



Building School Readiness with Geometry

Peter Stowasser

Senior Author

p_stowasser@origo.com.au

Rosemary Irons

Mathematics Consultant

mathmates@ozemail.com.au

Language for Geometry – some key words

Position and Location

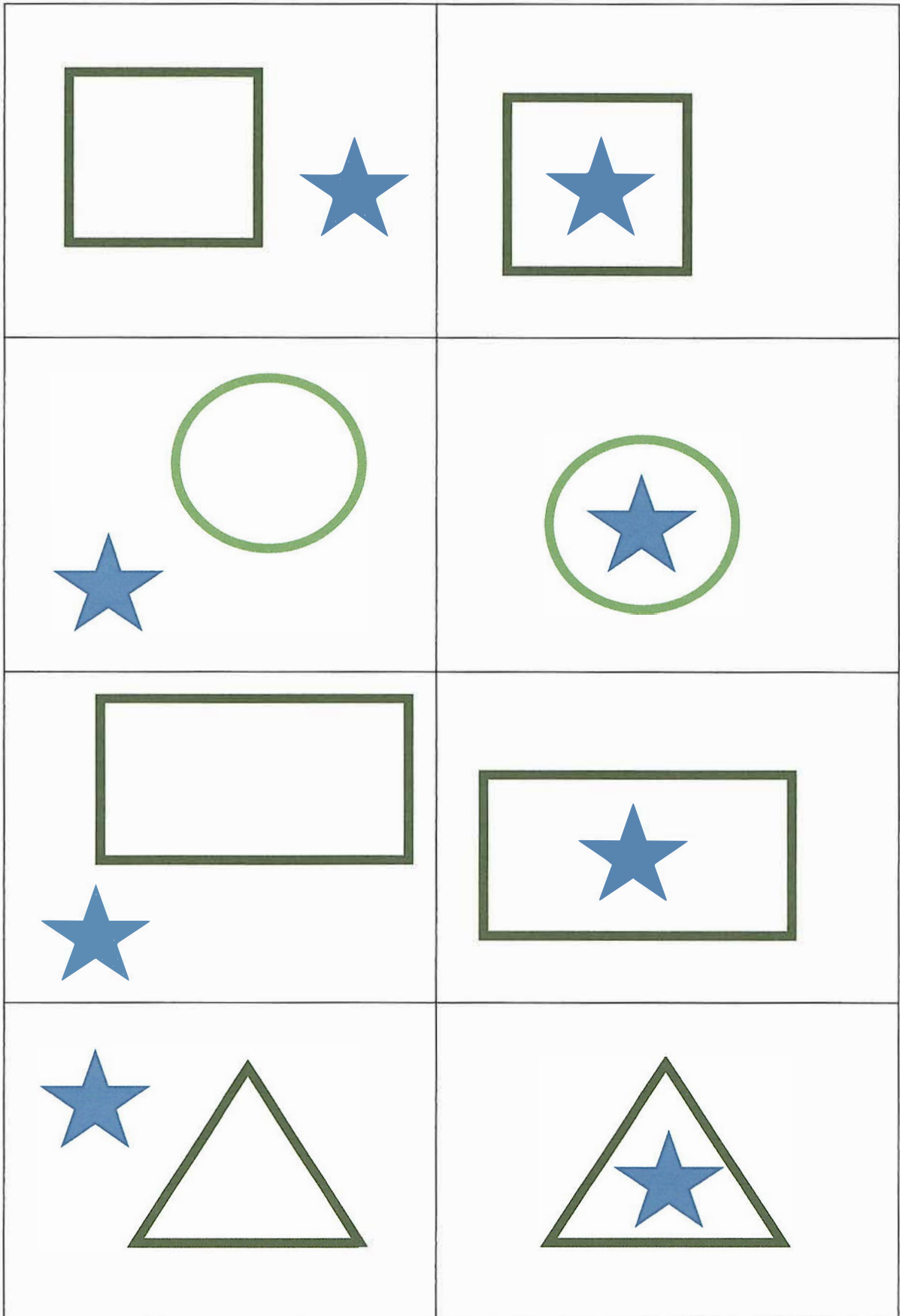
above	below	around
across	along	through
behind	front	back
beside	left	right
bottom	on	in
close	near	far
down	high	low
end-to-end	first	last
forwards	backwards	sideways
horizontal	vertical	maze
next to	between	up
outside	inside	in front
over	under	top
position	direction	location
turn	turnaround	way in
way out	walk/move on a path	

Three-dimensional objects

cone	rectangular prism	pyramid
cube	cylinder	sphere
face	corner	edge
filled	surface	apex
side	solid	hollow
solid shape	prism	vertex
space	3d face	line
stack	roll	slide
straight	curved	flat
vertices	base	

Two-dimensional objects

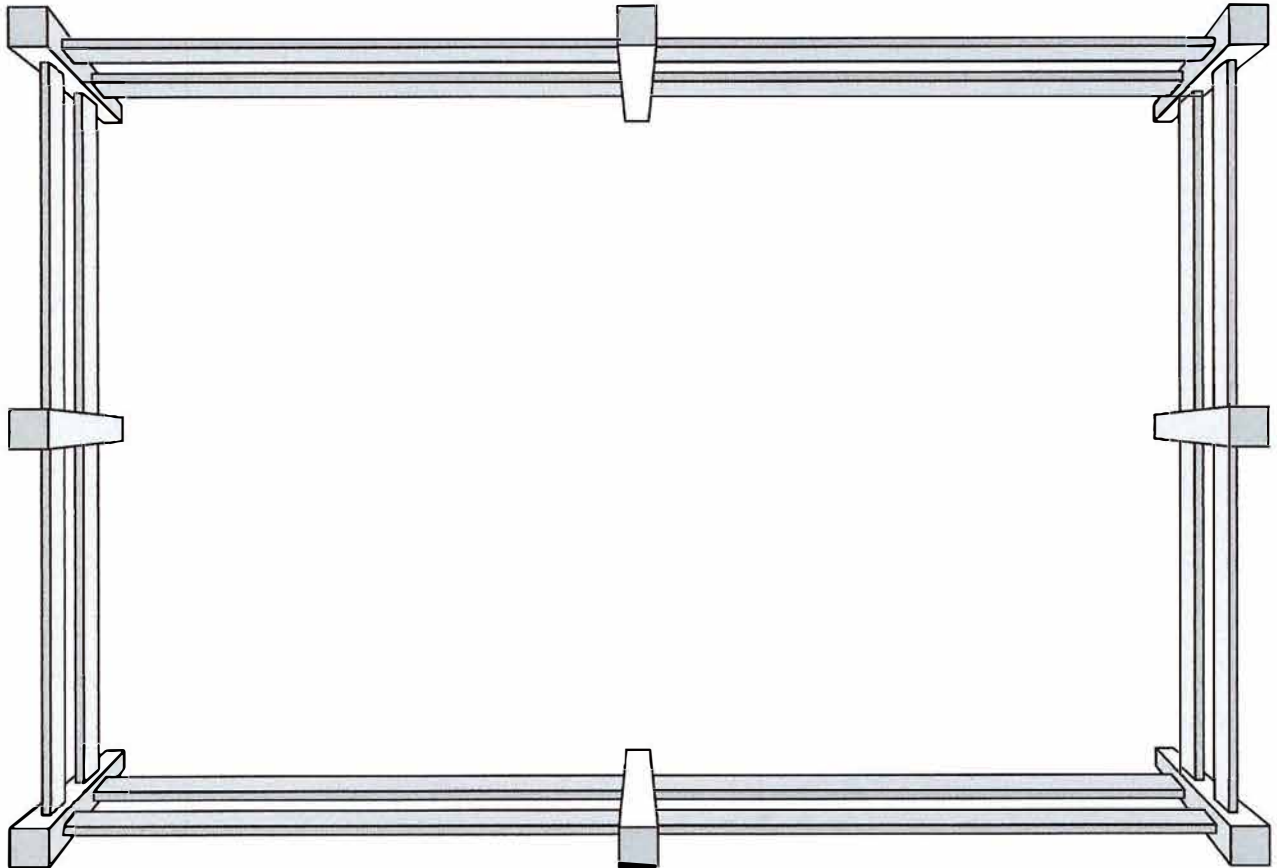
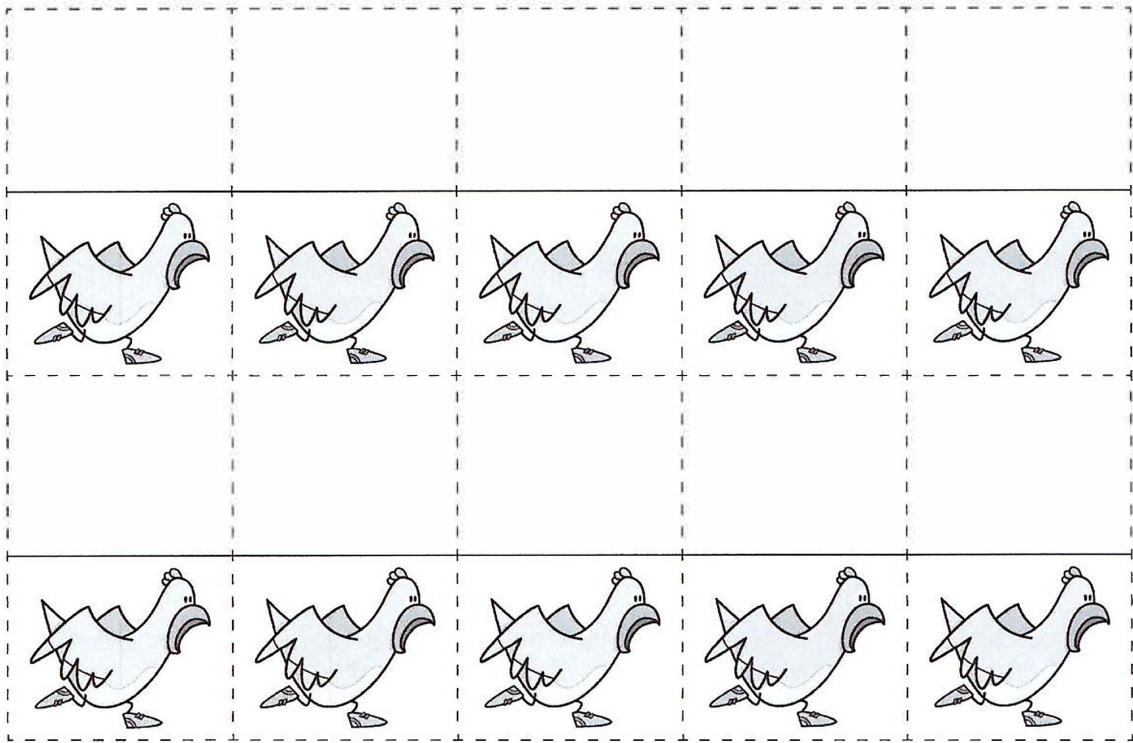
line	shape	round shape
centre	middle	closed
open	circle	triangle
square	rectangle	star
hexagon	rhombus	2d print from a 3d face
symmetry	symmetrical	matching halves
angle	right angle	side
boundary		



Place a large masking tape triangle, square, circle and rectangle on the floor or carpet. Make large enough for four children can stand inside the shapes. Small groups take turns to draw a card and do what the card says. Inside or outside a shape.

Cube A - 1, 2, 3, 4, 5, 6

Cube B - inside (I) or on three faces, outside (O) or X on three faces



Geometry - Language of position and direction

I Think I'll Go Flying

Resource – outside at large equipment or obstacle course, camera

- Teacher models positional language as children act out the location and direction movements (next to, under, through, etc.). Teacher takes photographs of children moving or standing to show location or direction positions.

Your idea:

Geometry - Three-dimensional objects

Look and See

Resource – Look and See Big Book, counters

- Child lays book flat on floor. For each page, child places a counter on matching pictorial three dimension object on facing page.

Resource – Classroom / Commercial 3D objects, Look and See Big Book

- Child selects a 3D object and finds the matching pictorial representation on a page in the Big Book. Then says the name of the 3D object.

Your idea:

*A little activity for you not the children.
Keeps your mind working. Enjoy!*

Logic and Geometry

There are four nesting boxes.

The blue box is inside the yellow box.

The green box is inside the red box.

The blue box is inside the red box.

The blue box is outside the green box.

The yellow box is outside the red box.

Which box is the smallest box?

Which box is the largest box?

Myself in Space

Children follow instructions to act out spatial relationships.

Blackline Masters 1 and 2 (pages 65–66)

Sheets of light card



Preparation

- Copy Blackline Masters 1 and 2 onto light card and cut out to make a set of 16 cards.
- For the extension activity, make one set of cards for each group.



Activity

Note: If the children have not yet learned “left” and “right”, remove this card from the set before doing the activity.

Have the children stand straight with their arms at their sides. Ask them to spread out so they cannot touch anyone. Read out the cards one at a time and give the children time to act out each instruction.



Extension

Have the children move into groups. Place a set of 16 cards in a stack facedown in front of each group. Have one child pick up four cards and read them aloud one at a time while the other children act out the instructions. Give each child a turn to be the leader and read out four instructions.



Blackline Master 1

Touch your
toes with
your hands.

Turn around.

Place one
arm above
your head.

Take one step
backward.

Place your
arms in front
of you.

Turn around
twice.

Point to
something
above you.

Take one step
sideways.



Blackline Master 2

Place your arms
behind you.

Place one foot
behind you.

Point to
something
under you.

Turn left.
Turn right.

Place your arms
at your sides.

Point to
something
far away.

Take one step
forward.

Turn all the
way around.



Which Way?

Children walk on paths following directions on cards.

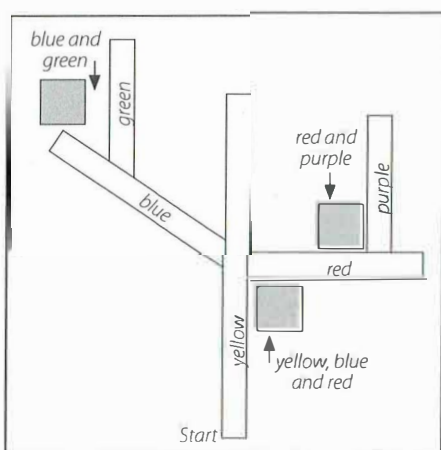
Sheets of light card

At least 5 crepe paper rolls of different colors (e.g. yellow, red, purple, green, blue)

3 small containers

Preparation

- Cut the light card to make 40 cards (4 cm × 5 cm). Write color names on the cards with crayons that match the crepe colors. Make eight cards for each of the five crepe colors. Shuffle and place the cards facedown in three containers (as shown left).
- Lay out the crepe paper paths on the floor and place the containers at their intersections (as shown left).



Activity

Taking turns, children walk along the path. At an intersection, they pick a card, say which color they picked, and walk along the matching color path. They then place the card at the bottom of the stack.

Give a child three cards: **yellow**, **red**, and **purple**, in that order. Ask them to walk along the path following the directions on the cards. Repeat with another child using **yellow**, **blue**, and **green** cards.

Ask three children to walk to the ends of different paths. Then have each child describe the paths they took to get there.



Extension

Working in groups, have the children make more challenging paths using the color cards. Include more colors and directions if desired. If the children are confident using "left" and "right", write new cards for **left** and **right** at each intersection.

Photo Puzzles

Children cut up photos of themselves to create jigsaw puzzles.

1 photo of each child

A ruler, scissors, and a pencil for each child

Envelopes

Magazines

1+ Preparation

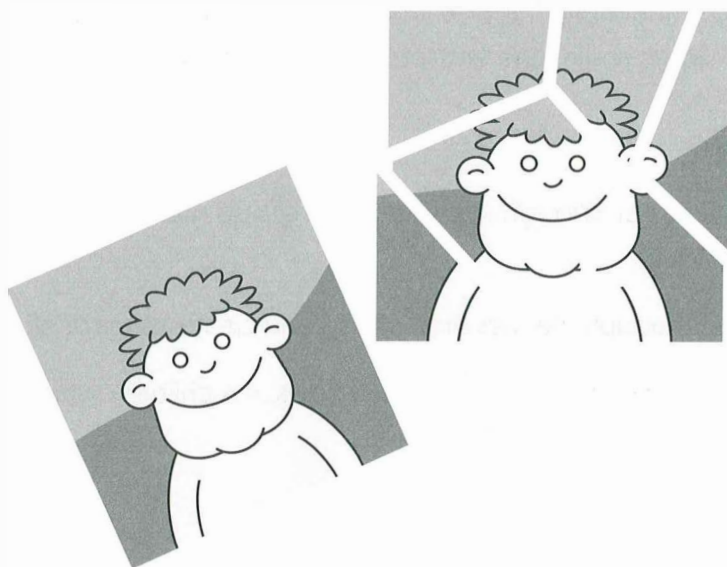
- A few days before the activity, send a note to each child's parents or guardians requesting a spare photo of the child, which will be cut up in an activity.

i Activity

Have each child place their photo facedown and rule three intersecting lines on the back. They then carefully cut along the lines to create a jigsaw puzzle. Have the children write their name on an envelope and place the puzzle pieces inside it. The children exchange envelopes with a partner and solve each other's puzzles.

i Extension

Have children make more complex puzzles by ruling more intersecting lines and cutting the photos into smaller pieces. Alternatively, have them make more puzzles by cutting pictures and photos from magazines to suit the current theme or interest.



Everyday Shapes

Children sort everyday, three-dimensional shapes into shape groups.

Sheets of light card

Collection of empty containers and boxes in cylinder, rectangular-prism, and cube shapes

Collection of empty containers and boxes in cone, triangular-prism, and pyramid shapes



Preparation

- Make three signs on light card for **cylinder**, **rectangular prism**, and **cube**. Place the signs at the front of the class where every child can see them.
- For the extension activity, make signs for **cone**, **triangular prism**, and **pyramid**.



Activity

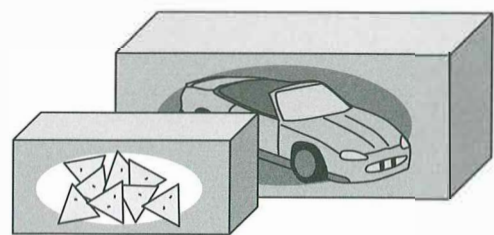
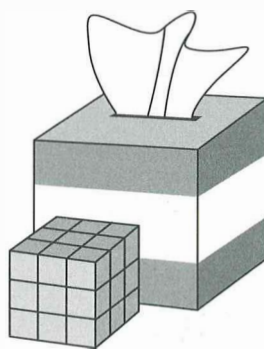
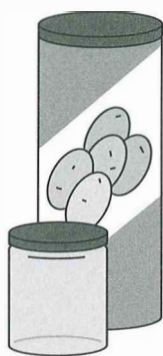
Show the children the sign for each three-dimensional shape and then read the names together. Show the children an everyday example of each shape and discuss the attributes of each.

Have the children work together to sort the everyday shapes into shape groups near the matching signs.



Extension

A few weeks later, repeat the activity for the other three-dimensional shapes.



Imagine the Shapes

Children move their bodies to create three-dimensional shapes.

Large three-dimensional shapes of different types (e.g. sphere, cube-shaped box, pyramid)



Activity



Have the children stand straight with their arms at their sides. Ask them to spread out so they cannot touch anyone.

Show the ball to the children and say, **This is a sphere. Make yourself into this shape. Make yourself into a large sphere. Now change to a little sphere.** Then show the cube-shaped box and say, **Make yourself into a shape that has flat faces like a cube.** Then show the pyramid and say, **Now make yourself into this pointed shape.**

Explain that the children will make three-dimensional shapes with their hands. Show the ball to the children and reinforce that the shape is a sphere. Say, **Make the sphere with your hands. Raise the sphere above your head.** Then show the cube and say, **Make your hands into a shape like a cube.** Finally, show the pyramid and say, **Make the pyramid shape with your hands.**

Have the children work in pairs to make each shape with all four hands. Repeat the above instructions for making hand shapes.

Say, **Let's imagine that we are building shapes with wet sand at the beach. Close your eyes and think about the beach and the sand.** Then ask the children to open their eyes, and show them the ball. Ask them to name the shape. Then say, **Yes, it is a sphere. Make an imaginary sphere with your wet sand. Pat it so it feels smooth and has a round surface.** Allow time for the children to pretend to make the shape with sand. Show the cube to the children and say, **Look at this cube. Now pretend to make a cube in the wet sand. Make it so big that you can't move it.** Finally, show the pyramid to the children and say, **Now make a pyramid with the wet sand. Make it a pointed shape.**



Extension

Repeat the activity. This time, have the children imagine making rectangular prisms, cones, and cylinders in the snow.

Yes or No?

Children ask yes or no questions to identify a hidden, three-dimensional shape.

Cloth bags, or boxes with hand-sized hole in the top

Collection of geometric, three-dimensional shapes (e.g. cone, rectangular prism, cube, sphere, cylinder, pyramid)



Preparation

- Place a collection of geometric, three-dimensional shapes in a bag or box. Make one for each group. For the extension activity, make one for each pair.



Activity

Note: This activity is best for a small group with an adult as the leader.

Have the children take turns to place their hand in the bag and hold one of the three-dimensional shapes. If the child is uncertain which shape they have, they can check with the adult. Ensure the other children do not see the shape. The children then ask yes or no questions to identify the three-dimensional shape. Encourage children to ask whether the shape has straight or curved surfaces, and whether it rolls or stacks. When a child correctly guesses the three-dimensional shape, remove the shape. That child gets to place their hand in the bag and hold a new shape for the children to guess.



Extension

Distribute more shape bags and have the children play the game in pairs. Encourage them to use appropriate language to describe the attributes of three-dimensional shapes.

Repeat the activity later in the year, encouraging the children to ask more complex questions about the numbers of edges, faces, and corners.

Shape Bingo

Children trace around pattern blocks to make bingo boards.

Sheets of light card

1 blank cube for each group

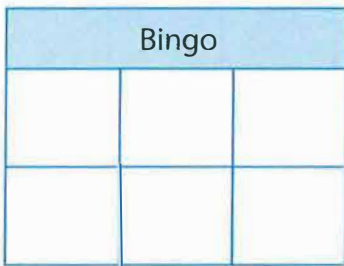
Collection of pattern blocks

Crayons for each child



Preparation

- Cut light card to make blank bingo boards with ruled lines (as shown below left). Make several for each child.
- On a blank cube, draw a different pattern-block outline on each face (e.g. 2 different rhombuses, triangles, squares, hexagons, trapezoids). Make a cube for each group.



Activity

Note: In North America, the term “trapezoid” is used to describe a quadrilateral that has two parallel sides. In Australia, Europe, and elsewhere, the same shape is called a “trapezium”.

Place a container of pattern blocks and one cube in the middle of each group. Distribute a blank bingo board to each child. One child rolls the cube and selects the pattern block that matches the shape outline on the cube. The child traces the pattern block onto a section of their bingo board while the next child rolls the cube and draws that matching shape on their board. Continue until each child has drawn six random shapes on their board. The same shape can go on the board more than once. Distribute more blank bingo boards and repeat the activity so the children make many filled bingo boards.



Extension

Distribute a filled bingo board to each child. Taking turns, each child rolls the cube and places the matching pattern block onto its outline on the board. If they have more than one of the same shape on the board, they can cover all the same shapes at once. The first child to cover all the shapes on their board says, *Bingo*.

Note: Store the filled bingo boards and pattern-block cubes for the “Backward Bingo” activity (page 52).

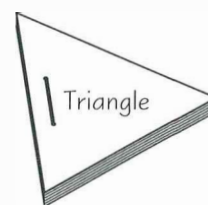
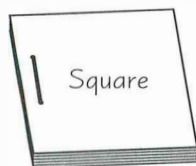
Shape Books

Children find pictures of two-dimensional shapes to paste onto paper to create shape books.

3 large sheets of paper for each pair
Sheets of heavy card
Magazines and catalogs
Scissors, glue, and a pencil for each pair

Preparation

- Cut sheets of large paper into square-, circle-, and triangle-shaped sheets. Make one of each shape for each pair.
- Cut the heavy card into triangle, square, and circle shapes to make the front and back book covers (as shown below).



Activity

Distribute a set of three paper shapes, magazines and catalogs, scissors, glue, and a pencil to each pair. Have the children look for pictures of two-dimensional shapes in magazines and catalogs (e.g. square windows, circular buttons, triangular road signs). They then cut out the pictures and paste them on the corresponding paper shape. After they fill each paper shape, they write their initials on each paper.

Ask the children to sort their work into three shape stacks. Take one stack, add the front and back covers, and staple to make a shape book. Repeat with the other two shape stacks. Write the title of each book on its front cover. Show the children the books and ask them to describe the pictures they found.

Extension

Discuss famous locations and other places where shape words like "circle", "square", and "triangle" are used. For example, say, **Square is used in Trafalgar Square and Madison Square Garden. What does it mean to be square, do a square dance, have a square meal, beat someone fair and square?** Use examples that suit your own location.