Problem Solving

Level B

Pages 11 - 27

Strategies

Pages 11 & 12 - 'Act out the situation' (consolidate strategy)	Unit B6
Pages 13 – 20 - 'Draw a picture, make a model' (consolidate strategy)	Unit B7
Pages 21 & 22 - 'Look for a simple pattern' (consolidate strategy)	Unit B8
Pages 23 – 27 - 'Guess, check and improve' (new strategy)	Unit B9

'Unit' refers to the Programme of Study

‘Acting out’ at level B

Line up at the door

You need 4 pupils to ‘act out’, and 4 differently coloured badges eg red, yellow, blue and green.

Get the 4 pupils to each put on one of the badges.

Ask the 4 pupils to line up at the door as if they were about to leave the room. They can choose any order they wish.

Record this order on the board using coloured circles.

Get the pupils to return to their seats and then ask them to line up again but this time in a different order. Again record the order chosen on the board.

Ask the rest of the class if they can suggest some or all the remaining orders of lining up at the door.

There are 24 possible ways to line up with 4 pupils.

An extension could involve 5 pupils and 5 colours, which can give 120 possible ways! The pupils will find lots of them, and perhaps they can record some of the ways using coloured pens.

Lets get dressed

You need a pile of 4 hats each in a different colour and 4 scarves each in a different colour.

Get a pupil to choose a hat and a scarf to wear.

Record the choice of hat and scarf on the board using coloured chalk.

Get the pupil to put the hat and scarf back in the pile and ask another pupil to choose a hat and a scarf to wear.

The choice must be different from that made by the first pupil.

Note: the same hat could be chosen but with a different scarf, or the same scarf chosen but with a different hat.

Record this second combination on the board.

Ask the rest of the class if they can suggest some or all the remaining ways of dressing up differently.

There are 16 possible combinations with 4 hats and 4 scarves.

An extension would be to have 5 types of hats and 5 types of scarves which would give 25 possible combinations.

‘Acting out’ at level B

Leaving the room in order

You need cards each with a number from 1 to 100, and some pupils (the whole class can be chosen). The number on each card should be written large enough to be read by all the pupils in the class.

Mix up the cards and give one each to the chosen pupils who will now have their own number. It dosn't matter if there are numbers missing.

Get these pupils to line up at the door in ascending order, smallest number first - they will have to sort themselves out according to their numbers.

The cards should be visible to the rest of the class so that all the pupils in the class can decide whether the order is correct.

If their order is the correct order, they can leave the room for their morning break or lunch, or home in the afternoon, handing their cards to the teacher as they go.

Obviously there is only one correct order for leaving the room.

Extensions can include;
* using numbers from 1 to 1000
* asking for a descending order, with the biggest number first to leave.

The 100 number cards can be used for other ‘acting out games’, particularly for running games in the gym eg
* “all the numbers bigger than 50 run to the blue corner”, or
* “all the even numbers run to the yellow corner”, or
* “all the numbers more than 30 but less than 40 run to the red corner”, or
* “all the numbers in the 5 times table run to the green corner”

Into your boats

You need 9 cards, each with a number, using all the numbers from 1 to 9. Get 9 pupils and give each of them a card.

Get them to go into 3 groups so that the totals on all the cards in each group add up to the same total. (The totals need to add up to 15 for each group).

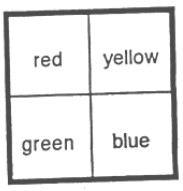
Hello

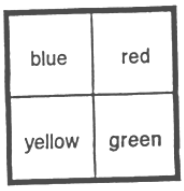
Get 6 pupils to line up and introduce themselves to each other with a handshake. Can the audience help to identify (and can the teacher record on the board) the 15 handshakes that will be required.

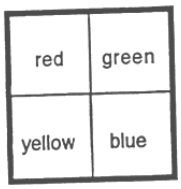
An extension would be to involve 7 pupils needing 21 handshakes, or 8 pupils needing 28 handshakes

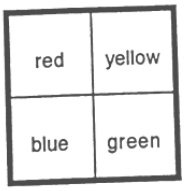
Flags with 4 colours

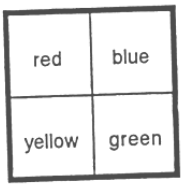
Make each flag different

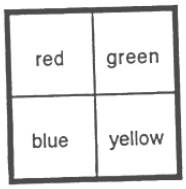


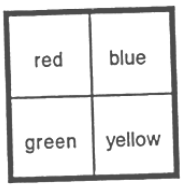


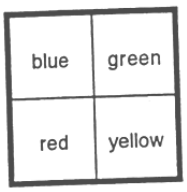


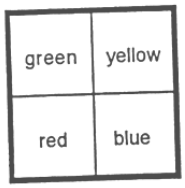


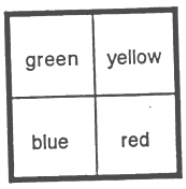


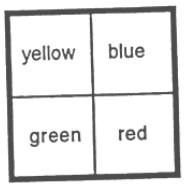


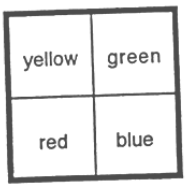


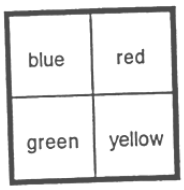


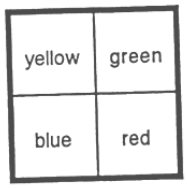


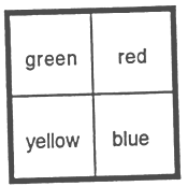


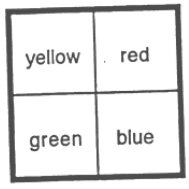


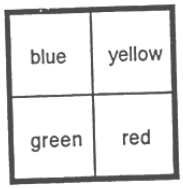


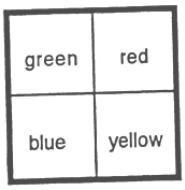


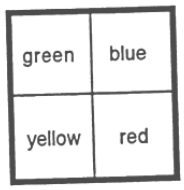


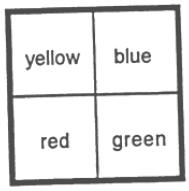




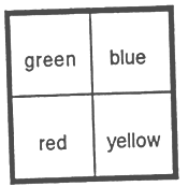


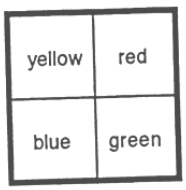


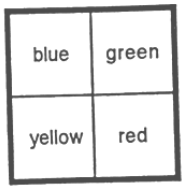


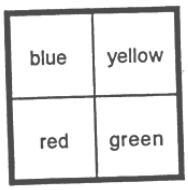


Can you check they are all different?



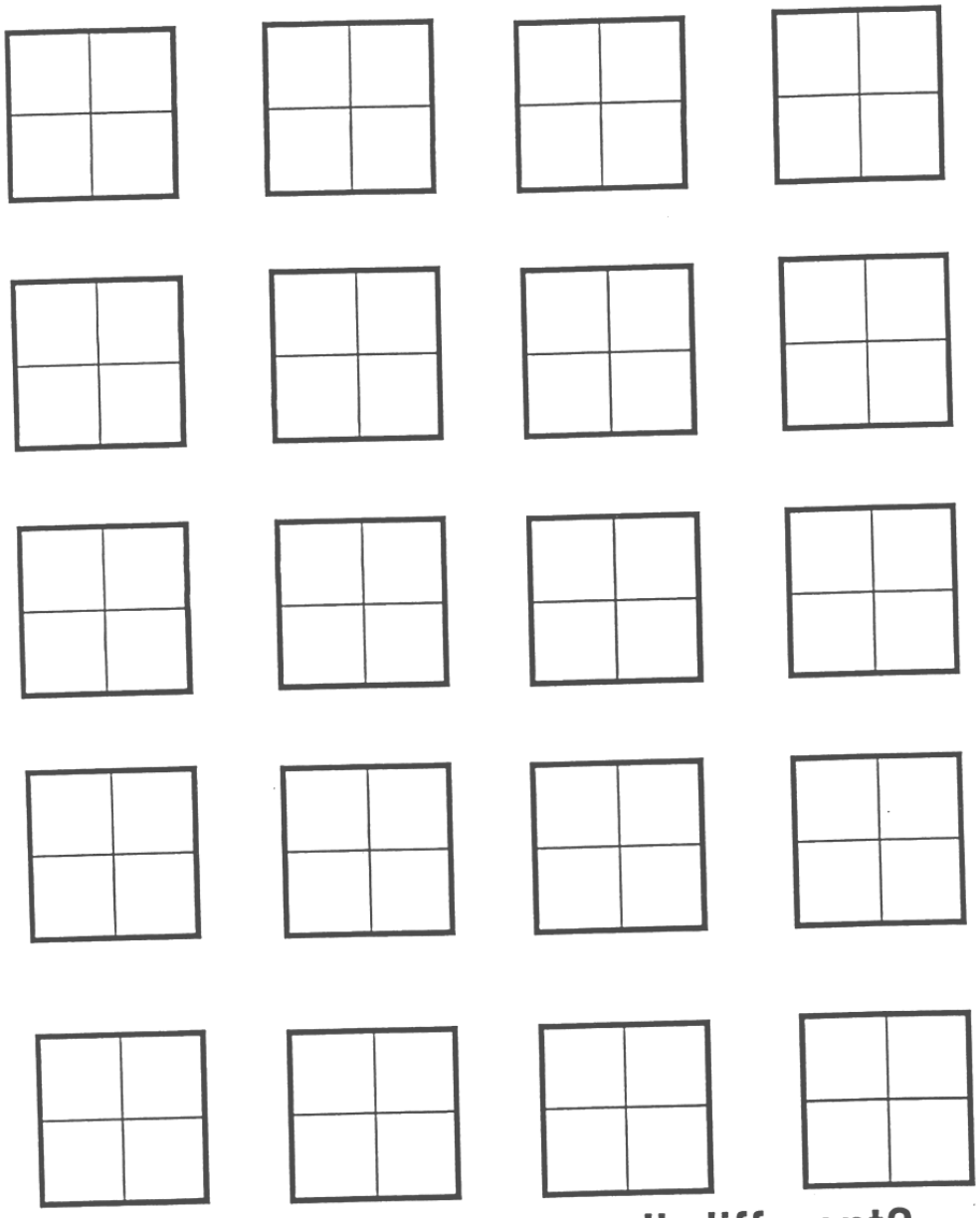




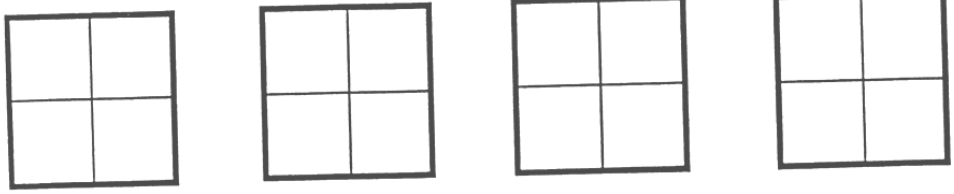


Flags with 4 colours

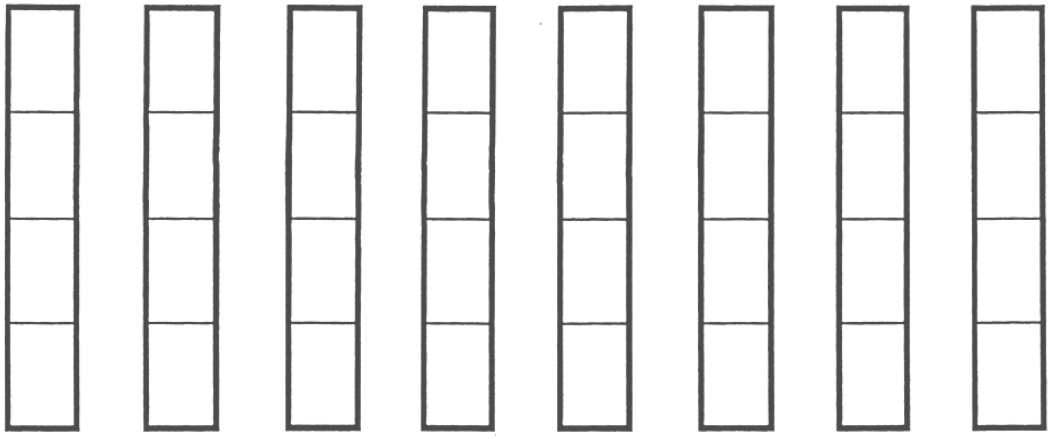
Make each flag different



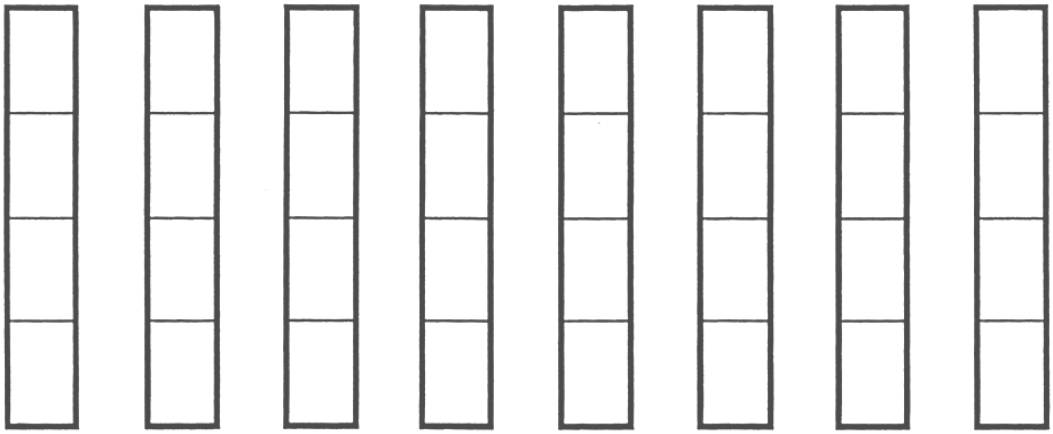
Can you check they are all different?



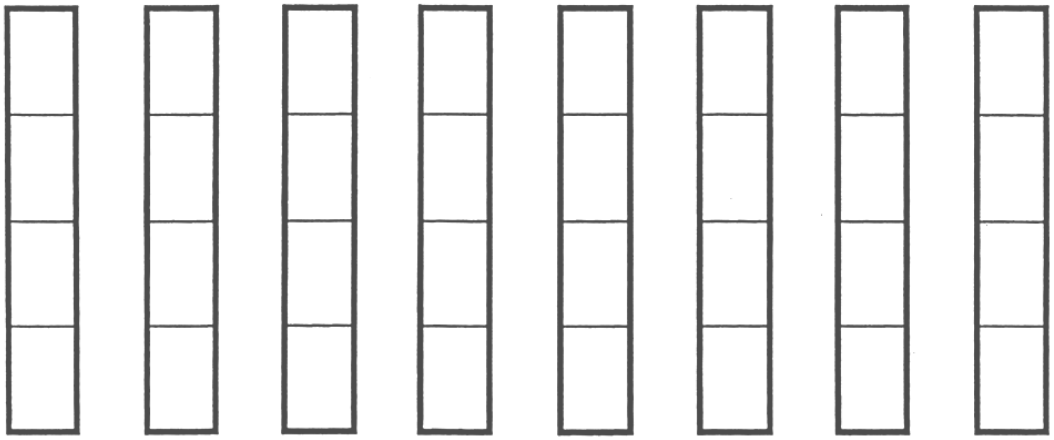
Towers with 4 colours



Choose 4 colours



Make each tower different



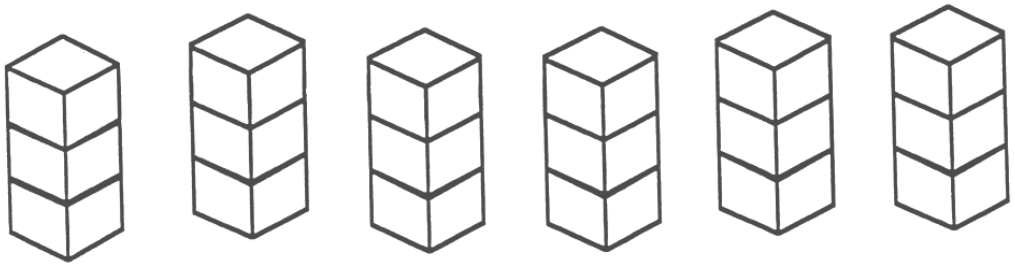
Towers with 3 colours

Get 6 red cubes, 6 yellow cubes and 6 green cubes.

Build 6 towers, each 3 cubes high.

Every tower must have a red, yellow and green cube each.

Each tower must be different.



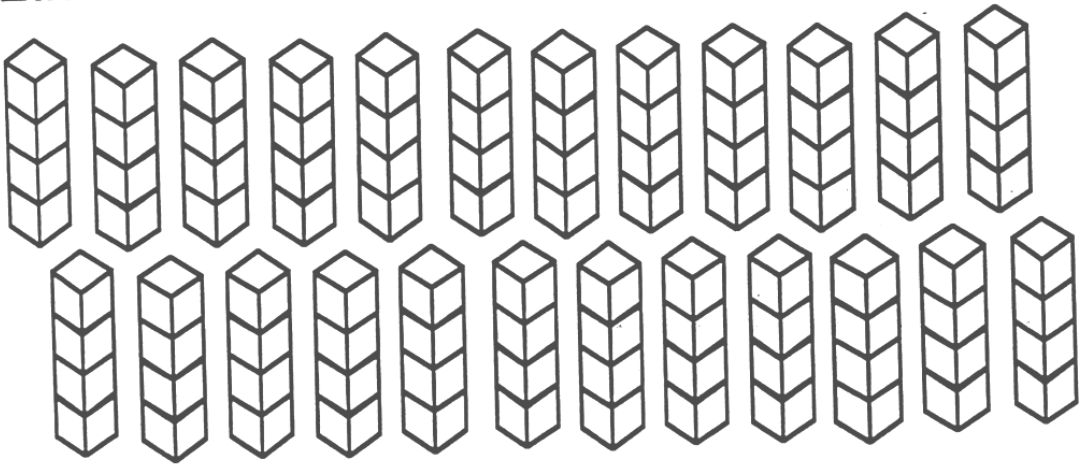
Towers with 4 colours

Get 24 red cubes, 24 yellow cubes, 24 green cubes and 24 blue cubes.

Build 24 towers, each 4 cubes high.

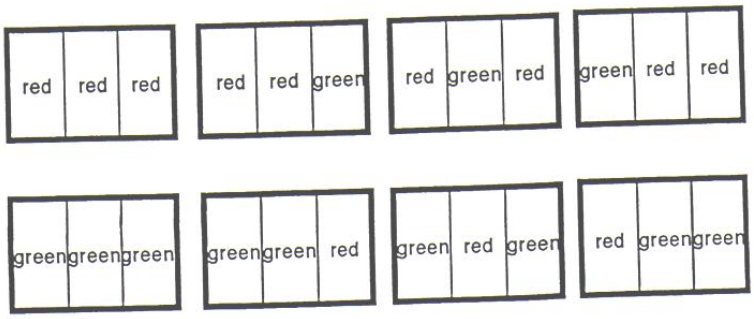
Every tower must have a red, yellow, green and blue cube each.

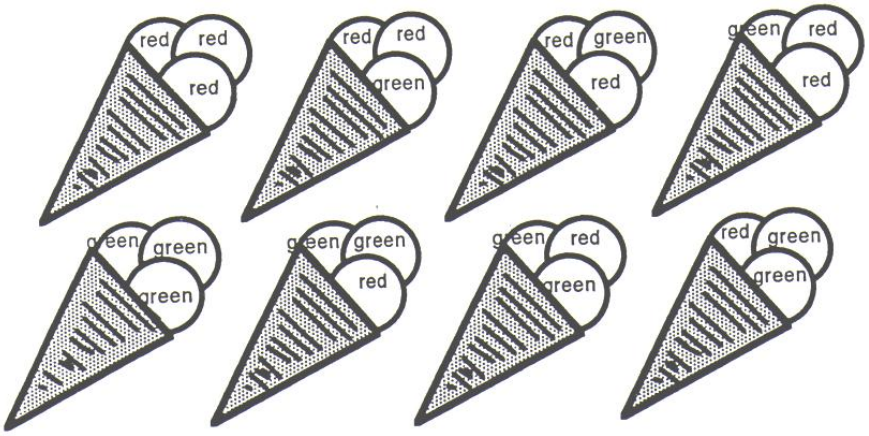
Each tower must be different.



Red and/or green

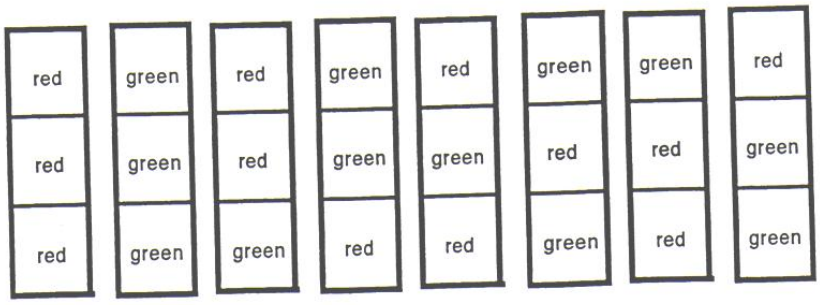
Colour the flags with red and/or green to make each flag different

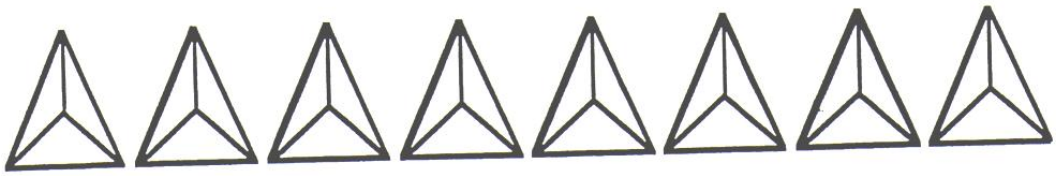




Colour the cones with red and/or green to make each cone different

Colour the towers with red and/or green to make each tower different

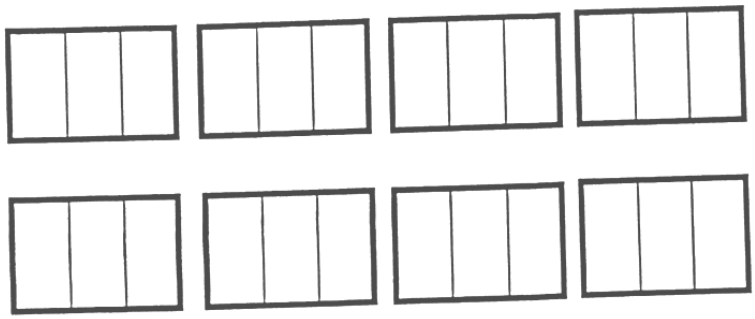


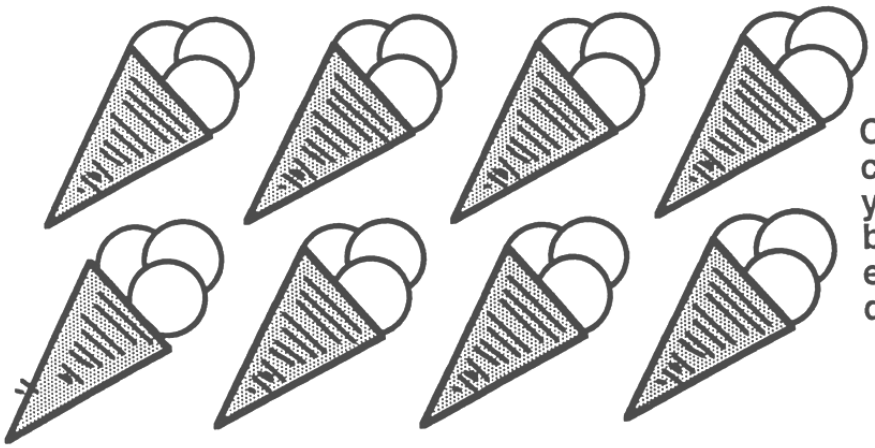


Colour the triangles with red and/or green to make each triangle different

Yellow and/or blue

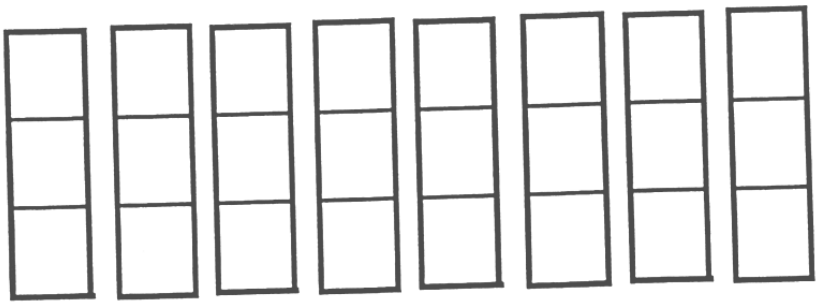
Colour the flags with yellow and/or blue to make each flag different

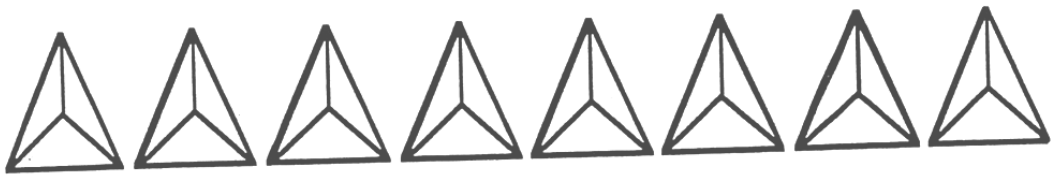




Colour the cones with yellow and/or blue to make each cone different

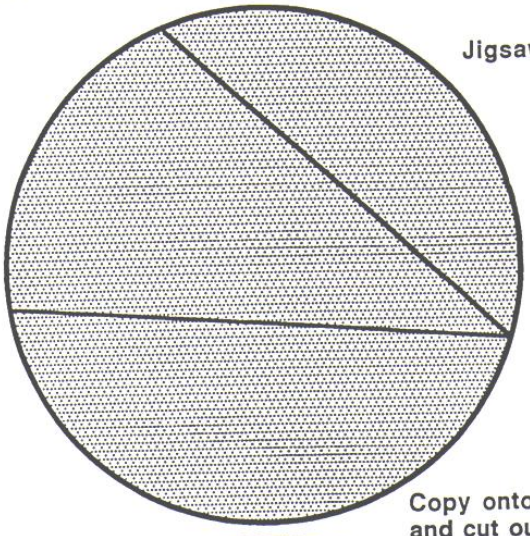
Colour the towers with yellow and/or blue to make each tower different



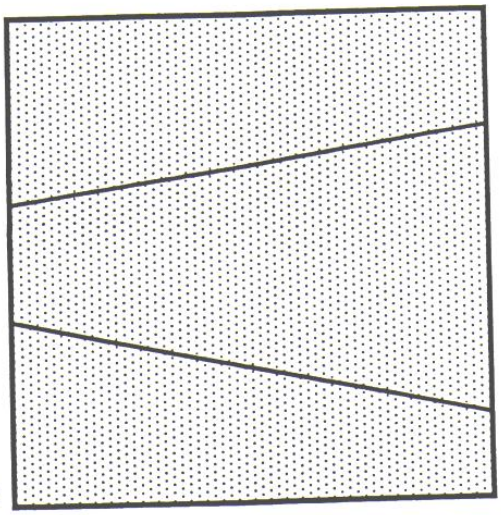


Colour the triangles with yellow and/or blue to make each triangle different

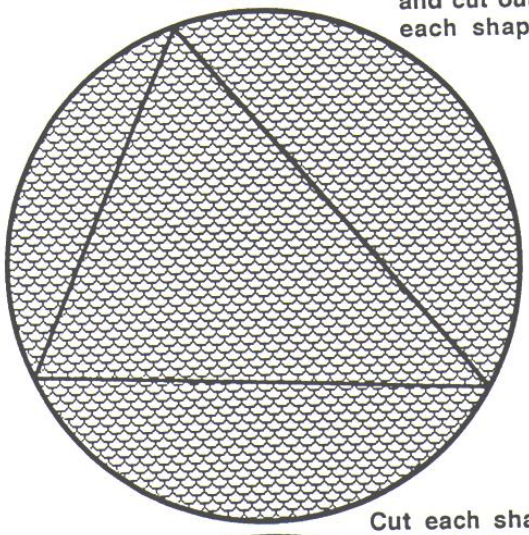
Models of circles and squares

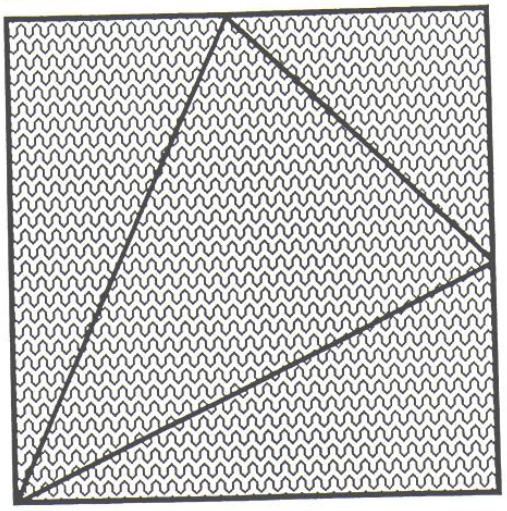


Jigsaws!

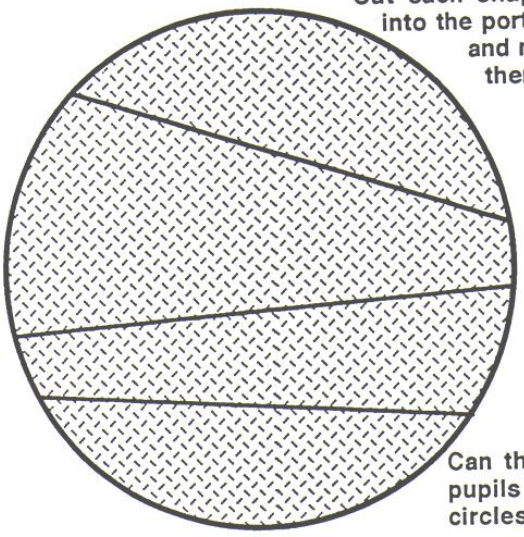


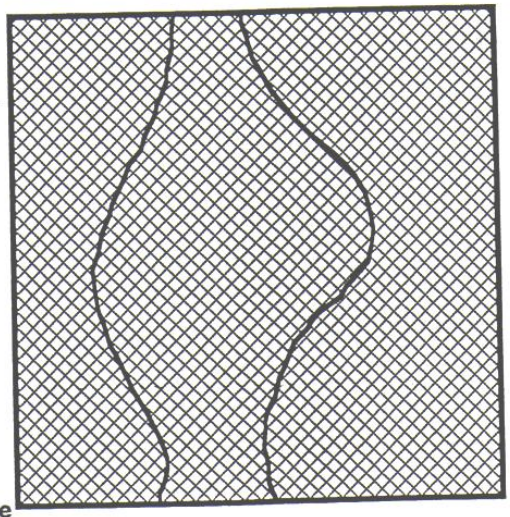
Copy onto card and cut out each shape.





Cut each shape into the portions and mix them up.

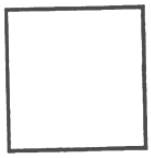




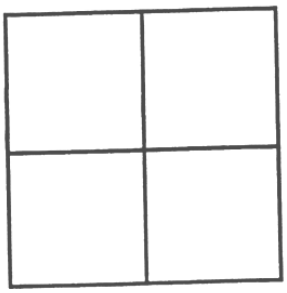
Can the pupils make circles and squares?

Find the squares

(use colours to show them)

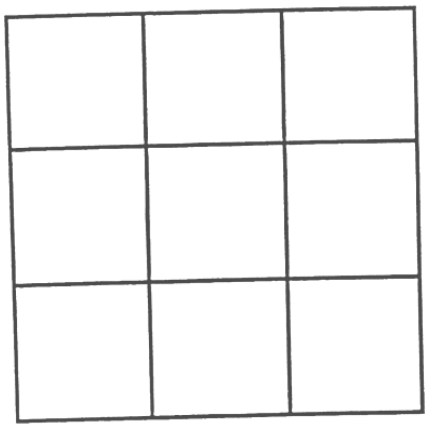


Draw round the
1 square.



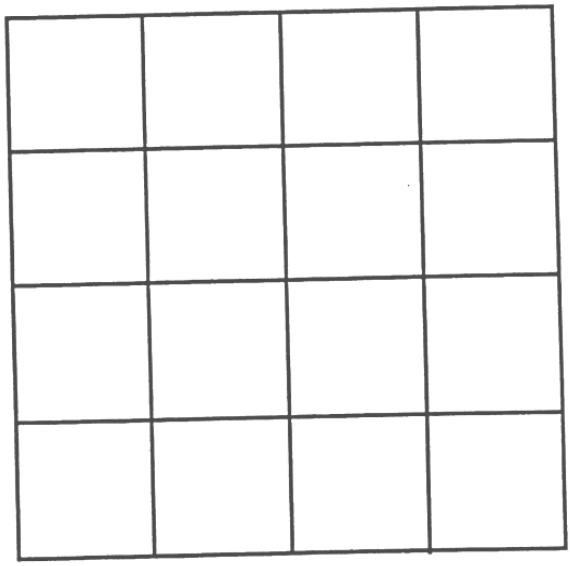
Can you find
the 5 squares?

Show them
with colours.



Can you find
the 14 squares?

Show them
with colours.



Can you find
the 30 squares?

Show them
with colours.

Can you draw the next
picture in the pattern?

Can you find how many
squares it would have?

Keep these patterns going;

1pm, 1:15pm, 1:30pm, 1:45pm, 2pm, ..., ..., ..., ...,

100, 200, 300, 400, ..., ..., ..., ..., ..., ...,

36, 34, 32, ..., ..., ..., 24, ..., ..., ..., ..., ...,

January, February, March, ..., ..., ..., ...,

95, 94, 93, ..., ..., ..., ..., 88, ..., ..., ..., ...,

4, 8, 12, 16, ..., ..., ..., ..., 36, ..., ..., ..., ..., ...,

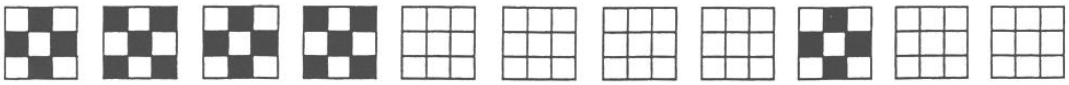
north, east, south, west, ..., ..., ..., ..., ...,

101, 91, 81, 71, ..., ..., ..., ..., ..., ..., ...,

3, 6, 9, 12, ..., ..., ..., ..., ..., ..., ...,

Keep these patterns going;

1pm, 1:30pm, 2pm, 2:30pm, ..., ..., ..., ...,



35, 37, 39, ..., ..., ..., 47, ..., ..., ..., ..., ...,

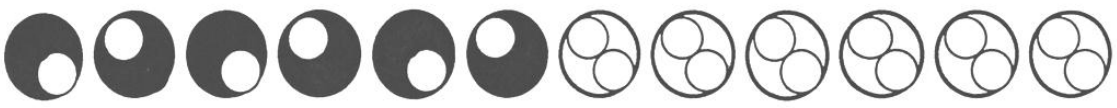
Monday, Tuesday, Wednesday, ..., ..., ...,

55, 54, 53, ..., ..., ..., ..., 48, ..., ..., ..., ...,

1, 3, 5, 7, ..., ..., ..., ..., 17, ..., ..., ..., ..., ..., ...,

north, west, south, east, ..., ..., ..., ..., ...,

100, 95, 90, 85, ..., ..., ..., ..., ..., ..., ...,

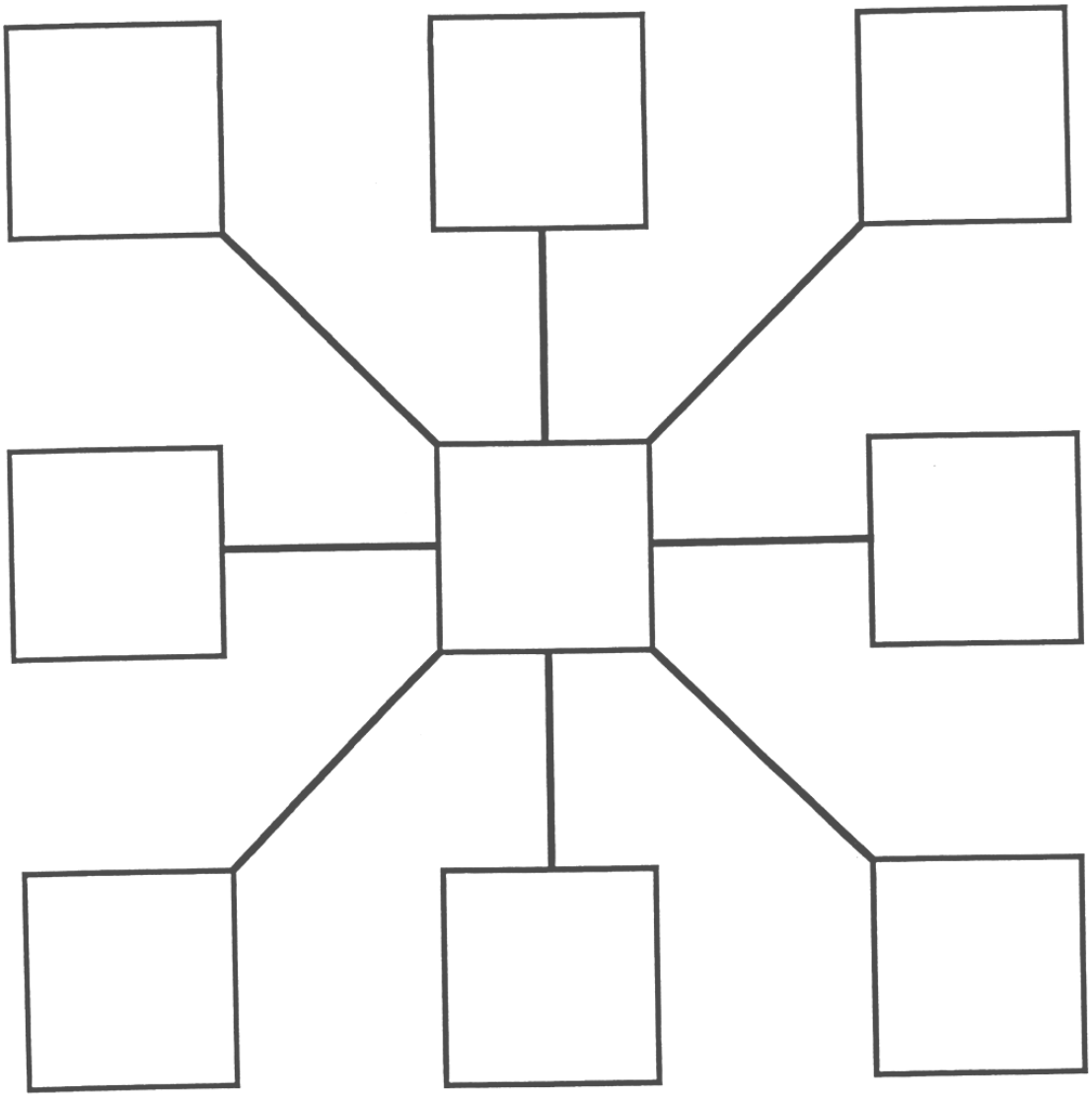


2, 12, 22, 32, 42, ..., ..., ..., ..., ..., ...,

Make each line add up to the same

Use cards with a 1, 2, 3, 4, 5, 6, 7, 8 or a 9 on them.

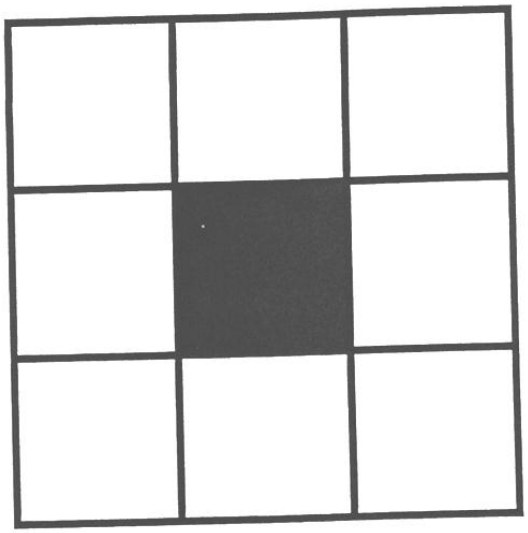
Put the cards onto the squares so that each line adds up to the same.



Make each line add up to the same

Use cards with a 1, 2, 3, 4, 5, 6, 7 or an 8 on them.

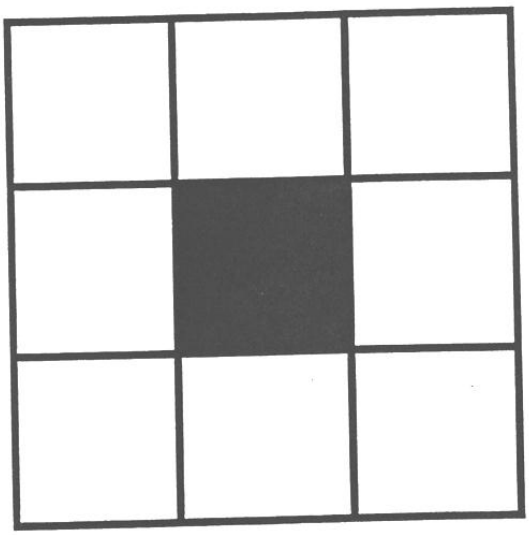
Put the cards onto the white squares so that each side **adds up to 13.**



Now do it a different way.

Use cards with a 1, 2, 3, 4, 5, 6, 7 or an 8 on them.

Put the cards onto the white squares so that each side **adds up to 14.**



Now do it a different way.

Make the sums correct

Make these sums correct by using only a 5, 7, 10 or 14.

☐ + ☐ = 17	☐ - ☐ = 2
☐ + ☐ = 24	☐ - ☐ = 5
☐ + ☐ = 15	☐ - ☐ = 3
☐ + ☐ = 12	☐ - ☐ = 7
☐ + ☐ = 19	☐ - ☐ = 4
☐ + ☐ = 21	☐ - ☐ = 9

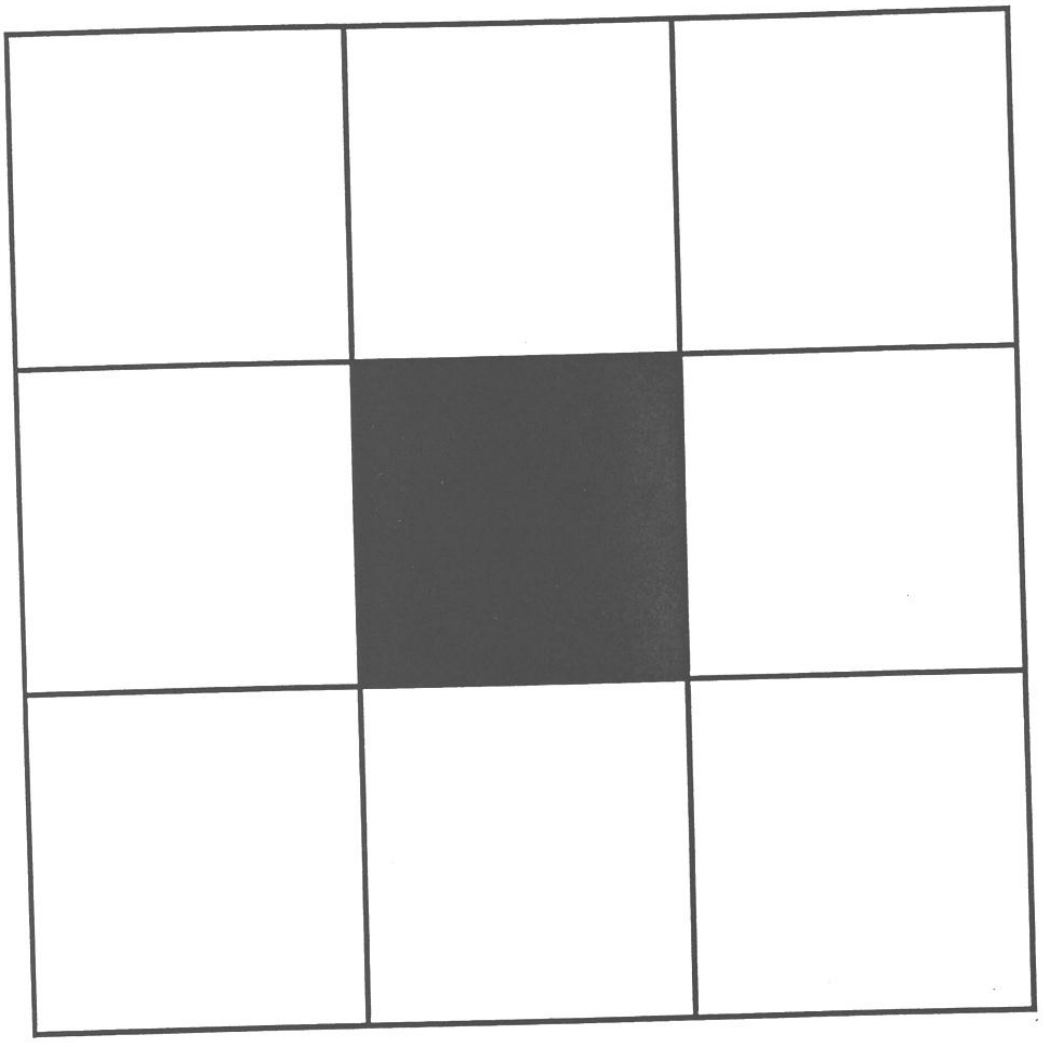
Make these sums correct by using only a 5, 8, 12 or 17.

☐ + ☐ = 20	☐ - ☐ = 3
☐ + ☐ = 22	☐ - ☐ = 12
☐ + ☐ = 29	☐ - ☐ = 4
☐ + ☐ = 25	☐ - ☐ = 9
☐ + ☐ = 17	☐ - ☐ = 5
☐ + ☐ = 13	☐ - ☐ = 7

Cubes in the squares

Get **20** cubes.

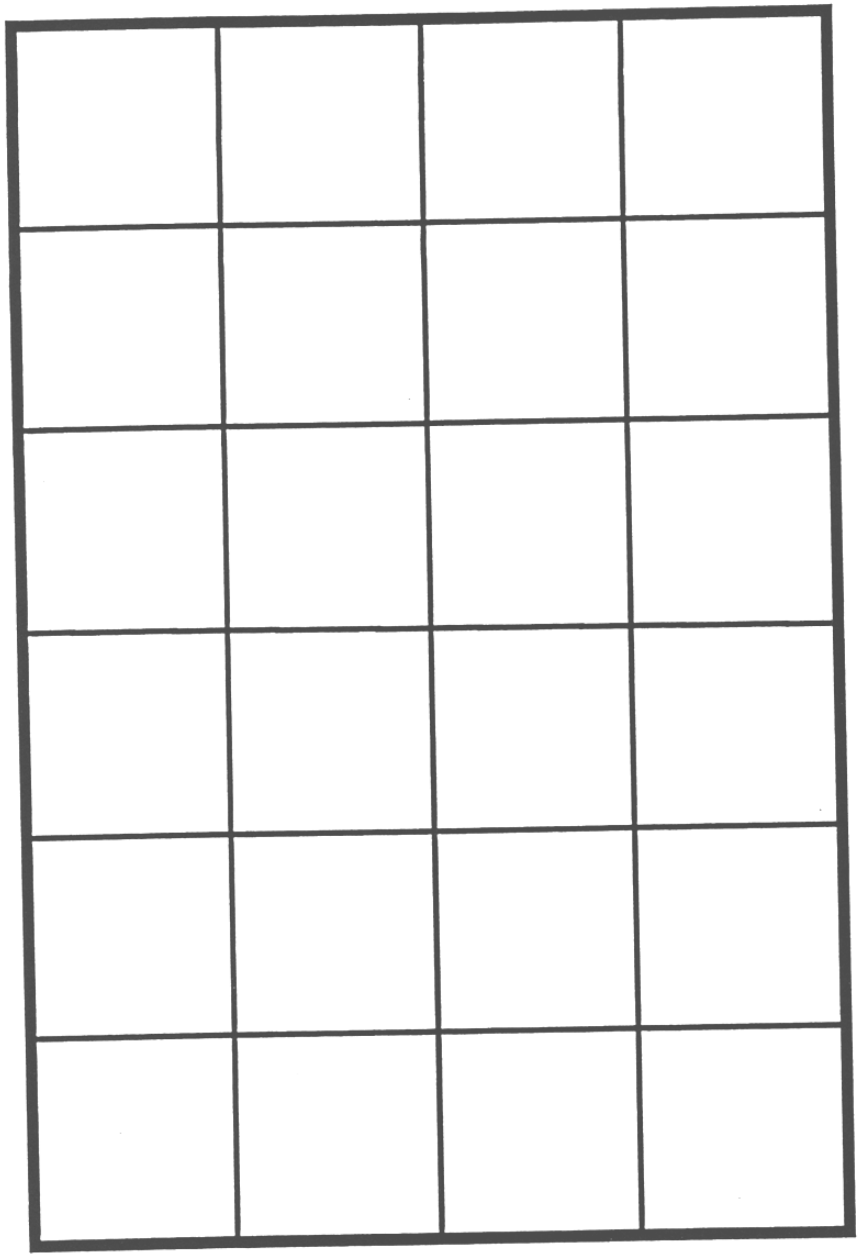
Put all of them into the white squares so that there are **7** cubes in each row and column.



Now can you put all 20 of them into the white squares so that there are **8** cubes in each row and column.

Let's get even

(even numbers are; 2, 4, 6, 8, 10,.....)



Get 18 cubes.

Put all the cubes onto the grid so that there is an **even number** of cubes in every row and in every column.

Can you find more than one way?