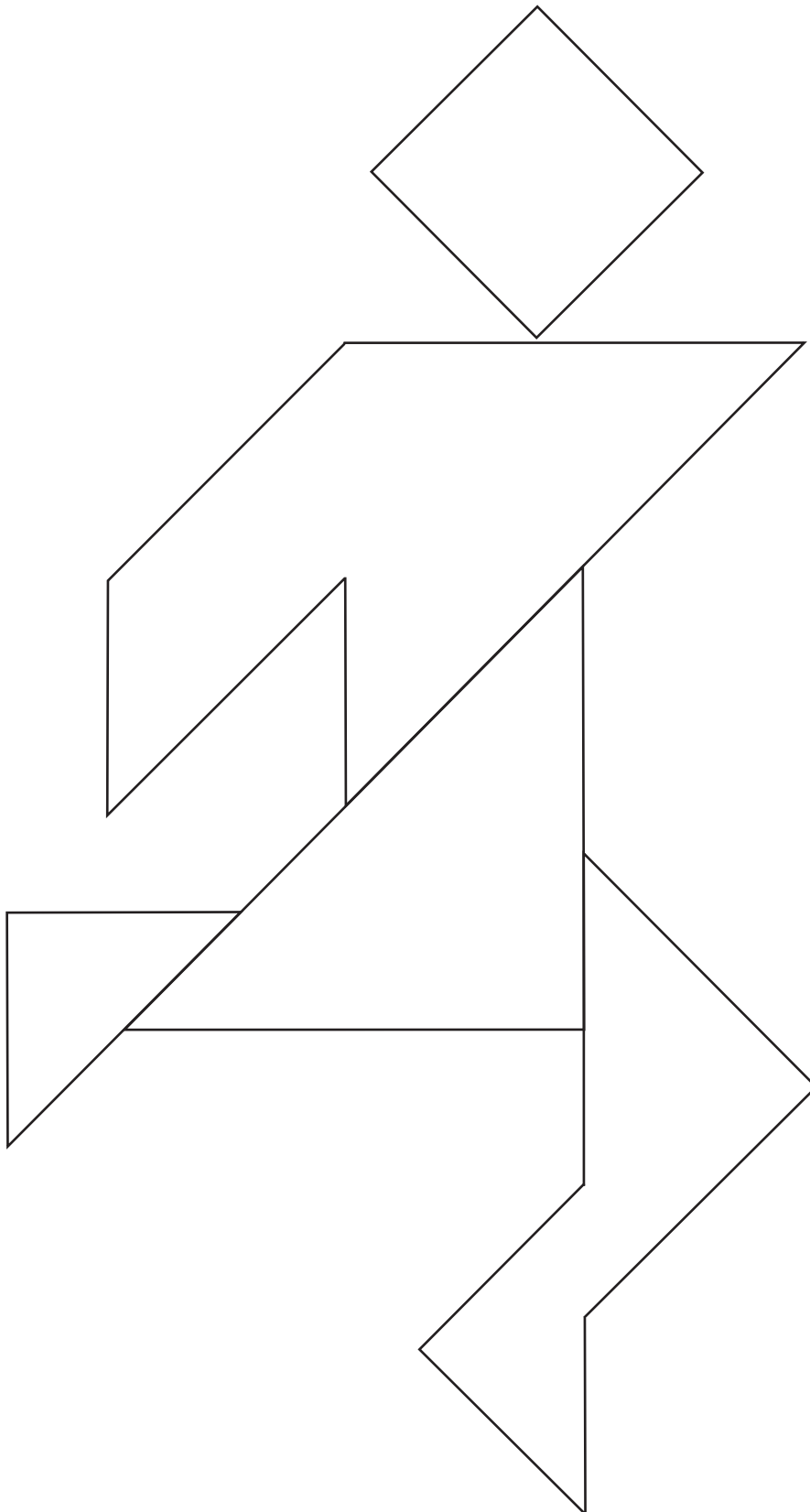
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Tangram Puzzles (I)



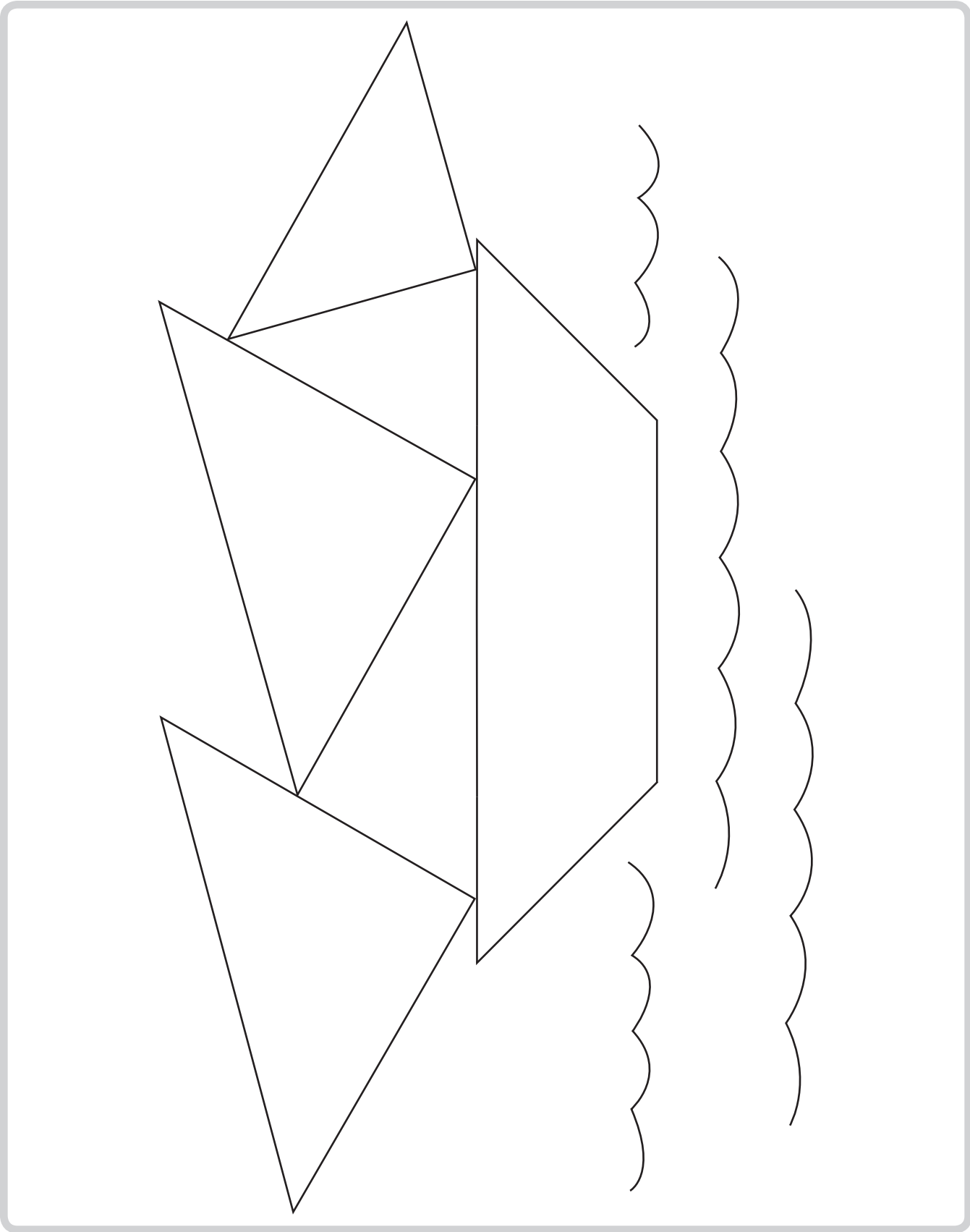
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Tangram Puzzles (2)

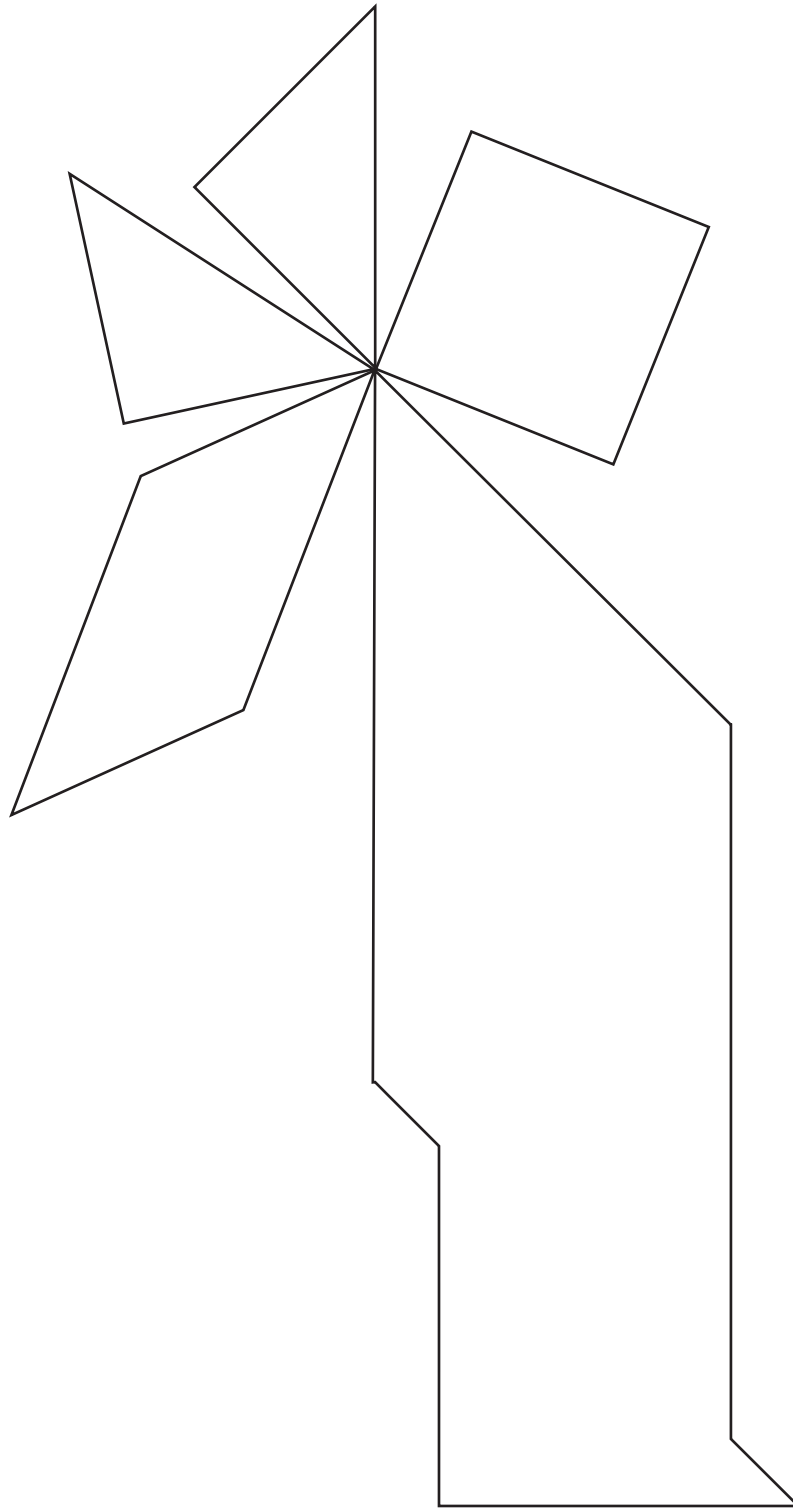


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Tangram Puzzles (3)

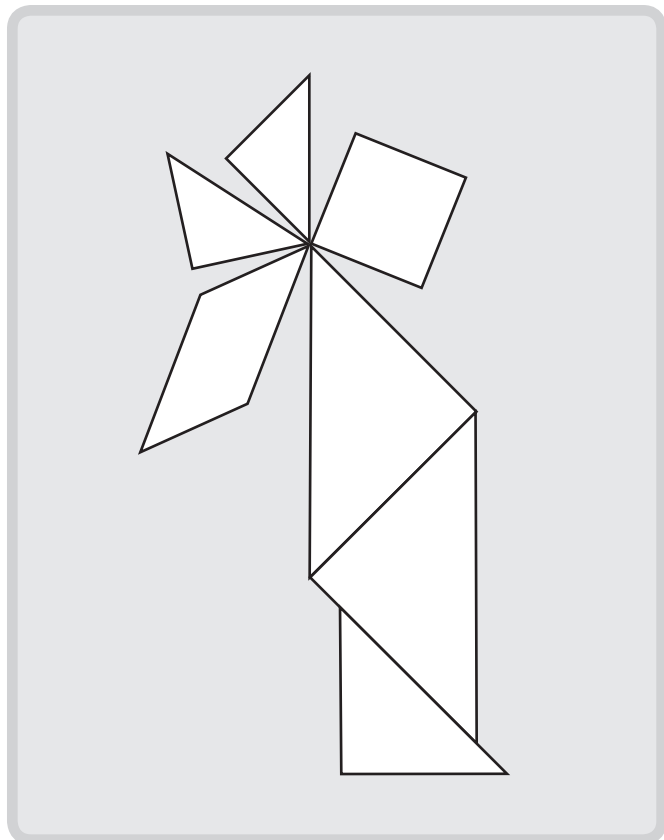
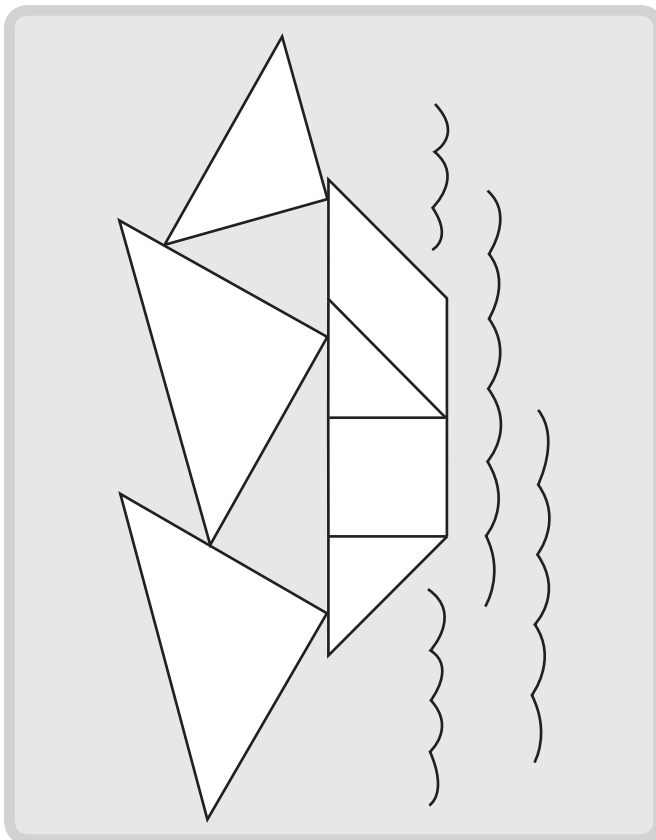
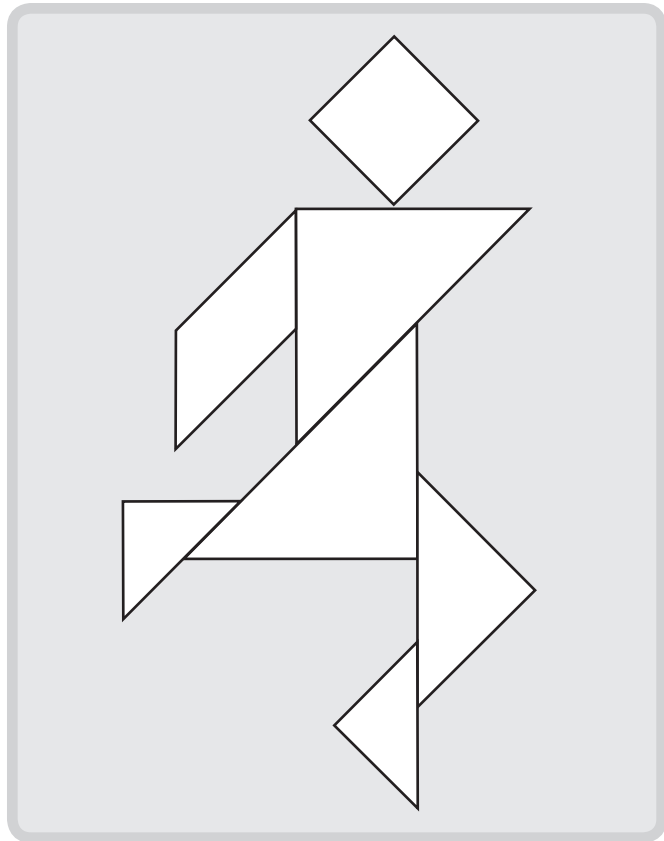
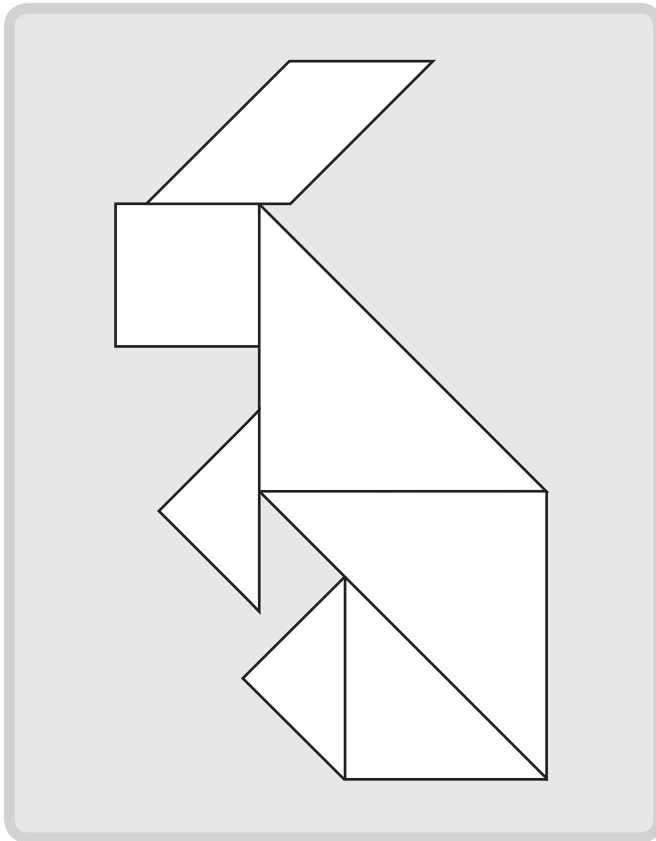


Tangram Puzzles (4)



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Tangram Puzzles (5)



G-74

Blackline Master — Geometry — Teacher's Guide for Grade 1

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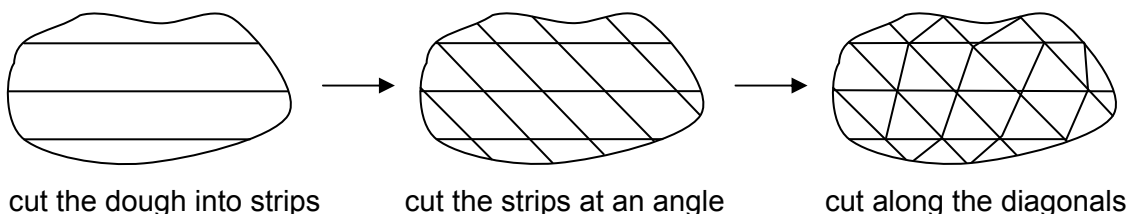
Dear Parent/Guardian,

re: JUMP Math program
Grade 1 Geometry
Lesson G1-5

In mathematics, your child is learning about geometric shapes. You can have fun with geometric shapes at home by baking cut-out cookies in different shapes. Use your favourite cut-out cookie dough or try the shortbread recipe below.

Discuss with your child how you can make cookies of different shapes without using cookie cutters. Examples:

- **circles**—use glasses, bottles, or jars to cut out circles of different sizes
- **squares and other rectangles**—cut the dough into strips, then cut the strips into squares or other rectangles
- **triangles**—cut squares or other rectangles into triangles along diagonals
- **more triangles**—



Shortbread Cookies

1 cup (2 sticks) unsalted butter

$\frac{1}{2}$ cup sugar

1 teaspoon vanilla extract

2 cups self-rising flour

a pinch of salt

(optional: $\frac{1}{2}$ cup chocolate chips OR 1 tsp ground cinnamon)

Whisk the butter until creamy. Add sugar and whisk until smooth.

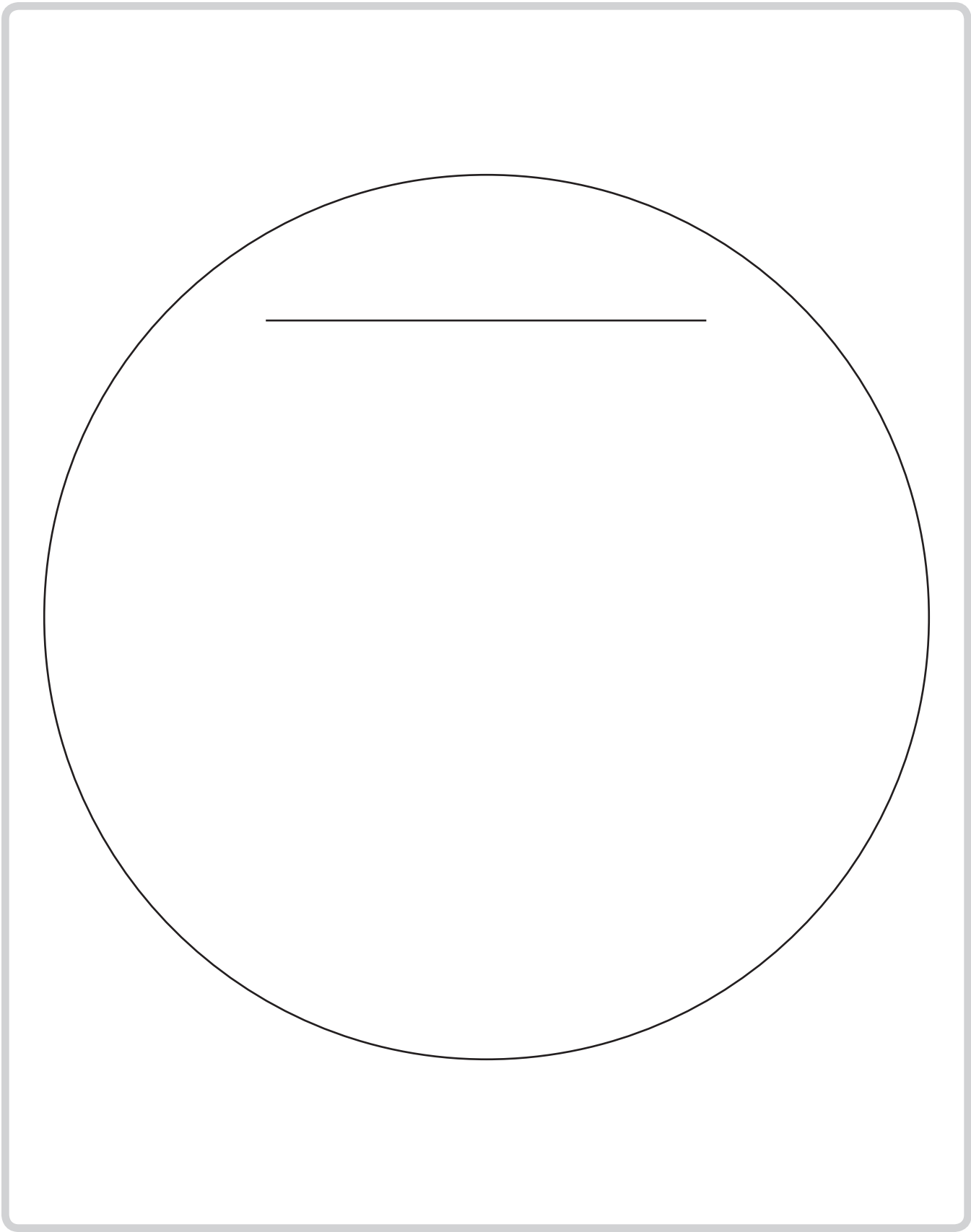
Add vanilla extract and whisk again. Stir in flour, salt, and any optional ingredients.

Knead the dough into a ball, wrap in plastic wrap, and refrigerate for 1 hour.

Roll out the dough to a thickness of $\frac{1}{2}$ inch (about 1 cm) and cut out your cookies.

Bake at 360°F (180°C) on a lightly greased cookie sheet for about 20 minutes or until golden. Enjoy!

Sorting Circle

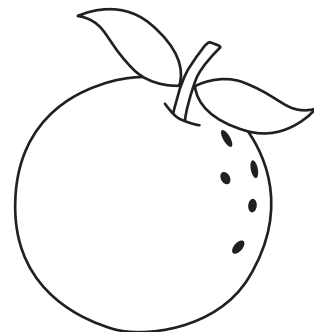
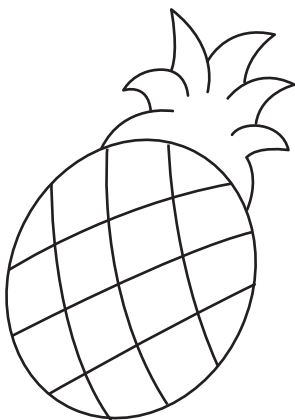
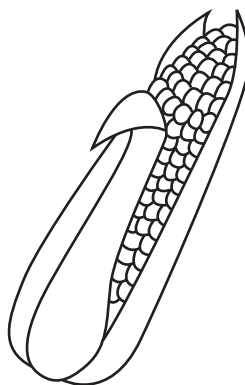
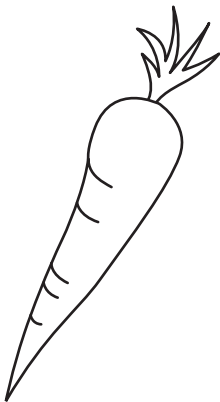
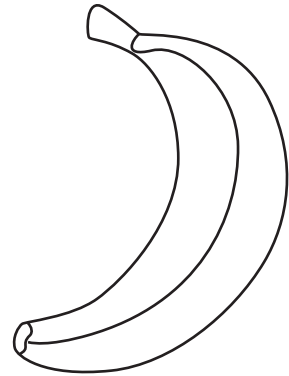
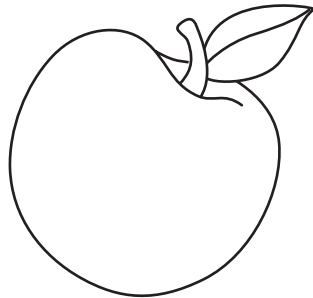
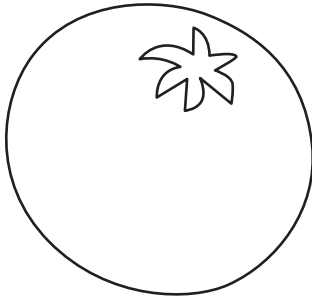


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Sorting into Two Groups

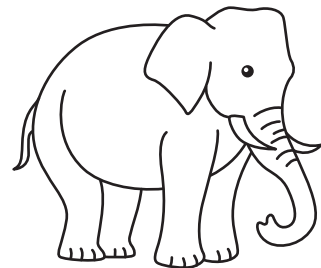
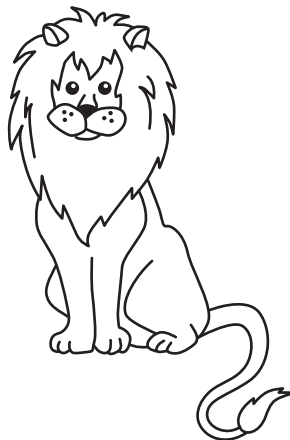
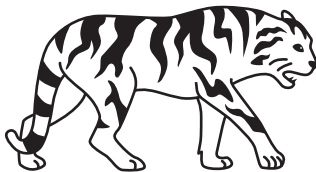
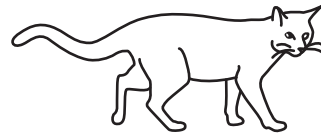
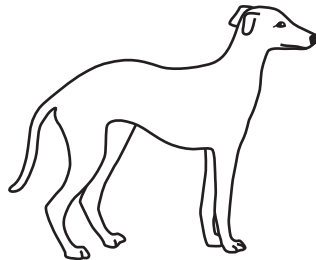
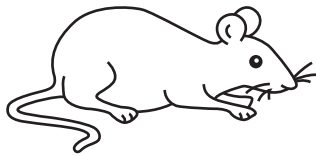
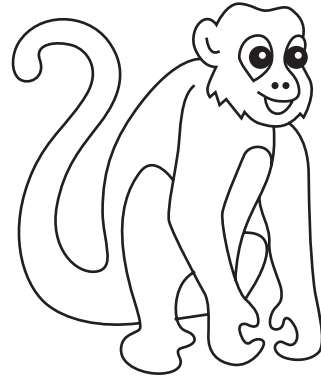
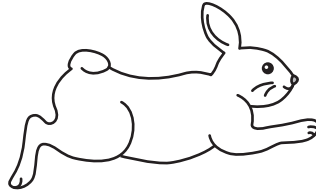
The form consists of two large, empty ovals arranged vertically. Each oval has a horizontal line drawn across its upper portion, intended for labeling the groups. The entire content is enclosed within a light gray rectangular border.

Fruit and Vegetable Cards



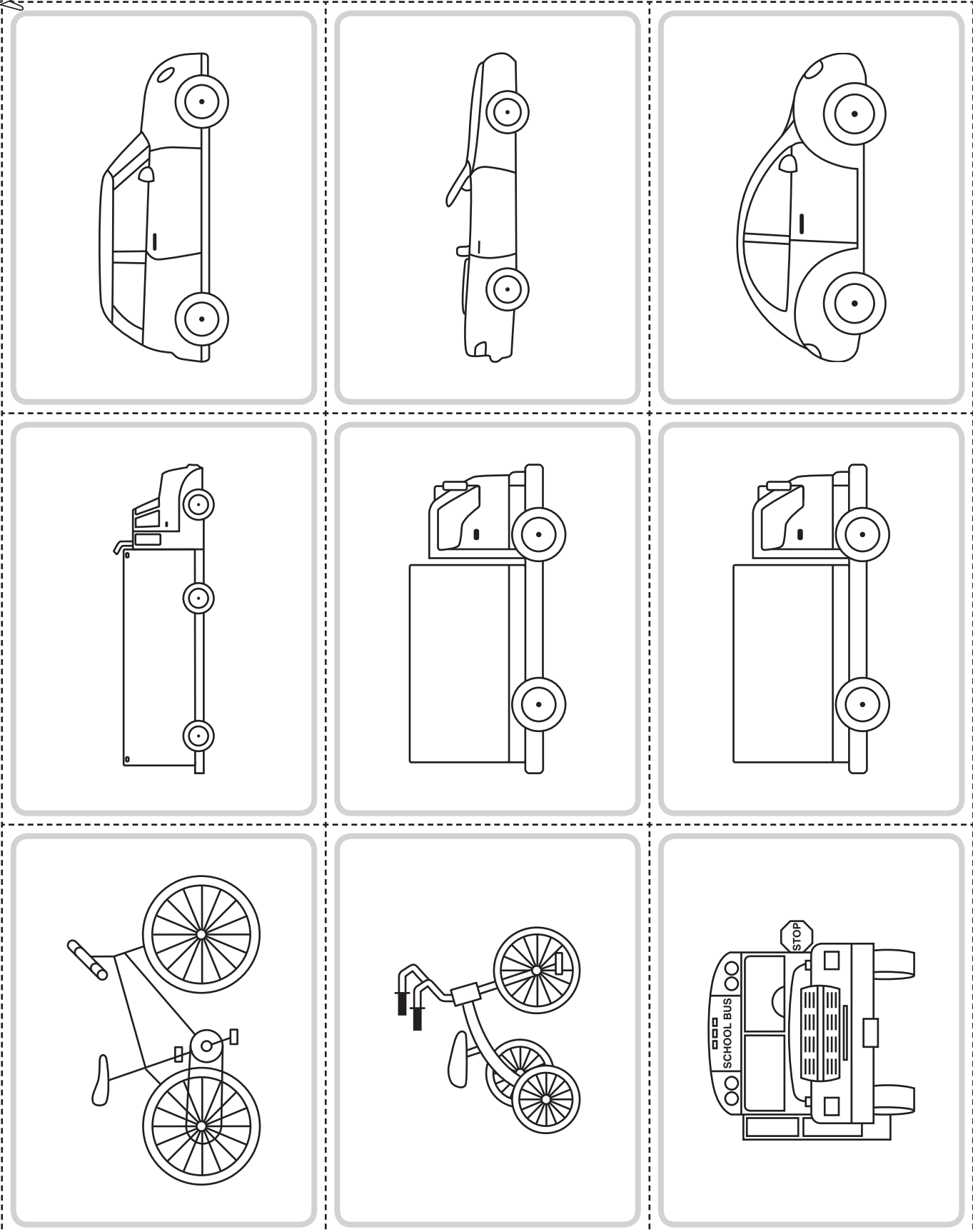
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Animal Cards



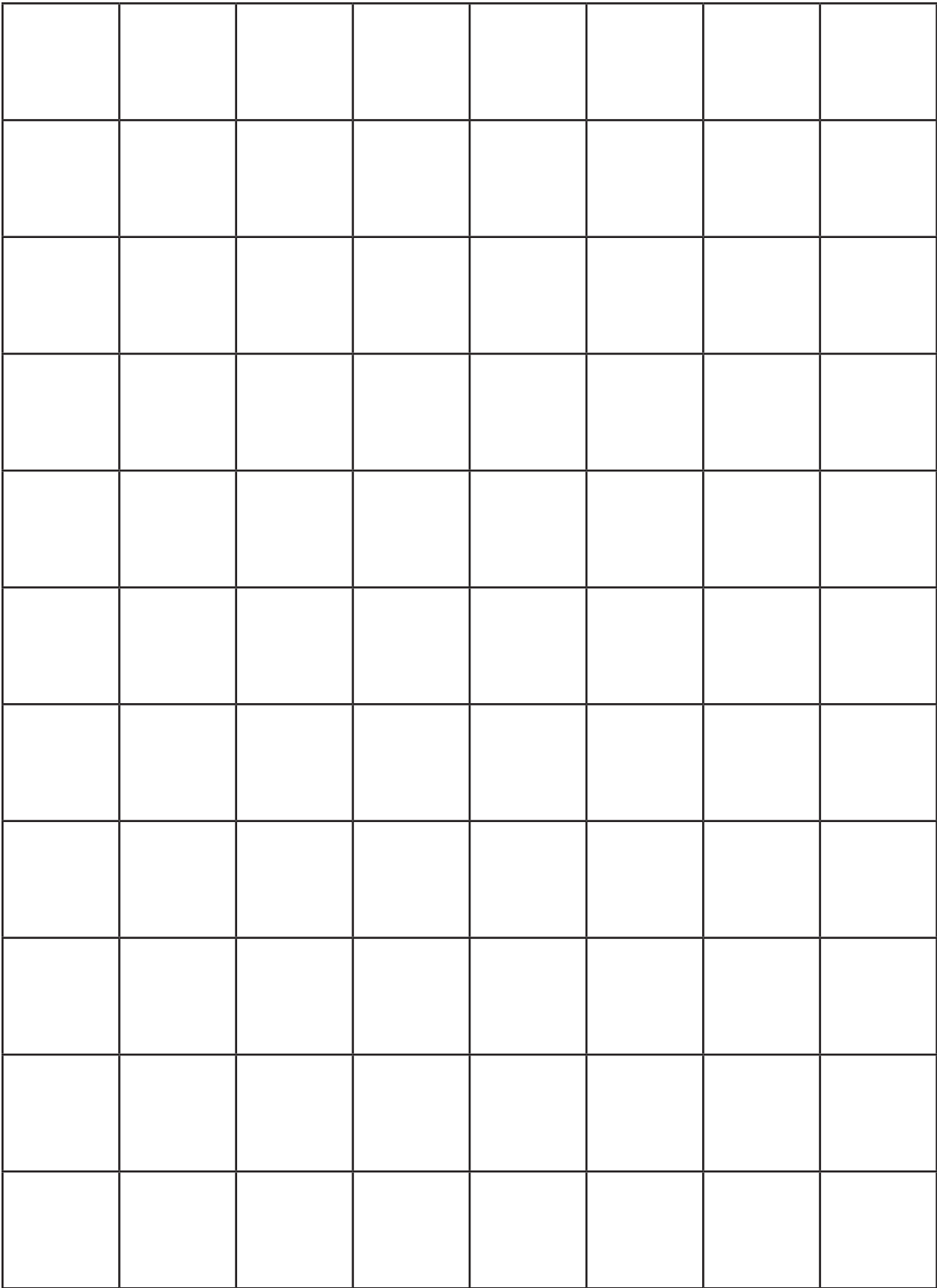
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Vehicle Cards

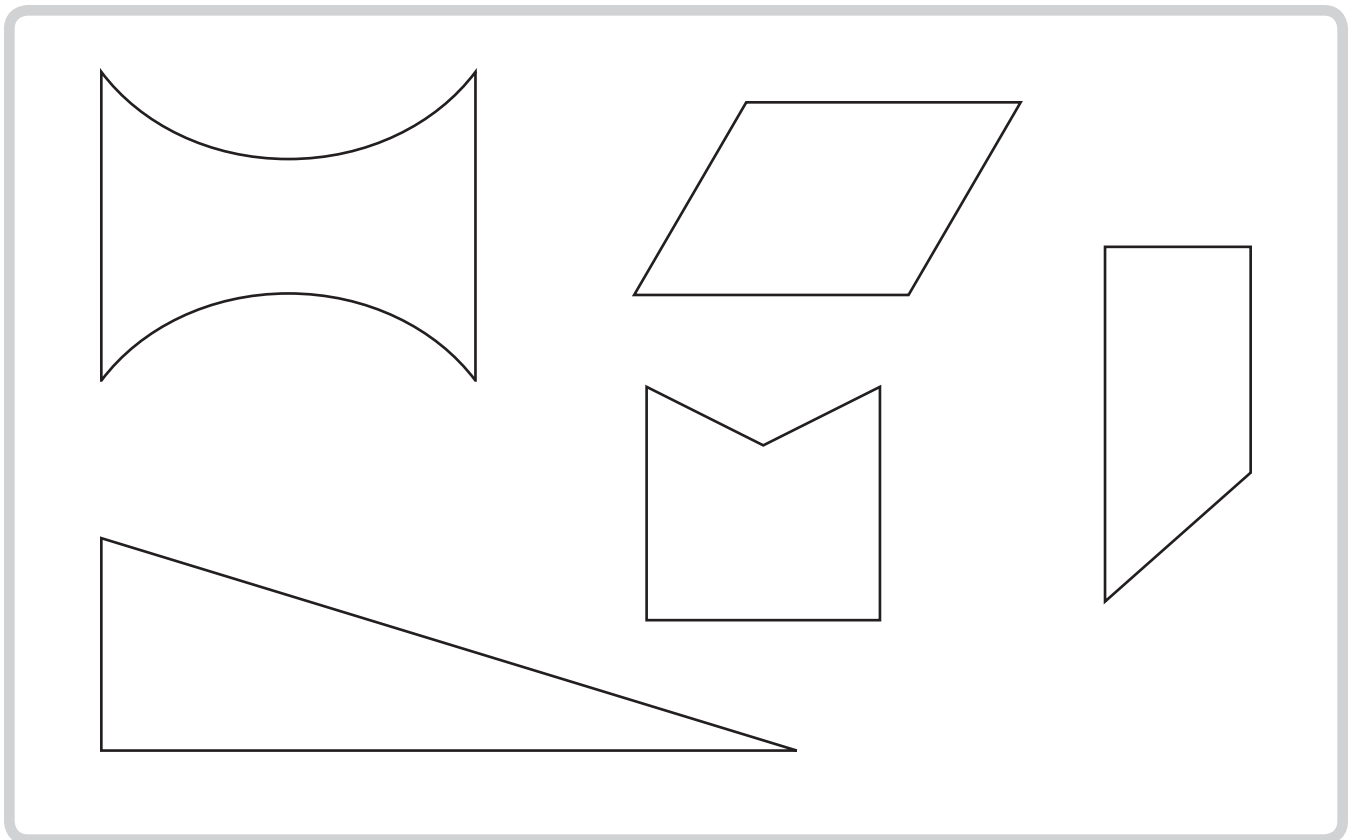
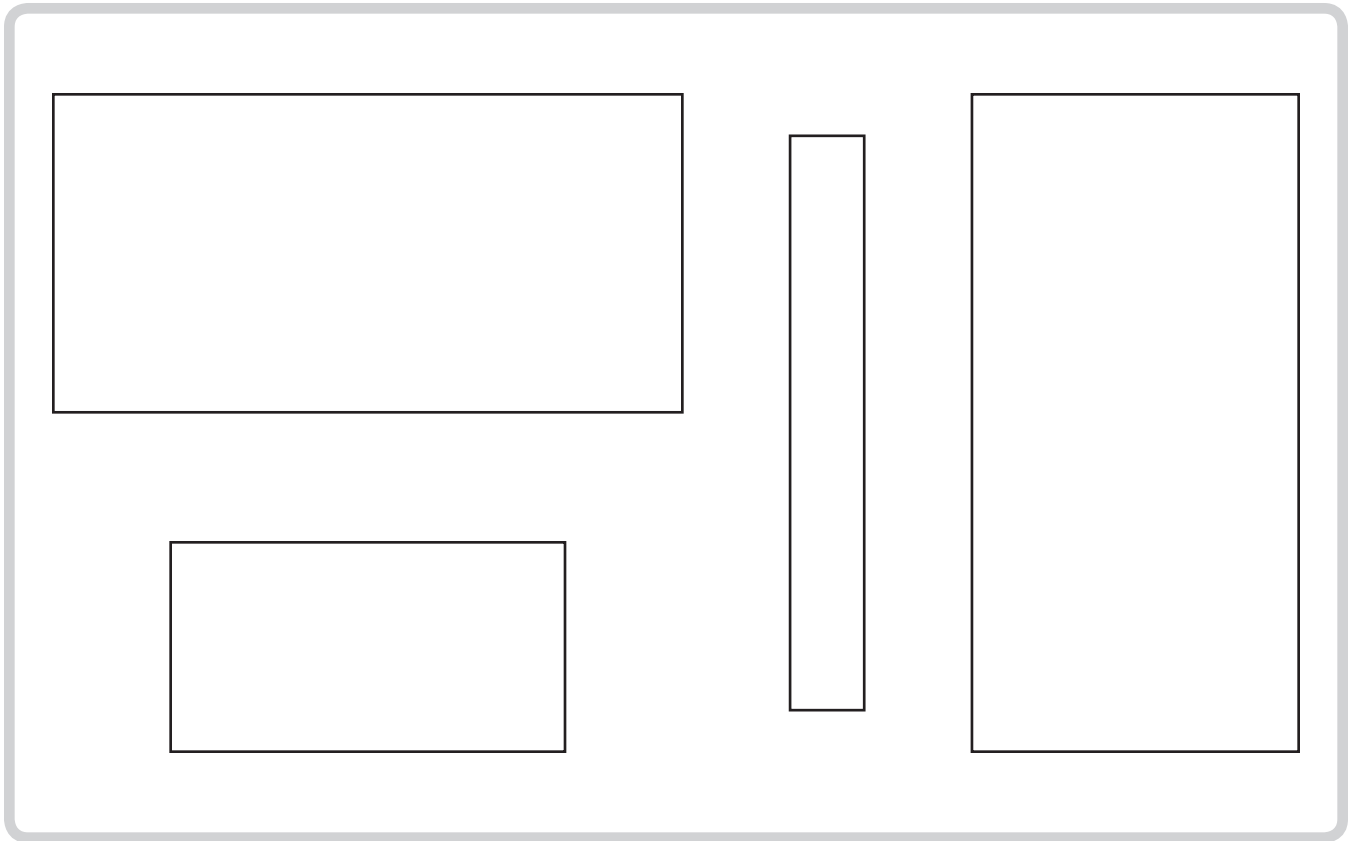


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2 cm Grid Paper



Rectangles and Not Rectangles



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