1981

Space to play: games and activities for spatial concepts in primary school children

Helen Mansfield (Ed.)
Churchlands Colege

Edith Cowan University

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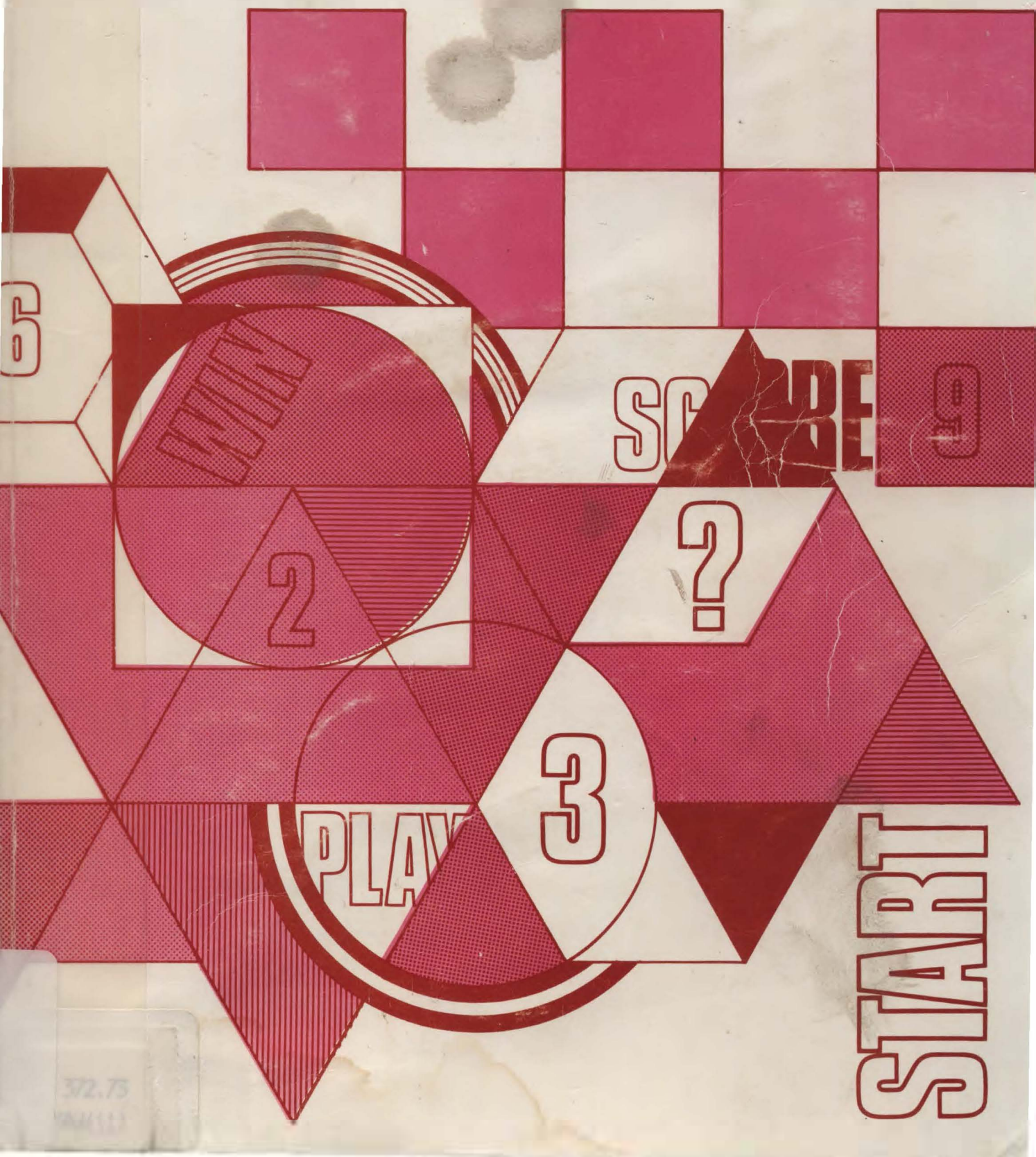
SPACE TO PLAY



SPACE TO PLAY

GAMES AND ACTIVITIES

FOR SPATIAL CONCEPTS

IN PRIMARY SCHOOL CHILDREN

Edited by Helen Mansfield,
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PERTH
CHURCHLANDS COLLEGE
1981

SPACE to play : games and activities for spatial concepts in primary school children / edited by Helen Mansfield. - Perth : Churchlands College, 1981.

ISBN0-909360-46-4

1. Geometry - Study and teaching (Elementary). 2. Space perception in children. I. Mansfield, Helen II. Churchlands College.

372.73

(Cataloguing entry by the Churchlands College Library).

Published and Printed by Churchlands College, Pearson Street, Churchlands, Western Australia 6018.

National Library of Australia card number and ISBN 0-909360-46-4

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INTRODUCTION

Spatial concepts are amongst the most important mathematical concepts that young children develop. Ideas of shape, size, and position are part of the young child's mathematical world from the very beginning. The spatial environment of the child is always changing. Objects move around in his environment, just as he moves around and observes them from different positions. The relationships between objects and their relative shapes, sizes and positions are constantly changing.

In our teaching of the Space strand of the primary mathematics syllabus, we are trying to develop in children the understanding and skills associated with spatial relationships that are important and appropriate to them.

The games and activities presented here are for the enjoyment and stimulation of the children in your class and focus on two important spatial concepts. The first of these is the idea of a boundary, and the second is the idea of scale.

We believe that the children in your class will enjoy learning about these ideas through playing the games and doing the activities we have written.

PART 1 BOUNDARIES

One of the earliest spatial concepts that the child develops is the idea of position. Words and phrases such as "over there", "here", "my place mat" are used by the child as he begins to organise his spatial environment into regions. Associated with this organisation is the idea of a boundary. Sometimes the boundary is visible, such as the chalk marks in a hopscotch game, sometimes the boundary is invisible, such as the imaginary line dividing "my half" of the desk from "your half".

The Space strand of our syllabus develops the associated concepts of regions and boundaries as a theme. The games in this section of our book are intended to enhance these concepts in children.

Each game specifies its purpose, the associated Western Australian syllabus entry, and the equipment necessary for playing the game. Where possible, game boards have been drawn to the correct size for immediate use in your classroom. In other cases, the information given should be enough to enable you to construct your own games.

We hope you and your class enjoy playing these space games.

PART 1 CONTENTS

CROCODILES

Noelene Reeves

A game for 2 players.

PURPOSE

This game encourages children to recognize the boundaries of a region and to understand adjoining regions.

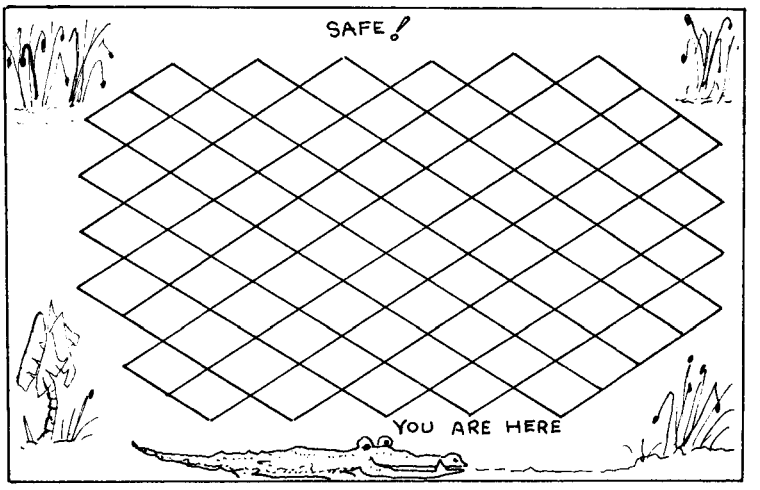
W.A. SYLLABUS ENTRY

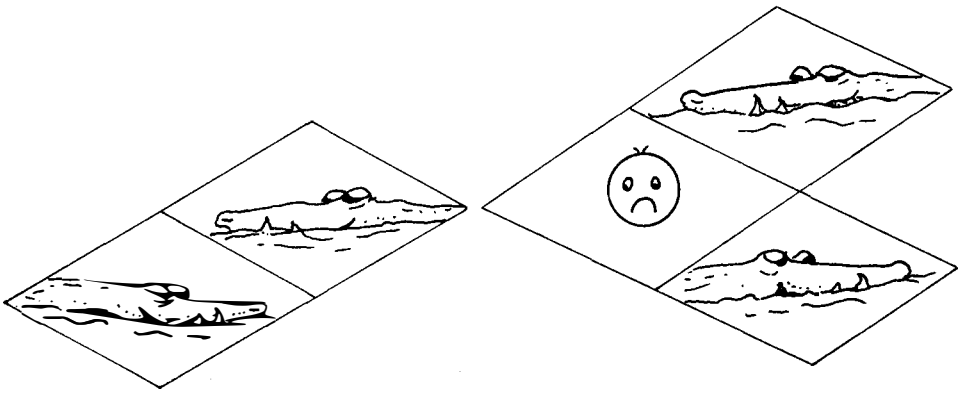
Space stage 2 page 41.

12. Play games involving "territories": home area, neutral ground, safe path.....

EQUIPMENT NEEDED

Crocodile Counters
Playing board
Small figure





HOW TO PLAY

Player 1

You have to cross the river. There are crocodiles in the river.

Rule Take one step each turn - you may only step into a space joining the one you are in.

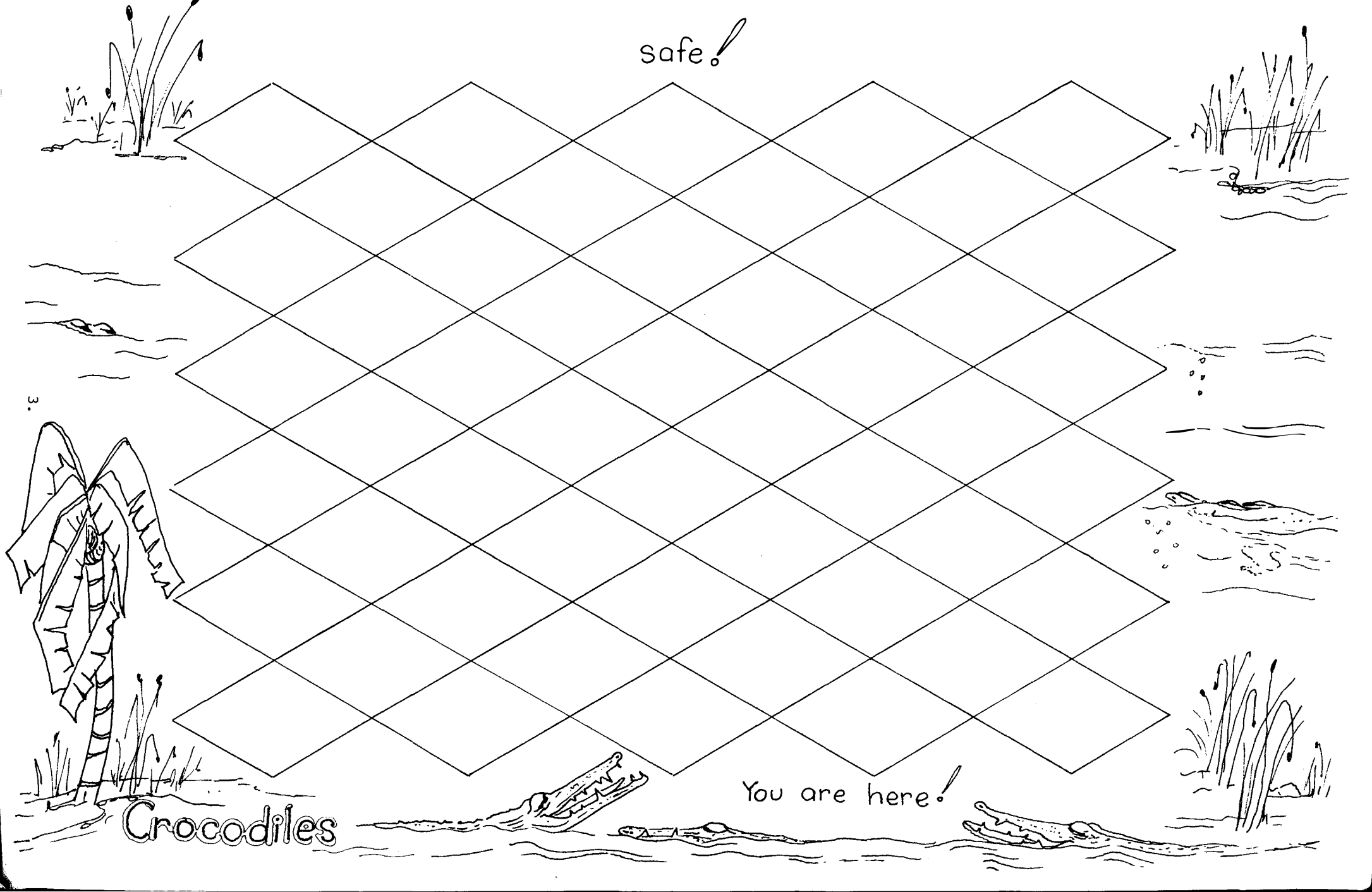
Where are the crocodiles?

Can you find a safe way to the other side?

Player 2

Rule You may put one crocodile down after each step made by Player 1. You can move your crocodile from place to place.

Can you stop your opponent reaching the safe bank?


safe!
3.
Crocodiles
You are here!

MAKE A HEXAGON

Jennifer Smallman

A game for 2, 3, or 4 players.

PURPOSE

This game encourages children to recognize the boundaries of a region. It develops size, shape, change of position concepts. Mathematical terms such as triangle, hexagon and rhombus may be used.

W.A. SYLLABUS ENTRY

Space stage 2 page 41.

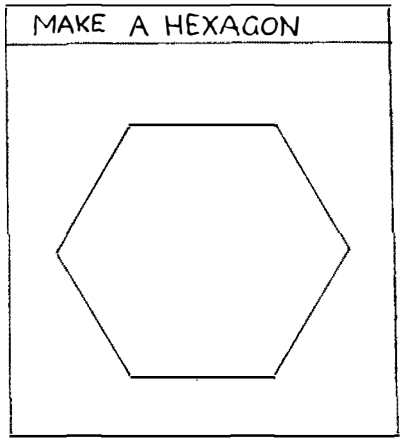
8. Carry out activities involving paths, boundaries, areas and surfaces.

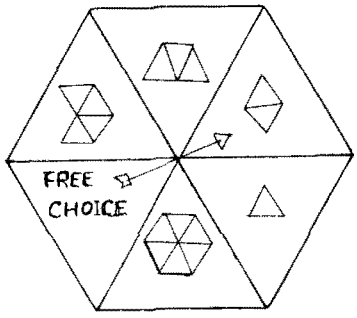
EQUIPMENT NEEDED

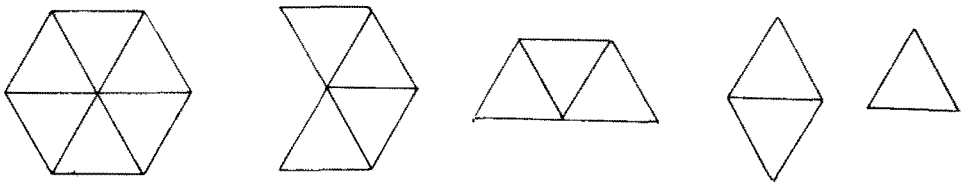
A hexagon form board.

Small shapes - triangle, hexagon, trapezoid, rhombus and as below.

A spinner







HOW TO PLAY

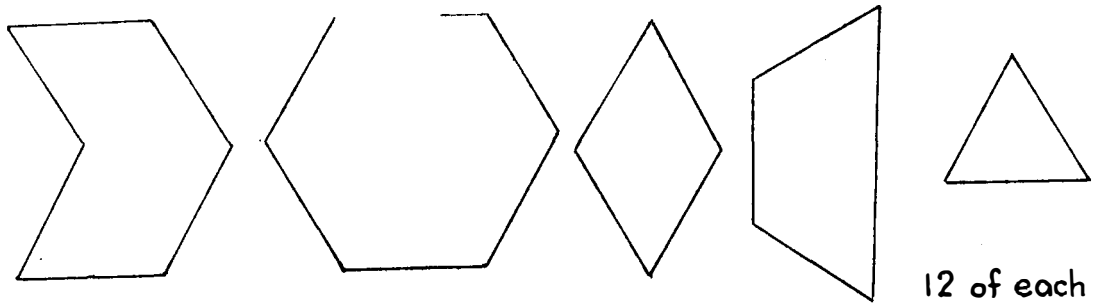
The first player spins the spinner and picks up a matching piece from the playing pieces. He places it on "Make a Hexagon" Board, wherever he chooses.

The second player spins the spinner and picks up a matching piece from the pile. This piece is placed on the board with at least one edge touching the first player's piece.

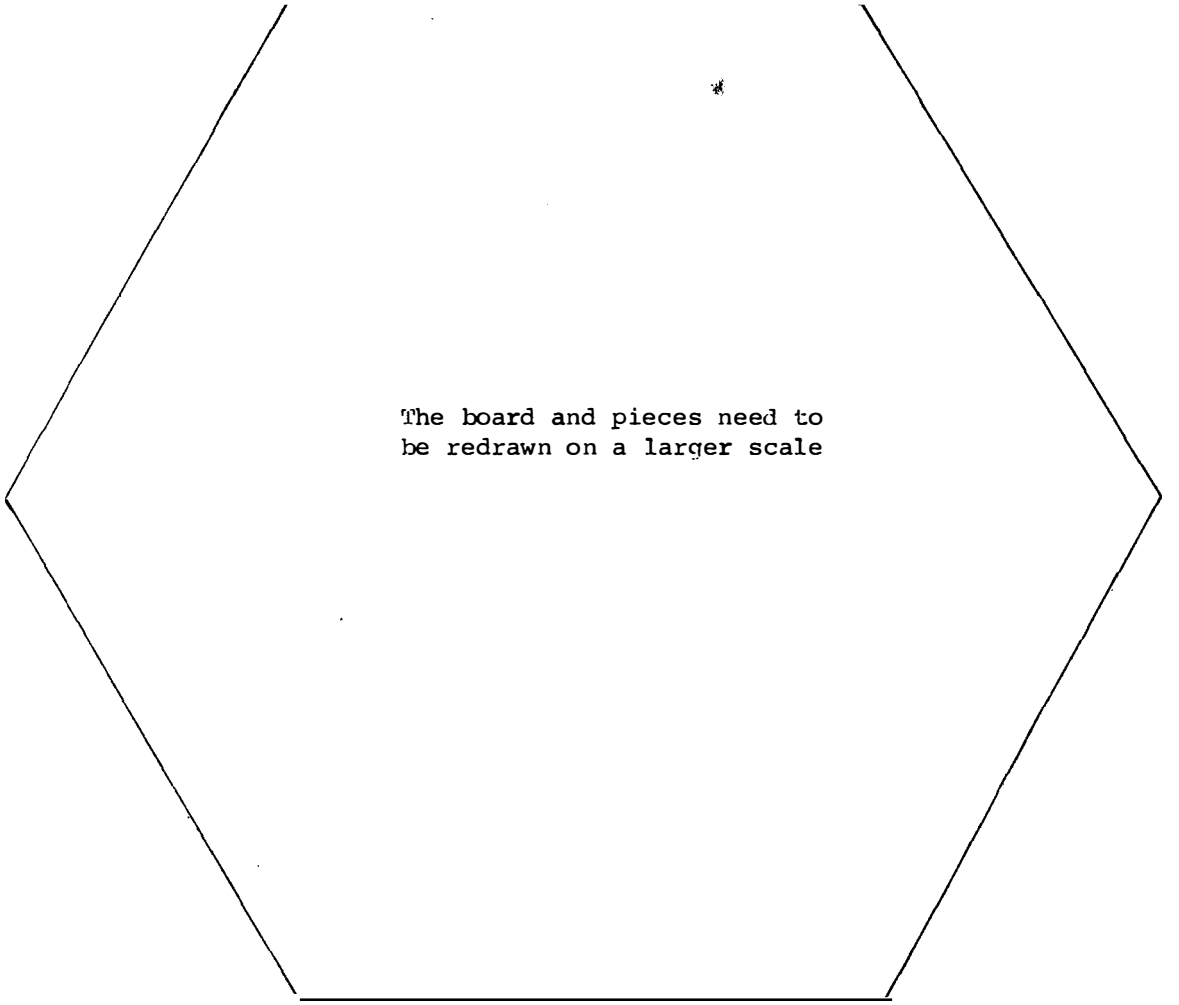
The game proceeds with players taking it in turn to spin the spinner, pick up a piece and place it on the board next to another piece already on the board.

If the player spins and cannot use the piece given, he misses his turn.

The player to fit the last piece on the board wins the game.



12 of each



CLIMB TO THE TOP

Jane Lowe

A game for 2 players.

PURPOSE

The game is to help children recognize 1) the boundaries of a region, 2) adjoining regions, and to give them practice in working out a strategy for play.

W.A. SYLLABUS ENTRY

Space stage 3 page 45.

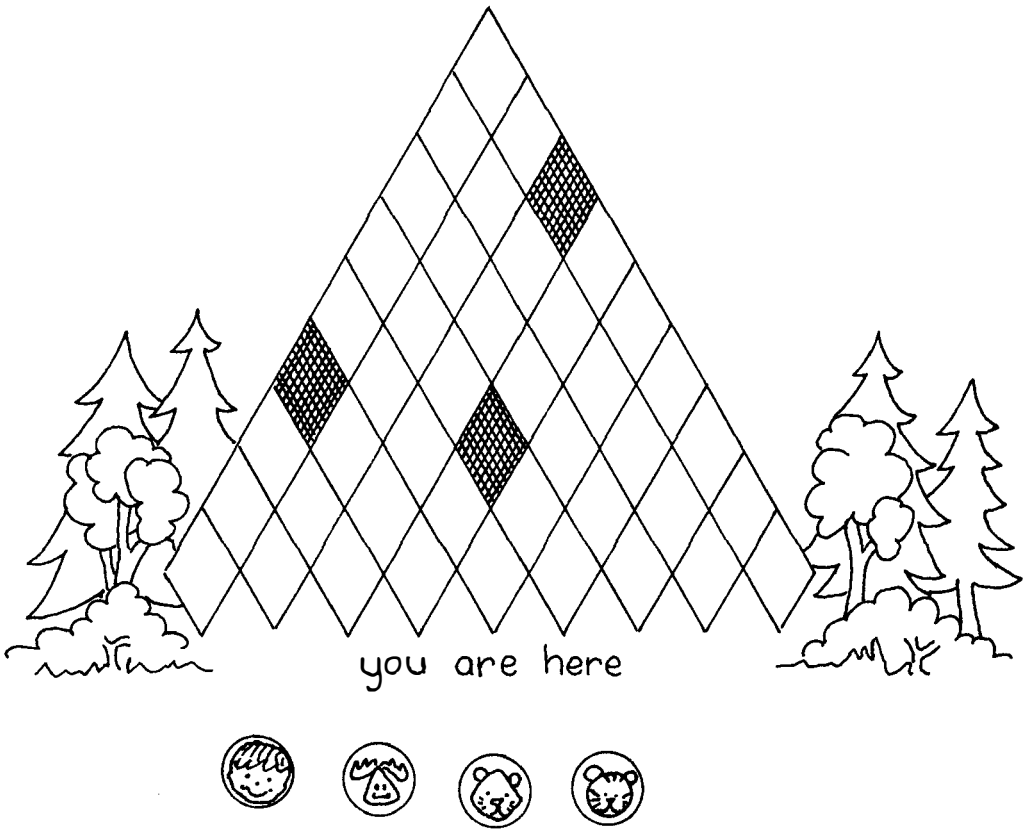
12. Play games based on movement and position using tracks, grids, "safe territory", "home base".

EQUIPMENT NEEDED

Playing board

Wild animal counters

Person counter



Player 1

You have to get to the top of the mountain. There are wild animals that may block your path. There are dangerous ledges that you can't go onto - these are blacked out spaces.

Rules

1. Take one step each turn.

2. Step into a space joining the one you are in.

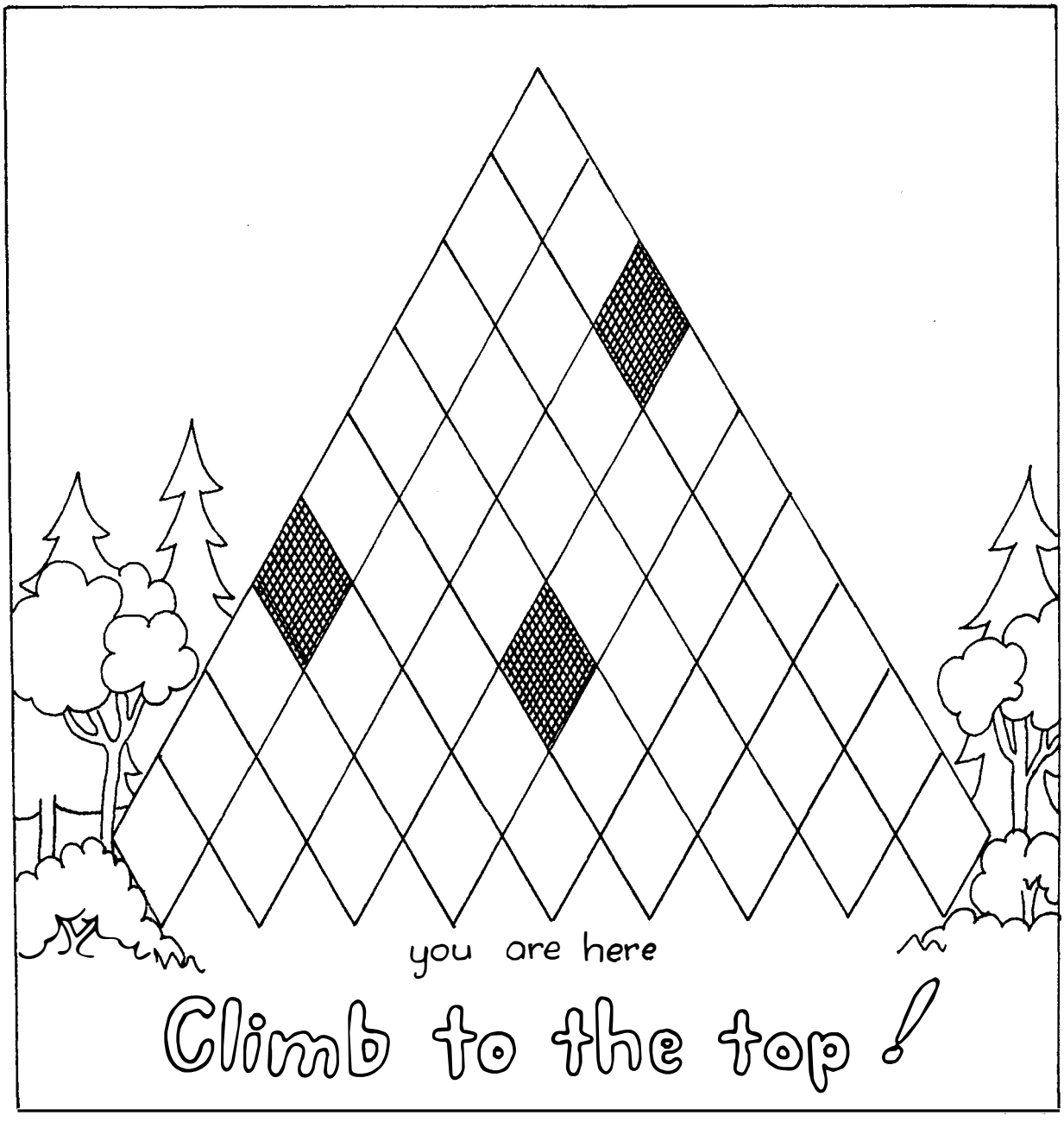
Player 2

You put down a wild animal after each step made by player 1.

After all three have been placed you may move them from place to place, to try to block player 1.

Rules

The animals must move into a space joining the one they are already in.



playing pieces

HEX-A-BEE

Jane Howell

A game for 2 players (or possibly two pairs or teams).

PURPOSE

Encourages further recognition of the boundaries of a region (in particular a hexagonal region), promotes understanding of adjoining regions, and encourages children to recognize paths by movement through a grid.

W.A. SYLLABUS ENTRY

Space stage 3 page 45.

12. Play games based on movement and position using tracks, grids, "safe territory", "home base".

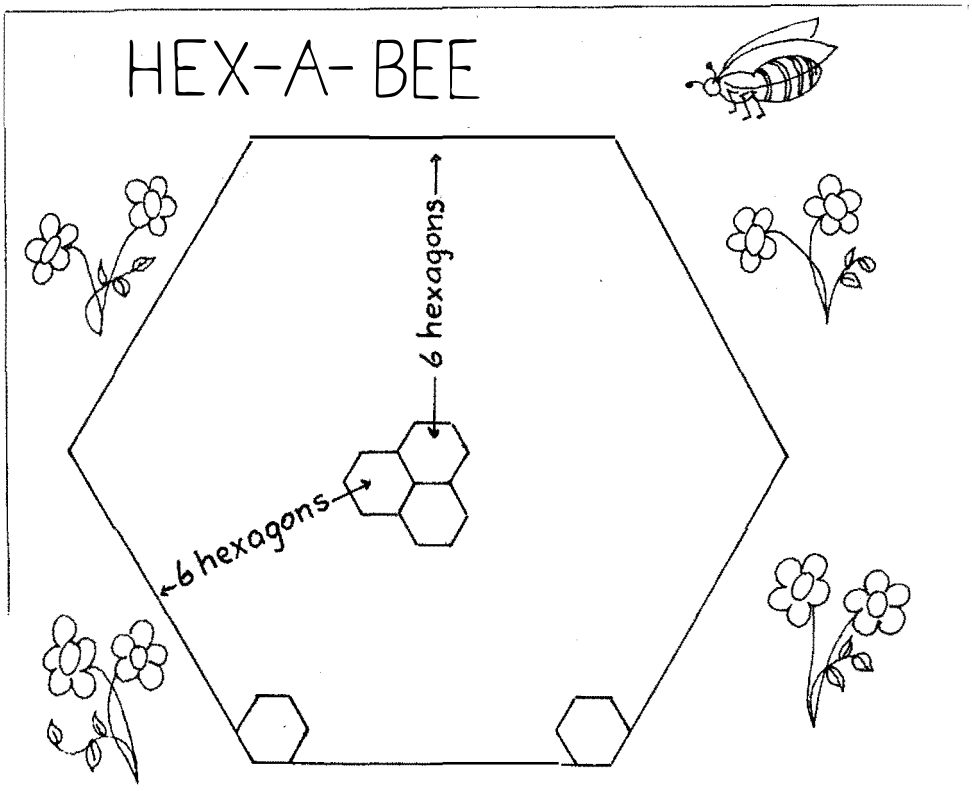
EQUIPMENT NEEDED

6 sided die (nos. 1 - 6)

matches (broken in half)

playing board

bee (counter or cardboard cut-out).



Game board dimensions : 60cm x 60cm

Each hexagon : 3½ cm wide , 2cm sides (½ match)

HOW TO PLAY

Bee and Catcher take turns to throw the die. Bee starts first.

Bee

Start in the middle hexagon. You must escape to the flowers and collect pollen. Throw the die and move that number of spaces. You will need to plan your course. Watch out for the catcher's matches. How can you avoid them? You may return to your starting middle hexagon if need be.

Catcher

After each move by the bee, throw the die and pick up that number of half matches. Use them to try and block the bee's path to freedom. Matches may be left on the board after each move. Can you stop the bee from collecting pollen? How quickly can you catch him?

Swap places for next game.

Scoring (if desired)

1. If you are the bee, score a point for reaching freedom. If you are the catcher score a point for capturing the bee (i.e. surrounding him with matches) OR

2. The winner (bee or catcher) of each round adds the number of matches used to his score. Make sure an even number of games has been played before declaring an overall winner.

TRAP THE TIGERS

Jane Lowe

A game for 2 players.

PURPOSE

The game is to help children recognize: 1) the boundaries of a region, 2) inclusion in a region.

W.A. SYLLABUS ENTRY

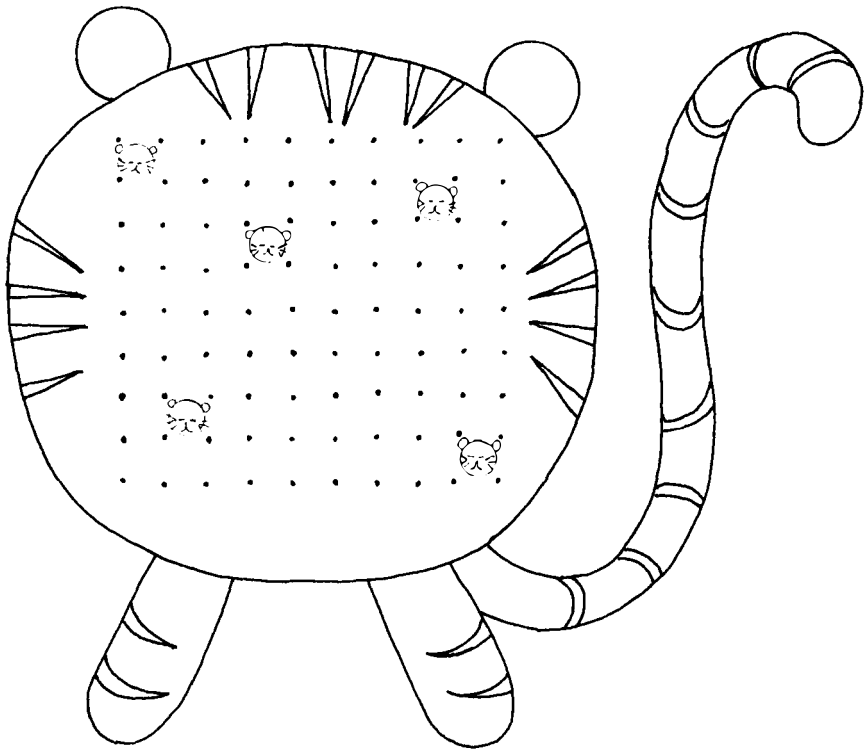
Space stage 3 page 45 .

12. Play games based on movement and position using tracks, grids, "safe territory", "home base".

EQUIPMENT NEEDED

Gameboard

2 Chinagraph pencils or non-permanent markers.



HOW TO PLAY

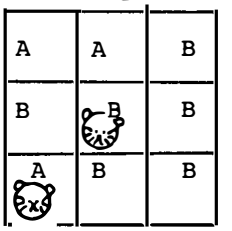
Players take turns in joining 2 dots. Lines can go across or down, not diagonally.

You must complete as many small squares as you can while trying to stop your opponent from doing so.

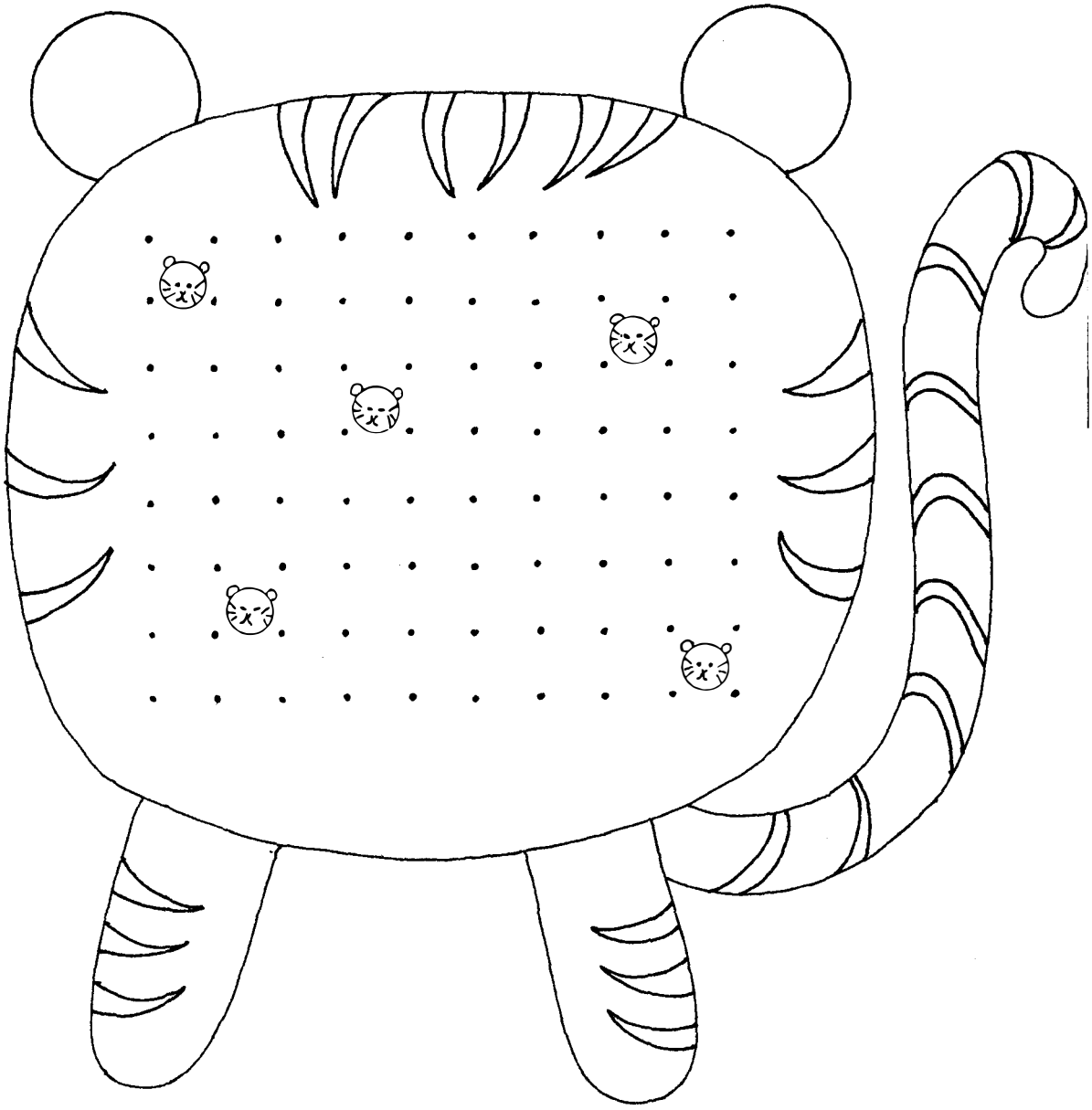
Put your initial in each square you complete and take another turn.

Squares in which animals are caught score 5 points, other squares score 1 point.

Example



B = 10 points
A = 7 points.



trap the tiger

CATCH ME IF YOU CAN

Aileen Kinsella

A game for 2 players.

PURPOSE

A game based on movement and position, using tracks, grids, "safe territory", adjacent paths, changing direction.

W.A. SYLLABUS ENTRY

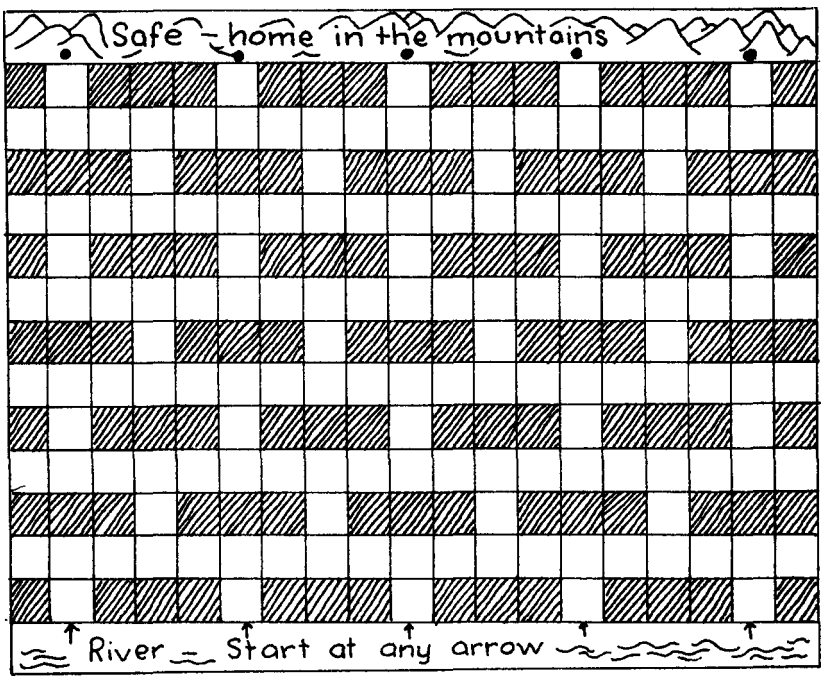
Space stage 3 page 45.

12. Play games based on movement and position using tracks, grids, "safe territory", "home base".

EQUIPMENT NEEDED

Board 30 cm x 42 cm. (Could use ordinary squared paper and small counters).

6 counters - 5 of 1 colour - 'Bad Spirits'
1 of another colour - 'Little Aboriginal'



shade black

shade red

HOW TO PLAY

Read Story - The Five Bad Tree Spirits

A little aboriginal boy lived in the Yellow Mountains. He loved to cross the Red Desert and swim in the Blue River. He had to be sure of returning to the Yellow Mountains before sunset, when the 5 Bad Spirits, who lived in the dead trees of the Red Desert, came awake and would try to catch him and turn him into one of them. One evening he was late and they chased him all over the Red Desert, but by being careful and keeping his eyes on the bad spirits he found he could slip past them and return to the Yellow Mountains. After that he was not frightened of the Bad Spirits anymore.

1st Move Player 1 places 5 Bad Spirits anywhere on black squares - thereafter can move only on black.

2nd Move Player 2 starts at any arrow and moves one square at a time only on red and in any direction. Players take turns. Move counters any directions one square at a time onto adjacent squares.

Rules

1. Player (Aboriginal) cannot move between 2 bad spirits as he tries to reach home safely in the Yellow Mountains (Any Black Dot).

2. Black spirits may jump across a red square (1 move) from side to side in any direction.

Catch Me If You Can
Yellow Mountains
finish at any black dot
Forest (colour dark green)
Forest (colour dark green)
Blue River
start at any arrow

PIRATE TREASURE

Lynne Messenger

A game for 2 to 4 players.

PURPOSE

This game is to encourage the children to recognize boundaries and regions - safe regions, unsafe regions and neutral regions.

W.A. SYLLABUS ENTRY

Space stage 3 page 45.

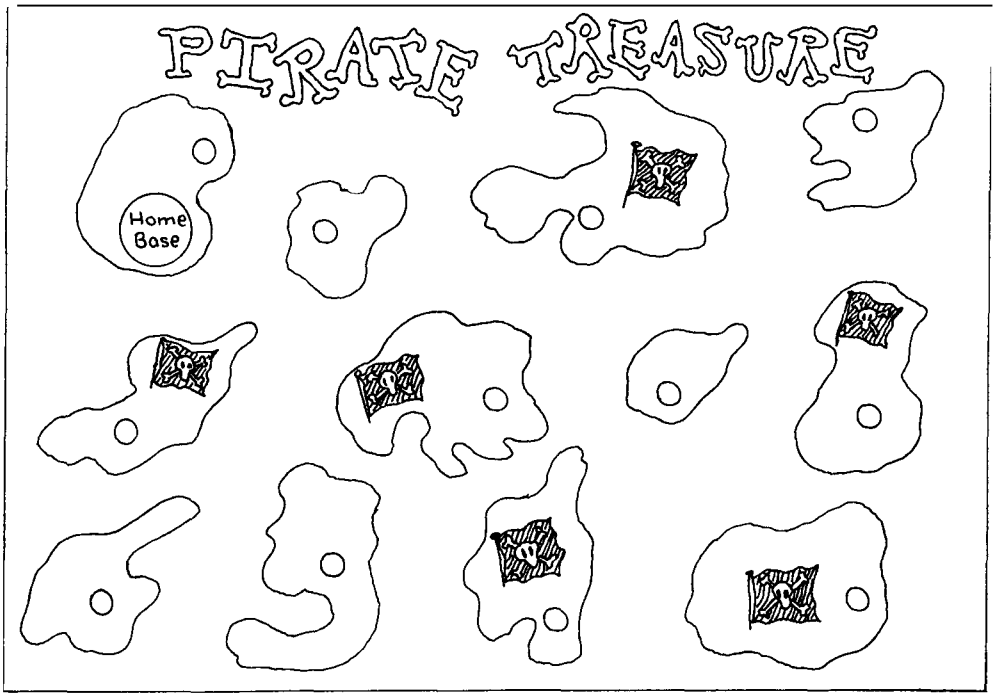
10. Carry out activities involving paths boundaries and regions.
12. Play games based on movement and position using tracks, grids, "safe territory", "home base".

EQUIPMENT NEEDED

1 large and 1 small counter for each player.

Playing board.

Pieces of gold (cardboard cutouts).



HOW TO PLAY

Each player has 1 large and 1 small counter (large used to flip small one) and 10 pieces of gold.

Starting at home base each player takes it in turn to flip his counter.

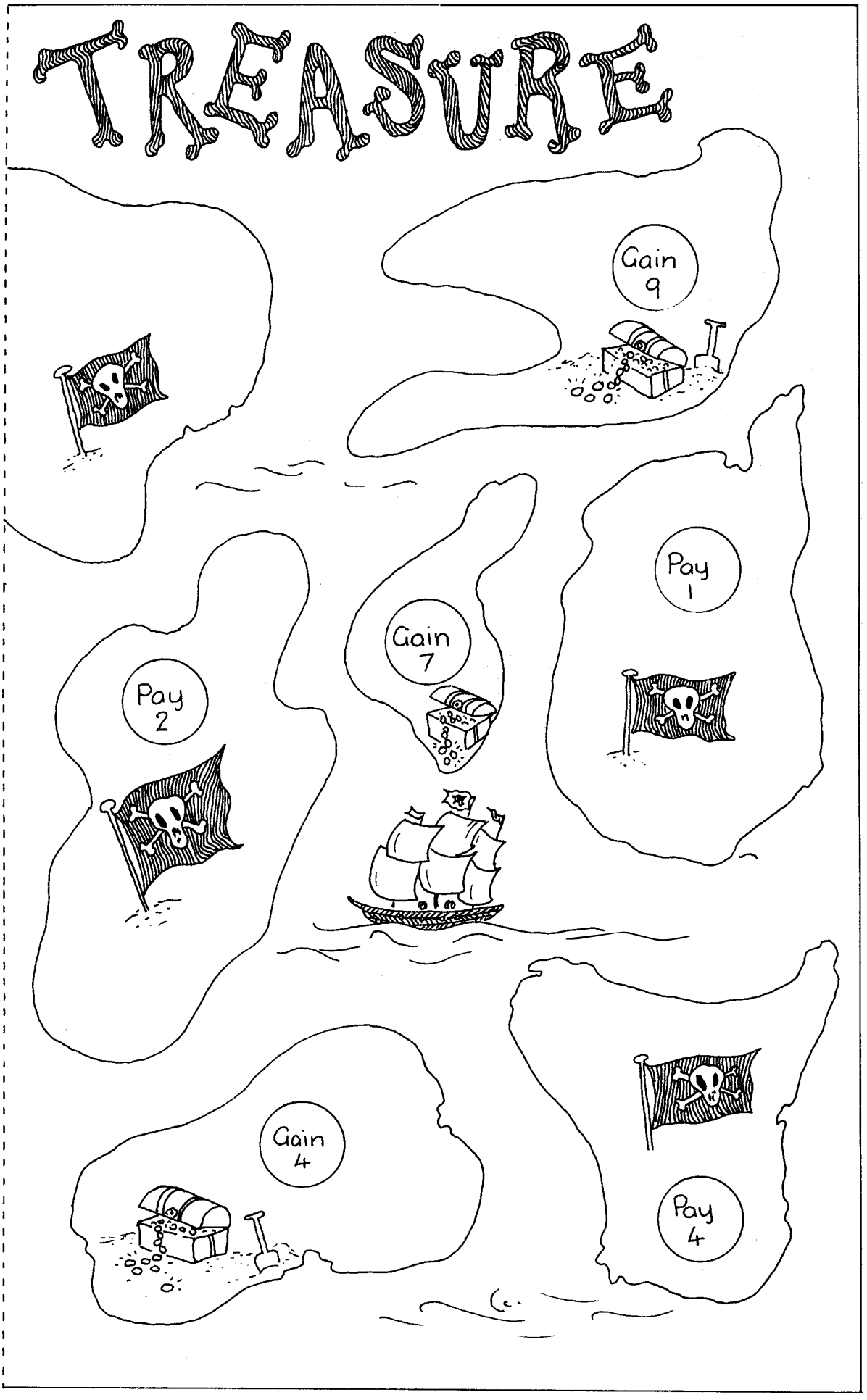
If you land on water you are on neutral territory.

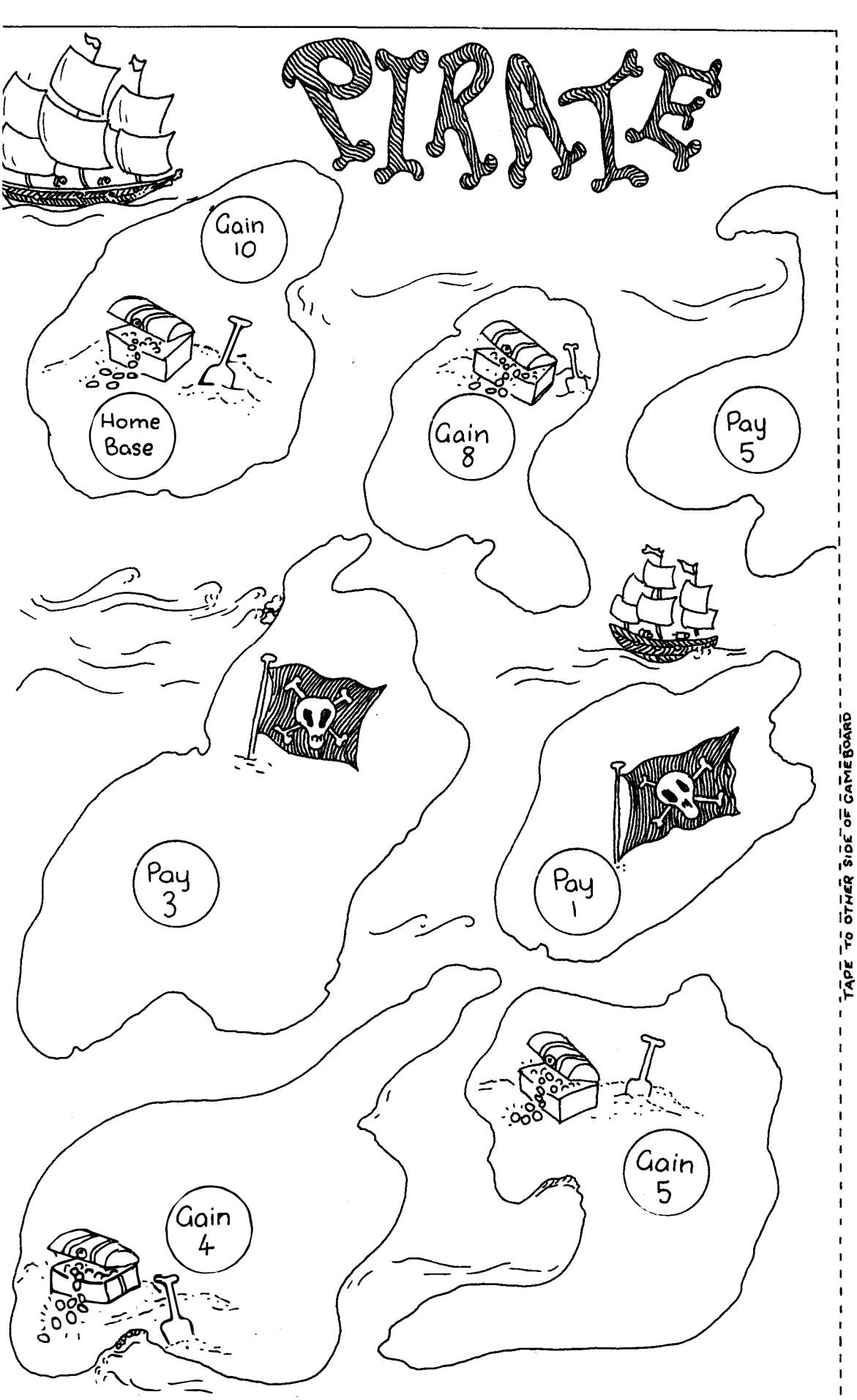
If you land on a pirate's island you must pay the pirate and return to home base - this is the end of your game.

If you land on a safe island you are rewarded and may flip again when your turn comes around.

If you flip off the board you are out.

The winner is the player with the most gold when everyone is out.


TREASURE
Gain 9
Pay 1
Gain 7
Pay 2
Gain 4
Pay 4


PIRATE
Gain 10
Home Base
Gain 8
Pay 5
Pay 3
Pay 1
Gain 5
Gain 4
TAPE TO OTHER SIDE OF GAMEBOARD

SQUARE-ACROSS, HEXACROSS AND TRIACROSS

Rik Nitert

A game for 2 players.

PURPOSE

Encourages children to discuss and recognize the boundaries of different shaped regions and understand the different ways they are joined, thereby creating different "pathways" among different shapes.

W.A. SYLLABUS ENTRY

Space stage 4 page 49.

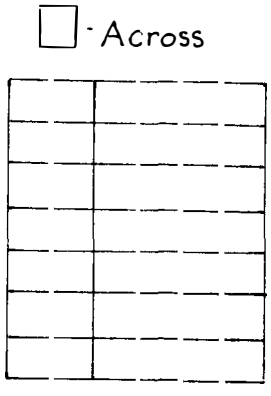
7. Carry out activities which give experience with paths and routes.

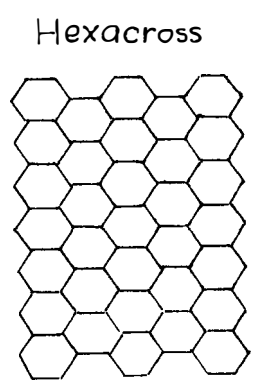
EQUIPMENT NEEDED

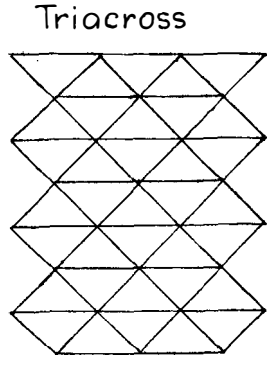
Boards or Sheets for Square-Across, Hexacross and Triacross

Coloured pencils

A 2¢ coin or counter of the same size.







HOW TO PLAY

The object is to be the first player to colour a pathway across the grid.

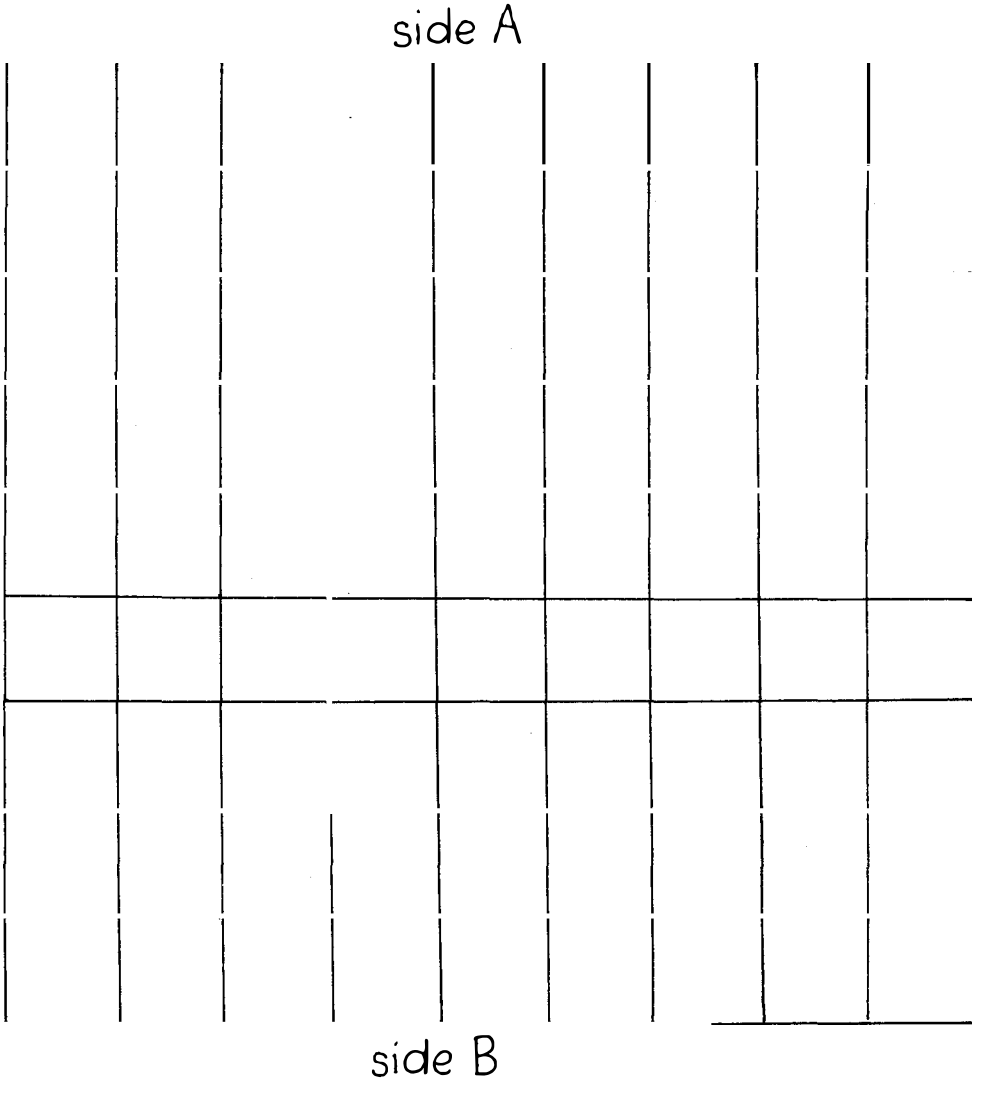
1. Two players take up positions on opposite sides of the board or sheet.

2. One player drops the coin or counter onto the grid. He or she then selects one of the shapes that has been intersected by the coin or counter and colours it in. This shape now becomes part of that player's "pathway" across the grid.

3. The other player now does the same, using a different colour.

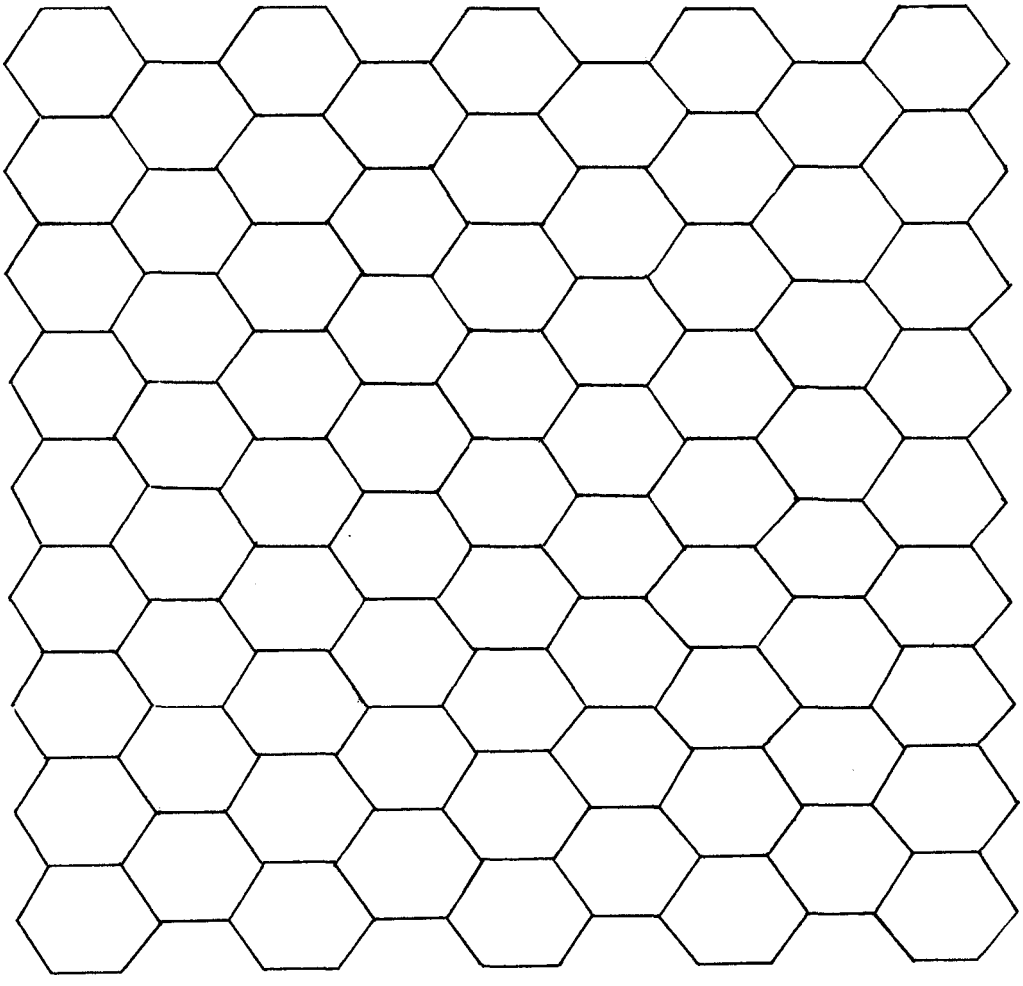
4. Shapes have to be joined by common edges to become a "pathway"; common vertices do not make a pathway.

□ - Across



Hexacross

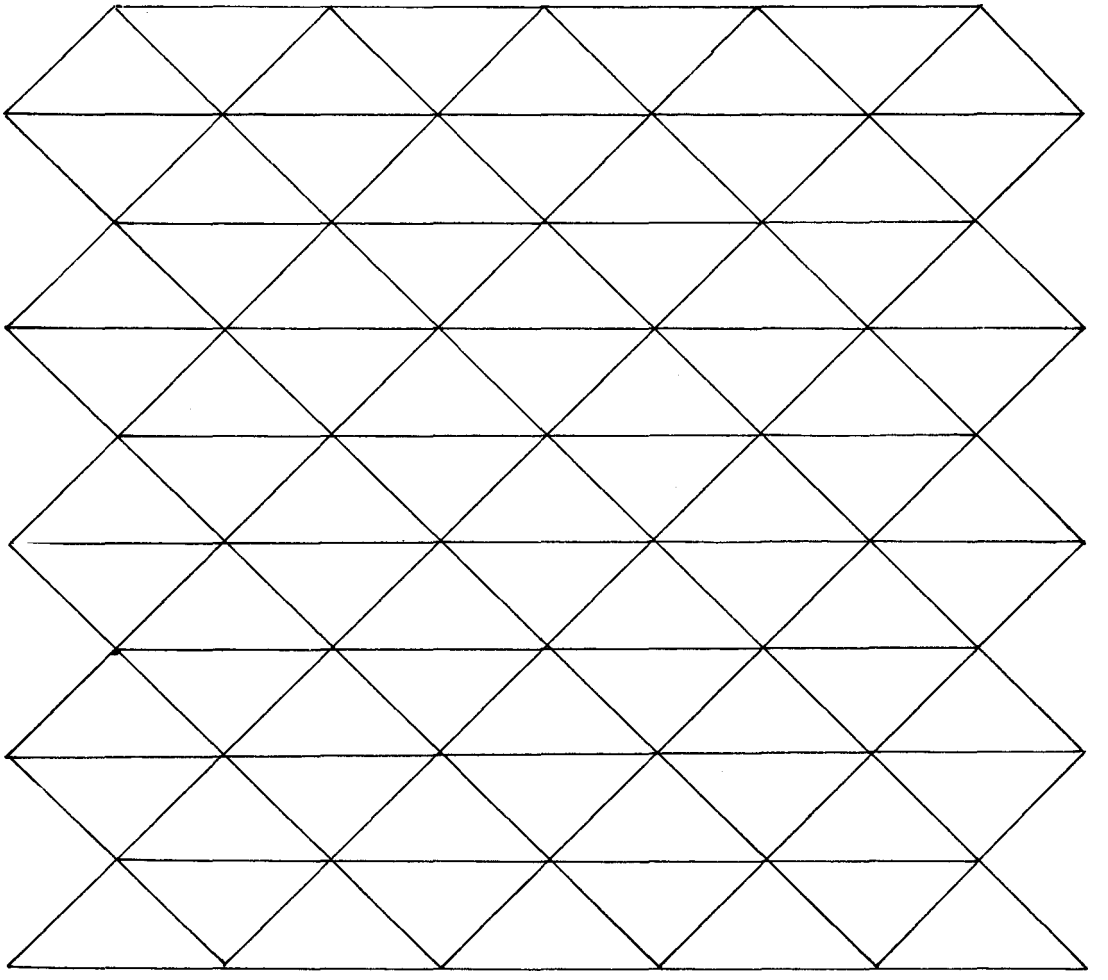
side A



side B

Triacross

side A



side B

ON THE RUN

John Lawniczak

A game for 2 players.

PURPOSE

This game is designed to encourage children to recognize the vertices and boundaries of different shaped regions, as well as understanding adjoining regions.

W.A. SYLLABUS ENTRY

Space stage 4 page 49 .

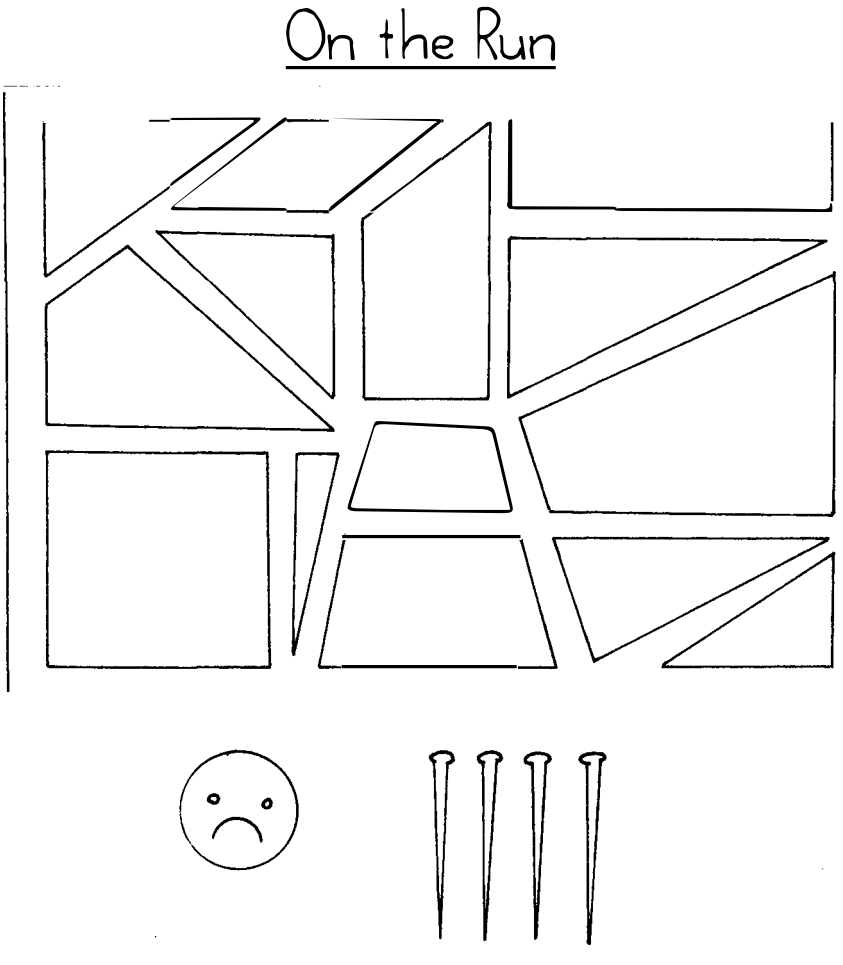
6. Investigate position and layout in the environment.

EQUIPMENT NEEDED

Playing board

Player 1 - Counter

Player 2 - 4 pins



Player 1

You have to stop yourself from being cornered by four burly policemen.

Rule Take one step each turn - you may only run across the road onto a block joining the block you are in.

Start where you like.

What is the safest shape to be on or near?

How long can you hide from the police?

Are the police closing in on you?

Player 2

You have to try and corner the run-a-way boy by using your four policemen.

Rule Use one policeman after each move made by Player 1. You may move your policemen about in an effort to catch the boy. You may only use the streets.

How long will it take you to catch him?

Where should you leave some policemen?

On the Run

TRAVELLING SHAPES

Daniel Khoo

A game for 2 - 6 players.

PURPOSE

This game helps the children to be familiar with the names of the polygons (3 sided to 6 sided) and the number of sides or vertices each of the polygons has. It gives a sense of direction (integrating Space in Mathematics with Social Studies) and position. The children are faced with decision making to their advantage when the direction die shows NE/SE or NW/SW. Mental addition is revised or practised in this game.

W.A. SYLLABUS ENTRY

Space stage 4 page 47.

4. Carry out activities with two dimensional shapes in which the features of the shapes are used and investigated.

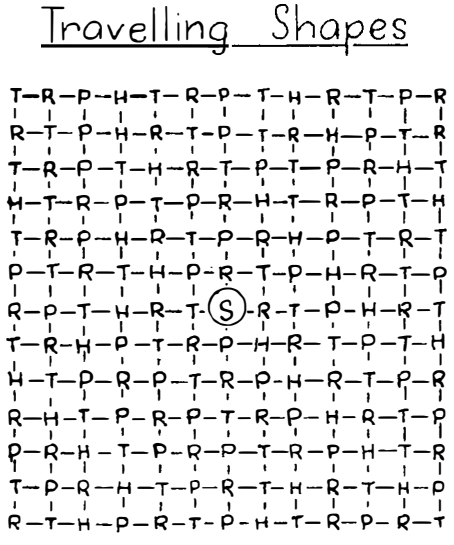
5. Play games and carry out activities based on movement and position:

EQUIPMENT NEEDED

2 dice: one with numbers 1 - 6; the other with N, S, E, W, NE/SE, and NW/SW

6 plastic discs - or 1 cent coins.

1 board with 12 by 12 squares (2 cm x 2 cm each), centre intersection marked S (for start). Other intersections are marked T (for triangle), R (for rectangle), P (for pentagon) and H (for hexagon).



HOW TO PLAY

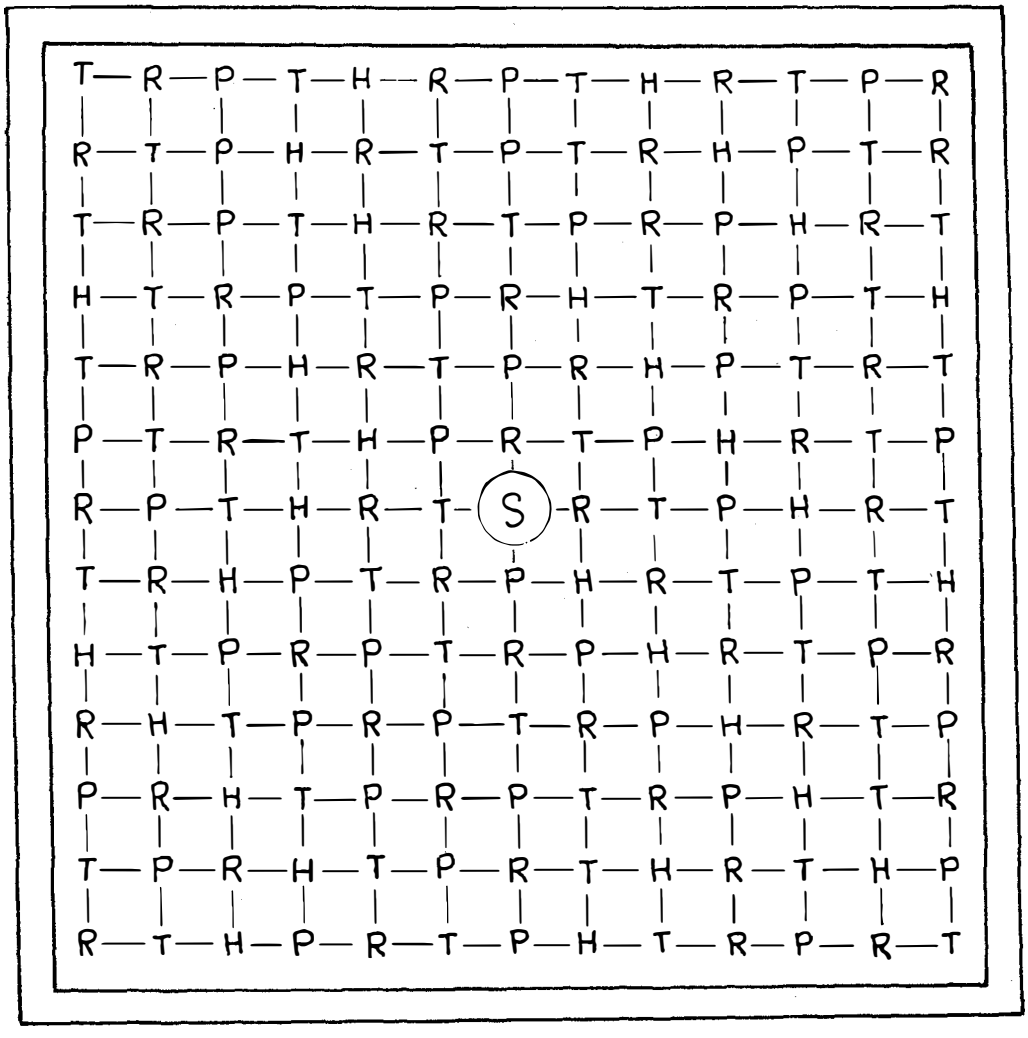
Each player takes his turn to throw the two dice. The direction die decides what direction the player moves and the number die determines the number of steps to move in that direction, beginning from the centre point S.

The letter on the position (intersection of lines) on which a player lands stands for a polygon and gives him a score equivalent to the number of sides (or vertices) of the polygon: T = 3, R = 4 P = 5 and H = 6.

On his next turn and acquiring his new position, a player's new score is added to the previous score or previous total. THE FIRST PLAYER TO ACQUIRE AN AGREED TARGET TOTAL (example, 50 or 100) WINS.

When the direction die shows NE/SE (or NW/SW), the player has the option of moving either north-east or south east. When a player's disc has arrived at the extreme end of any direction he forfeits his move and a score each time any direction die turns up that same direction. At the SE corner a throw of S or E will yield no move or score. The score when one gets back to S is 7 points.

Travelling Shapes



BLOCKED

Bob Dayman

A game for 2 players.

PURPOSE

To allow children to develop their skill and knowledge of transformations.

Children of Year 7 may be encouraged to describe the actual moves made.

The game may also allow the children to appreciate movement within regions and recognize regions.

W.A. SYLLABUS ENTRY

Space stages 5, 6 and 7 pages 53 - 61.

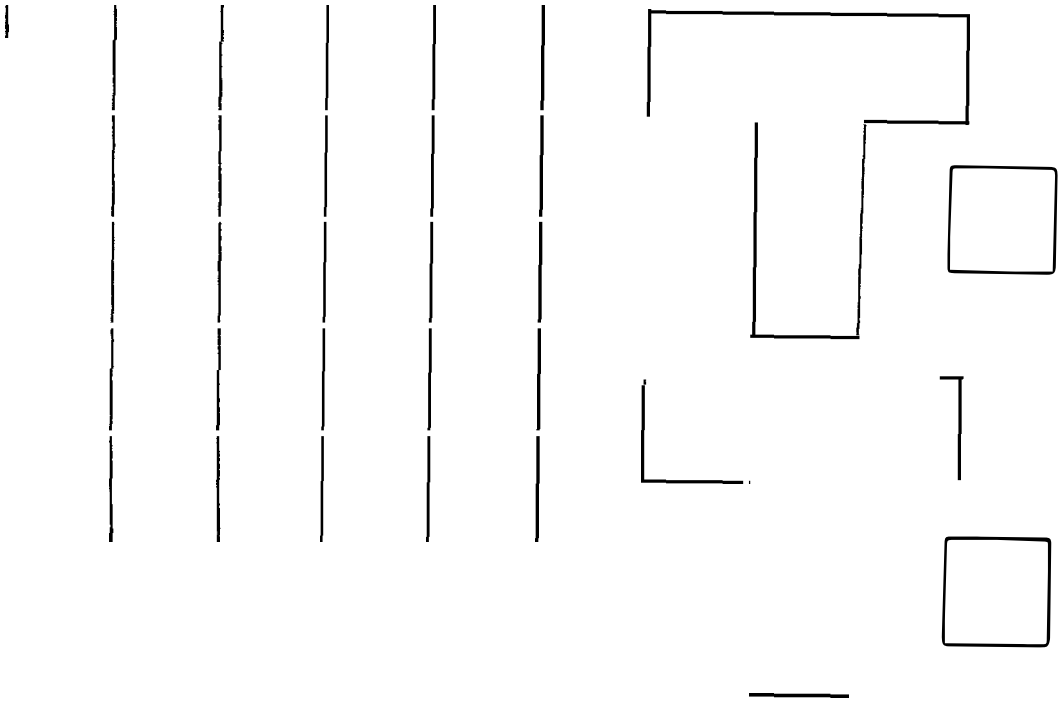
6. Play games and carry out activities based on movement and position.

EQUIPMENT NEEDED

Two 'T' shaped pieces of different colours

Two squares each to match colour of 'T'

Playing board.

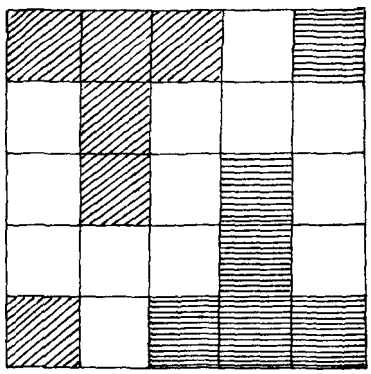


HOW TO PLAY

Aim — To block your opponent so that his playing piece (the 'T') cannot be moved to any new position.

Rules —

1. The starting position is as shown



2. On each move the 'T' piece must be moved first. After moving The 'T' piece the player may, if he wishes, move his second piece (the square) to any other position on the board. Players take turns at moving.

3. Moves are based on flips, slides or turns, or any combination of these movements.

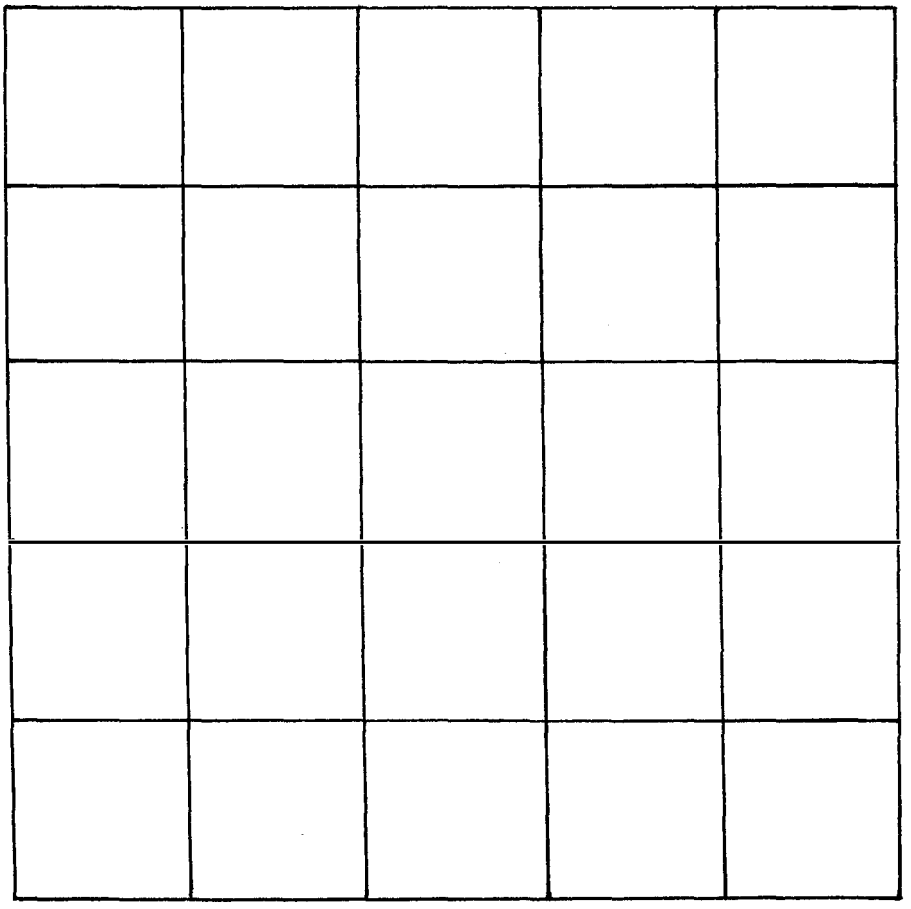
4. The 'T' may not be replaced to cover exactly the position it is to be moved from.

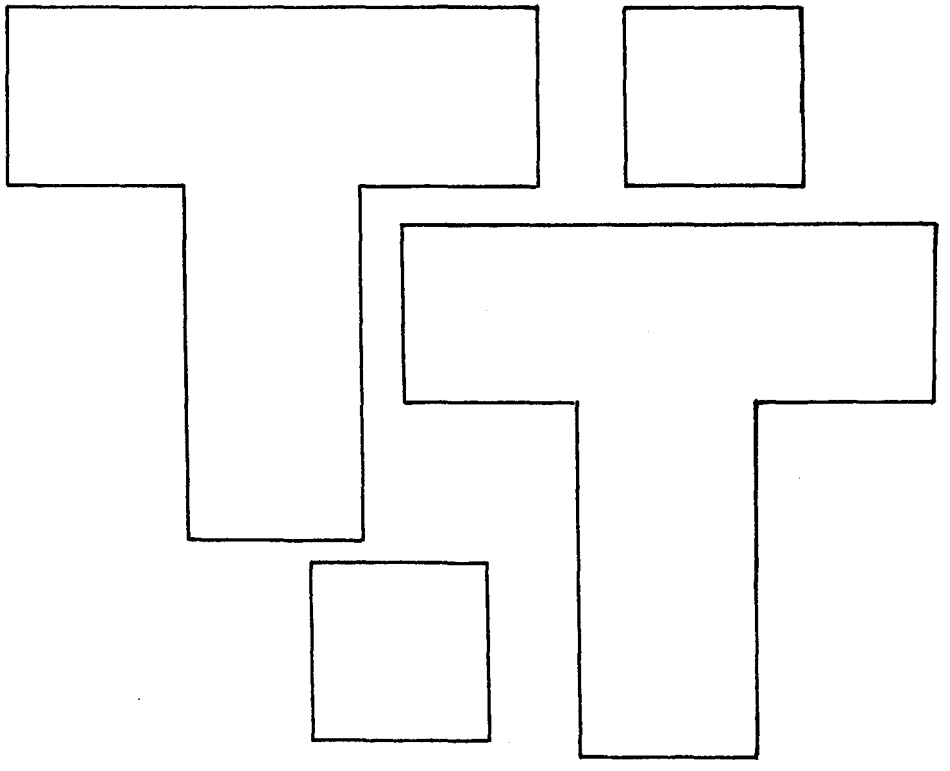
5. No piece may be placed on top of another piece or outside the board at the end of the moves.

NB The square does not have to be moved on each turn.

Adapted from: "Recreational Maths Activities", ideas prepared by the Mathematics Education Major students at the Bendigo College of Advanced Education.

BLOCKED





"CAPTURE!"

Neil Cox

A game for 2 players

PURPOSE

To encourage the use of the words "vertical" and "horizontal" and the understanding of what they mean.

To find the most direct route between two points - necessary in map reading.

W.A. SYLLABUS ENTRY

Space stage 6 page 57.

7. Play games and carry out activities based on movement and position: (b) investigating horizontal, vertical and oblique positions.

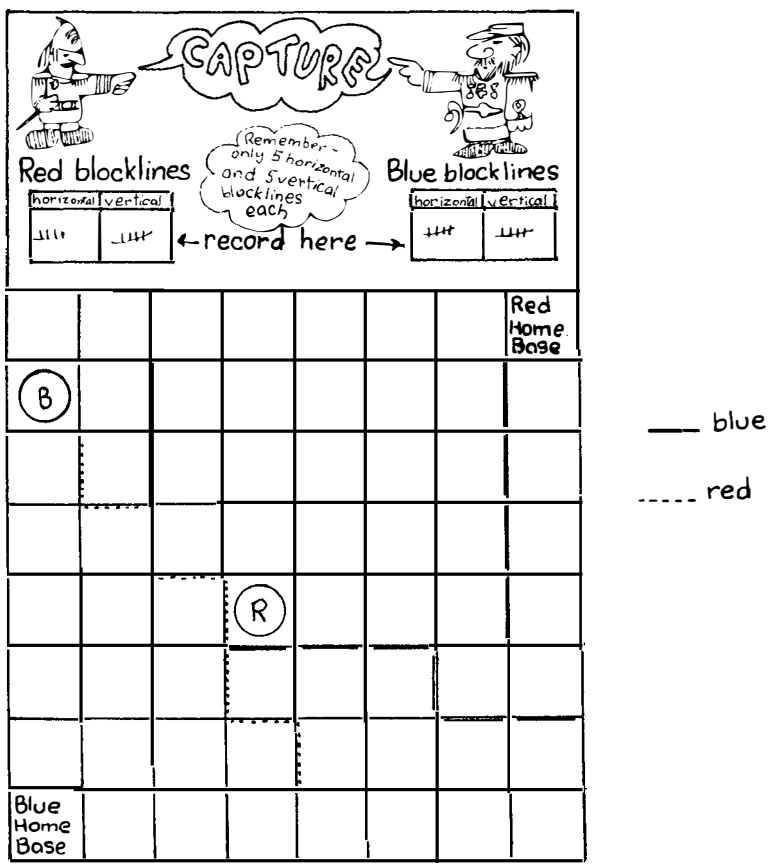
9. Carry out activities which give experience with paths.

EQUIPMENT NEEDED

2 counters - red and blue

2 pencils - red and blue

Game sheet. (Blocklines are added during the game.)



HOW TO PLAY

Purpose To capture your opponent's HOME BASE.

To block your opponent's route to your HOME BASE.

Rules

1. Start at your Home Base by placing a counter on your square.

2. Decide who begins e.g. flip a coin.

3. Move your counter to a square - move vertically or horizontally. Move only one square at a time.

4. No counters may occupy the same square.

5. For the first 10 moves each player must play a "Blockline" alternately. A total of 5 vertical and 5 horizontal lines must be used by each player.

6. Draw your "Blocklines". Use a pencil. Record in "Blocklines" box.

7. When "Blocklines" are exhausted each player must begin the race to capture each other's Home Base.

"Blocklines"

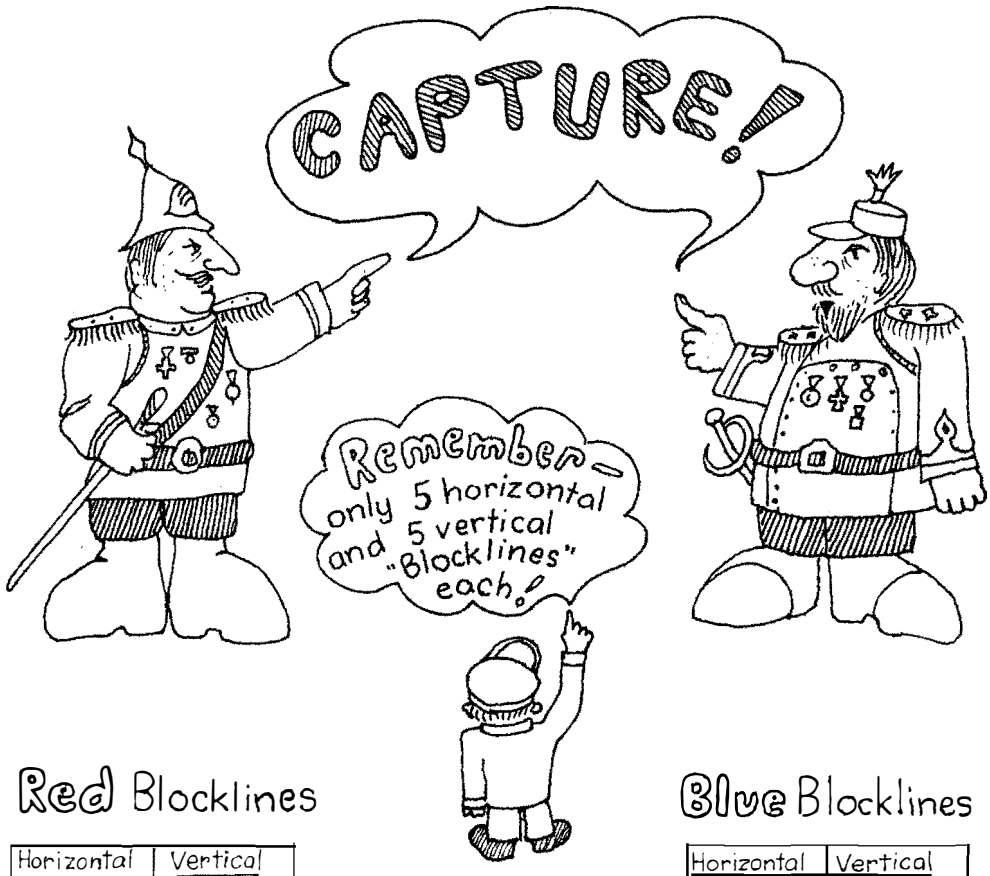
(a) A "Blockline" is used to block your opponent's route to your Home Base.

(b) A "Blockline" is drawn on the grid paper after you have moved your counter.

(c) A "Blockline" may be drawn horizontally or vertically.

(d) A "Blockline" can only be one square long.

"Blocklines" may not be used to block off totally the access to either Home Base.



Red Blocklines

Horizontal	Vertical

← Record here →

Blue Blocklines

Horizontal	Vertical

						Red Home Base
Blue Home Base						

SPACE INVADERS

Mark Beresford

A game for 2 players.

PURPOSE

This game encourages students to give directions and find coordinates on a grid.

W.A. SYLLABUS ENTRY

Space stage 6 page 57.

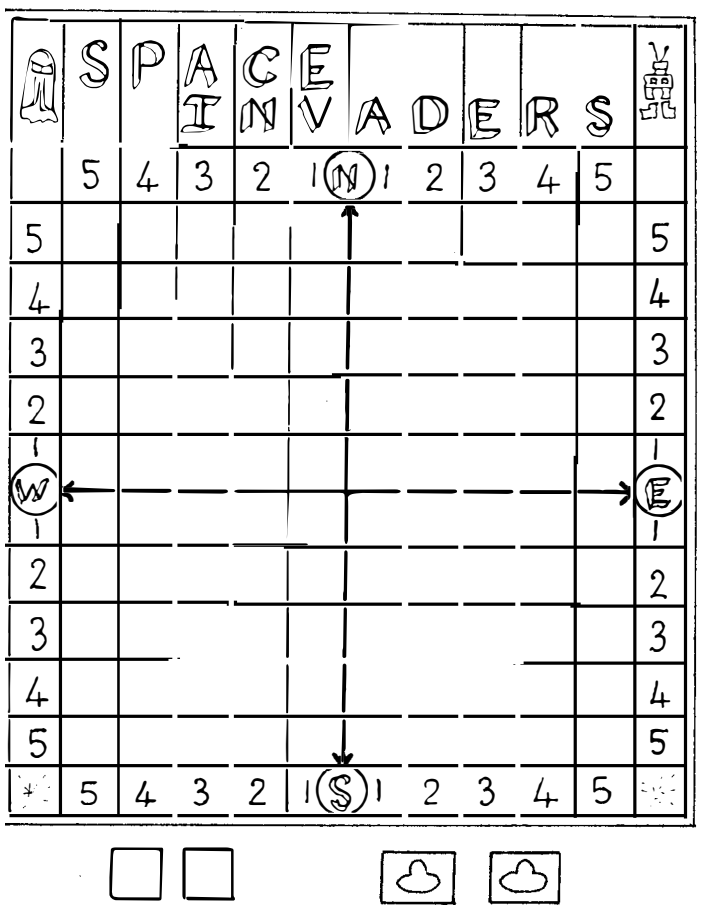
7. Play games and carry out activities based on movement and position.

EQUIPMENT NEEDED

Playing board for each player

Square counters

Space ships



HOW TO PLAY

Each player places five space ships on his grid.

You have to destroy your partner's fleet of space ships.

One player has the first turn and calls out a coordinate.

Partner answers by saying whether it was a hit or a miss, then has a turn at calling a coordinate.

A hit is covered with a square counter.

Winner is the first player to destroy all of the other player's space ships.

Use an extra grid to record what you have called out.

SNOWFLAKES

Michael Henderson

A game for 2 or more players.

PURPOSE

To develop the relationship of shapes to lines and points of symmetry using regions on a grid.

W.A. SYLLABUS ENTRY

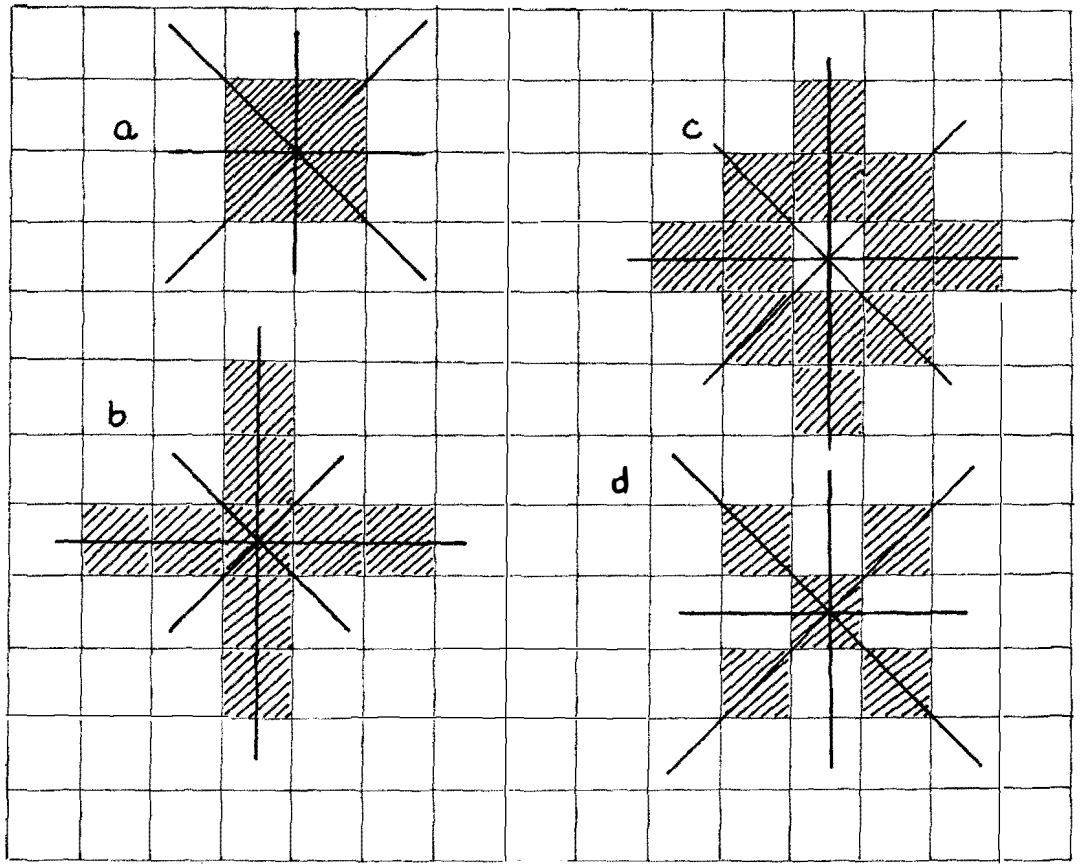
Space stage 7 page 61.

8. Investigate symmetry in two and three dimensional shapes.

EQUIPMENT NEEDED

Sheet of squared paper (graph). Pref: 15 x 15 one cm square.

Coloured pencils; crayons or textas.



Black lines are lines of symmetry.

HOW TO PLAY

Each person tries to 'grow' snowflakes by colouring in more squares than his opponent(s).

Rules

1. Snowflakes must be symmetrical (see diagram a) through four axes.

2. A snowflake consists of four squares or more (see diagrams b and d) coloured by one player.

3. Snowflakes may have holes in them (see diagram c).

4. When a player achieves a snowflake, he must 'declare it' to his partner(s). This is done verbally and by drawing a distinctive line around the snowflake. These squares may not be used in subsequent snowflakes.

5. Blocking an opponent's move is legitimate.

To Start

1. Each player chooses his colour and order of turn.

2. Game is completed when - i. no blank squares are left; or
   ii. no more flakes can be formed.

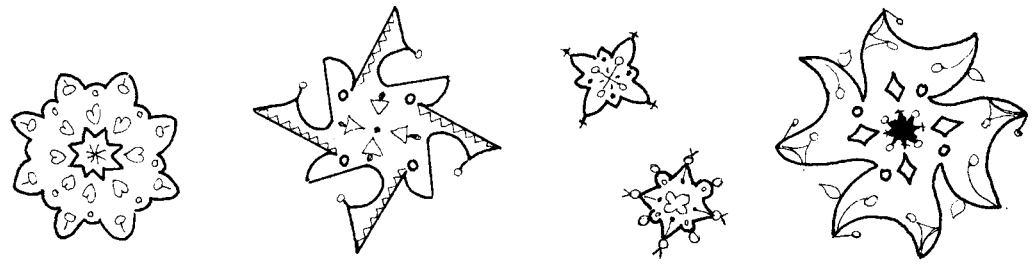
To Score

At completion of game, players decide on legitimate flakes and add up the total number of squares for their flakes. Highest wins.

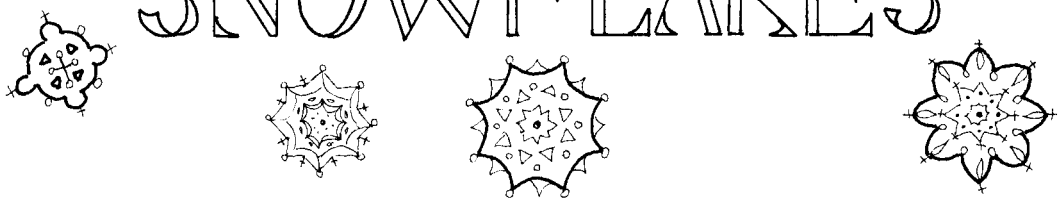
Alternative

1. Each player could be allocated more than one colour.

2. No holes allowed in snowflakes.



SNOWFLAKES



COVER UP - PATHWAYS - MAKE IT

David Ashcroft

A game for 2 - 4 players.

PURPOSE

To develop concepts of boundary, region, area, inclusion, exclusion, changes of shape, symmetry, rotation, size, shape, position, arrangement, path, direction, distance.

W.A. SYLLABUS ENTRY

Space Stages 2 - 7 e.g. page 41.

7. Make patterns and assemble puzzles using two dimensional pieces.
8. Carry out activities involving paths, boundaries, areas and surfaces.
10. Investigate the use of shapes in common objects and structures, and in classroom activities.
12. Play games involving "territories": home area, neutral ground, safe path ...

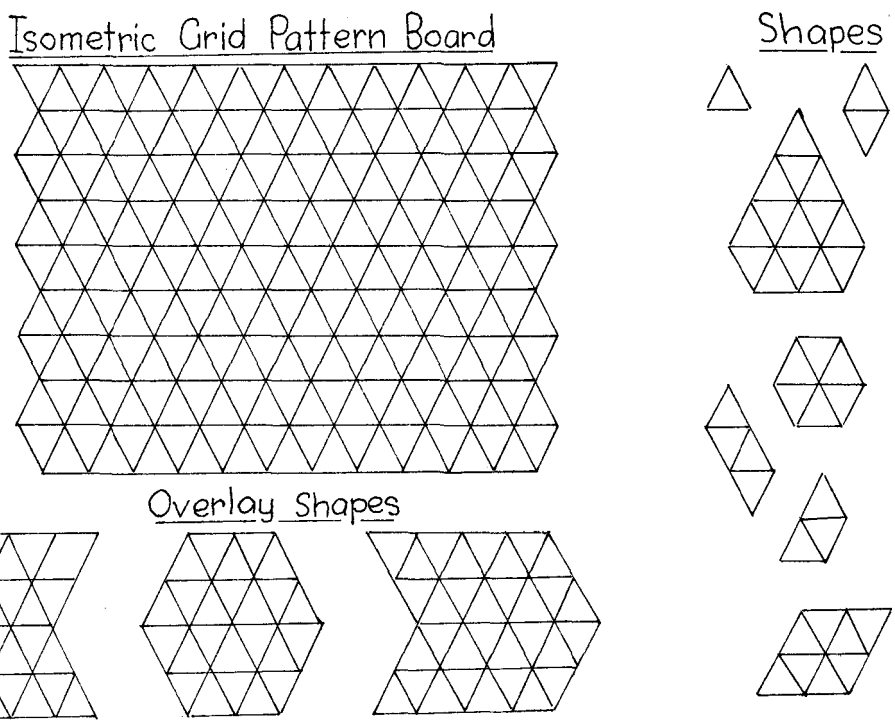
EQUIPMENT NEEDED

Isometric Grid Pattern Board

Thermostat Overlays

Game Cards and Point Cards

Boxes containing similar shapes and a number of each shape but each box containing a different colour.



HOW TO PLAY

Cover Up 1 Each player in turn selects a shape and places it on board until all spaces are filled. Player covering largest area of board when all spaces are filled wins.

Cover Up 2 Each player in turn selects a shape and places it on the board until all spaces are filled.

Rule 1. Players must connect successive pieces only with pieces of their own colour.

Last player able to use one of their pieces wins. Blocking is permitted.

Cover Up 3 Each player selects 1 or 2 or 3 ... different shapes. These shape types then are the only ones which can be used to cover the board. Last player able to place a piece wins.

OR

Player with largest area covered wins.

OR

Player who completes the most examples of selected shapes wins.

Make It (Use of overlays.) First player to complete the shape wins.

Pathways (Use neutral area overlay for board centre)

a. Players aim to make a pathway of their colour from one side of the board to opposite side. First to complete path wins.

b. As above but path must end at shape identical to starting shape.

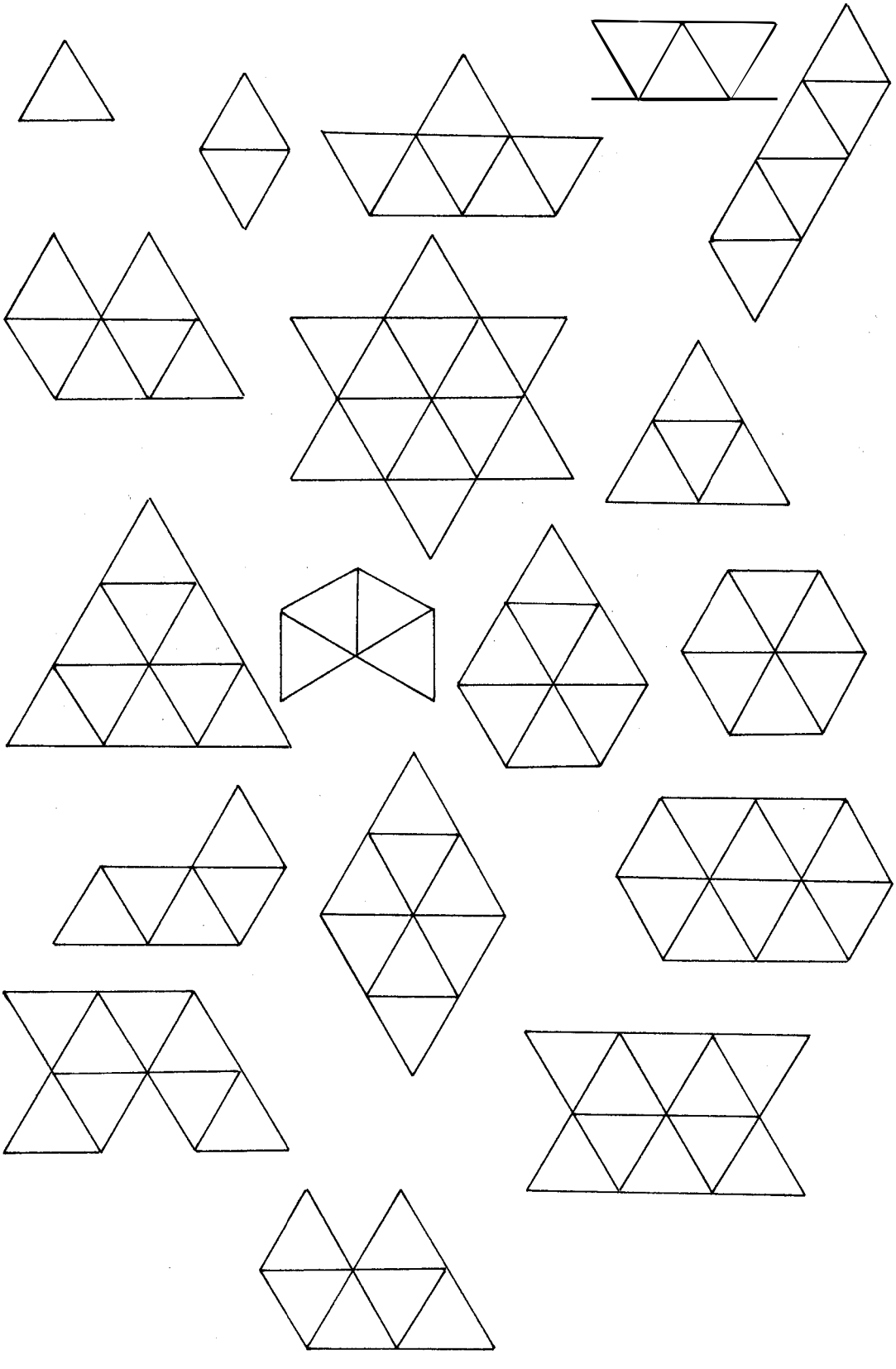
The board lends itself to many games similar to those above. These are placed on cards which are shuffled and the one selected could indicate the game to be played.

A die could be rolled and the person permitted to place that number of pieces on the board for that turn.

Cards could be used to state points given for each individual game played, the first to a nominated total being the winner.

Shapes

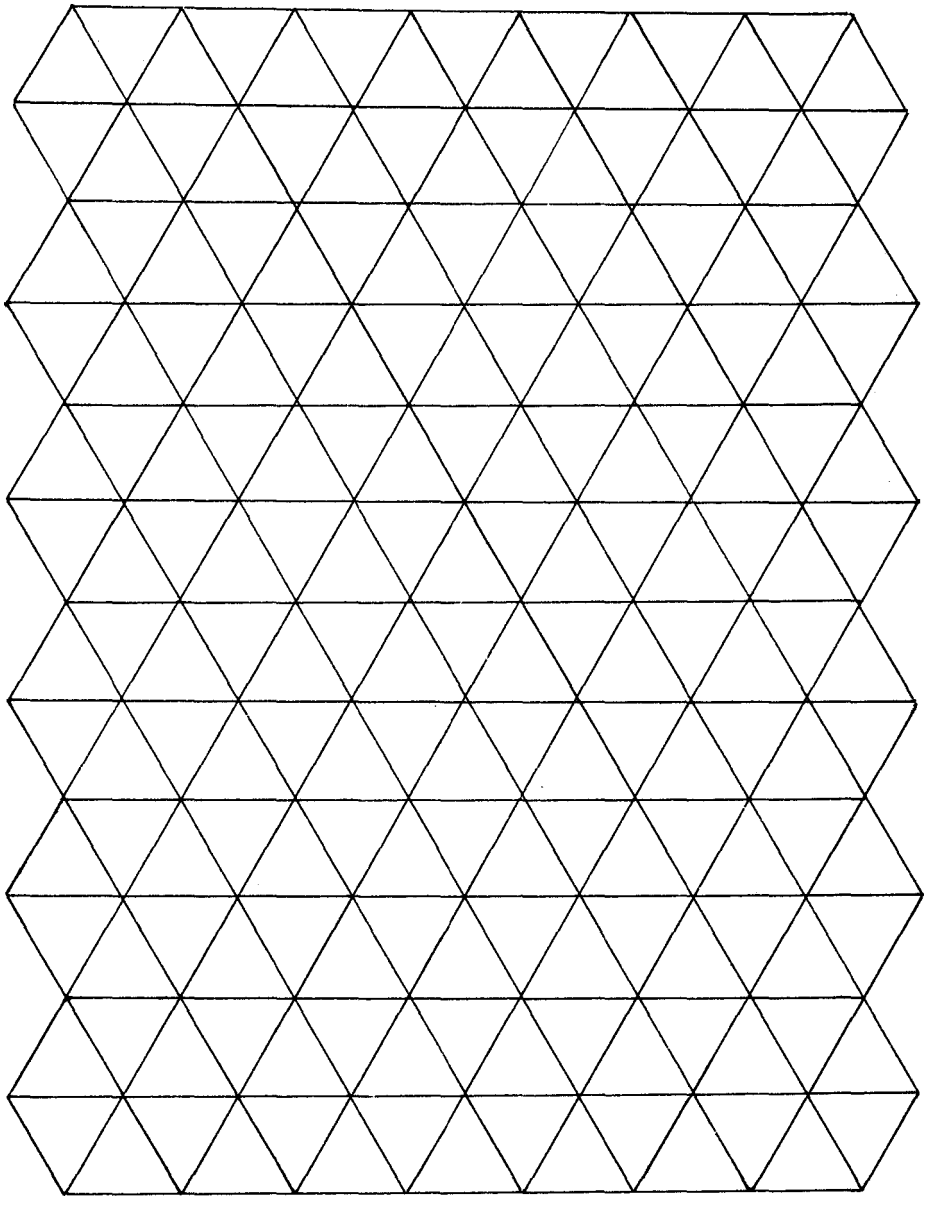
Make from any material.
Make a number of each shape. Use different colours and keep in boxes; one box for each colour.



Cover Up - Pathways

Cut along this zig-zag edge and join to matching edge on opposite page.

Make It



PART 2 SCALE

One of the most beloved of children's stories is "Goldilocks and the Three Bears". Of course, the repetition of the language pattern makes this story enjoyable to most children. Mathematically, the story is a very early introduction to the idea of scale, which becomes a very important spatial skill in the lives of all of us. Eventually we must all learn to interpret maps, scale diagrams and patterns.

From the beginning, children can develop intuitive ideas about scale and comparative sizes by constructing models of familiar three-dimensional objects. Later, they may progress to two-dimensional plans, and accurate work interpreting and constructing scale drawings.

The activities presented in this section of our book are graded in difficulty, but no grade level is specified. Within any one class, children may be working at different levels in their understanding of this important spatial concept. You are invited to use the activities as presented here with your class. We hope that the activities will also provide you and your class with ideas for further activities in this part of the Space syllabus.

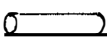
Make an Animal

You will need:

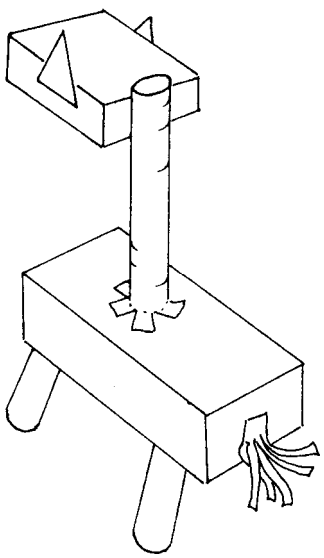
1 small box  for the head

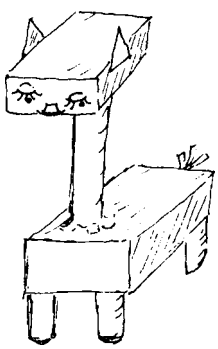
1 large box  for the body

1 long cylinder  for the neck

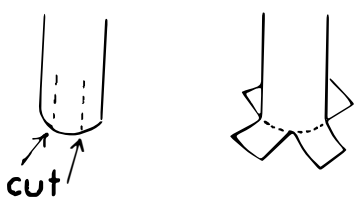
4 cylinders  for the legs

paper for the ears, mane and tail





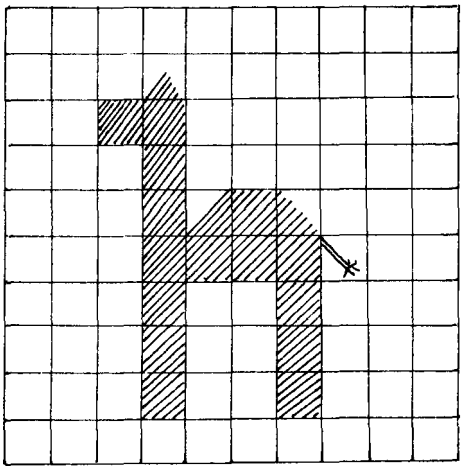
Stick the cylinders to the boxes by cutting the ends and bending back the tabs.

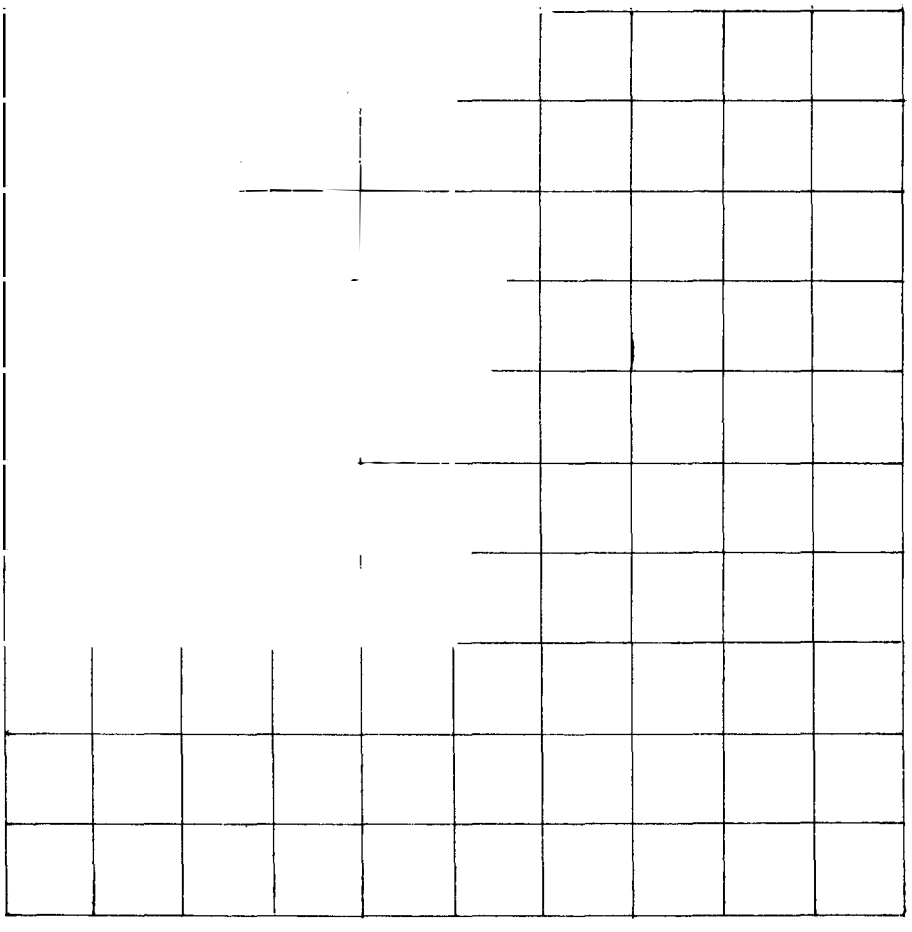


Paint your animal.

Make a different animal out of boxes, cylinder and paper.

Copy the Picture



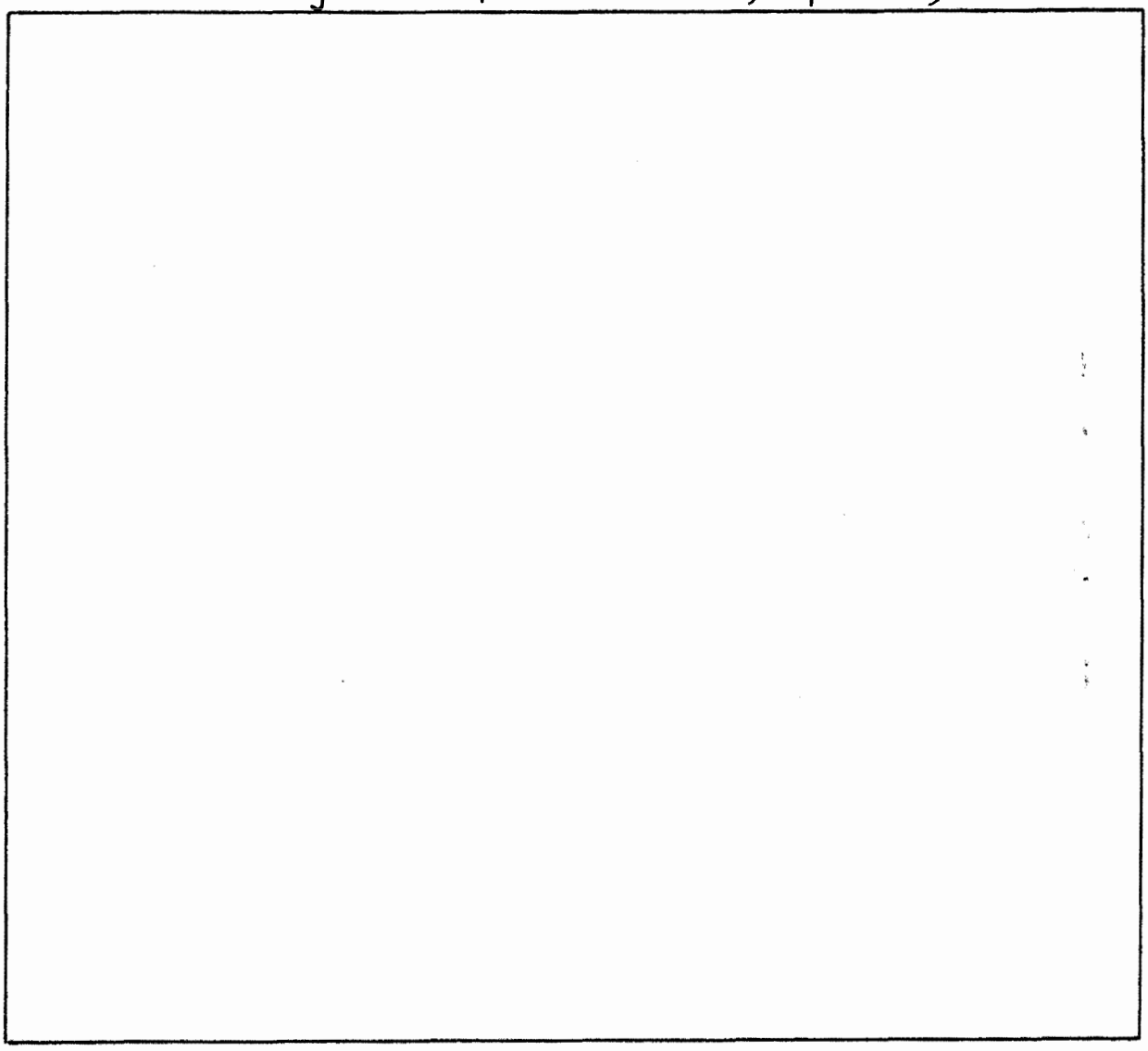


How is it different?

Arrange Your House

Dining Room

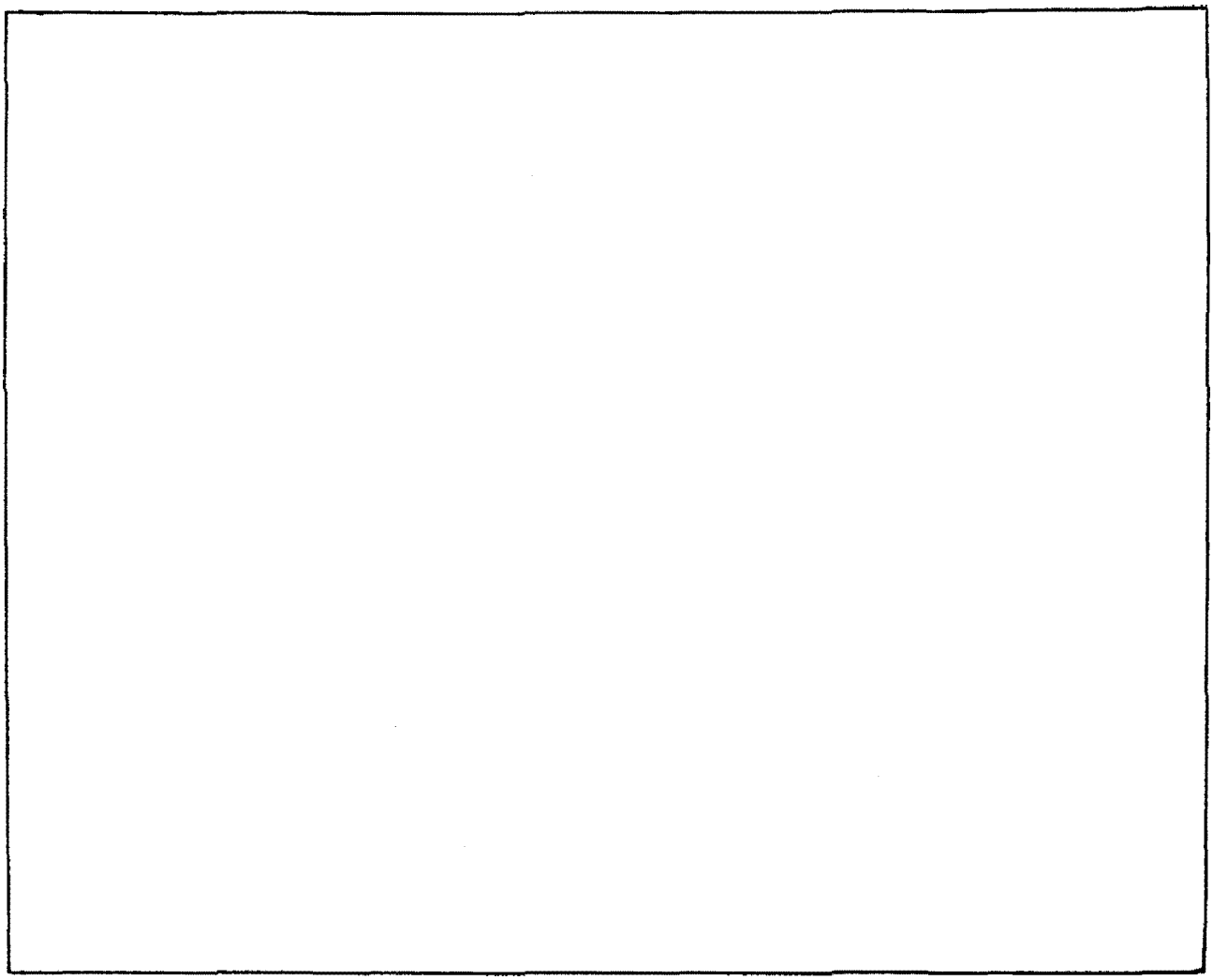
1. Find the dining room pieces- table, 6 plates, 6 chairs.



2. Where is the best place for the table in the dining room? Put it on the plan above.
3. There are 6 people in your family. Can you put their chairs around the table so that they all have room to eat? Now put the plates out.
4. Two visitors are coming for tea. Cut out some chairs and plates for them. Can you fit them around the table?
5. Make enough place mats for your family and the visitors. They go on the table and under the plates

Bedroom

1. Find the bedroom pieces - bed, wardrobe, desk and bedroom chair

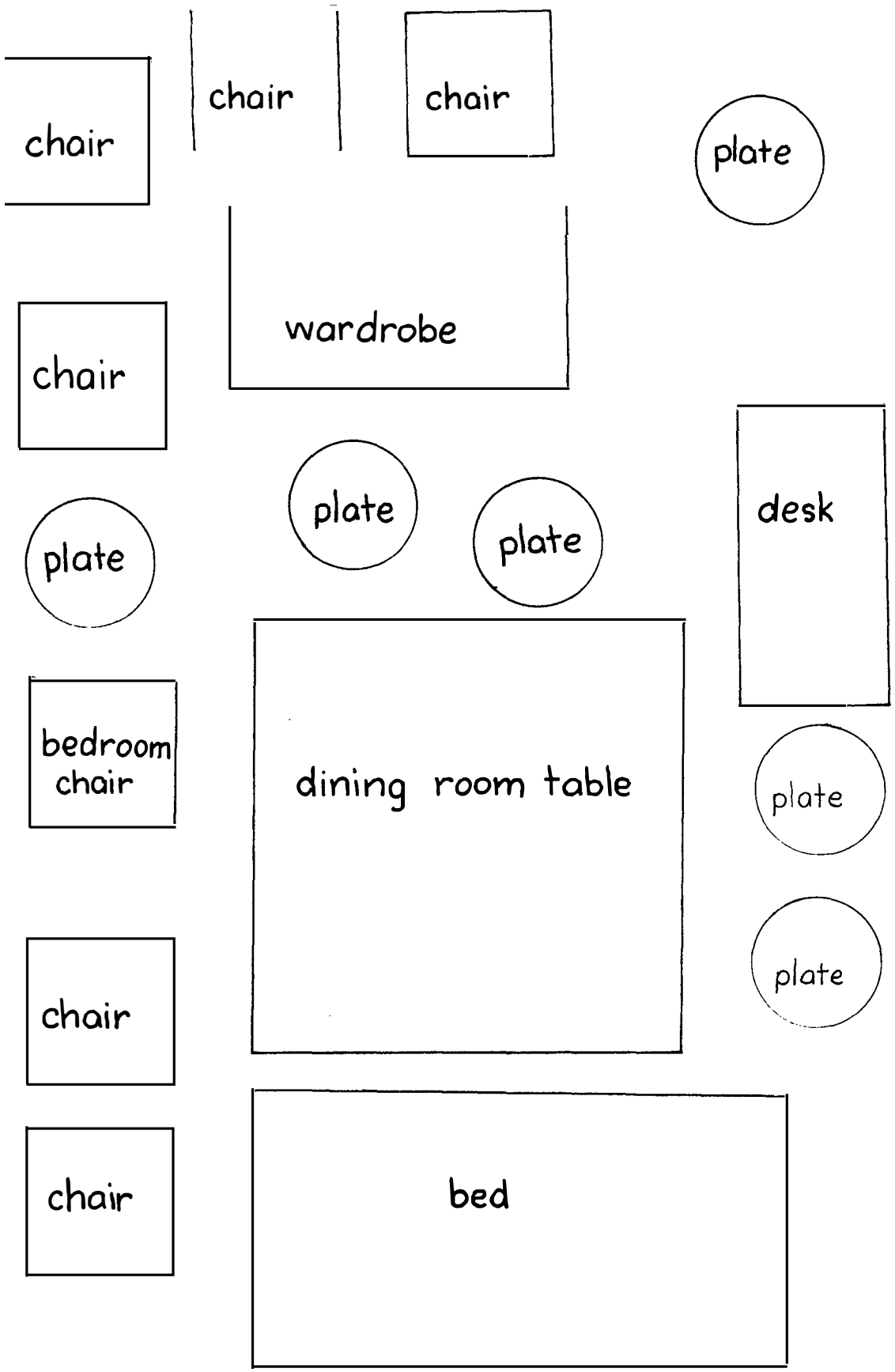


2. Where is the best place for the bed in the bedroom? Place it on the plan above.

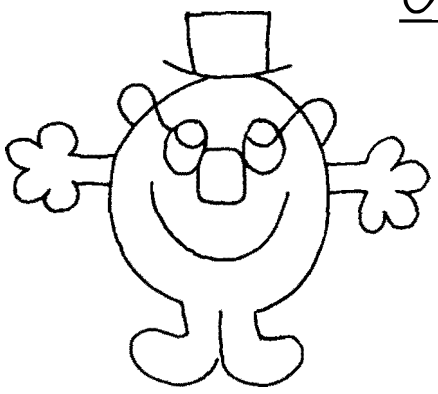
3. You also have a wardrobe, desk and chair in your bedroom. Can you fit them in as well?

4. Cut out a plan for a toybox that can be hidden under the bed.

5. Draw a picture of yourself so that you fit in the bed. Cut out a blanket from a scrap of material and tuck yourself in.


chair
chair
chair
plate
wardrobe
chair
plate
plate
plate
desk
bedroom chair
dining room table
plate
plate
chair
chair
bed

Our Classroom



Here is Mr Clever

Can you be a Mr Clever and finish the map of our classroom?

Draw a black line where the blackboard is.

Draw a green line for the windows.

Draw where the door is.

Put in the cupboards.

Where are the pin-up boards?

Draw the teacher's desk.

Draw the children's desks.

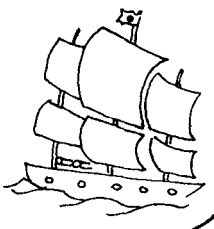
Mark X where you sit.

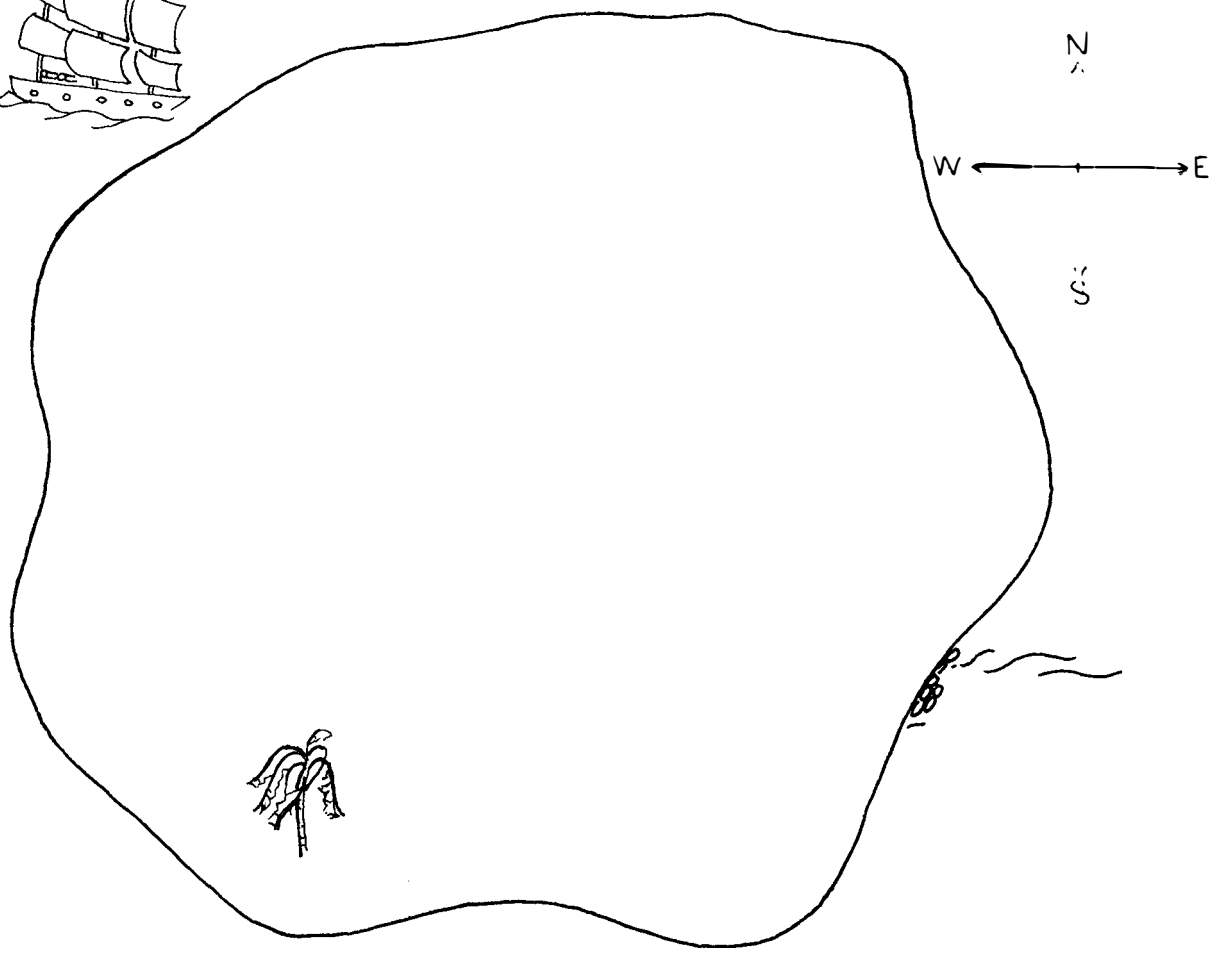
Print your friends' names where they sit.

Check your map with the plastic sheet.

A stencil is to be made of the classroom's floor plan for the child to work on.
The plastic sheet can then easily be used as a self-check.

Find the Treasure





1 pace = 1 cm

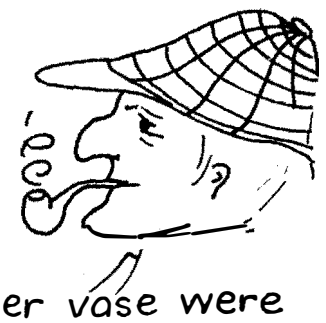
Go 8 paces N from the  and draw a rock  .

Go 5 paces E from the  and draw a skeleton  .

Go 3 paces S from the  and put an X.

Draw your own treasure map and show how to find the treasure.

Be a Detective - Find the Criminal



You will need a map of "Quiet Town"

A robbery has taken place at the bank. A diamond, an expensive ring and a silver vase were stolen.

3 men were seen running from the bank. Follow them on your map (START AT THE BANK).

Man 1. 1 square South, 1 East, 2 North, 4 West, 5 North - Cut out the square you are on.

Man 2. 1 South, 4 West, 1 North, 1 East, 2 North, 4 West - Cut out the square you are on.

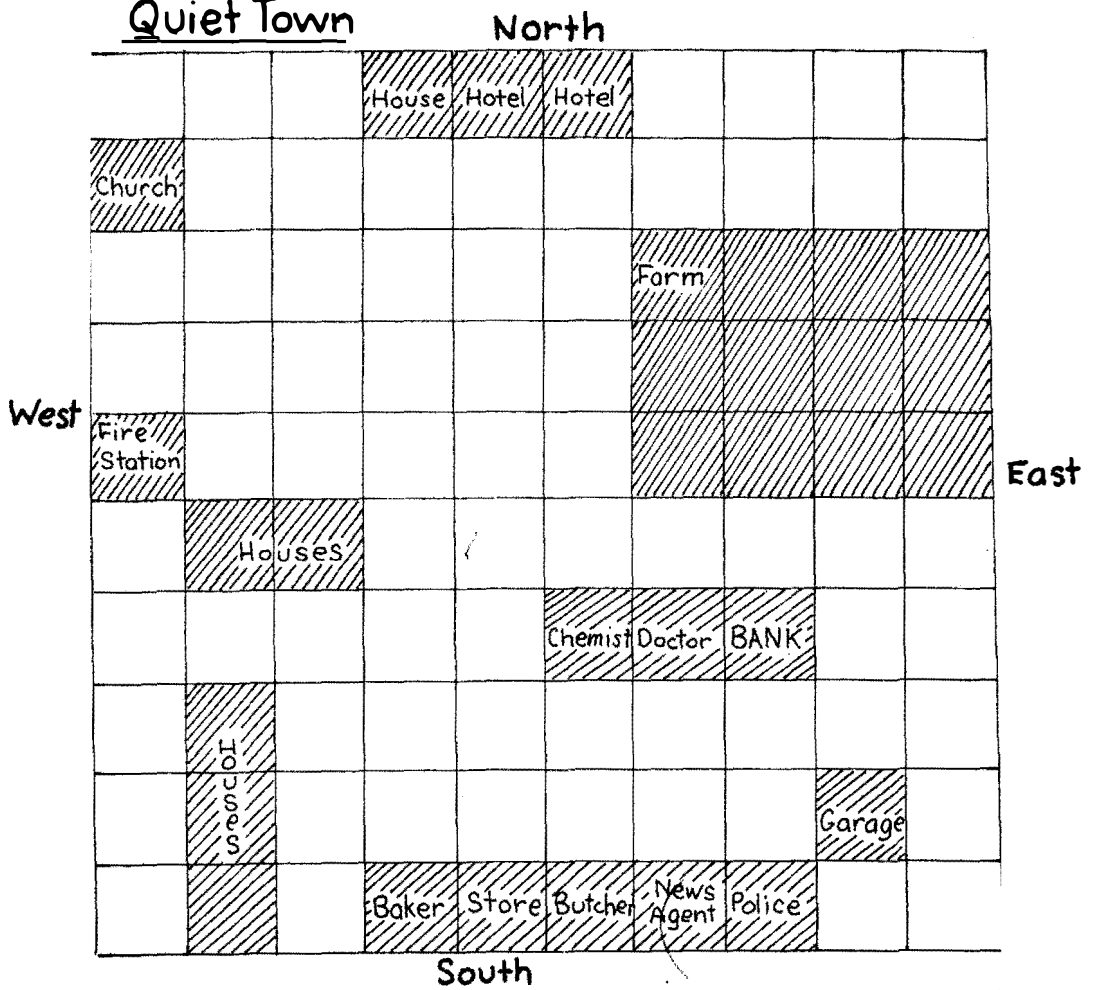
Man 3. 2 South, 5 West, 2 North, 2 East, 1 North, 5 East, 3 South, 1 West - Cut out this square.

Cut out the bank on your map and fit your map over the answer grid. so that the bank shows through the bank hole.

If you can see the stolen goods through the holes then you have caught the criminals.

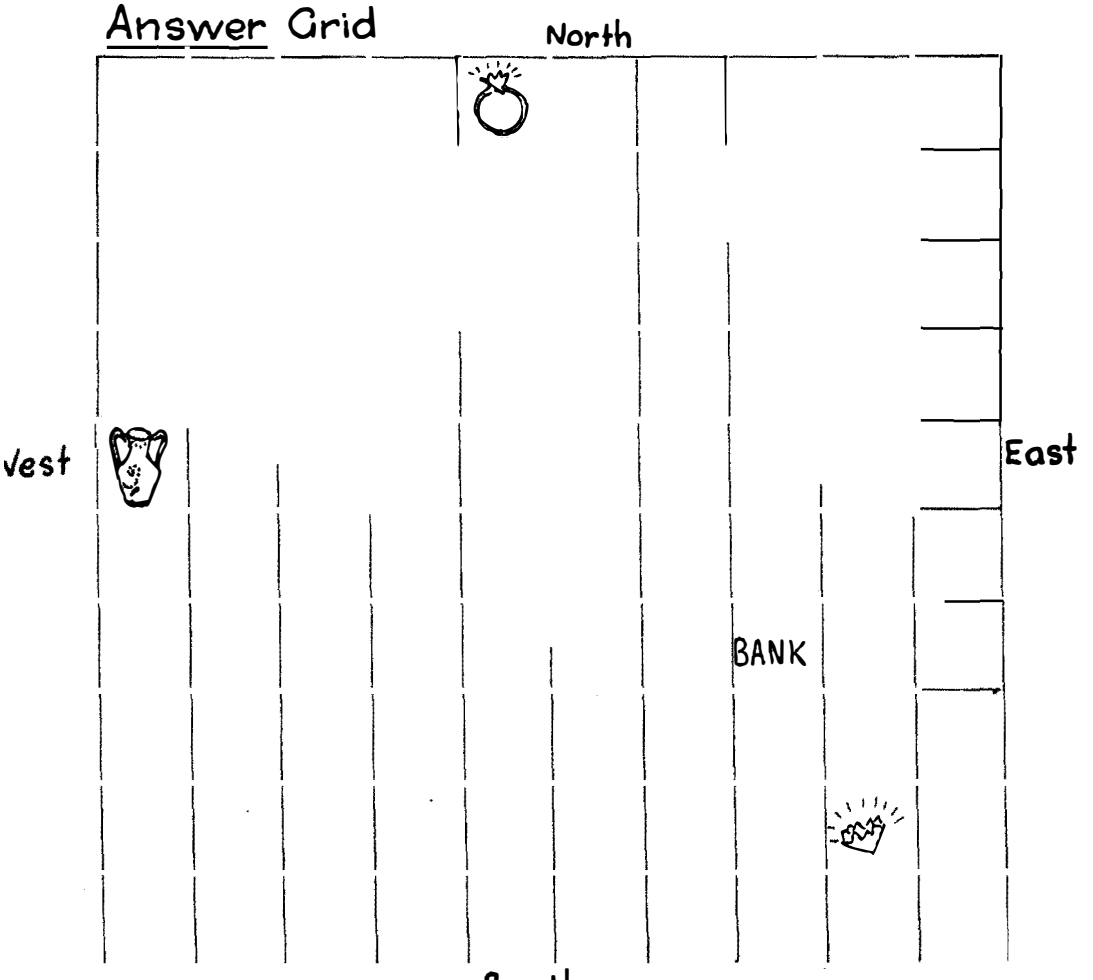
WELL DONE!

Quiet Town

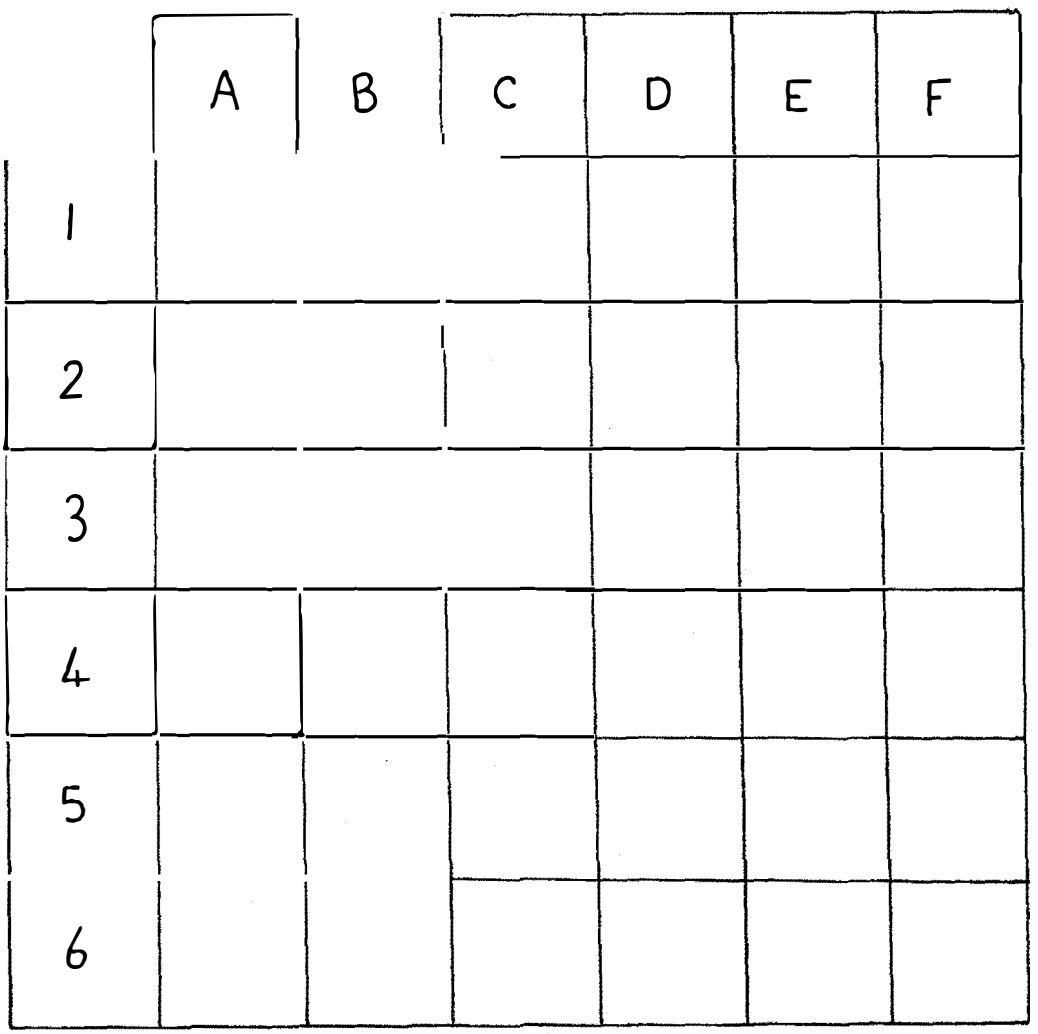


Make a copy for each child.

Answer Grid



Treasure Trove



To work with A cards:

1. Work with a partner.
2. From the "Treasure Tin" take 36 small objects and place one in each square on the board.
3. Each partner takes an A card and works in turn from his card.

To work with B cards:

1. Work with a partner.
2. Each takes turn to do as card says. Use "Treasure Tin".

Card A

1. Take off the object on D5 square.
2. Swap the objects on C3 and E5.
3. Remove all objects in Column B.
4. Place another object on F2.
5. Find an object your partner asks for and tell him where you find it.
6. Move the object from A6 to D5

Card A

1. Swap the objects on C4 and B6.
2. Remove all objects in Row 4.
3. Take off the object from F3.
4. Place another object on E5.
5. Place to object from D2 onto F3.
6. Find an object your partner asks for and tell him where you find it.

Card B

1. Place a red object on F4.
2. Put 2 objects on B4.
3. Put a green object on E6.
4. Place objects on all squares in Column D.
5. Put 2 objects in adjacent squares in Row 4.
6. Put 3 objects in 3 different squares chosen by partner.

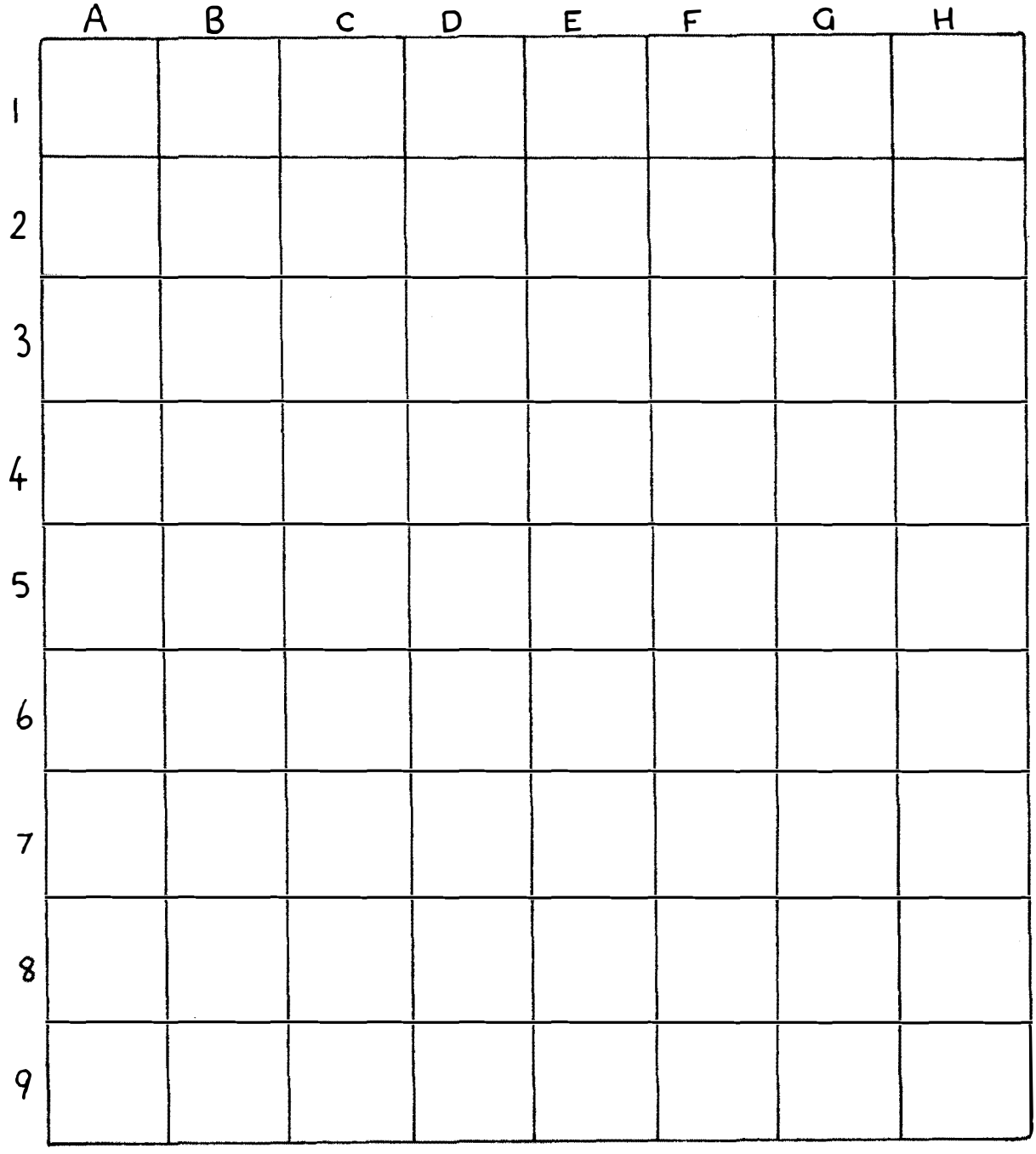
Card B

1. Place a blue object on E5.
2. Place 2 black objects on F6.
3. Place objects on all squares in Row 3.
4. Place an object on C2.
5. Put 2 objects in adjacent squares in Column E.
6. Put 3 objects in 3 different squares chosen by partner.

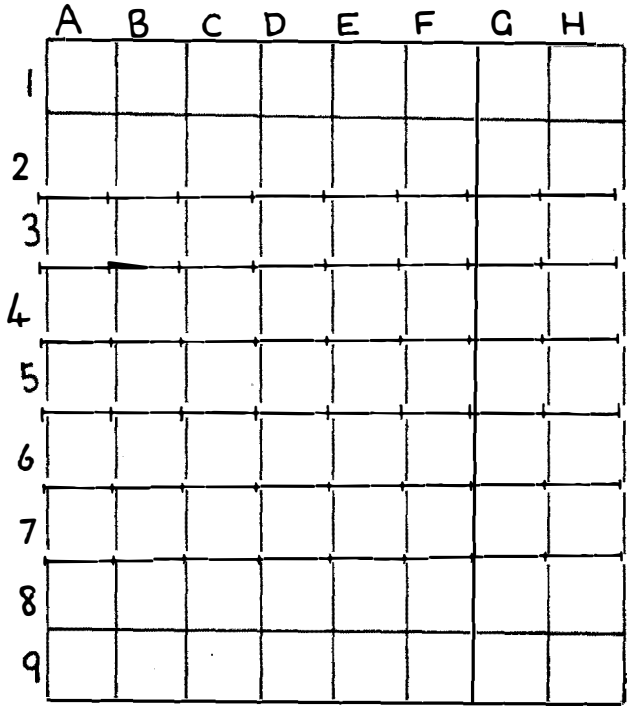
Getting Bigger or Smaller

Work with a partner.
Use a water based felt pen to draw. Wipe off when finished.
One partner draws the outline of a simple object in either the red or green region.
The other partner, by drawing square by square, in the other region repeats the outline.
Check outlines with teacher.

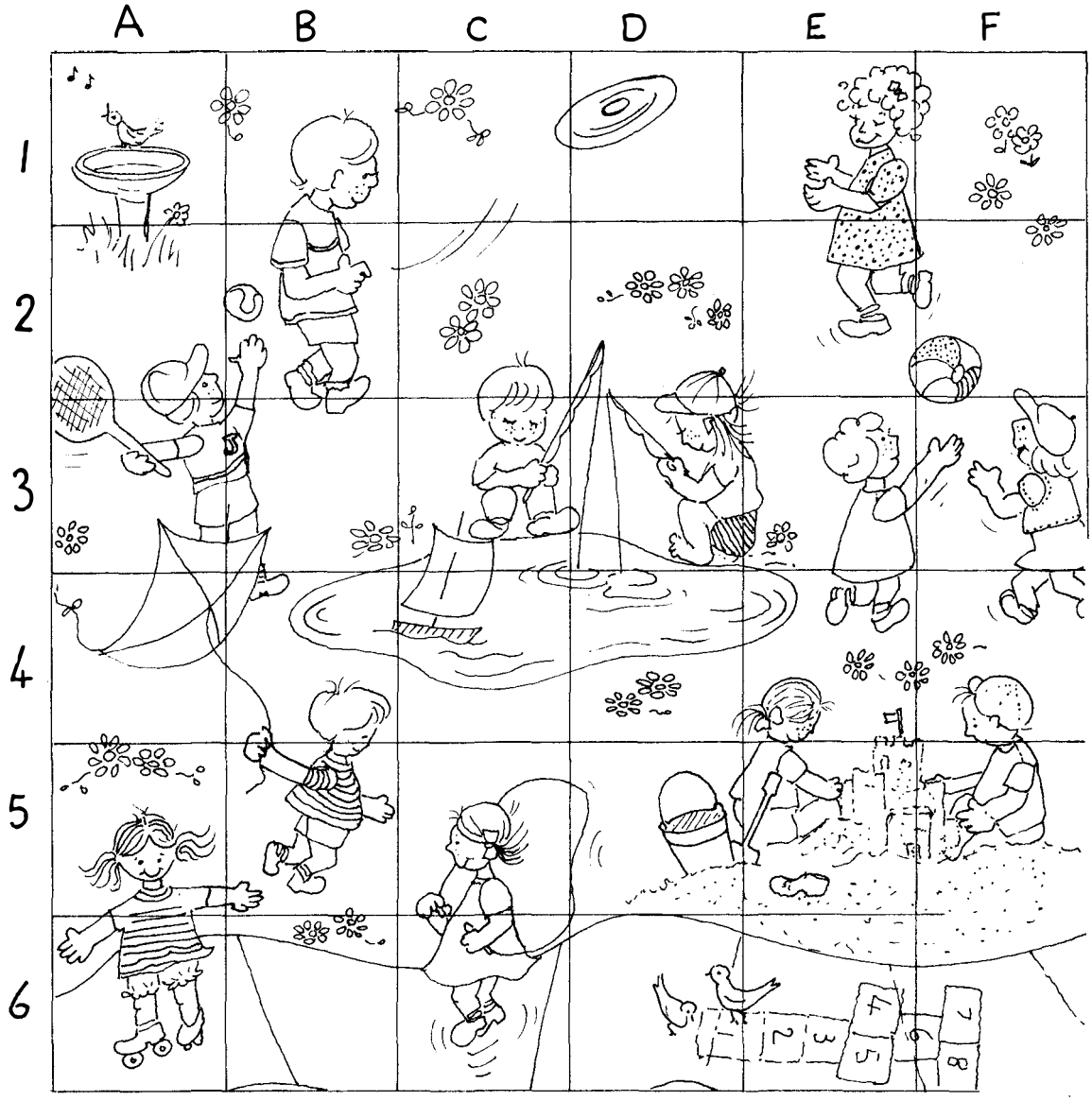
Colour Region Green - cover card with a seal



Colour Region Red - cover card with a seal



At the Park



How to use the picture grid

Look at the letters on top of the picture and the numbers down the side of the picture.

By using these numbers and letters we can find things in the picture quickly. Look at the birds on the hopscotch. They are in the line with D at the top and in row number 6. We call this square D6.

Turn over and answer the questions using the letters and numbers to name the squares.

At the Park

Questions

1. What square is Fred's frisbee in?
2. What square is the bird on the bird-bath in?
3. What is in square A4?
4. Joe has been playing tennis. In which square is his ball? In which square is his racquet?
5. What is happening in squares A5 and A6?
6. What is being built in square E5?
7. What is the girl in C5 and C6 doing?
8. If you were in square C4 where would you be?
9. What is in square F1?
10. What square is the bucket in?

Now check your answers with your teacher.

Find one or two friends to play this game.

You need:

picture grid (At the Park)
2 dice - 1 with numbers 1-6
1 with letters A-F
coloured counters: different colour for each child.

To play:

1. Each child rolls the dice in turn.
2. The dice will show a square such as C4. Cover thi square with a counter.
3. If the square is already covered you do not cover one that turn.
4. The game ends when all the squares are covered.
5. The child with the most covered squares wins.

Getting Bigger on the Geoboard

Activity 10

You will need:

geoboard, elastic bands
work cards
dot/grid paper
pencil, ruler

What to do:

1. Select a work card

2. Make an exact copy of the shape on your geoboard.

3. Make a larger copy of the shape on your geoboard.

4. Draw both shapes on dot/grid paper.

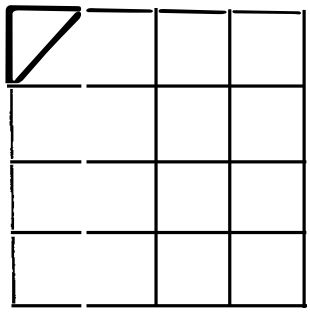
5. How much longer are the dimensions of the larger shape?

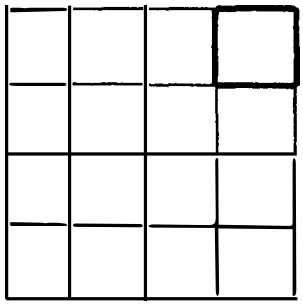
6. How much further around the larger shape?

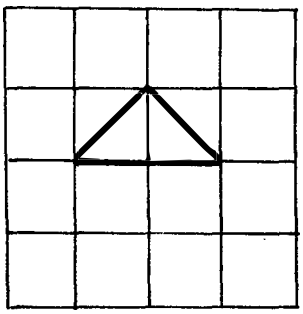
7. Find the number of squares in each shape. How many times more squares in the largest shape?

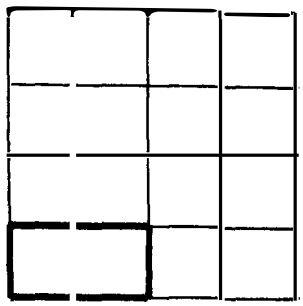
8. Repeat with other shapes.

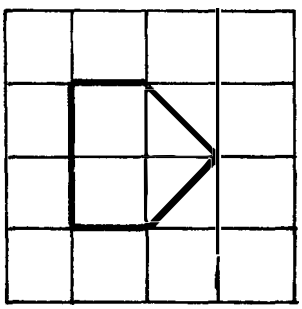
Geoboard Work Cards

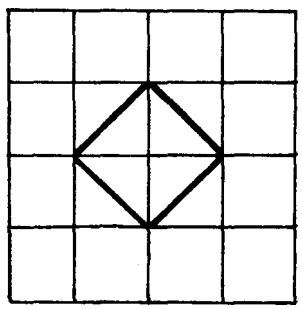






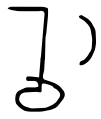






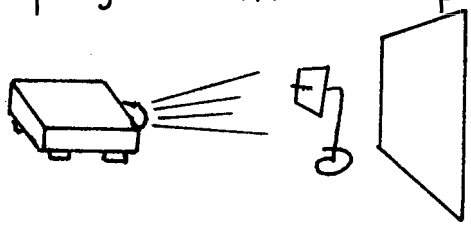
Large, Small or the Same?

You will need:

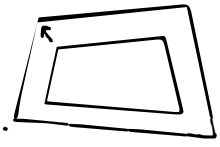
paper and scissors
wire (bent to form a stand )
slide projector

What to do:

1. Cut out any three or four sided shape – it must have straight sides. e.g  or 
2. Punch your wire stand through your shape like this. 
3. Place the stand between the slide projector and the blackboard. The paper shape and the projector must be parallel to the blackboard.



4. Trace the shadow on the blackboard.
5. Is the shadow the same size as your shape?
6. Does the shadow look like your shape?
7. Move the stand towards the blackboard. What happened?
8. Move the stand towards the projector. What happened?
9. Turn the stand sideways a little. What happened?
10. Remove your shape from the stand and take it to the shape you traced on the blackboard.
11. Slide your paper shape into each corner.
12. Are the angles of the paper shape the same as the angles of the blackboard shape?

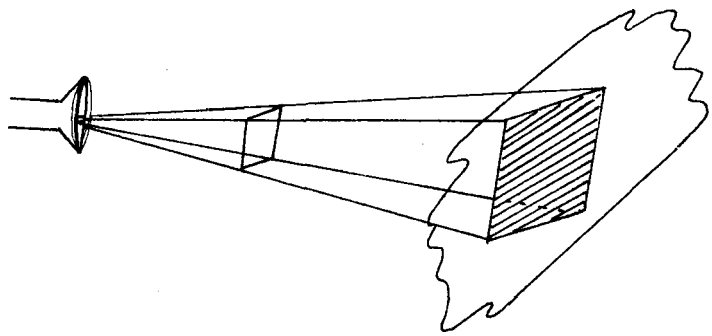


Enlarging Shapes Card 1

1. With torchlight make shadows on a wall with your hands. Can you change the size of your shadows?

2. Draw and cut out some cardboard shapes. Make shadows with them. Can you make a shadow that is different from the cardboard in shape and size?

3. Cut out 2 cardboard squares (or similar triangles or other polygons) with one having sides twice as long as those of the other. Pin the bigger shape on a board and use the smaller shape to cast a torchlight shadow exactly on the bigger shape.



Enlarging Shapes — Card 2

1. Make a square 1 unit long and 1 unit wide on your geoboard.

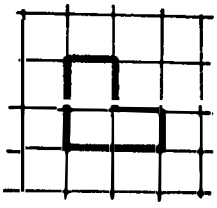
2. Make another square similar to the one above, except twice as long and twice as wide. Draw the square next to the first one.

3. On your geoboard make a rectangle 2 units long and 1 unit wide. Make a similar rectangle with its length and width doubled. How much bigger is the second rectangle than the first (in area)?

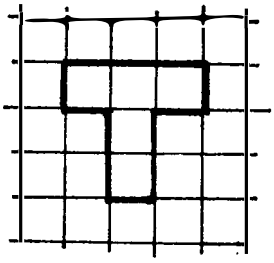
4. Draw a square 4 units by 4 units. Draw another square with the measurements halved.

Enlarging Shapes — Card 3

1. Draw a shape similar to the one in the diagram with each side measuring twice as many units. Compare the areas.



2. Enlarge this shape by drawing a similar shape with each side measuring twice the number of units. How many times larger have you made the area?



3. Draw any shape on your grid paper. Make an enlargement of it, increasing its sides to 3 times as long.

4. Draw 2 squares, one with sides three times as long as the other.

Doubling Your Yacht

Activity 13

1. The yacht below consists of three shapes (two triangles and one quadrilaterd).
2. Your task is to draw another yacht exactly twice the size of the yacht below, but with exactly the same shape.
3. Start at point. A.
4. Follow the instructions on the next page.

G'. J'.

F'. H'

I'

B'

C'

D'

Instructions For Doubling Size of Yacht

* Remember to start at point A.

1. Measure the distance from A to B. What is it? Now go back to point A and double the distance AB to find the new AB, called A'B'. Draw line A'B'.

2. Measure AC; double this length and, following the direction of AC, draw in the new line A'C'. (A' is the same as A, but C' is twice as far from A as C is.)

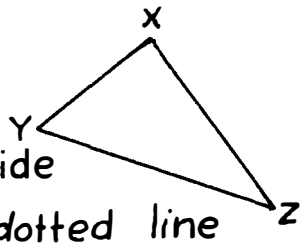
3. Follow the same procedure, measuring AD to find point D'
" AE " " E'
" AF " " F'
" AG " " G'
" AH " " H'
" AI " " I'
" AJ " " J'

* Remember that your new points are in the same direction from A, but twice as far from A as the original points.

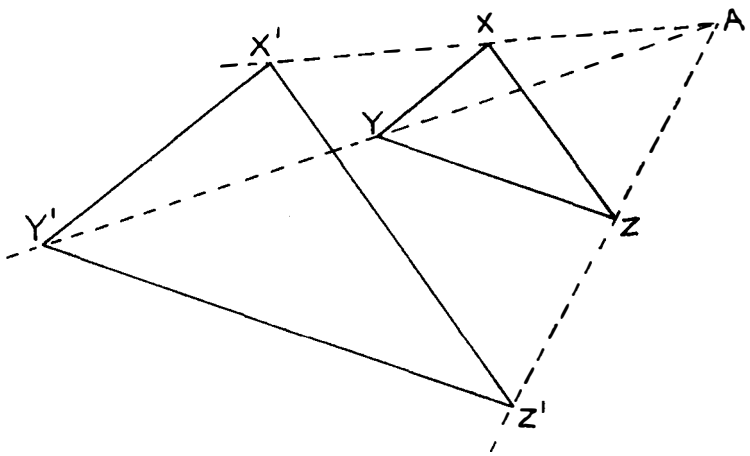
* All your new points occur where two lines meet.

4. Join the new points to form the new yacht.

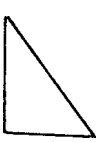
Enlargement Using Rays

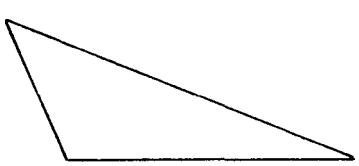


Here is a triangle, XYZ. You can double the length of each side by using the RAY method. First fix any point A outside the triangle. Now using a ruler draw a dotted line from point A to point X and beyond. Measure AX (3 cm) and double it to find point X' (i.e. AX' = 6 cm).
Now draw in the line AY and double its length to find Y'.
Do the same with AZ to find Z'. Join X', Y' and Z'.
This new triangle has sides that are double the length of those in triangle AYZ. Check this by measuring the lengths of the sides in each triangle.

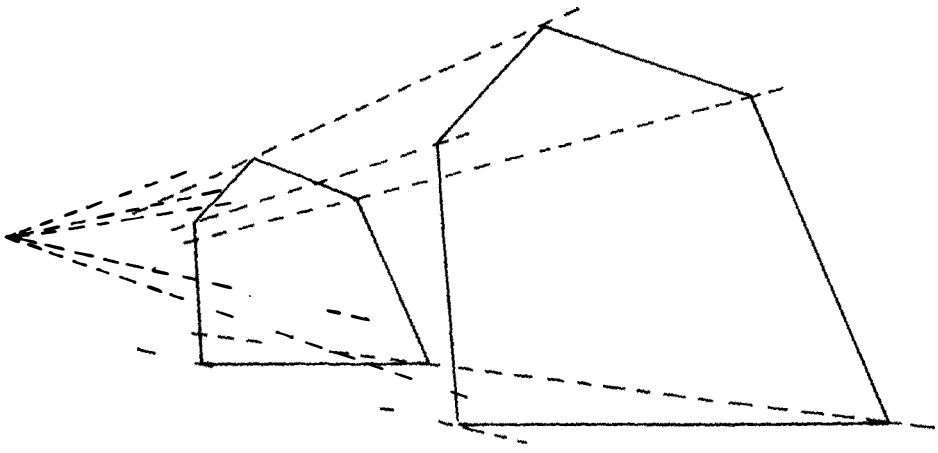


Try this method to double the size of these triangles.

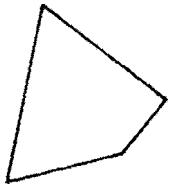


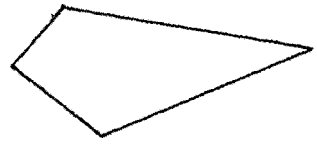


The RAY method of enlargement works for other shapes as well as triangles. Look at this example.

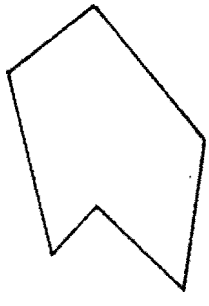


Use this technique to double the size of the following shapes.

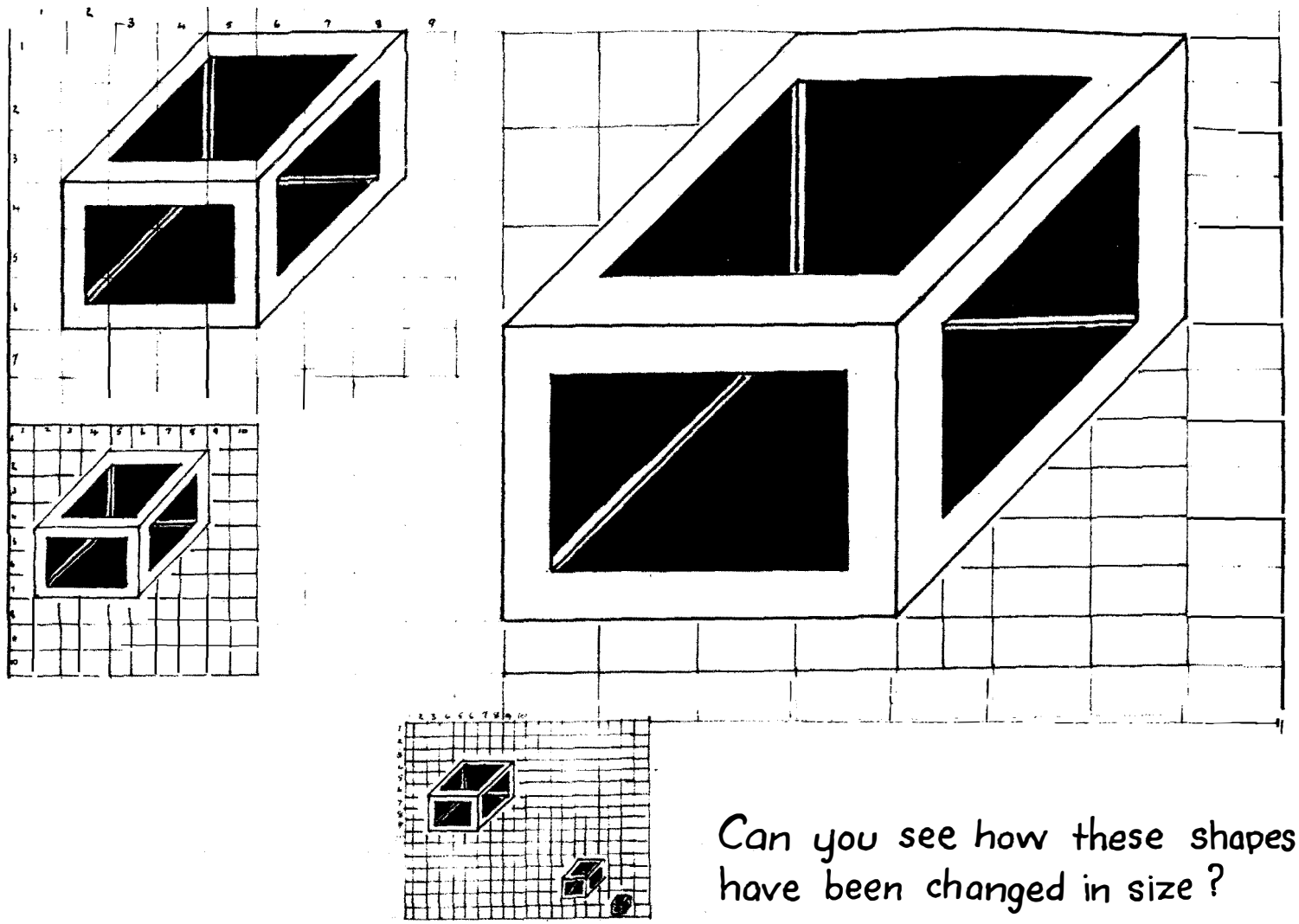




Could this method be used to more than double the size of a shape ?
Make a shape like this that is three times as big.



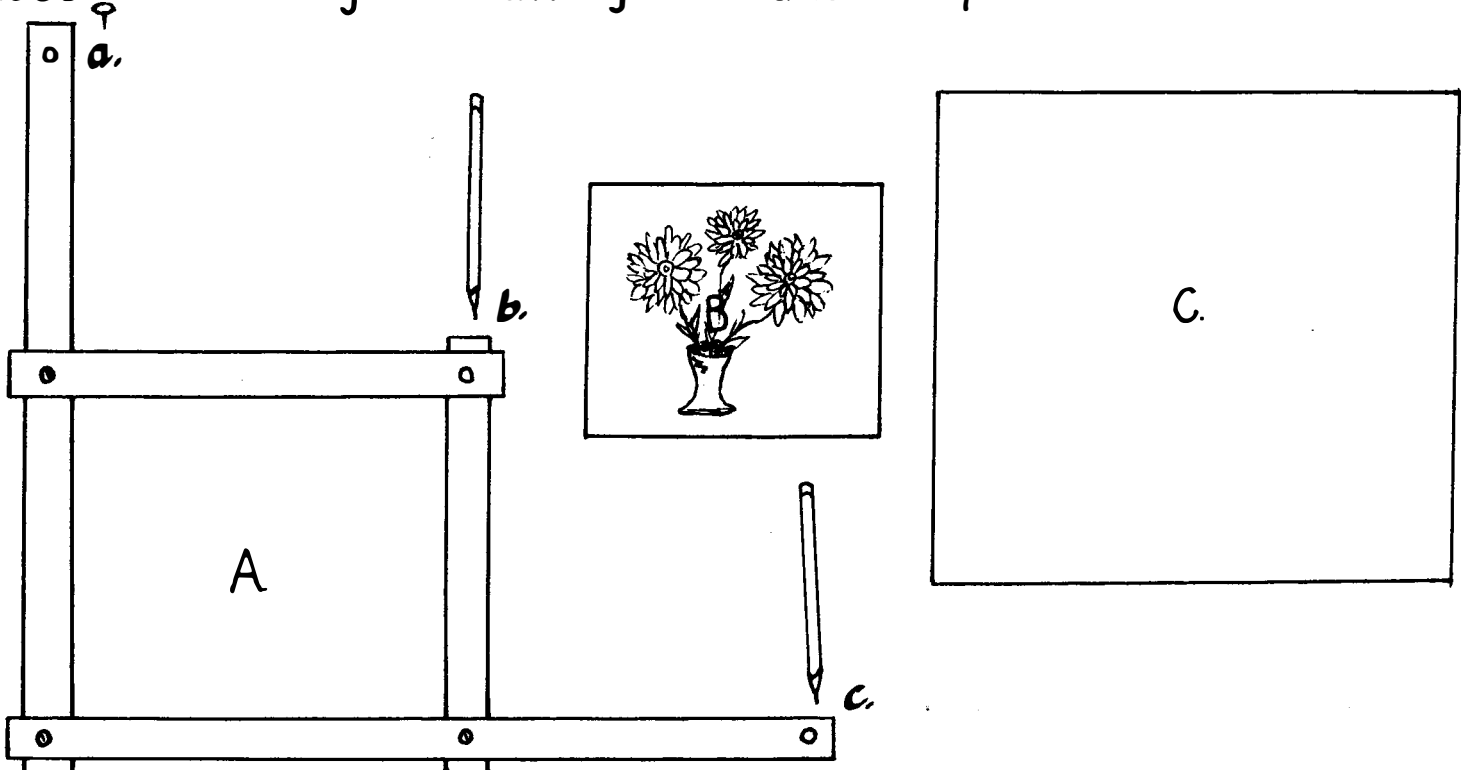
Enlarging, Reducing, Scaling and Mapping



Can you see how these shapes have been changed in size?

Reducing and Enlarging With a Pantograph

A useful way of enlarging or reducing a plan, shape or drawing is to use a pantograph, A. If the plan, shape or drawing is to be enlarged to twice the size, place next to it a sheet of paper with double the dimensions and pin both plan and drawing paper firmly to a board. Fix the pantograph at point (a) with a pin. Using the pencil at (b) follow the lines of the plan carefully to produce the enlarged drawing with another pencil.

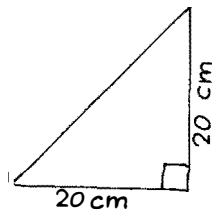


Making a "Height - Sight"

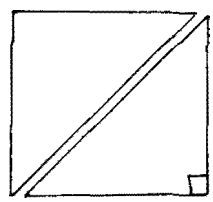
You will need cardboard, a straw, sticky tape and scissors.

What to do:

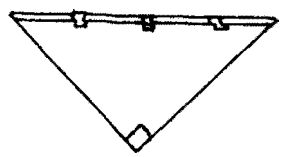
1. Cut the cardboard to make a 20cm x 20cm square and mark the diagonal.



2. Cut along the diagonal to form two triangles.

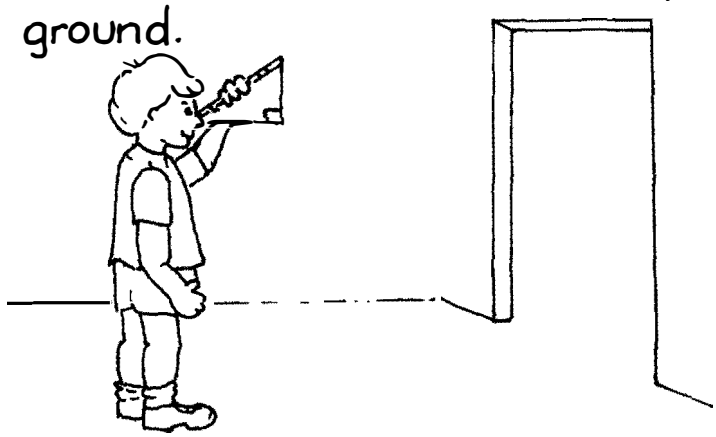


3. Tape a straw to the diagonal edge of one of the triangles.



How to use your "Height - Sight":

1. Sight the top of a window or door.
2. Move closer or further away until the bottom edge of your "Height - Sight" is parallel to the ground.
3. Ask a classmate to make sure it is parallel to the ground.



"Height - Sight" Activities

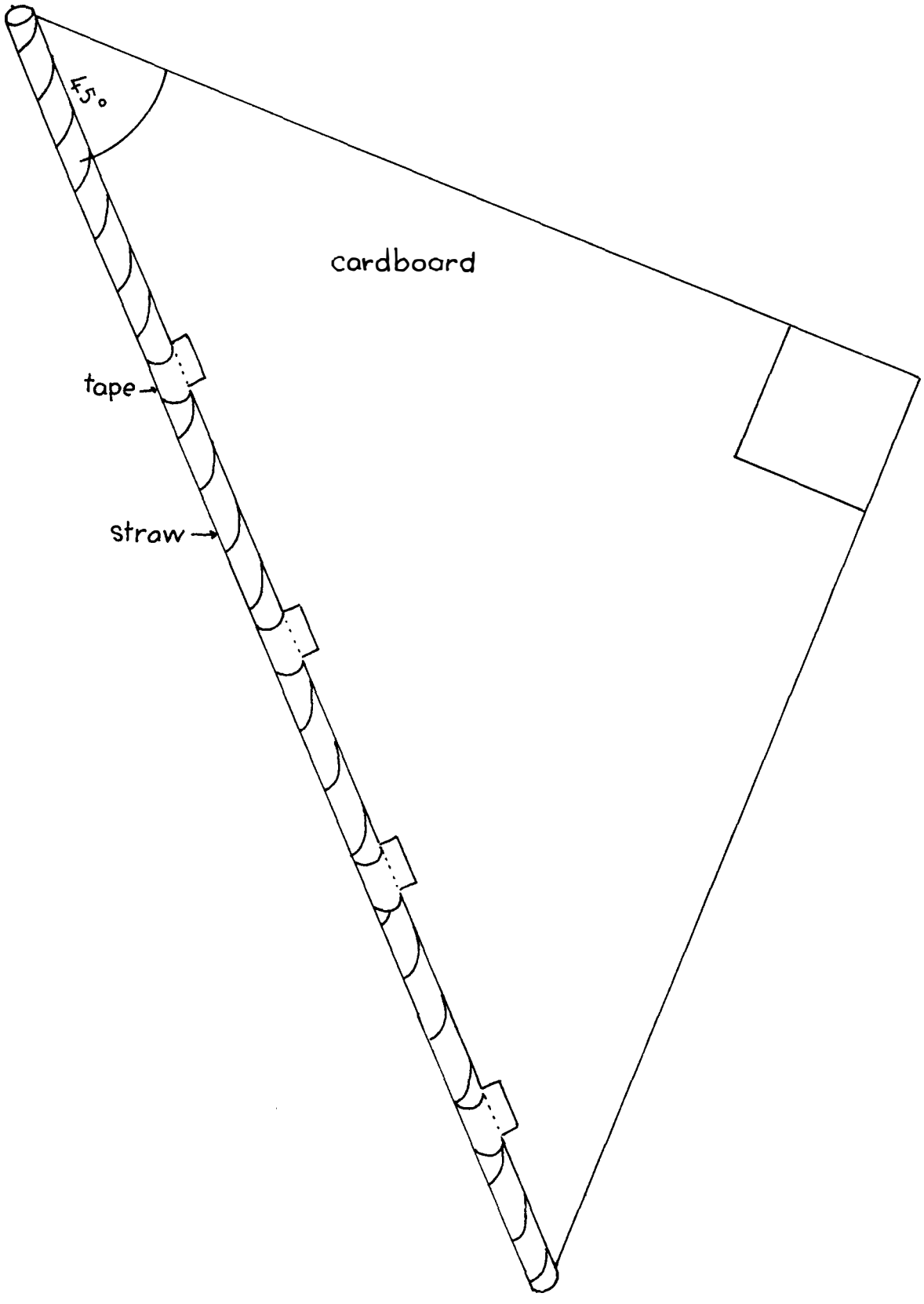
Try sighting in different positions and record these measurements.
What patterns do you see?

Position	Eye Height	Distance to Door	Height of Door
standing on floor			
kneeling on floor			
sitting on chair			
standing on chair			
sitting on floor			

Measure the height of four other objects with your "Height - Sight".

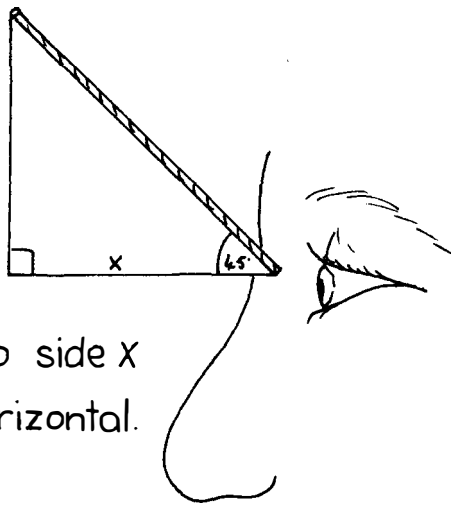
Finding an Unknown Height

You will need this instrument.



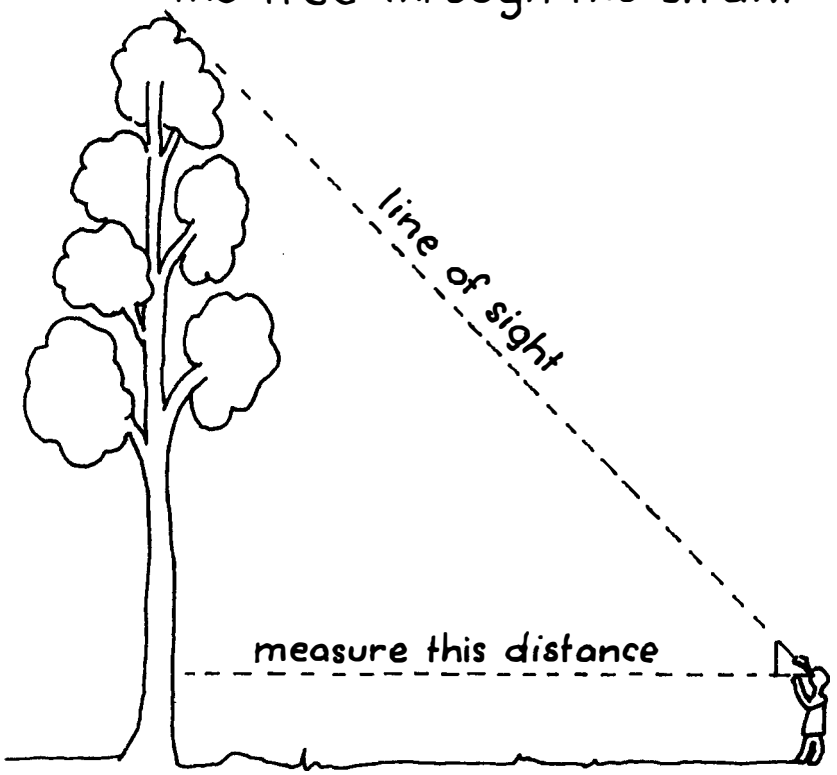
What to do:

1. Place the instrument to your eye like this.



Remember to keep side x of the triangle horizontal.

2. Move to where you can see the top of the tree through the straw.



3. Place the triangle on the ground where your feet are.

4. Measure from the triangle to the base of the tree.

* The height of the tree should be the same as the distance you have just measured.

Questions: Why has an isosceles triangle been used?
Could any right angled triangle be used?

Finding an Unknown Height

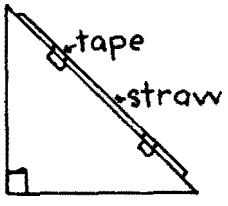
You will need:

1 right angled isosceles triangle
1 straw
sticky tape
metre rule, trundle wheel or tape measure (could use walking paces)

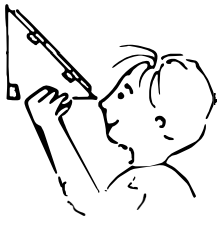
What to do:

Work in twos or threes

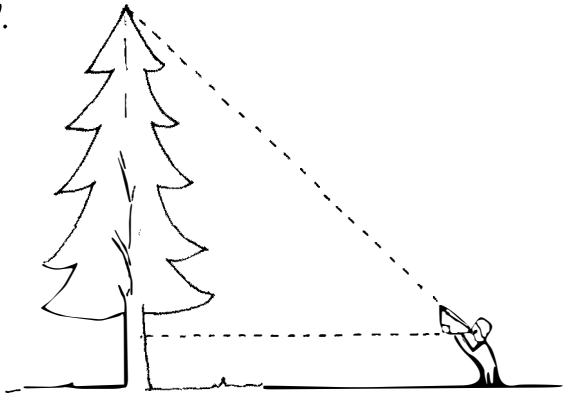
1. Tape straw to hypotenuse of triangle.



2. Hold triangle at eye level and look through the straw.



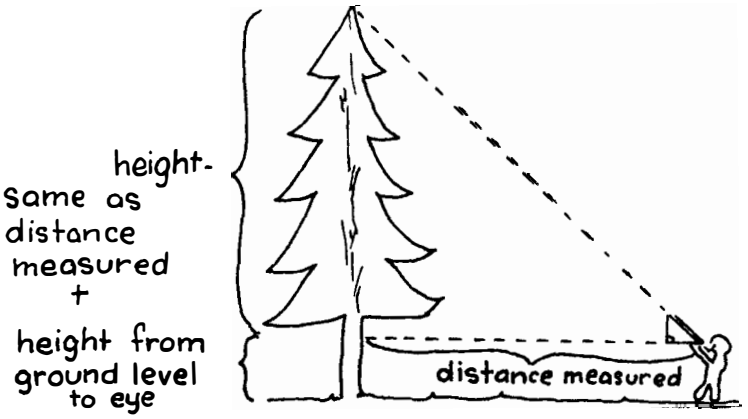
3. Keep triangle in this position and move to where you can see the top of the tree through the straw.



4. Get your partner to measure or pace the distance between yourself and the tree. Record the distance.

* The distance measured is the same as the height from your eye to the top of the tree (sides of isosceles triangle)

5. Get your partner to measure the height from ground level to your eye, add it to the distance measured or paced from you to the tree and you have the height of the tree.



Finding an Unknown Height

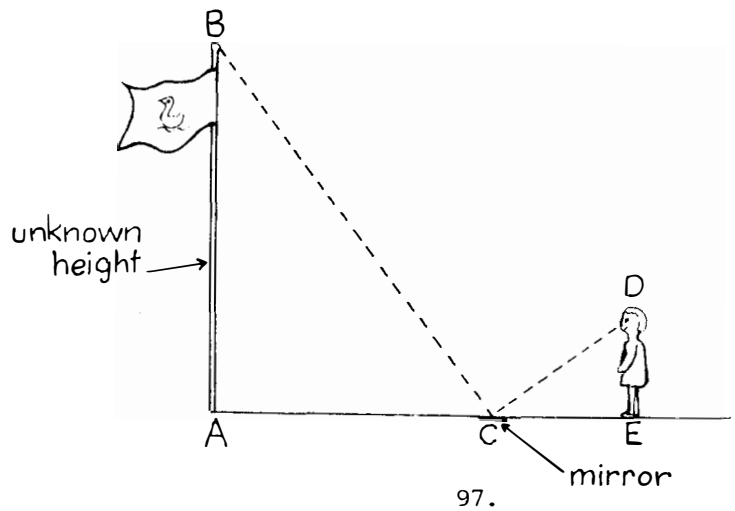
You will need a mirror and a measuring tape.

1. Read all the instructions before commencing.
2. Estimate the height in metres.
3. Measure 10m from the object of unknown height. At this point (C in the diagram) place the mirror flat on the ground.
4. Standing as vertically as you can, walk backwards while looking into the mirror. Walk in line with the 10m you measured from the object.
5. When you can see the top of the object in the mirror, stop. This point is E.
6. Measure the distance from the mirror to E.
7. Measure your height to your eye level. Find this distance on the diagram.
8. The triangles in the diagram are similar. Why?
   Because the triangles are similar the sides are proportional.

$$\text{so } \frac{AB}{DE} = \frac{AC}{CE}$$

$$\therefore AB = \frac{DE}{1} \times \frac{AC}{CE}$$

9. Substitute the values we know for DE, AC and CE. Calculate AB.
10. Height of our object is .....

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