

You Need

- One [1] A3 size Final Eight board and two [2] dice
- Eight [8] team cards (A - H) and eight [8] cards numbered 1 - 8

The Story

A final eight play-off like this is one way to decide the winner of a sporting season. Number cards show the position of a team at the end of the regular season. You will investigate whether some positions are better than others. (This task may be used by 8 students so that each player 'owns' one team.)

Your Task

1. Randomly choose a Team Card and a Number Card. If you choose, for example, Team H and 3 it means Team H finished in third place at the end of the season. Keep on selecting until all teams are in position.
2. Partners play a 'match' between two teams, as shown on the board, by rolling two dice. The higher number wins.
(This assumes the teams have an equal chance of winning.)
3. After each 'match' move the Team Cards as shown by the board.
Continue playing each match until one team is Premiers.
4. Play 10 final series and keep a record in your journal of the starting position of the winning team.

Challenge

Starting Position	1	2	3	4	5	6	7	8
Estimate: Wins out of 100								

Imagine you played 100 final series. Estimate the number of times the winner would start in Position 1. How many times would the winner start in each of the other positions? Record in your journal as shown.

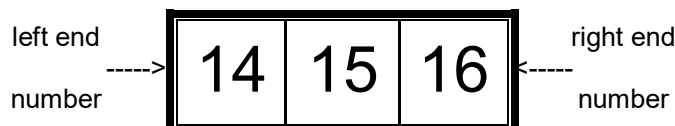
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Team A	Team A	Team A	Team A
Team B	Team B	Team B	Team B
Team C	Team C	Team C	Team C
Team D	Team D	Team D	Team D
Team E	Team E	Team E	Team E
Team F	Team F	Team F	Team F
Team G	Team G	Team G	Team G
Team H	Team H	Team H	Team H
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
Team A	Team E	1	5
Team B	Team F	2	6
Team C	Team G	3	7
Team D	Team H	4	8

You Need

- One [1] number board 0 - 109 (and more)
- A selection of plastic 'window frames'

Use the 1 x 3 frame. Place it over any three numbers in a row like this:



Your Task

1. Add the two [2] end numbers.

Record the end numbers and the total in your journal.

Move the frame to any other set of numbers and add the ends again.

One student worked out the total using the middle number.

How did she do it? Why does it work?

2. Use the same frame to find the total of all three [3] numbers.

Find a way to calculate the total using the middle number.

3. Find a way to calculate the total using the left end number.

4. What happens if this frame is placed over any three numbers in a *column*?

Make and check some hypotheses. Why do they work?

5. What happens if the number board goes beyond 99?

What happens if the number board has eleven [11] cells in each row?

Challenge

Explore the number board using any of the other window frames.

Make and check hypotheses for finding the total in your frame.

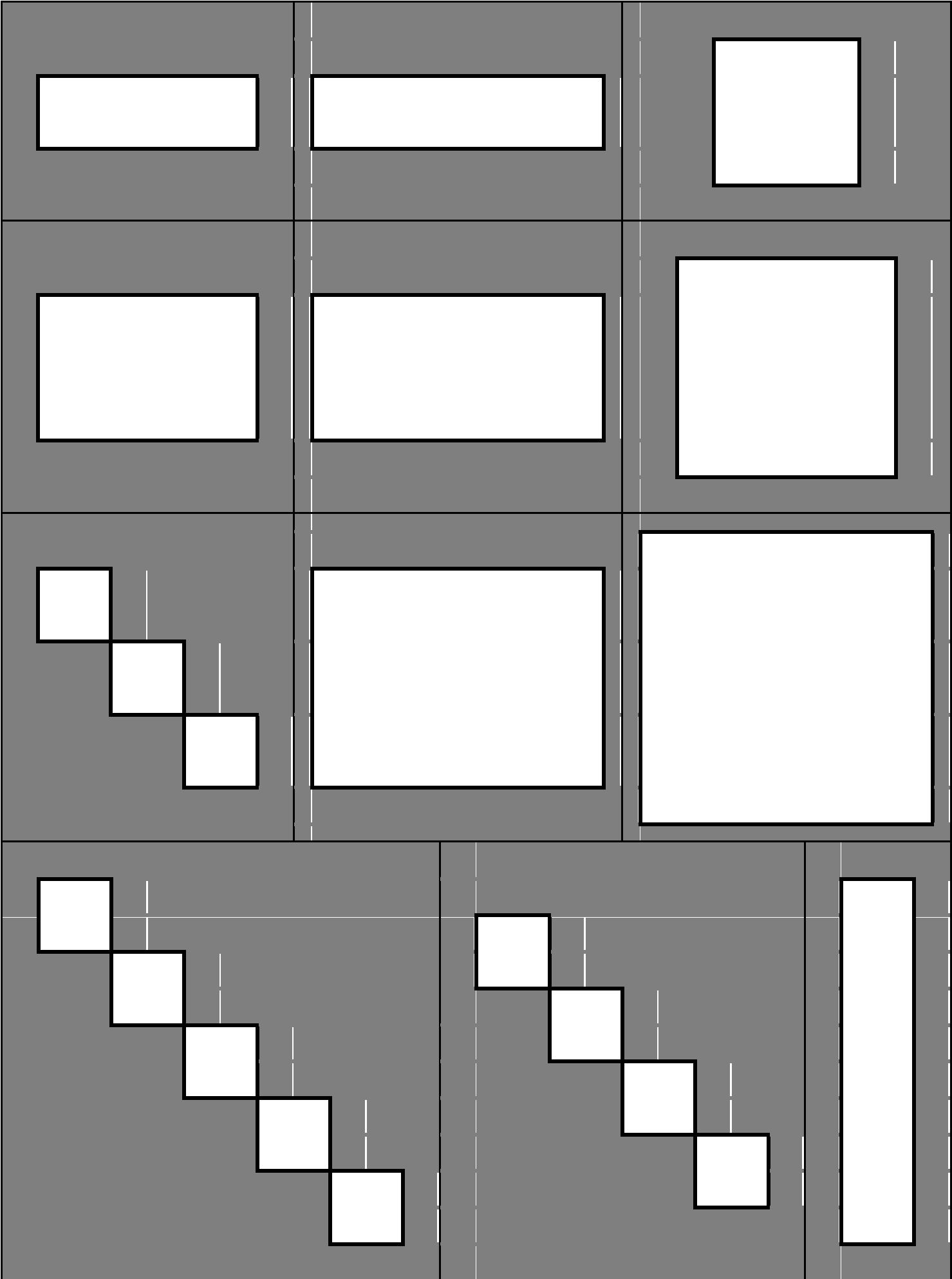
(Hint: Numbers at the end of diagonals might be useful.)

In each case, try to explain why your shortcut works.

(You don't have to try all the frames now. You can come back to this task.)

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WINDOW FRAMES MASTER SHEET



Window Frames Number Board

0	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29
30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49
50	51	52	53	54	55	56	57	58	59
60	61	62	63	64	65	66	67	68	69
70	71	72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87	88	89
90	91	92	93	94	95	96	97	98	99
100	101	102	103	104	105	106	107	108	109

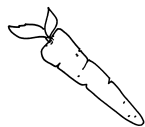
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You Need

- Twenty-four [24] card pieces that make four [4] teacups, four [4] beach balls and four [4] carrots

Your Task

1. a) Find all the carrot pieces.
b) Match all the carrot pieces.
c) Put the carrot pieces in order from smallest to biggest.



2. a) Find all the beach ball pieces.
b) Match all the beach ball pieces.
c) Put the beach ball pieces in order from smallest to biggest.



3. a) Find all the tea cup pieces.
b) Match all the tea cup pieces.
c) Put the tea cup pieces in order from smallest to biggest.



Challenge

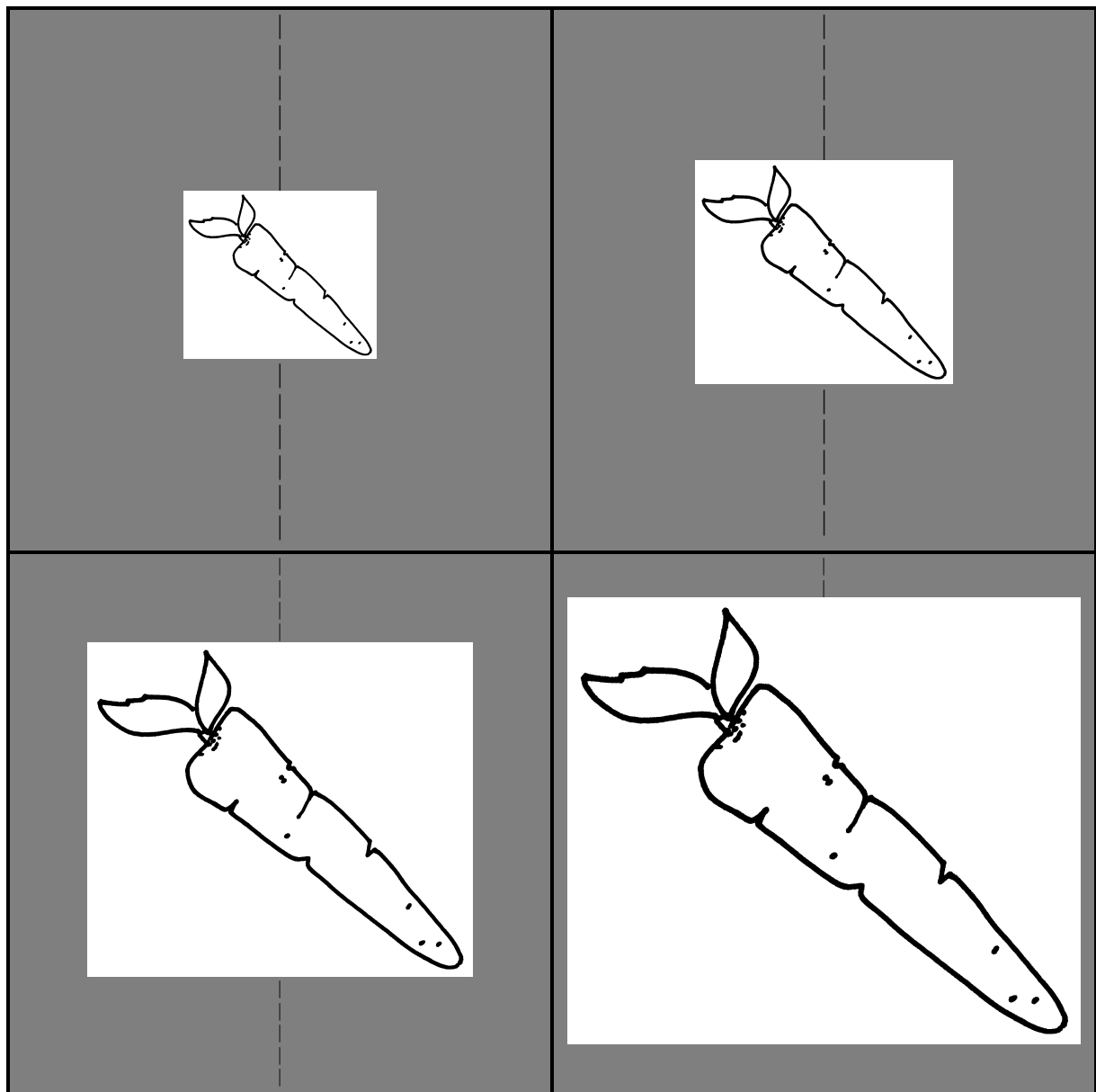
Choose the carrots OR the beach balls OR the tea cups.

Spread them out on the table face down.

Choose two cards. What is the chance they match?

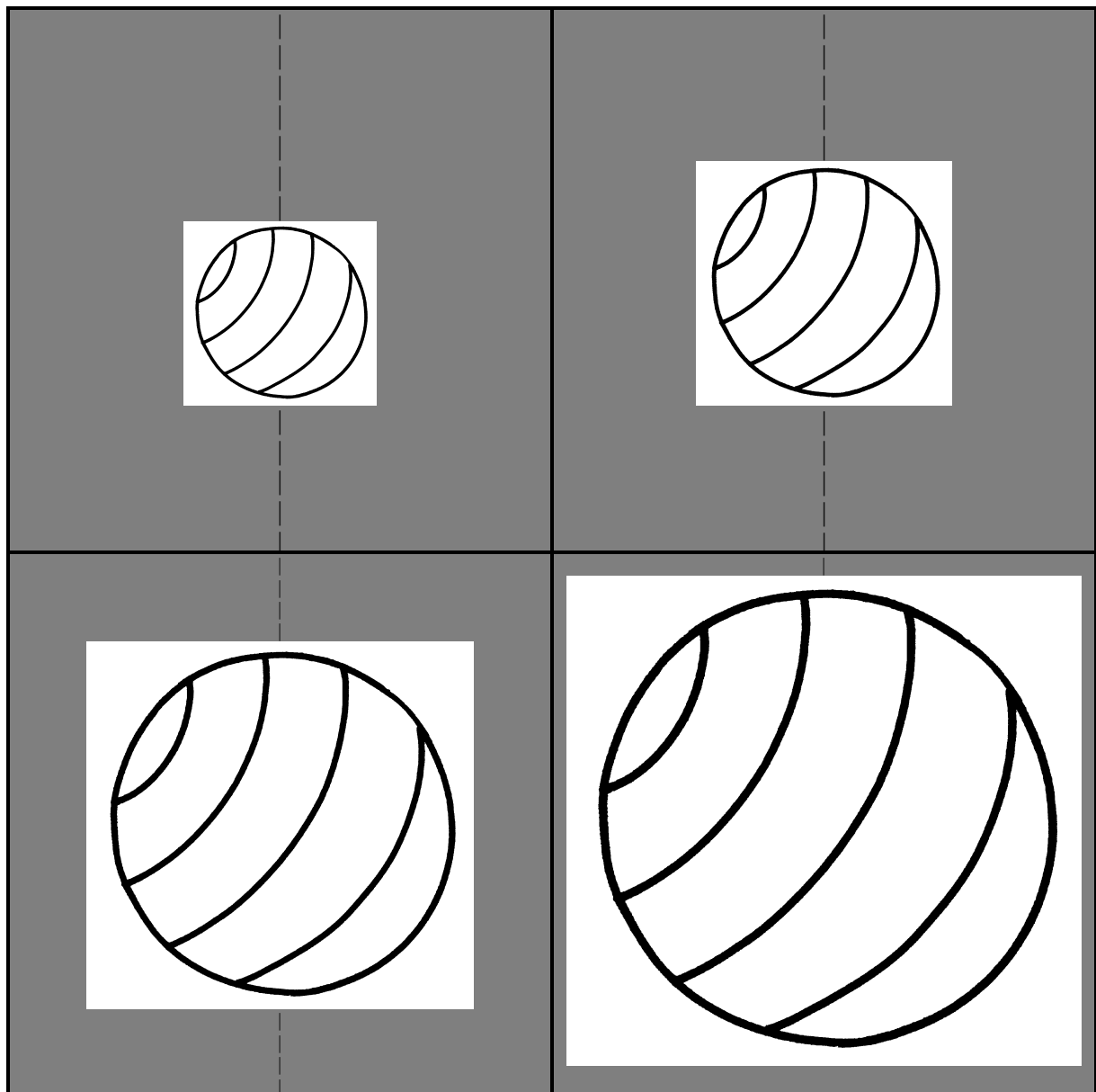
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MATCHING CARDS MASTER SHEET 1/3



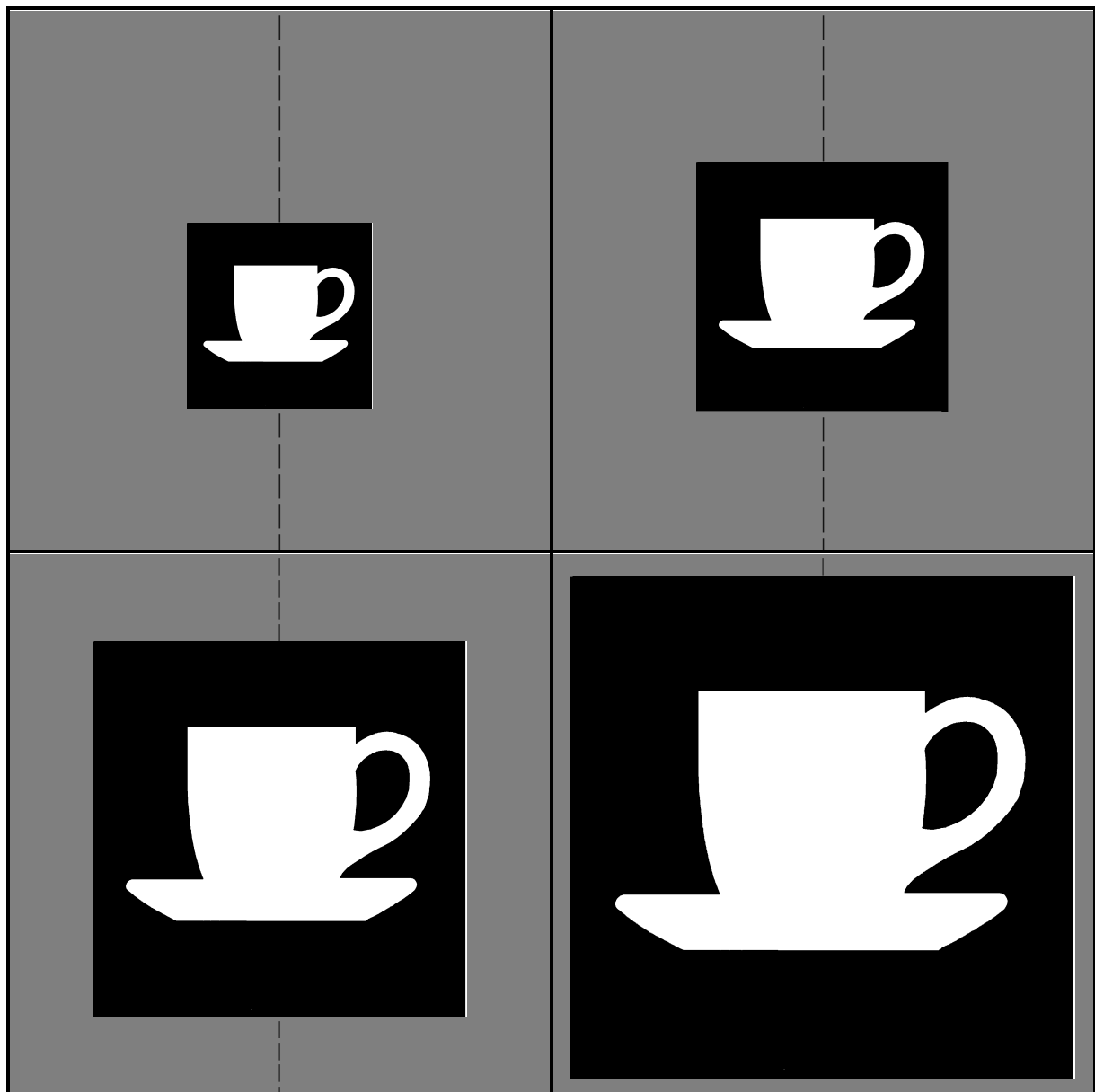
First cut out each card along the black lines.
Then cut each card through the centre from top to bottom.

MATCHING CARDS MASTER SHEET 2/3



First cut out each card along the black lines.
Then cut each card through the centre from top to bottom.

MATCHING CARDS MASTER SHEET 3/3



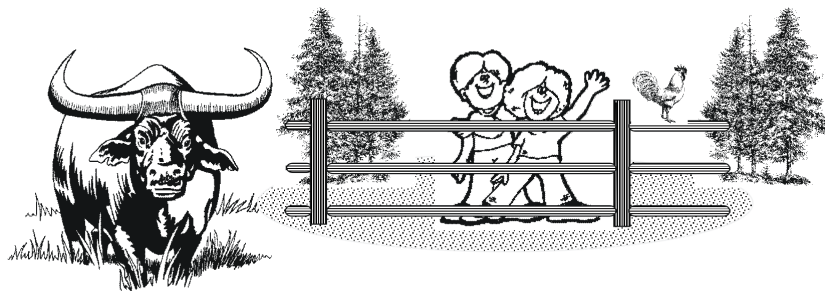
First cut out each card along the black lines.
Then cut each card through the centre from top to bottom.

You Need

- Eight [8] buffalo and eight [8] roosters
- One [1] farmyard card

The Story

Sarah and Sam are looking over the farmyard fence. They play a game where Sarah counts heads and Sam counts legs. You have to work out how many animals there are in the farmyard.



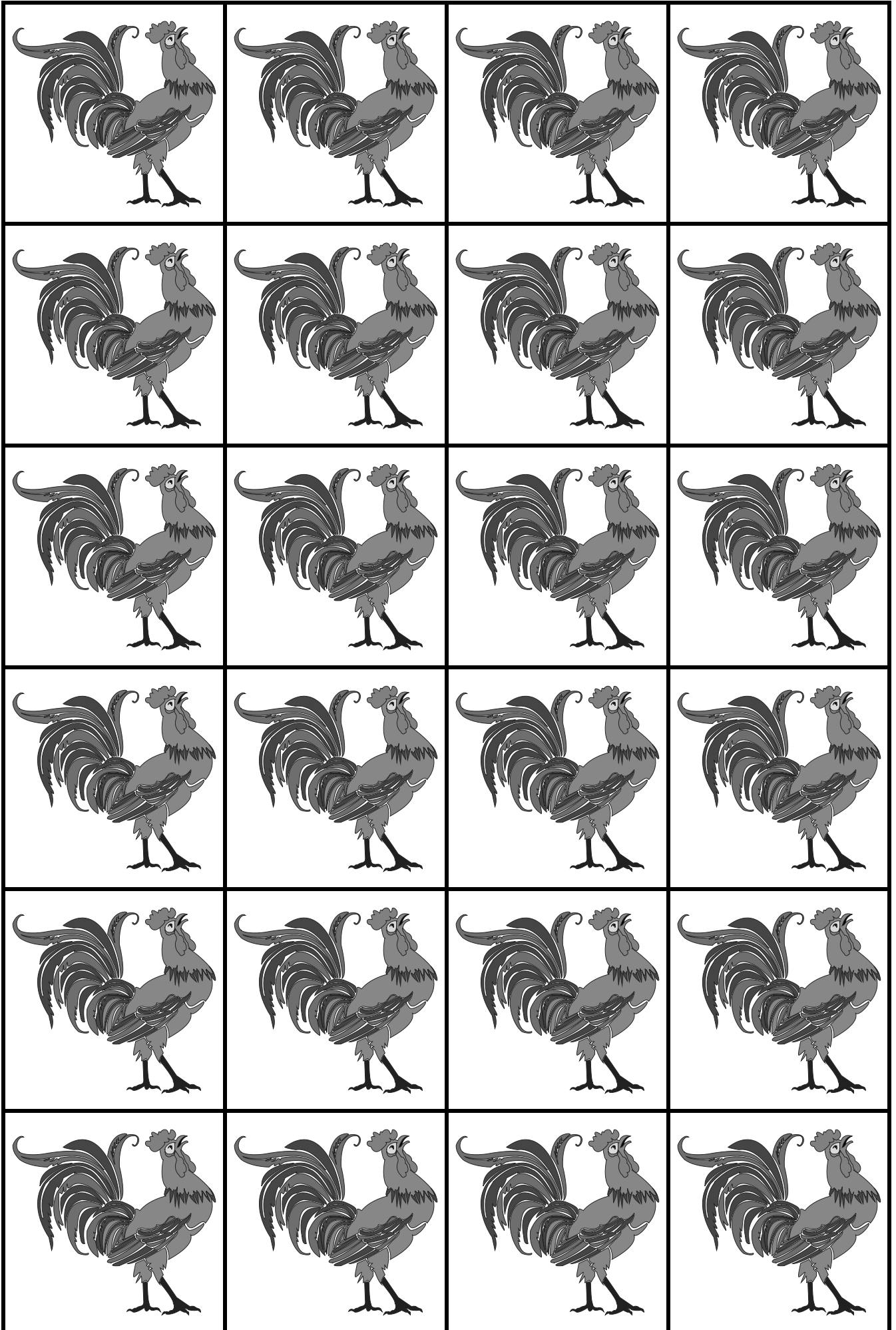
Your Task

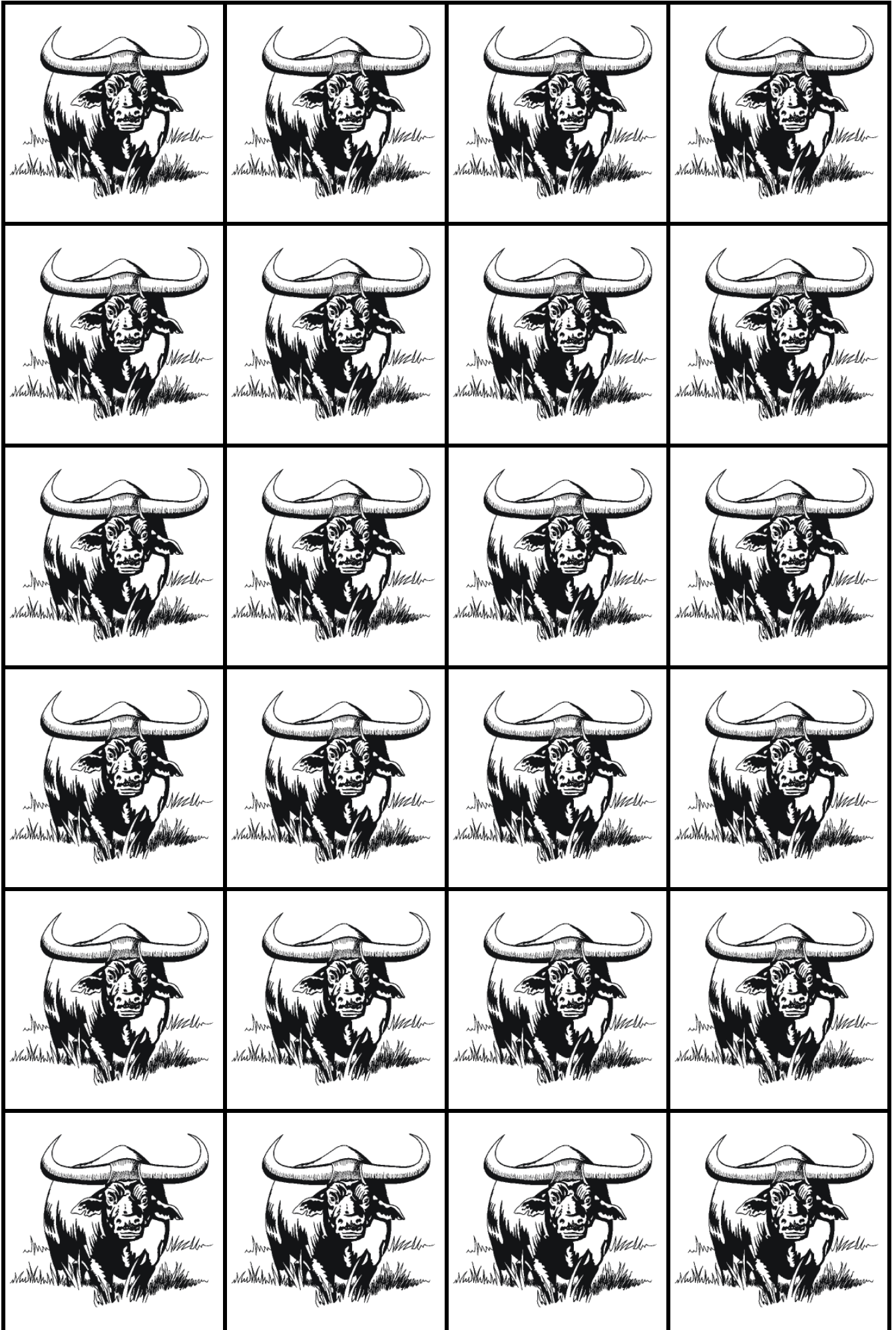
1. Put two [2] buffalo and three [3] roosters in the yard.
How many heads? How many legs?
2. Sarah counted eight [8] heads and Sam counted twenty-two [22] legs.
How many buffalo and roosters were in the yard?
3. a) What if there were ten [10] heads and twenty-eight [28] legs?
b) What if there were nine [9] heads and thirty-four [34] legs?
c) Make up some more questions like this for each other.

Challenge

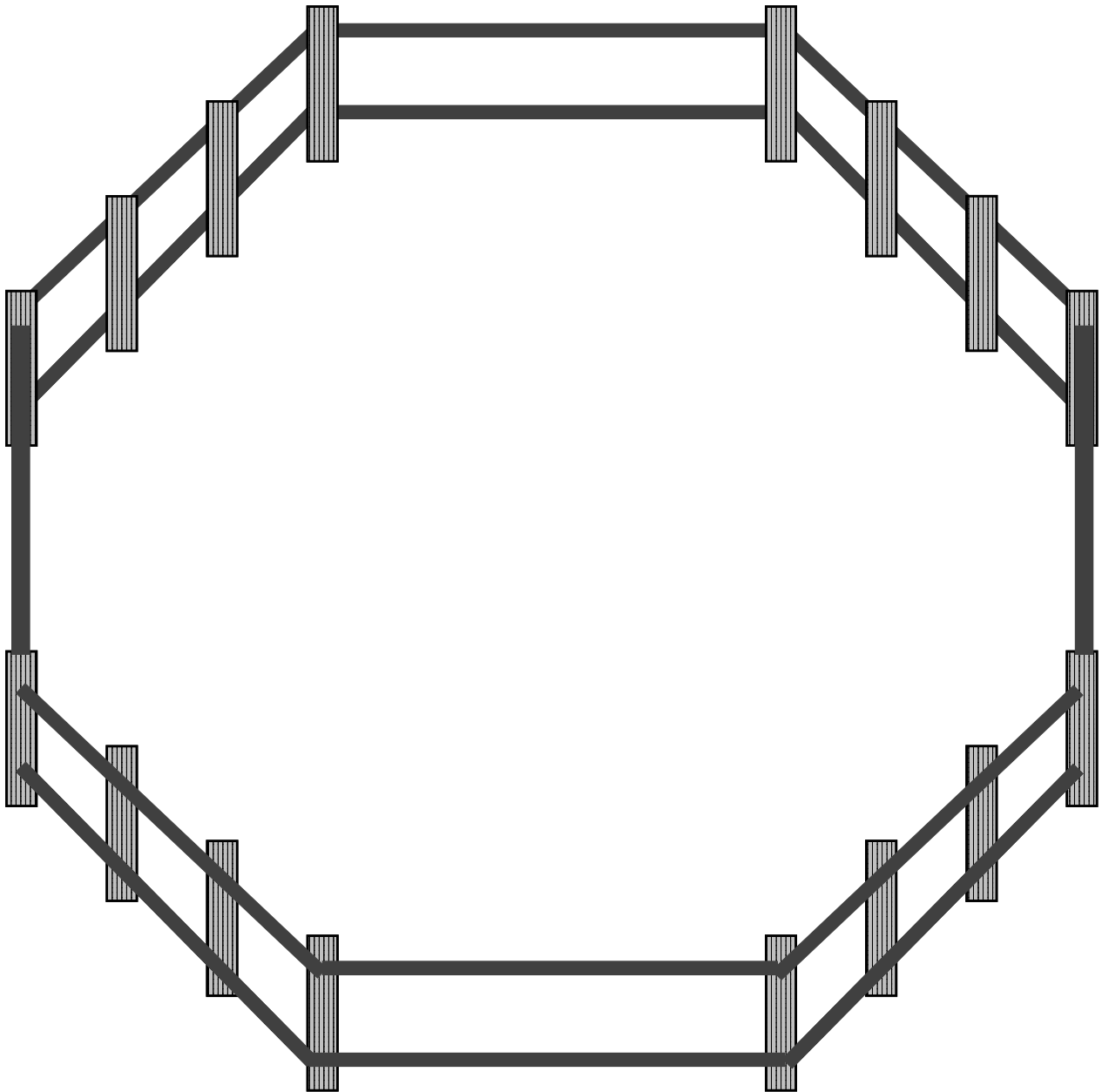
If Sarah and Sam tell you any number of heads and legs can you tell them the number of animals? Explain your method. Does it always work?

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Heads & Legs Farmyard



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You Need

- One [1] map of Australia
- Two [2] different colour counters and one model aeroplane
- One clock showing twenty-four [24] hours (tape it to make a ring)
- One travel chart with cards showing flight times and city names

Departure Time means the *local* time the plane leaves the city.

For example, planes leave Cairns at 7am and 3pm.

The time for the trip is shown along the flight path.

For example, Alice Springs to Adelaide takes 2 hours (2hr).

Your Task

In each problem use one counter to show the start of the journey and one to show the end. Then use the chart and the cards to help you.

1. What is the quickest way to get from Darwin to Sydney?

Explain in your journal.

-
2. Suppose you want to start and finish in Perth *and* travel through every other city on the map. What is the quickest way?
 3. Put your counters on any two cities.

Make up your own travel question and ask a friend to try it.

Challenge

Find out about Australian time zones.

Look at Question 1 again. What is the arrival time in Sydney?

Look at Question 2 again. If you leave Perth on the first day of the month, what day and time do you return?

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TRAVELLING AUSTRALIA

Cut out these rectangles to supply the task.

PERTH	PERTH	DARWIN	DARWIN	CAIRNS	4 hr
CAIRNS	BRISBANE	BRISBANE	SYDNEY	SYDNEY	4 hr
HOBART	HOBART	MELBOURNE	MELBOURNE	ADELAIDE	4 hr
ADELAIDE	ALICE SPRINGS	ALICE SPRINGS	6 am	6 am	4 hr
7 am	7 am	8 am	8 am	9 am	3 hr
9 am	10 am	10 am	11 am	11 am	3 hr
12 midnight	12 midnight	1 pm	1 pm	2 pm	3 hr
2 pm	3 pm	3 pm	4 pm	4 pm	3 hr
5 pm	5 pm	6 pm	6 pm	7 pm	2 hr
7 pm	8 pm	8 pm	9 pm	9 pm	2 hr
1 hr	1 hr	1 hr	1 hr	2 hr	2 hr

TRAVELLING AUSTRALIA

DEPARTURE PLACE	DEPARTURE TIME	ARRIVAL PLACE	ARRIVAL TIME	JOURNEY TIME

mid
ght
1am
2am
3am
4am
5am
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7am
8am
9am
10am
11am
noon
1pm
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THE DAY

24 HOURS
TRAVELLING AUSTRALIA

CHANGE

© Mathematics Task Centre
Task 26

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8am
9am
10am
11am
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THE DAY

24 HOURS
TRAVELLING AUSTRALIA

CHANGE

© Mathematics Task Centre
Task 26

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10am
11am
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THE DAY

24 HOURS
TRAVELLING AUSTRALIA

CHANGE

© Mathematics Task Centre
Task 26

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2am
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noon
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THE DAY

24 HOURS
TRAVELLING AUSTRALIA

CHANGE

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Task 26

Cut out each strip. Curve into a circle and tape the ends to make a 24 hour clock.

You Need

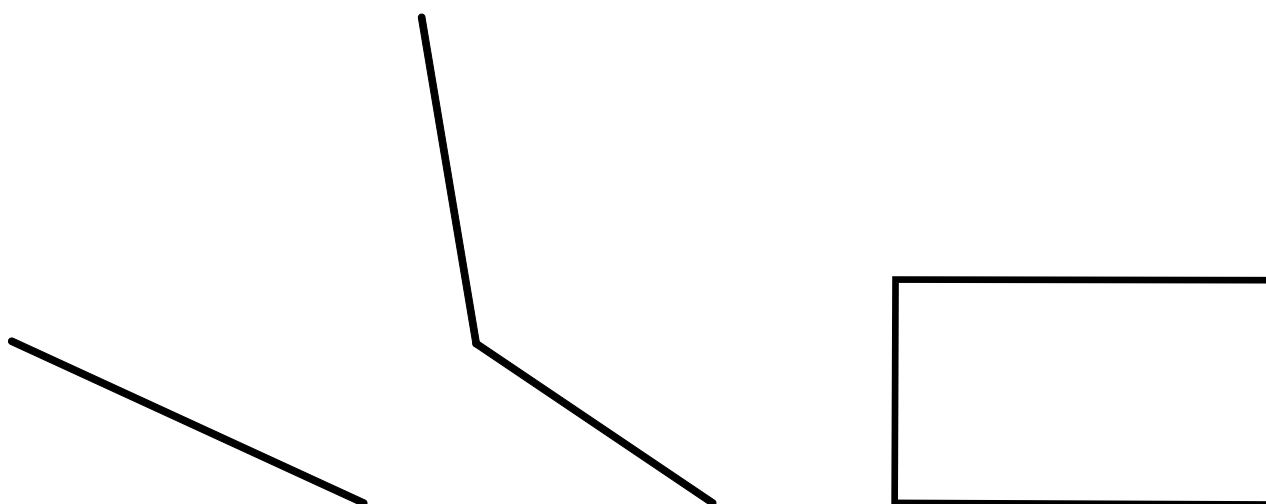
- Three [3] plastic pieces which are copies of the pictures below
- A small amount of sticky-tac

Your Task

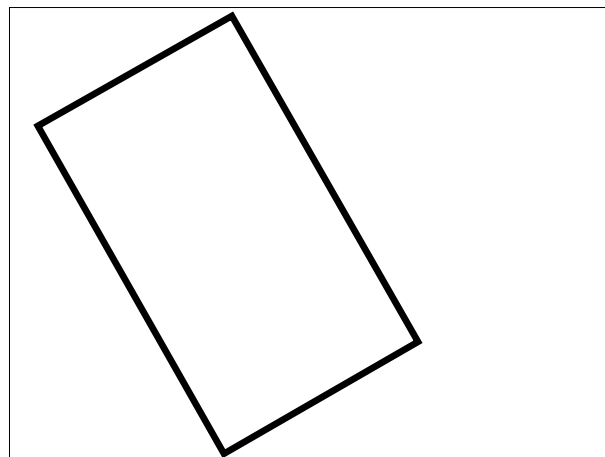
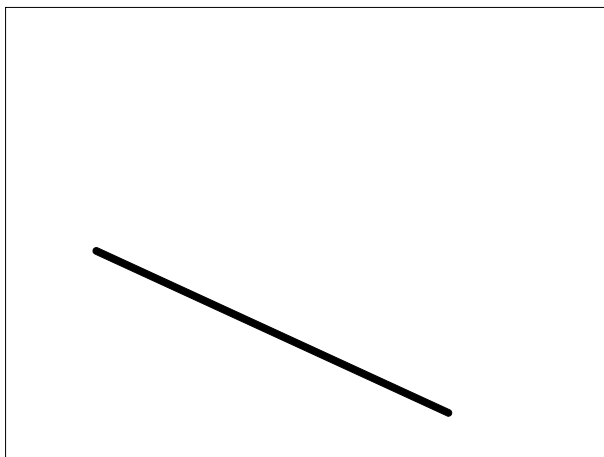
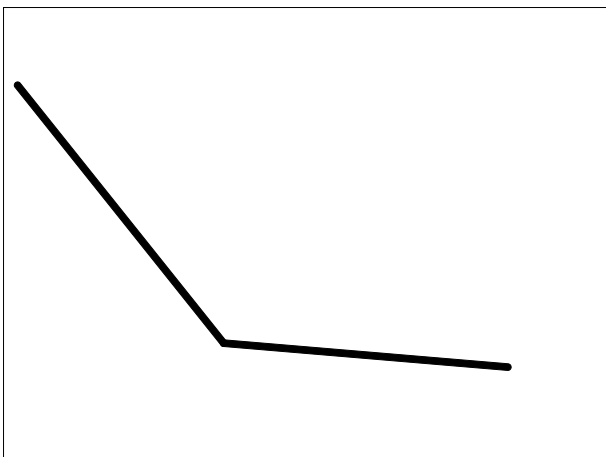
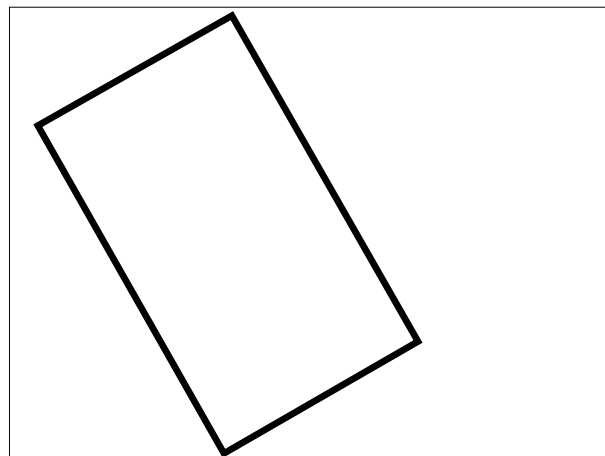
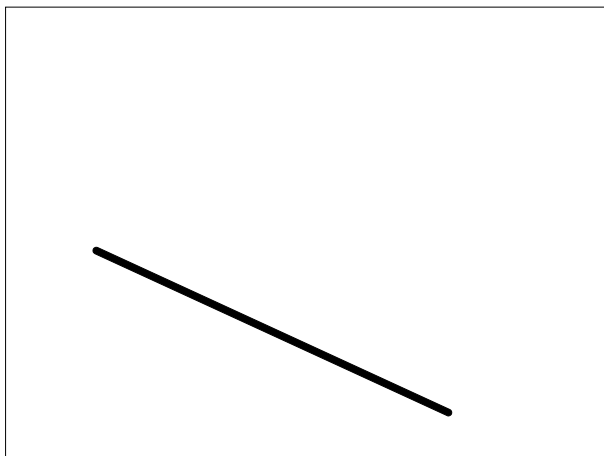
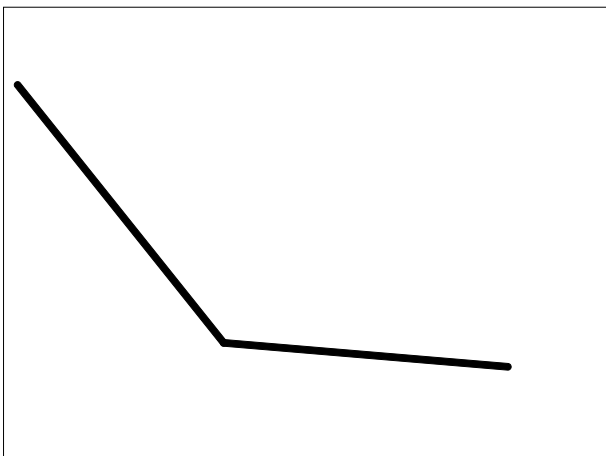
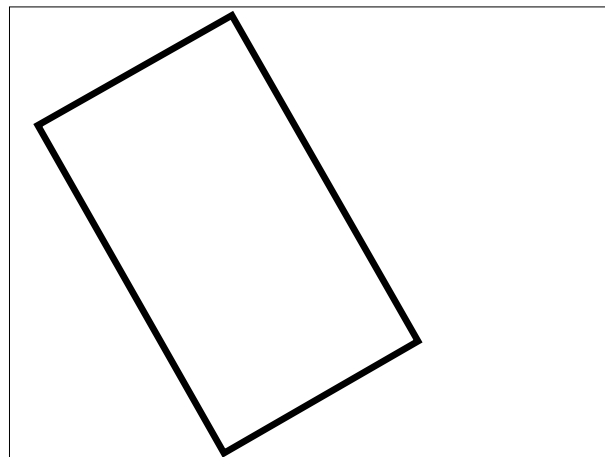
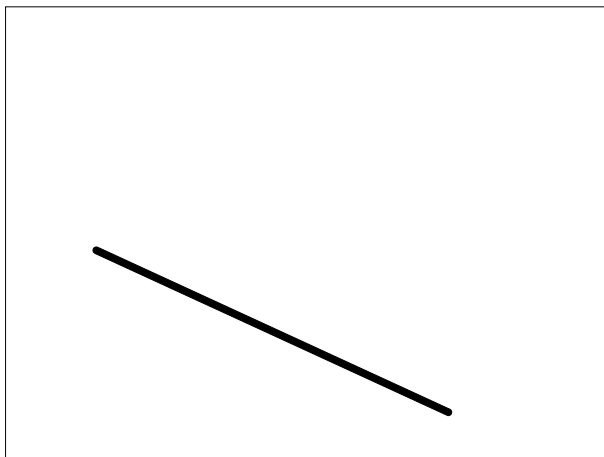
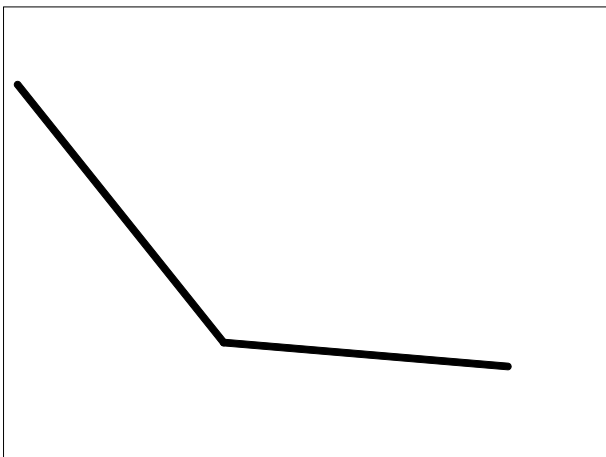
1. Using the rules below, one person has to guide the other person to place a plastic piece exactly on top of its drawing.

Rules

- Sit so you are facing each other and attach the card to the table.
 - Player A closes their eyes to pretend they can't see.
 - Player B drops a plastic piece anywhere onto the card.
 - Player B guides 'blind' Player A to find the plastic piece and move it until it is exactly on top of its picture.
 - Player B can *only* use words and sentences - no touching!
2. Swap roles and try again.
 3. Try the task with the 'guide' standing behind the 'blind' person.
Is it easier?
 4. In your journal, write about the task and what you discovered.



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You Need

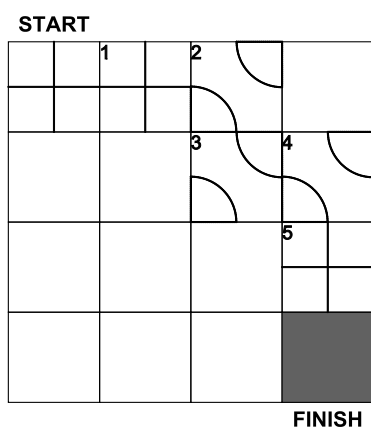
- Twelve [12] tiles and a playing board

This is a game for two players.

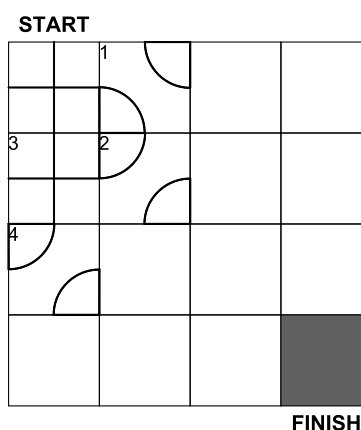
Rules

- The aim is to make a continuous path from Start to Finish without going off the board.
- Players take turns to place one tile to make the path.
- The winner is the person who makes the final connection to the Finish square.
- If you take the path off the board you lose.

Examples



A plays 1.
B plays 2.
A plays 3.
B plays 4.
A plays 5 and **wins**.



A plays 1.
B plays 2.
A plays 3.
B plays 4 and **loses** because the path goes off the board.

NB: The middle of the + tile is *not* a corner. It is like a road on a bridge above another road.

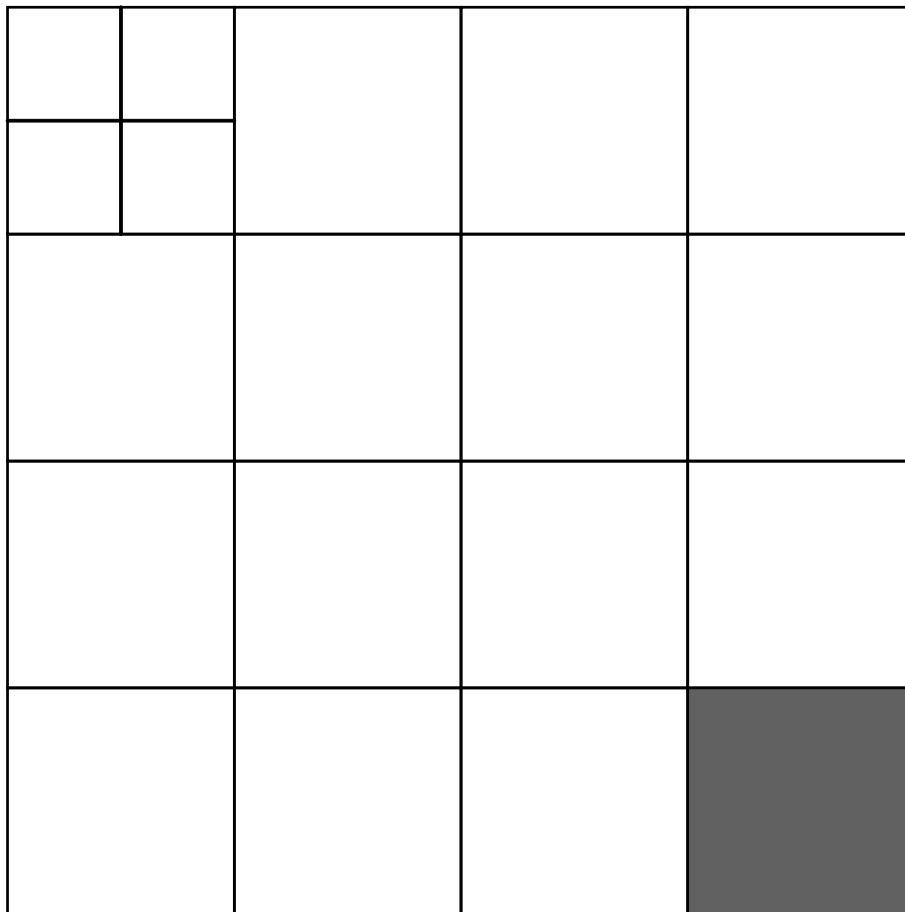
Challenge

1. Play the game a few times then investigate the game together.
2. In your journal, write a paragraph that helps a new player to be good at the game.
You can draw too.

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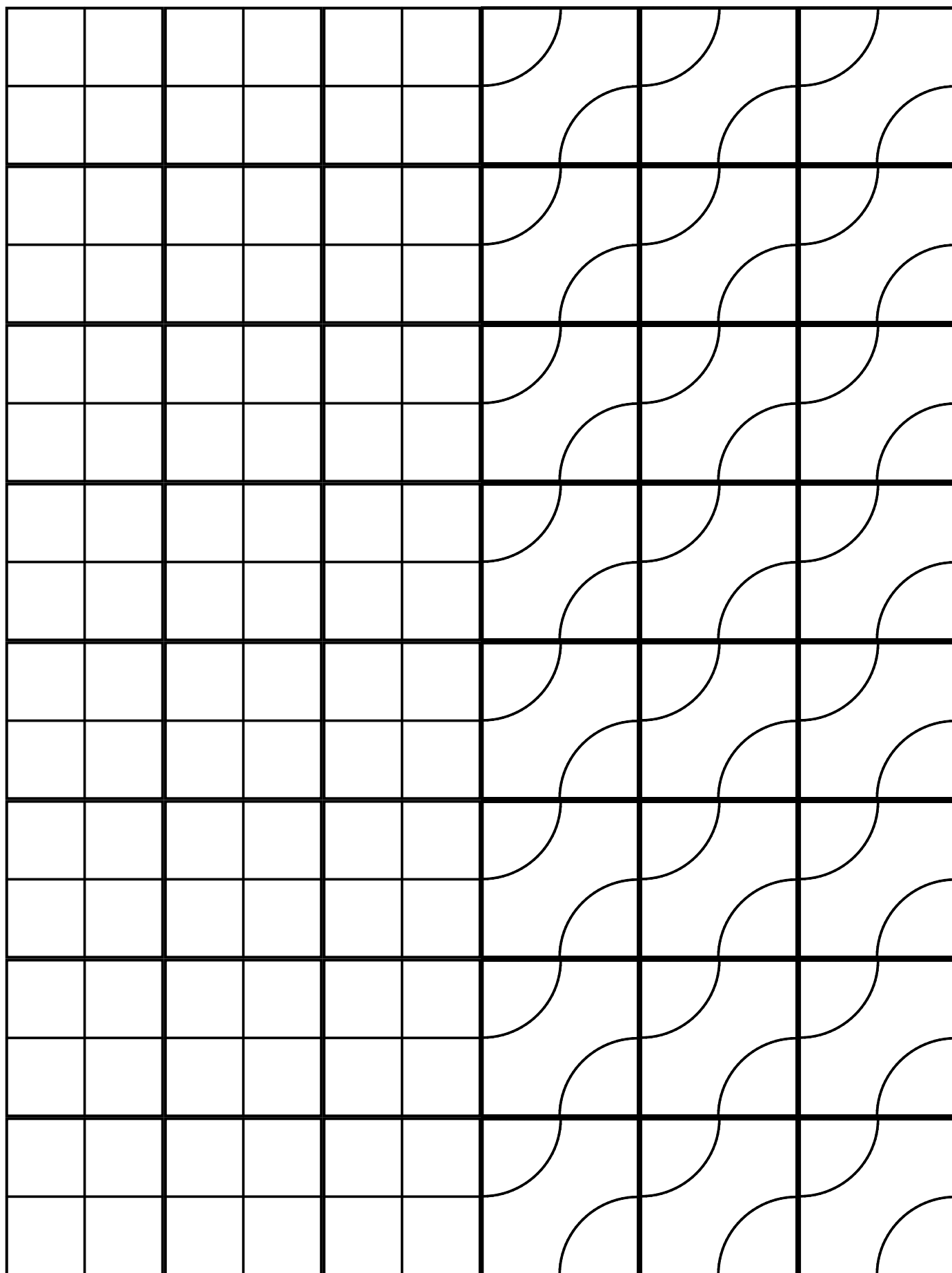
Networks

START



FINISH

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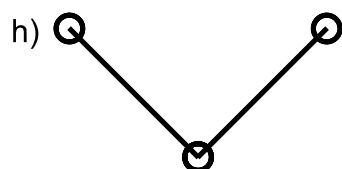
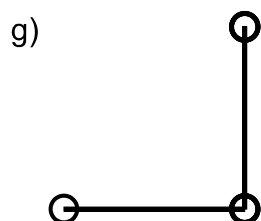
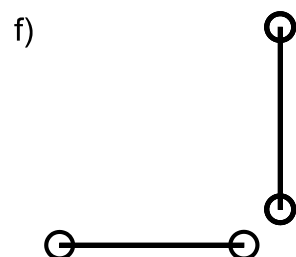
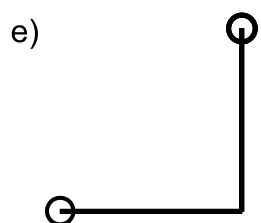
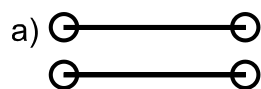
Slice into tiles along the thicker lines. Produces four sets of material for the task. One set = 6 straight & 6 curved.

You Need

- Two [2] mirrors, one [1] dumbbell card and one challenge board

Your Task

1. Make the following pictures using one mirror and the dumbbell card.



Challenge

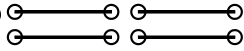
Make the pictures on the challenge board using two mirrors and the card.

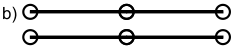
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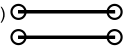


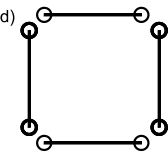
Mirror Patterns 1 Challenges

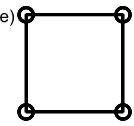
Make the following pictures using two mirrors and one dumbbell card.


a) 

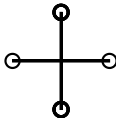
b) 

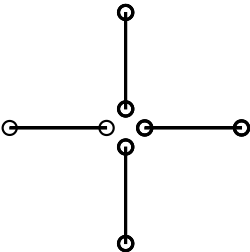
c) 

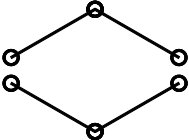
d) 

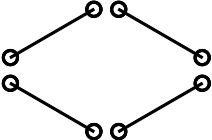
e) 

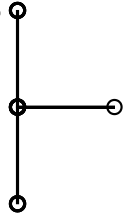
f) 

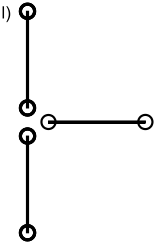
g) 

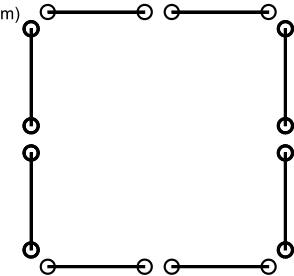
h) 

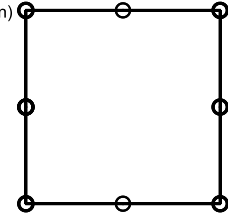
i) 

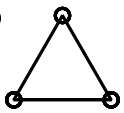
j) 

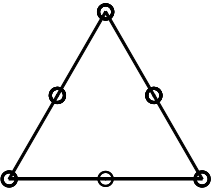
k) 

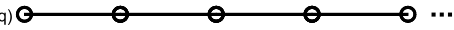
l) 

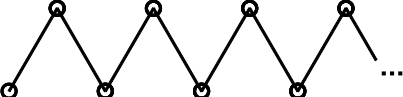
m) 

n) 

o) 

p) 

q) 

r) 

s) Make up your own.

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You Need

- Nine [9] crazy animal cards and one [1] dice



D - OR - SE

Your Task

1. How many different animals can be made?
2. How do you know when you have found them all?

Challenge

Making Crazy Animals by rolling the dice

- Make an animal by rolling the dice three [3] times.
- Make the head first, then the body, then the legs.
- **Rolling 1 or 2 means a giraffe.**

Rolling 3 or 4 means a horse.

Rolling 5 or 6 means a duck.

Example: Roll 2, then 4, then 5 and you make a *giorck*.

Choose one animal to be your favourite.

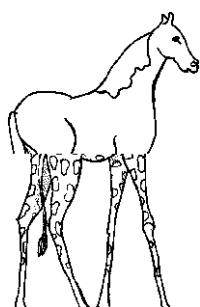
Predict the number of animals you will have to make to get your favourite.

Check your prediction by rolling and making until your favourite comes up.

Do this several times and write a report in your journal.

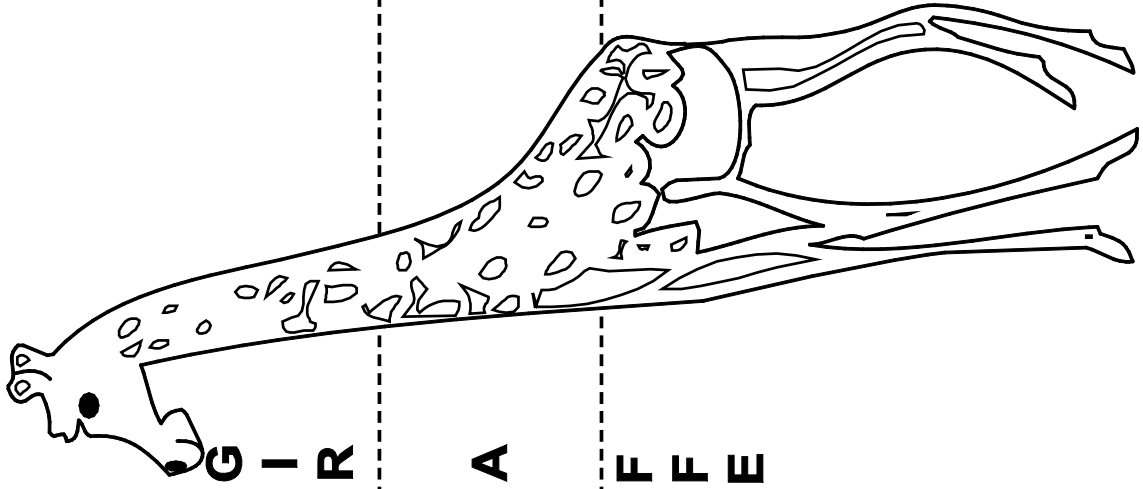


GIR - U - FFE

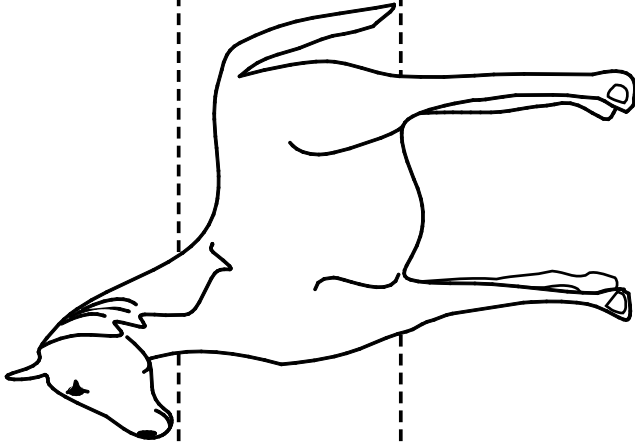


H - OR - FFE

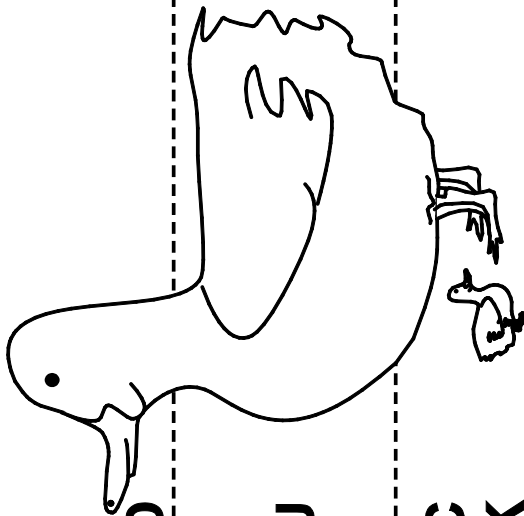
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G I R A F F E



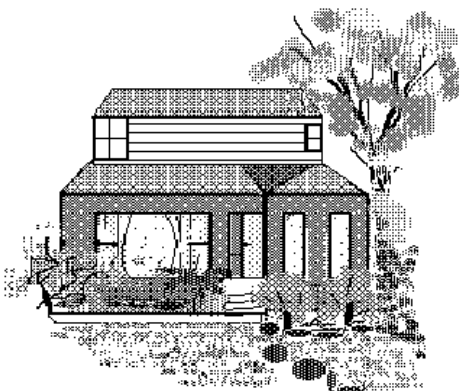
H O R S E



D U C K

You Need

- Nine [9] small cards and one [1] board



The Story

There are only three [3] houses on one side of Short Street. They are numbers 1, 3 and 5. The families living in those houses are the Jacksons, the Papadopoulos family and the Nguyens.

Your Task

1. Use the clues to work out:
 - which family lives in which house
 - the name of the child in each family
 - the car owned by each family

Clues

- The Nguyens live next door to the Papadopoulos family.
- Mr. Jackson's son is friendly with Mr. Papadopoulos's son.
- The family in the middle has no boys.
- Sam's mother works with Mrs. Jackson.
- The family in Number 5 does not own a Ford.
- Kim wants to be an architect when she leaves school.
- The family that owns the Mazda does not live next door to the family that owns the Ford.
- Chris thinks their Mazda is great.

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Who Lives Where?

	NUMBER 1	NUMBER 3	NUMBER 5
FAMILY NAME			
CHILD'S NAME			
CAR			

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JACKSON	PAPADOPOULOS	NGUYEN	JACKSON
HOLDEN COMMODORE	FORD FALCON	MAZDA 323	PAPADOPOULOS
SAM	CHRIS	KIM	NGUYEN
JACKSON	PAPADOPOULOS	NGUYEN	HOLDEN COMMODORE
HOLDEN COMMODORE	FORD FALCON	MAZDA 323	FORD FALCON
SAM	CHRIS	KIM	MAZDA 323
SAM	CHRIS	KIM	

WHO OWNS THE MONKEY?

You Need

- Five [5] clue cards, five patterned houses, five pet cards, five car cards, five nationality cards and five drink cards.

Challenge

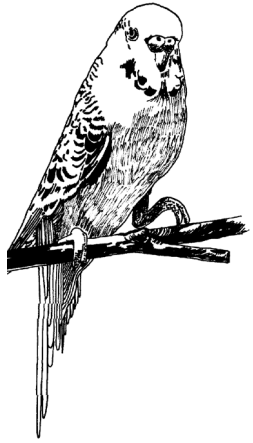
Use the clue cards to work out who owns the monkey if:

- There are five houses side by side along the street.
- Each house is painted a different pattern.
- The people in each house have different cars.
- The people in each house have different pets.
- The people in each house drink different drinks.
- Each house is

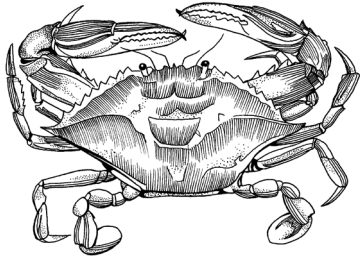
lived in by
people of
different
nationalities.



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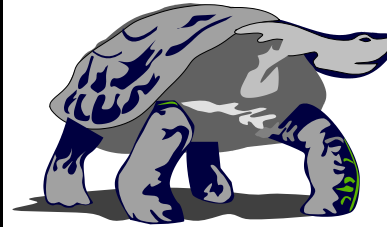
BUDGIE



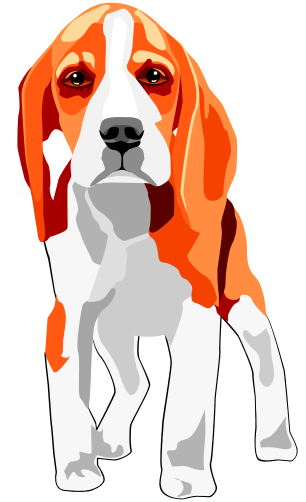
CRAB



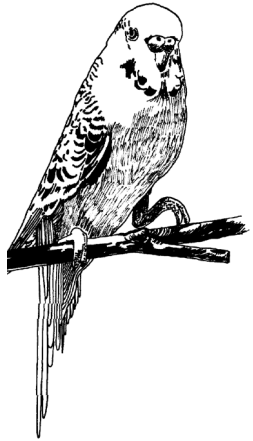
MONKEY



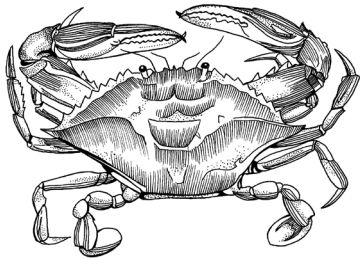
TURTLE



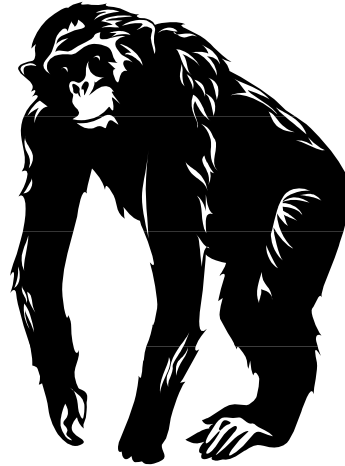
DOG



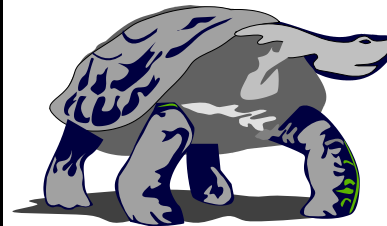
BUDGIE



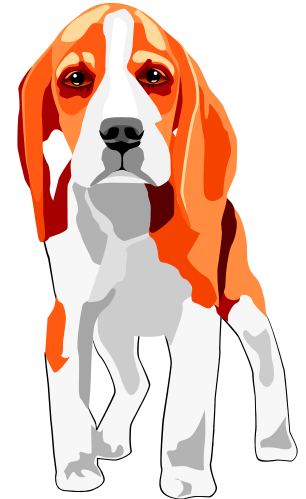
CRAB



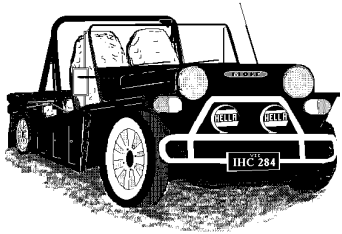
MONKEY



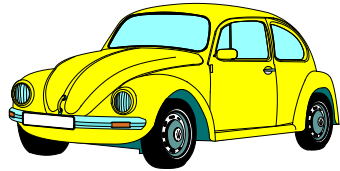
TURTLE



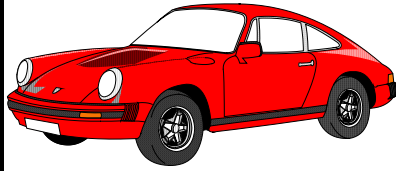
DOG



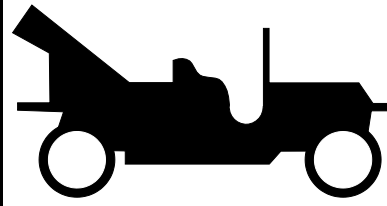
MOKE



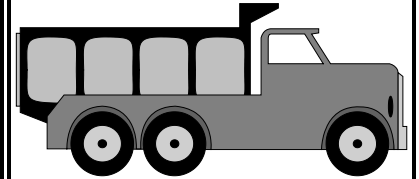
VW



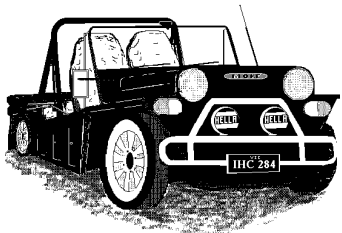
**SPORTS
CAR**



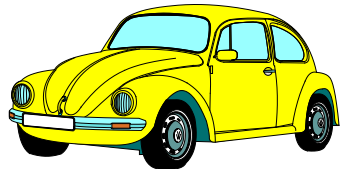
**ANTIQUE
CAR**



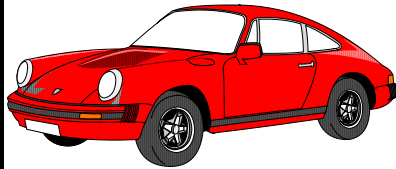
TRUCK



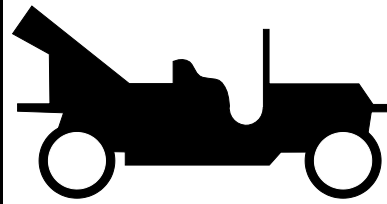
MOKE



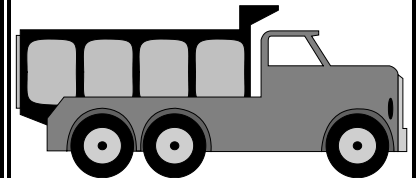
VW



**SPORTS
CAR**



**ANTIQUE
CAR**



TRUCK

<ul style="list-style-type: none"> • THE FRENCH LIVE IN THE WAVY HOUSE WHICH IS IN THE MIDDLE. • THE PLAIN HOUSE IS TO THE RIGHT OF THE GREY HOUSE. • THE PEOPLE IN THE BRICK HOUSE DRINK TEA. 	<ul style="list-style-type: none"> • THE AUSTRALIANS LIVE IN THE HOUSE ON THE FAR LEFT. • THE MALAYSIANS DRIVE A SPORTS CAR. • THE AUSTRALIANS LIVE NEXT DOOR TO THE STRIPED HOUSE. 	<ul style="list-style-type: none"> • THE AMERICANS OWN A CRAB WHICH TRIES TO CATCH THE BUDGIE NEXT DOOR. • THE GREY HOUSE IS OWNED BY THE PEOPLE WHO DRIVE THE SPORTS CAR AND LIVE TO THE LEFT OF THE PEOPLE WITH THE PET TURTLE. • THE DOG OFTEN GETS A RIDE IN ITS OWNER'S VW. 	<ul style="list-style-type: none"> • THE MALAYSIANS DRINK SODA. • THEY DRINK ORANGE JUICE IN THE PLAIN HOUSE, BUT OFTEN GO NEXT DOOR FOR SODA. • THEY DRINK WINE IN THE MIDDLE HOUSE. 	<ul style="list-style-type: none"> • THE PEOPLE WITH THE ANTIQUE CAR OWN A BUDGIE. • THE BRICK HOUSE OWNER DRIVES A VW. • THE PEOPLE WITH THE TRUCK DRINK COFFEE.
<ul style="list-style-type: none"> • THE FRENCH LIVE IN THE WAVY HOUSE WHICH IS IN THE MIDDLE. • THE PLAIN HOUSE IS TO THE RIGHT OF THE GREY HOUSE. • THE PEOPLE IN THE BRICK HOUSE DRINK TEA. 	<ul style="list-style-type: none"> • THE AUSTRALIANS LIVE IN THE HOUSE ON THE FAR LEFT. • THE MALAYSIANS DRIVE A SPORTS CAR. • THE AUSTRALIANS LIVE NEXT DOOR TO THE STRIPED HOUSE. 	<ul style="list-style-type: none"> • THE AMERICANS OWN A CRAB WHICH TRIES TO CATCH THE BUDGIE NEXT DOOR. • THE GREY HOUSE IS OWNED BY THE PEOPLE WHO DRIVE THE SPORTS CAR AND LIVE TO THE LEFT OF THE PEOPLE WITH THE PET TURTLE. • THE DOG OFTEN GETS A RIDE IN ITS OWNER'S VW. 	<ul style="list-style-type: none"> • THE MALAYSIANS DRINK SODA. • THEY DRINK ORANGE JUICE IN THE PLAIN HOUSE, BUT OFTEN GO NEXT DOOR FOR SODA. • THEY DRINK WINE IN THE MIDDLE HOUSE. 	<ul style="list-style-type: none"> • THE PEOPLE WITH THE ANTIQUE CAR OWN A BUDGIE. • THE BRICK HOUSE OWNER DRIVES A VW. • THE PEOPLE WITH THE TRUCK DRINK COFFEE.

COFFEE	TEA	SODA	ORANGE JUICE	WINE
COFFEE	TEA	SODA	ORANGE JUICE	WINE



FRENCH	AUSTRALIANS	AMERICANS	NEW ZEALANDERS	MALAYSIANS
FRENCH	AUSTRALIANS	AMERICANS	NEW ZEALANDERS	MALAYSIANS

You Need

- Ten [10] 'suspects'

The Story

A crime has been committed and ten suspects have been placed in a police line-up. The following information is known about the suspects:

Bugsy is taller than Spike.

Spike is taller than Mike.

Mugsy is shorter than Mike.

Lefty is taller than Mike, but shorter than Spike.

Fingers is standing somewhere between Benny and Bert.

Bert is shorter than Bugsy, but taller than Fingers.

Frankie is standing between Bugsy and Clyde.

Clyde is next to Bert.

There are seven [7] suspects standing between Frankie and Mugsy.

BENNY



Challenge

Place the suspects in a line from tallest to shortest.

- A witness identifies the fourth [4th] tallest suspect as the criminal.

Who is it?

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BERT



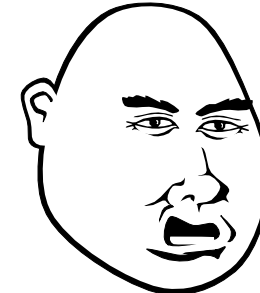
MIKE



BENNY



BUGSY



CLYDE



FINGERS



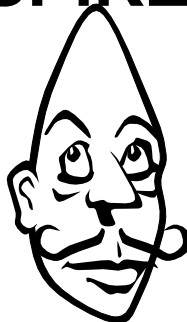
FRANKIE



LEFTY



SPIKE



MUGSY

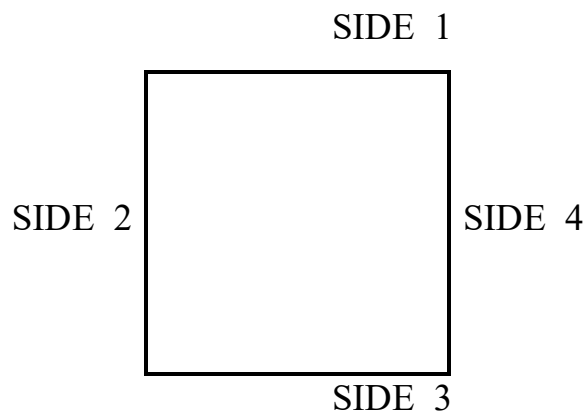


You Need

- Five [5] objects: large building, small building, tree, person, rooster
- Playing board

The Story

Imagine you are spending the weekend at a friend's farm. You stroll around her square paddock and notice that objects inside it appear in different orders from different sides.



From SIDE 1 you see the objects in this order from left to right:

- Large building, small building, rooster, tree

From SIDE 2 you see the objects in this order from left to right:

- Large building, person, small building, tree

Your Task

1. Place the objects on the grid to show both views.

(Remember, it's you who is moving, not the objects in the paddock.)

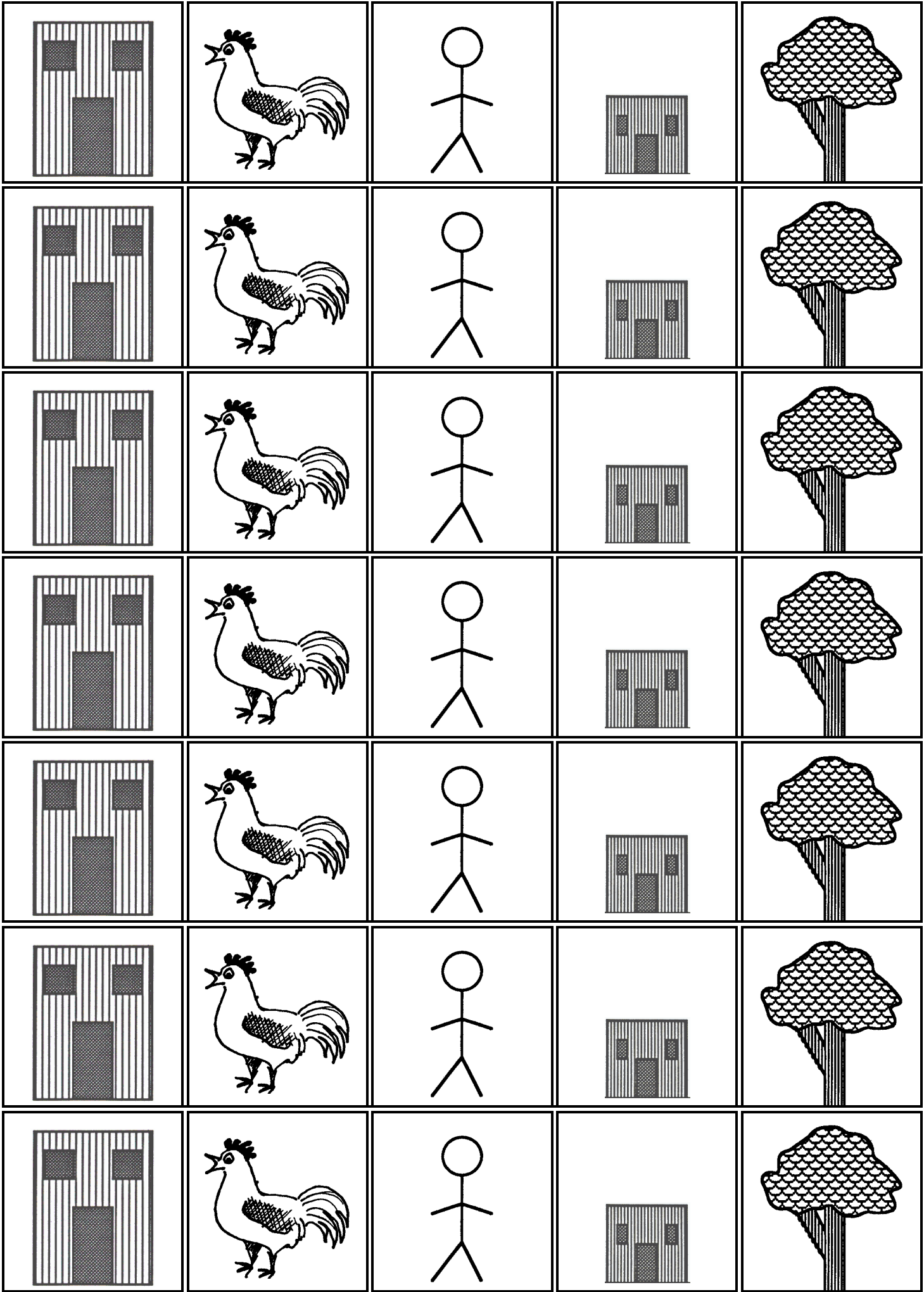
Challenge

Are there any other solutions? How do you know?

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Farmyard Views

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You Need

- Five [5] animals - horse, pig, cow, chicken, goat

Your Task

1. Arrange the animals in the pens so that:
 - the cow is beside the chicken
 - the horse is in the pen at the end
 - the pig comes after the cow
 - the goat is beside the chicken
2. Find a different solution.

Challenge

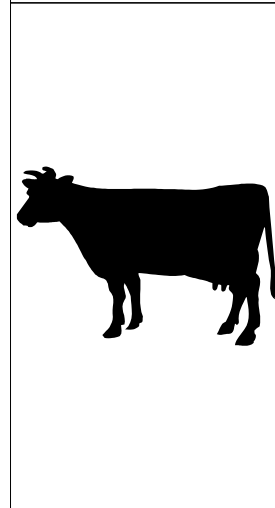
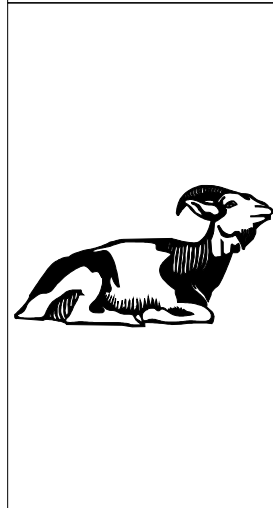
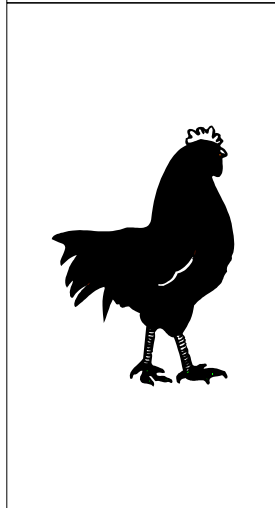
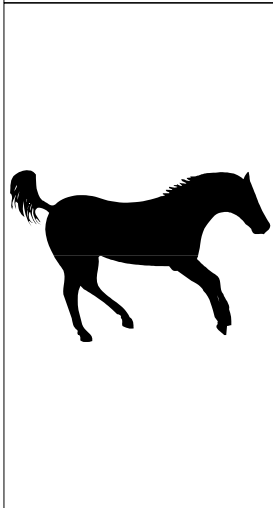
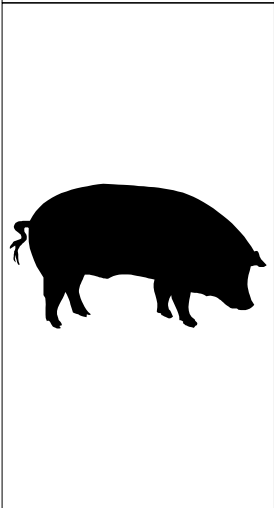
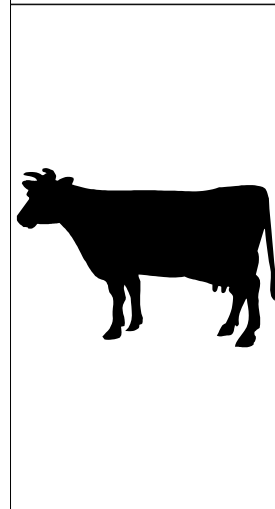
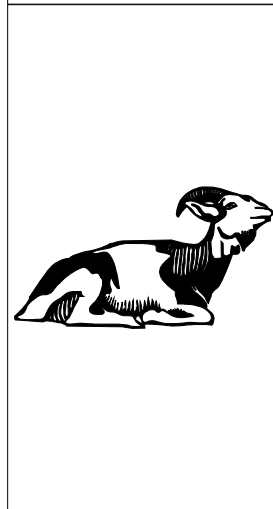
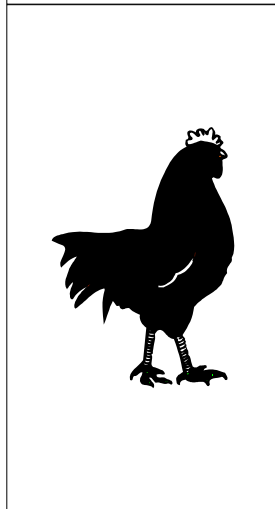
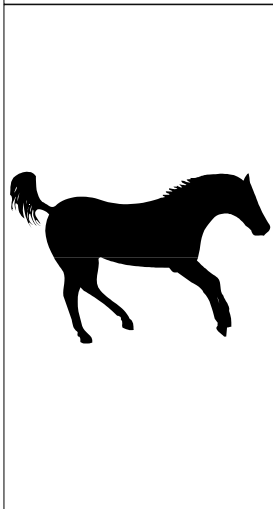
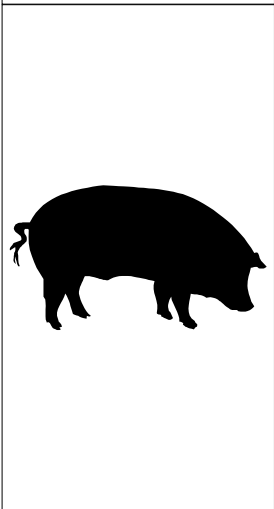
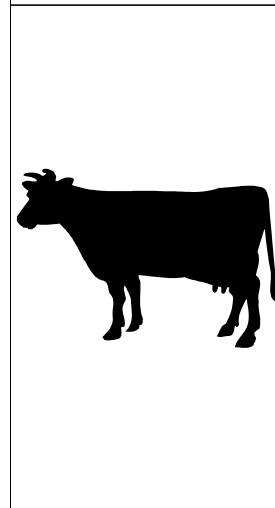
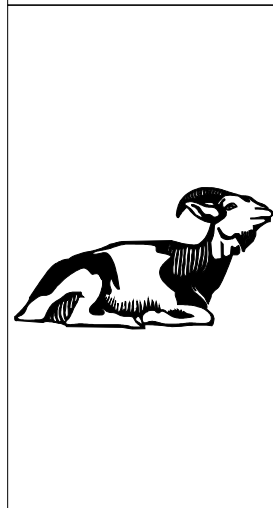
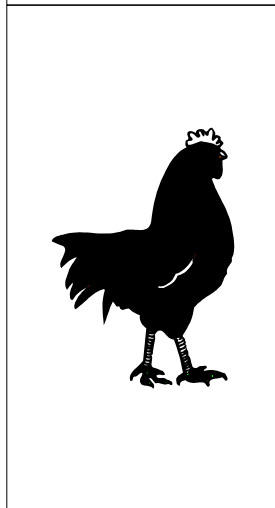
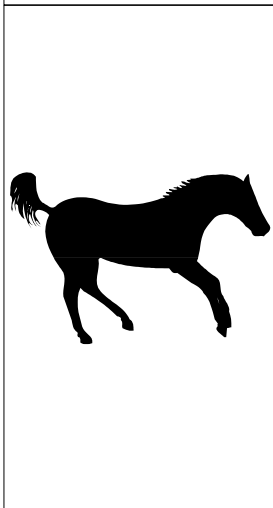
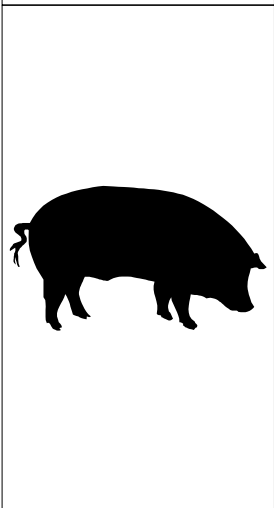
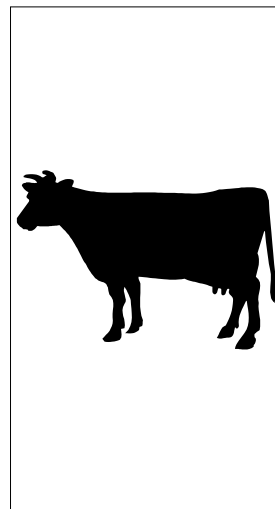
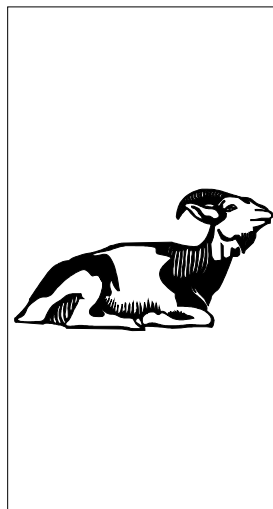
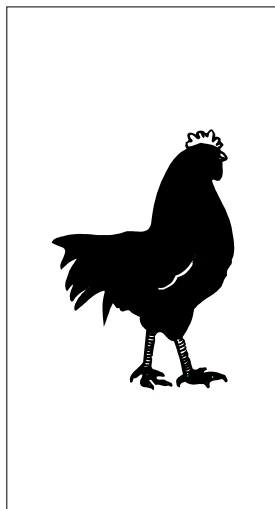
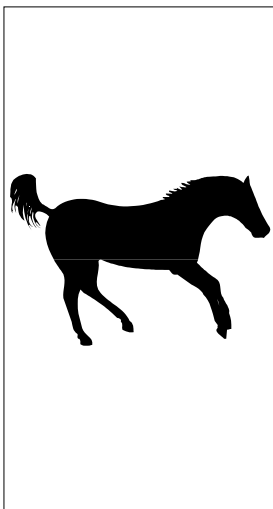
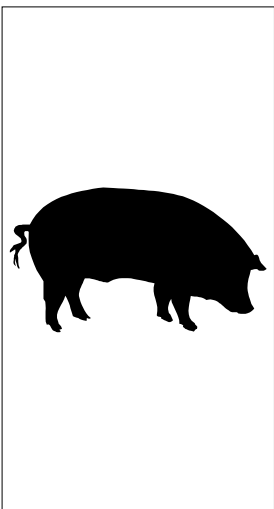
How many solutions are there?

How do you know when you have found them all?

Animal Pens

--	--	--	--	--

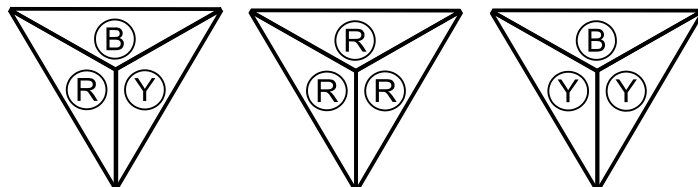
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You Need

- About thirty [30] equilateral triangles
- Eighty [80] coloured discs - twenty [20] in each of four [4] colours

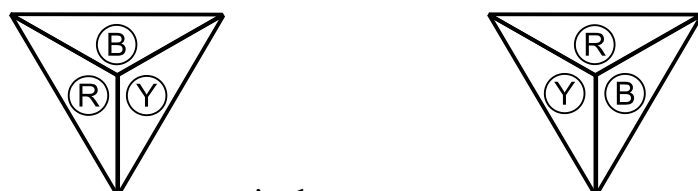
Each triangle can be 'coloured' using any three discs like this:



Your Task

1. Colour at least ten [10] different triangles.

To be different, one cannot be rotated to be the same as another.



is the same as

2. There are exactly thirteen [13] triangles with at least one red section.

Try to make them all.

3. Make all the other triangles that have no red section.

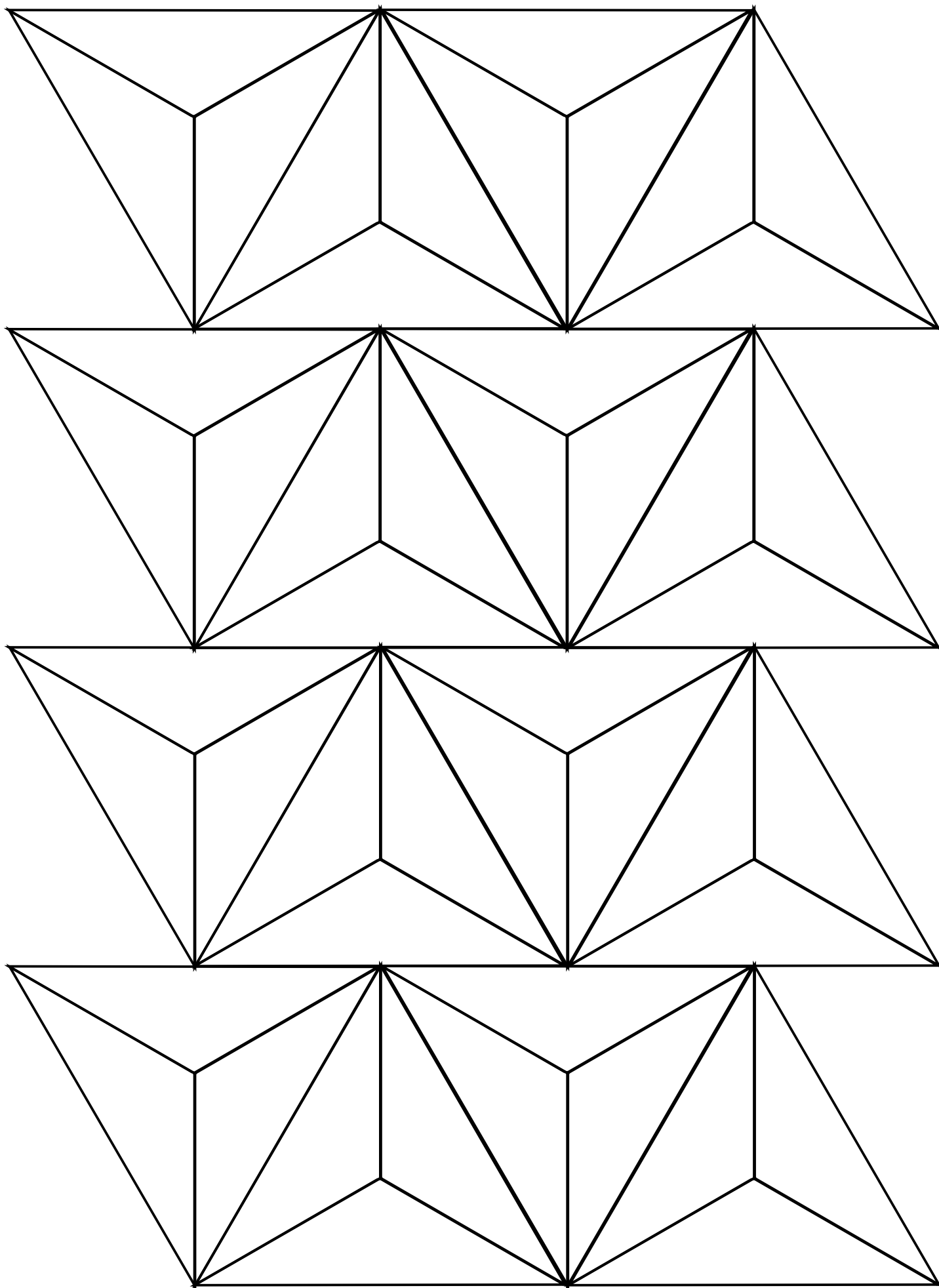
Challenge

How many triangles in the complete set?

How do you know when you have found them all?

(Coloured triangles like these are used in Task 107, *McMahon's Triangles 2*.)

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You Need

- Two [2] mirrors, one [1] protractor and two [2] dumbbell cards

Task 100, *Mirror Patterns 1*, shows many interesting patterns that can be made with dumbbell cards and mirrors.

Your Task

- Use the mirrors and the unmarked dumbbell card to make these polygons:
 - an equilateral triangle
 - a square
 - a pentagon
 - a hexagon
- Make the polygons again and this time measure the angle between the mirrors. Make a table like this in your journal and fill in your results.

No. of sides	3	4	5	6	7	8
Angle						

- Look for a connection between the number of sides and the angle?

Challenge

Make a table like this in your journal.

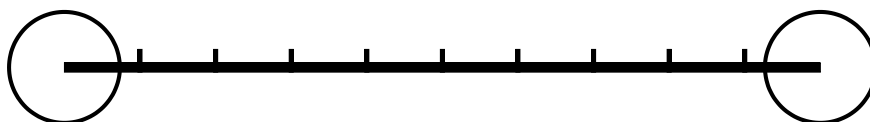
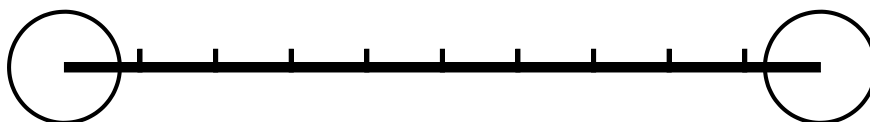
Angle	100	70	55	35	20	10
No. of sides						

Predict the number of sides in each case then check with the mirrors.

Hint: Use the marked dumbbell card. For an angle of 100 you should see 3·6 sides.

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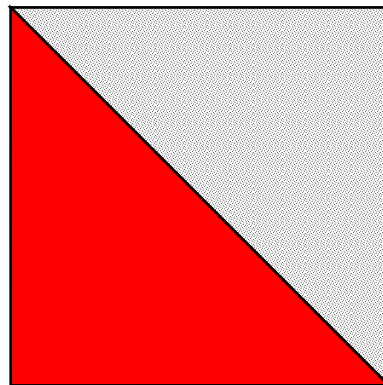
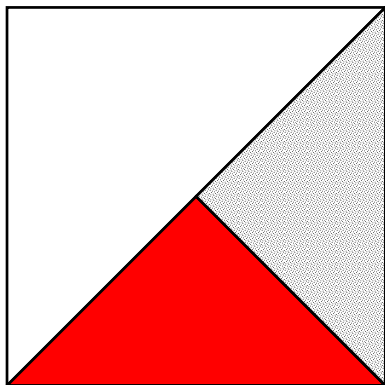




You Need

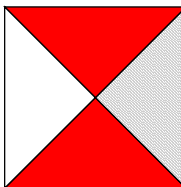
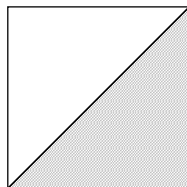
- Two [2] mirrors, two [2] shape cards and a recording sheet

Ebony started with this shape and ... with one mirror, saw this picture.



Your Task

- Where did she place the mirror? Draw it on the recording sheet.
- Where did she place the mirror to see these pictures?



Yes, it is smaller!

- Use one mirror on Ebony's shape.

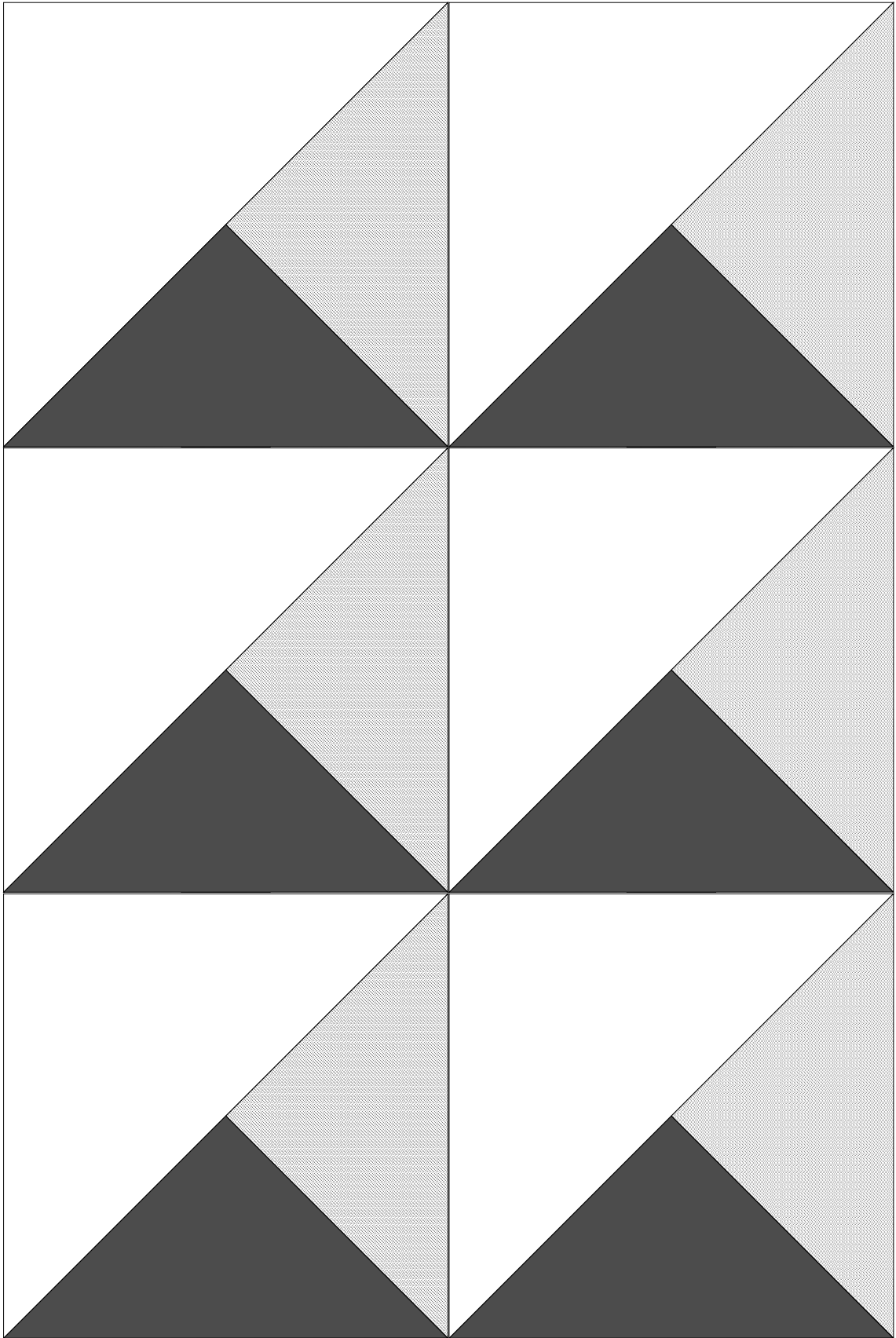
Make and record ten [10] pictures of your own.

Challenge

How many different pictures can you make with one mirror?
(Remember the smaller one above.)

Use two mirrors to make and draw five [5] interesting pictures.

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You Need

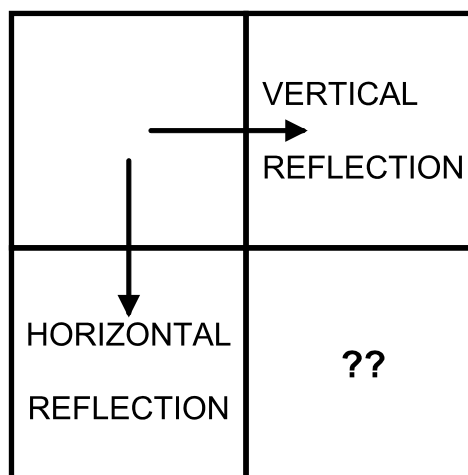
- Thirty-two [32] tiles and one [1] board

To make a wallpaper pattern, choose a tile and repeat it according to a rule.
Tiles can be repeated by sliding, reflecting or rotating.

Your Task

1. Place any tile in the top left corner.

Now find tiles for the other three squares.



2. **Pattern A:** Place any tile on Start.

Repeat it by sliding horizontally and vertically until all squares are filled.

If possible, photograph the result.

3. **Pattern B:** Place any tile on Start. Repeat it by reflecting it in each horizontal and vertical line until all squares are filled. If possible, photograph the result.
4. **Pattern C:** Place any tile on Start. Repeat it by reflecting it in each vertical line of the top row, then sliding the row down to fill the squares. If possible, photograph the result.

Challenge

Place the tiles on the board to make a pattern of your own.

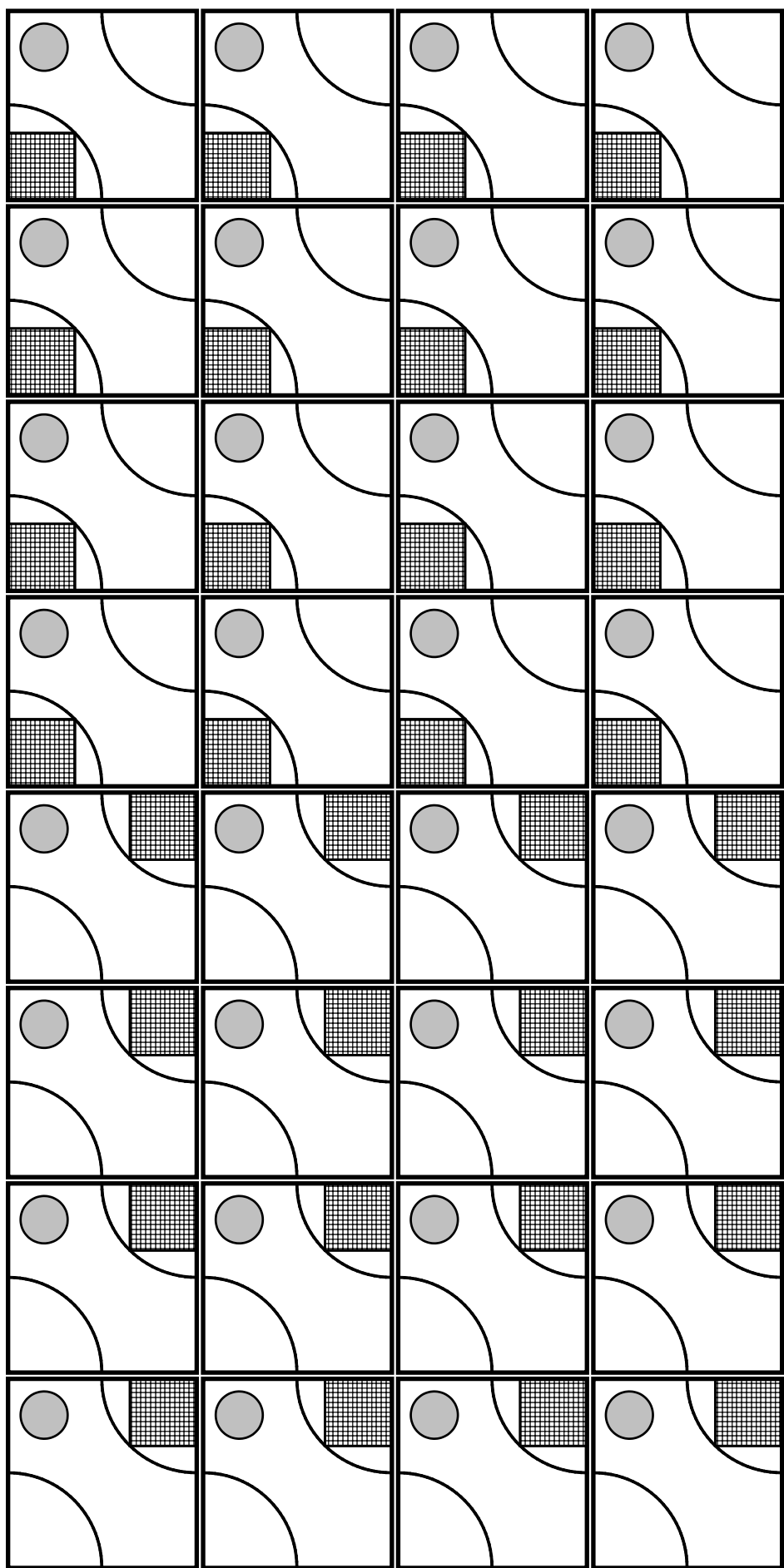
Write the rules for making it.

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Wallpaper Patterns

START			

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You Need

- Six [6] shapes - one [1] triangle, one square and four [4] quadrilaterals

The Story

Pythagoras lived in Greece during the 6th century B.C. He was a mathematician. His most famous discovery is known as Pythagoras' Theorem. It states:

For any right angled triangle, the area of the square on the hypotenuse is equal to the sum of the areas of the squares on the other two sides.

This task is one of many ways to demonstrate Pythagoras' Theorem.

Your Task

1. Put the triangle on the table and build a square on its longest side.
 - This longest side is called the hypotenuse.
 - It is opposite the right angle.
2. Move all the pieces to build squares on the other two sides.
3. Measure the large square and calculate its area.

Measure each of the two smaller squares and calculate each area.

Can you find a connection?

Challenge

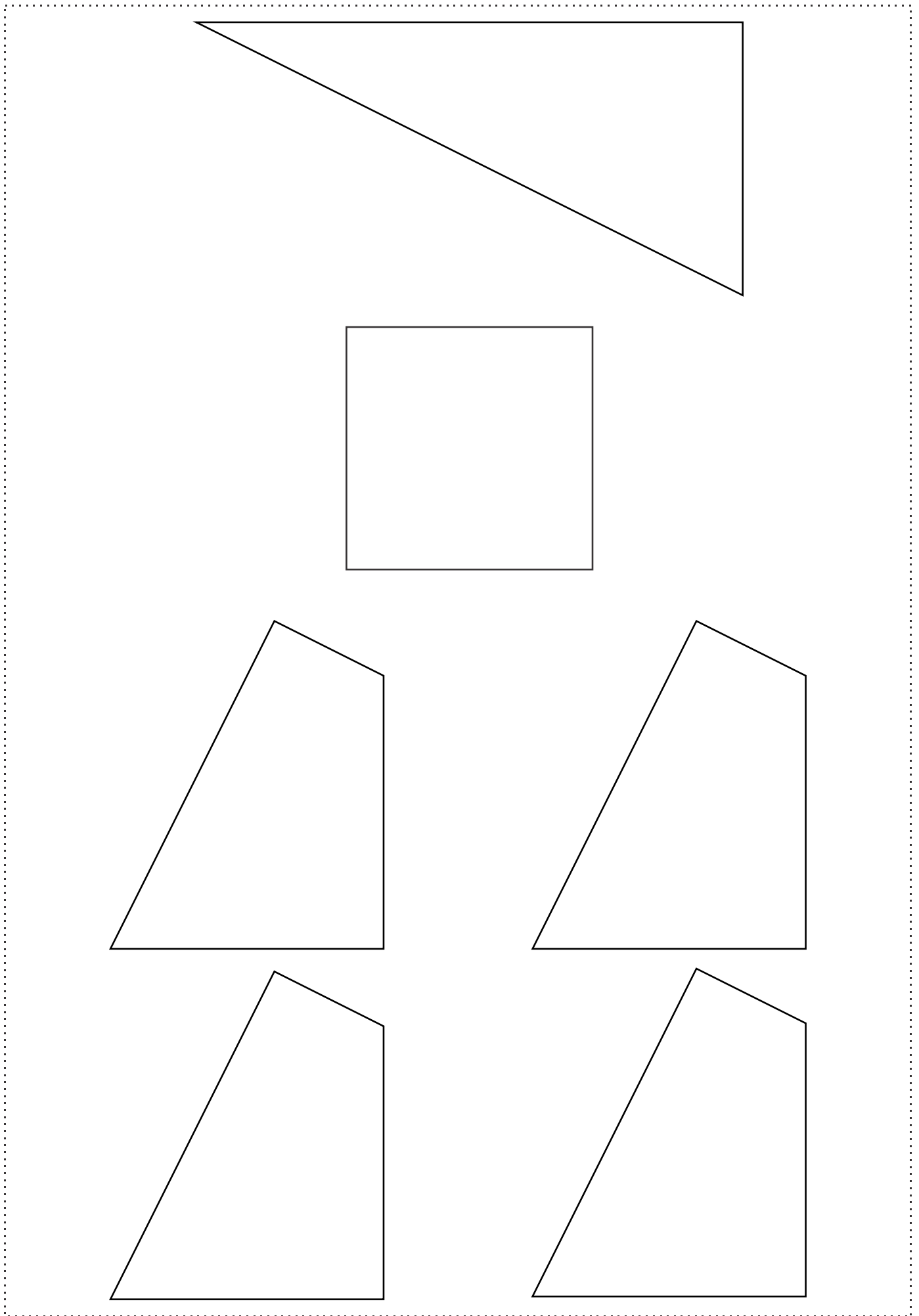
Draw a different shaped right angle triangle on graph paper.

- Carefully draw the square on each side.
- Pick up the pieces again and place the four-piece square in its place on the triangle. What is special about where the cut lines go?
- Carefully draw cut lines on your paper square.
- Cut out your two smaller squares and cut along the lines.

Your five [5] pieces should exactly fit into the hypotenuse square?

Draw and write in your journal to explain Pythagoras' Theorem.

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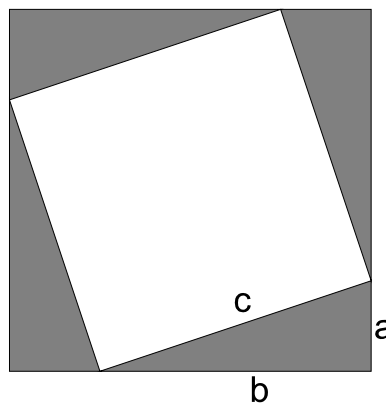
You Need

- Three [3] sets of identical right angle triangles - four [4] in each set
- One [1] base board

Choose one of the sets and arrange it on the base board like this:

Your Task

1. The uncovered space in the centre is a square. Using a , b or c write its area in your journal.
2. Without lifting, SLIDE the triangles inside the base board to change the uncovered space into two [2] separate squares



One [1] square is size a^2 and one is size b^2 .

3. Try the experiment again with each of the other triangle sets.

Challenge

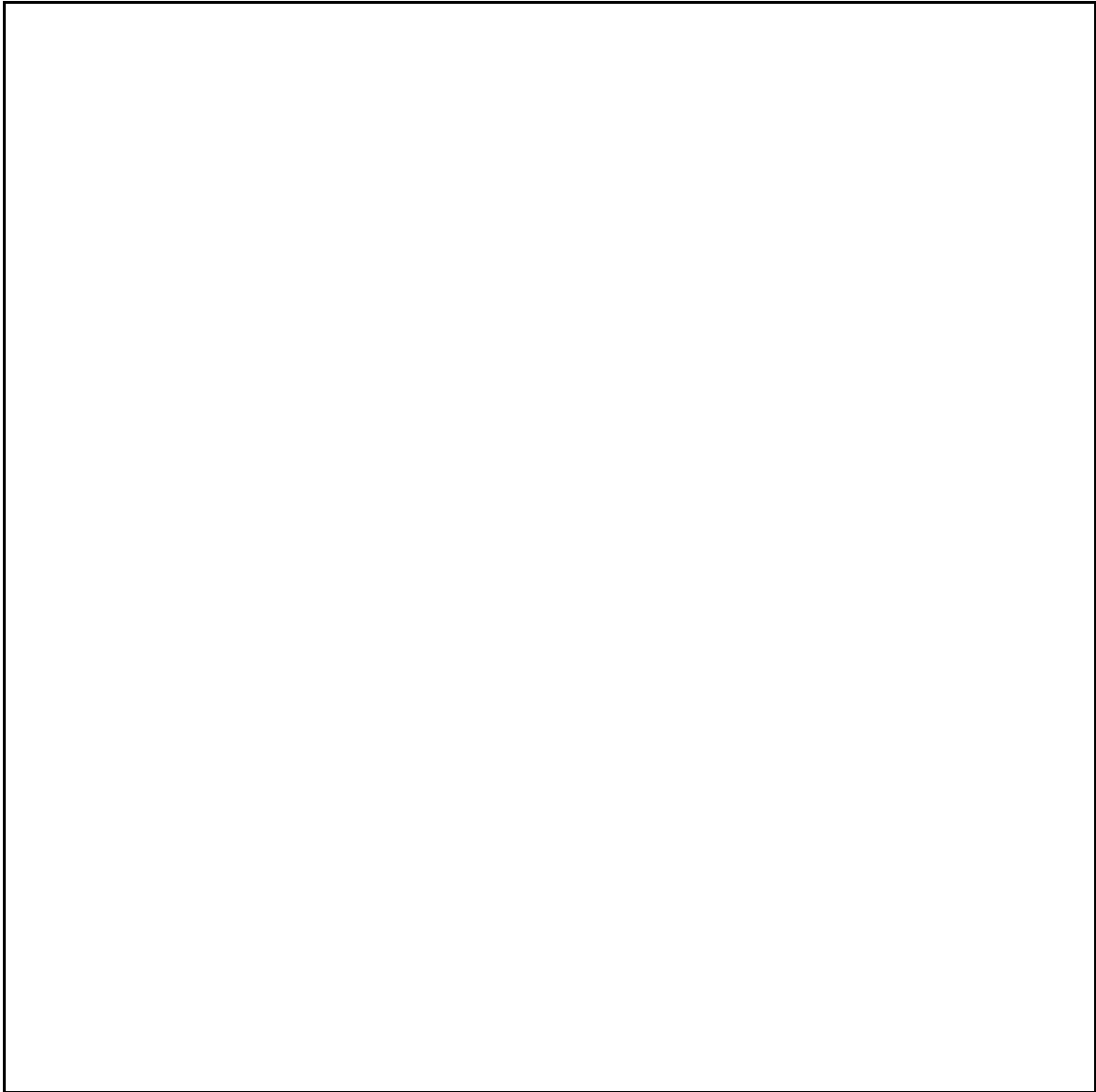
Explain how this model illustrates Pythagoras' Theorem which states:

For any right angled triangle, the area of the square on the hypotenuse is equal to the sum of the areas of the squares on the other two sides.

Hypotenuse = longest side of a right angle triangle. It is opposite the right angle.

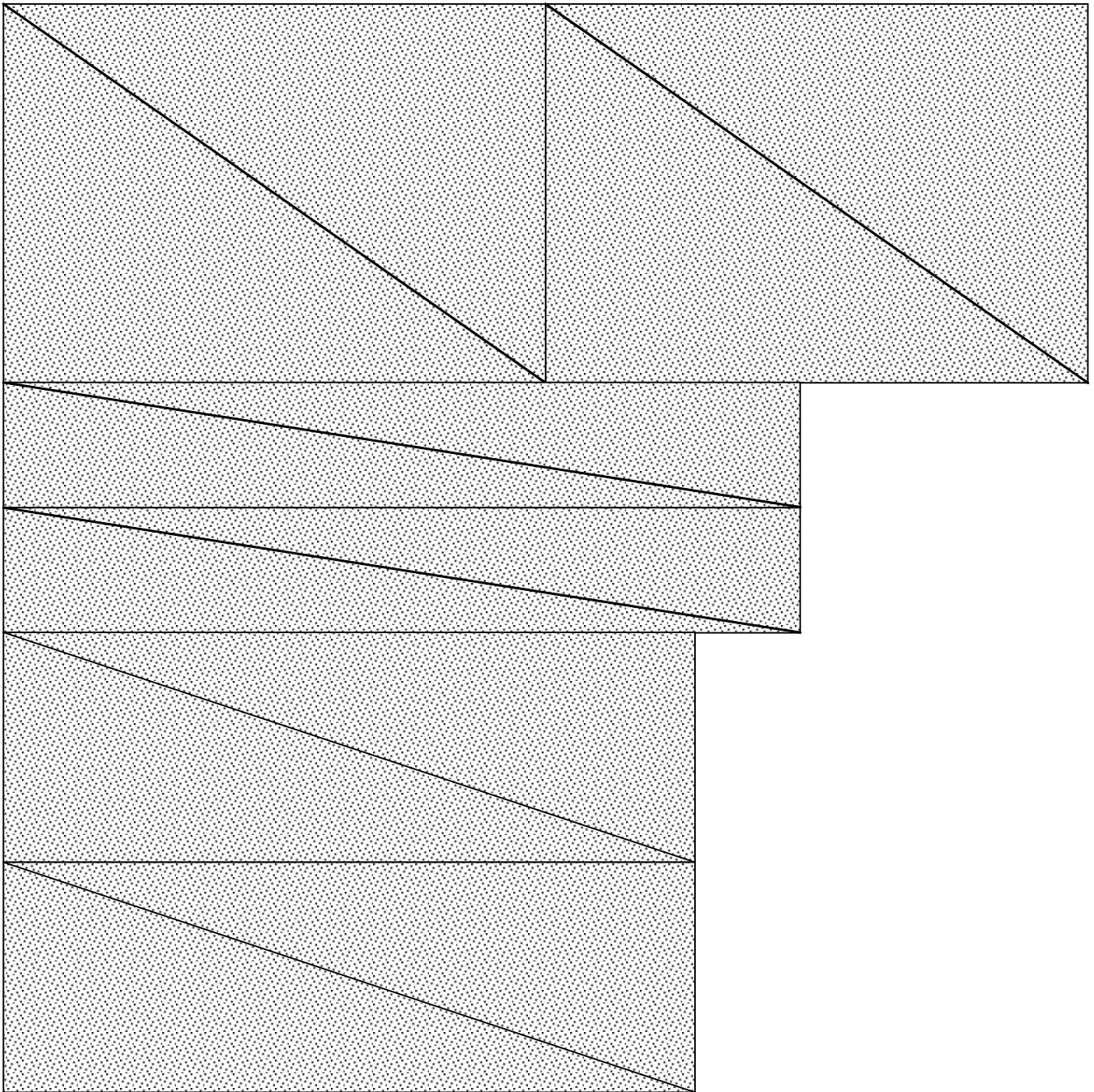
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Pythagoras 2 Base Board



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Pythagoras 2 Pieces



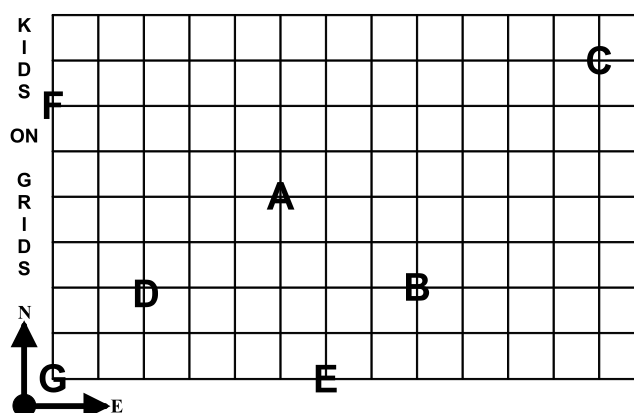
Cut into 12 pieces as shown to make 3 sets of 4.

You Need

- Ten [10] children and one [1] object to mark their camping spot
- Large grid board

The Story

A group of children go camping. Their camping spot is at the bottom left corner of the grid. In the morning they go to different places



looking for water. The letters show where each child looked.

Your Task

1. Child A is at position (5, 4) because it is five [5] units East and four [4] units North of the camp.

In your journal record the position of Child B ... Child C ...up to Child G.

Which child looked for water closest to the camp?

2. Put your children anywhere on the grid and record their position.
3. Put your children on the grid so they are in a straight line. Record.

A straight line is a pattern in space. It will have a matching pattern in the numbers. Find the special rule that works for all your number pairs.

Challenge

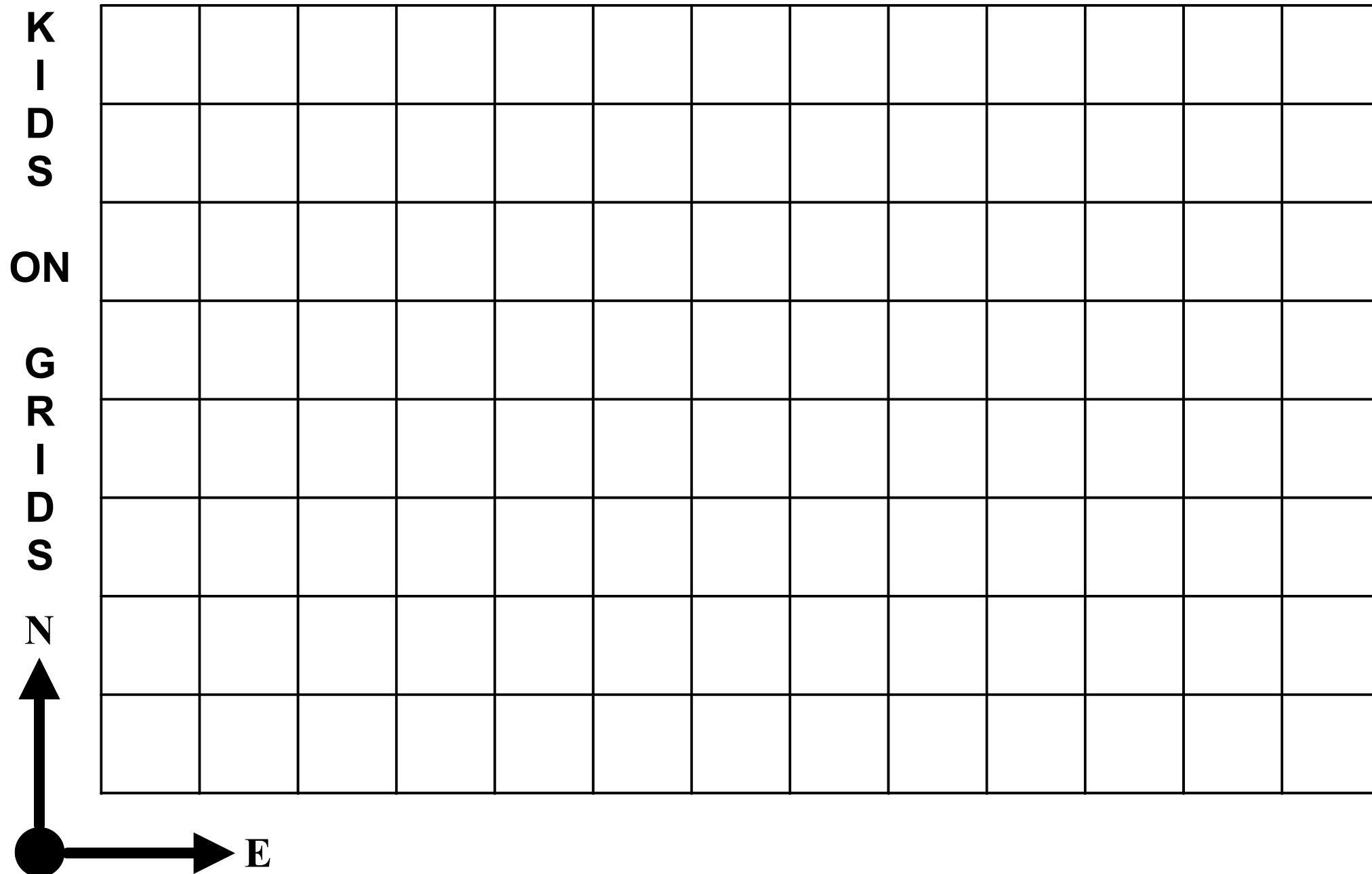
Invent number pairs using your own special rule.

- Place your children in these positions. What pattern do they make?

What number pairs would give a horizontal line of children?

What number pairs would give a vertical line of children?

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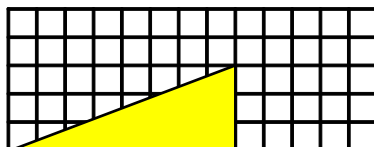


You Need

- One [1] set of four [4] pieces for each person and one [1] grid

Your Task

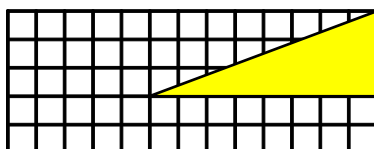
1. Start by putting the larger triangle in the bottom left like this:



Add the other pieces to make a big triangle as *high* as the grid.

Record the final arrangement on graph paper.

2. Start by putting the larger triangle in the top right like this:



Add the other pieces to make a *holey triangle* as *long* as the grid.

The holey triangle has a square hole in its base.

Record the final arrangement on graph paper.

Challenge

The big triangle and the holey triangle are made from the same pieces.

The big triangle and the holey triangle have the same area
(half the grid).

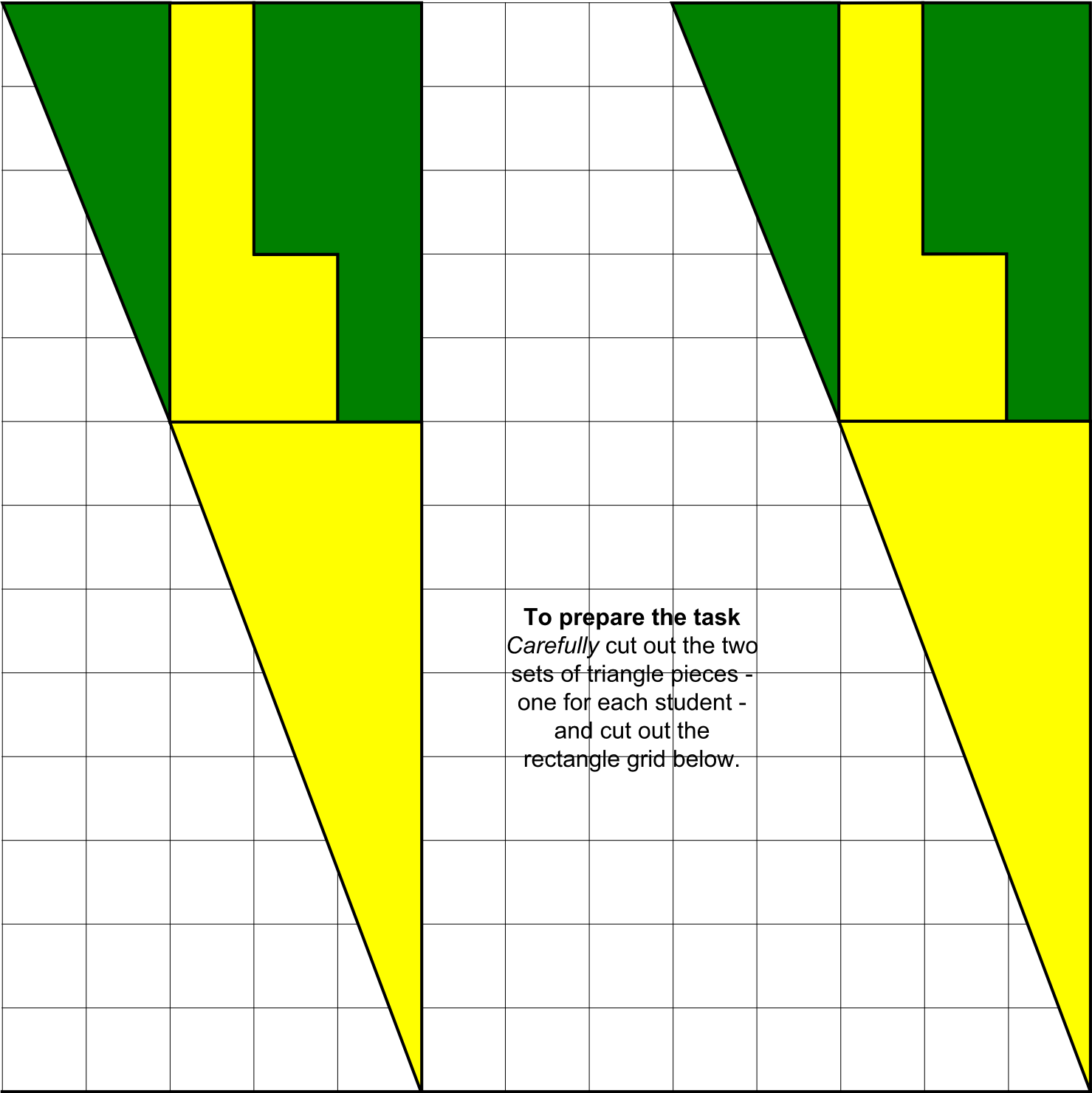
Triangle = 4 pieces = half the grid

...and...

Holey triangle = *same* 4 pieces + 1 square = half the grid

How can that be?? Try to explain the extra square.

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To prepare the task
Carefully cut out the two
sets of triangle pieces -
one for each student -
and cut out the
rectangle grid below.

