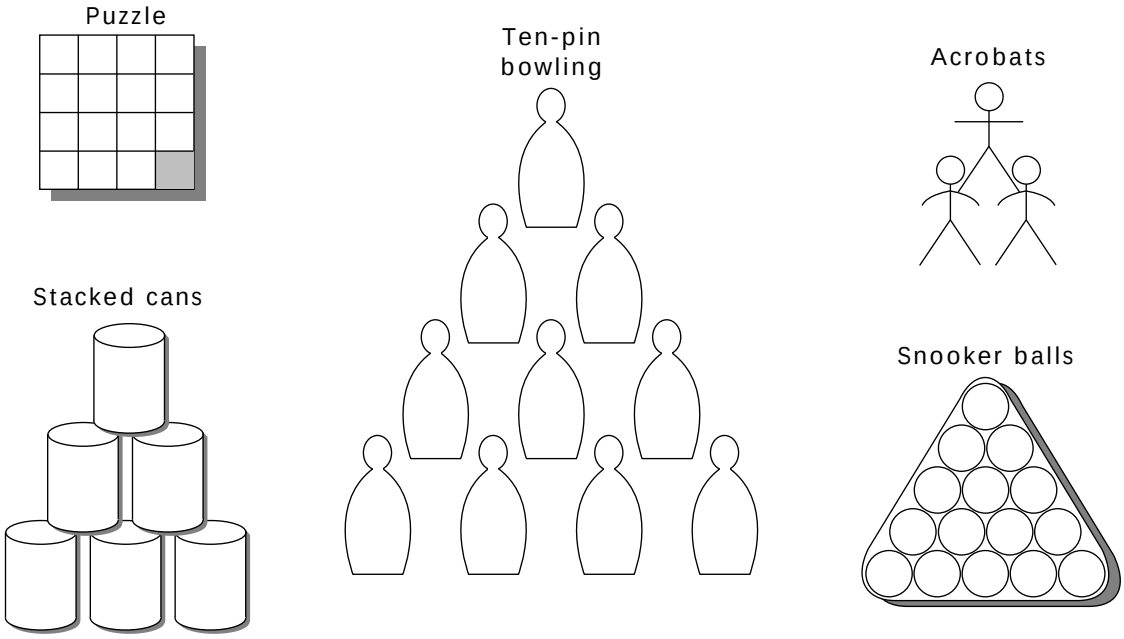
Activity 4: Shaping up numbers



You may have come across triangular and square numbers before. Make sure you understand what triangular and square numbers are before you try this activity.

▲ Explore the following ideas:

```
 1  =  1
 3  =  1 + 2
 6  =  1 + 2 + 3
10  =  1 + 2 + 3 + 4
15  =  1 + 2 + 3 + 4 + 5
21  =  1 + 2 + 3 + 4 + 5 + 6
```

a To find the sixth triangular number, multiply 6 by 7 and halve the result. How does this quick method work?

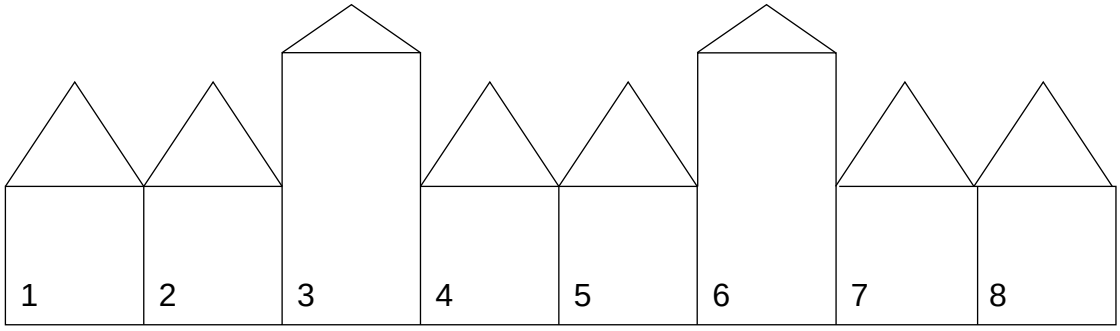
b Can you work out any triangular number, say the hundredth?

c The sum of two consecutive triangular numbers is a square number. Can you show or explain why this is true?

d The 17th-century French mathematician Pierre de Fermat suggested that every number is either a triangular number or the sum of two or three triangular numbers. Explore this theory.

e Have you done an investigation which produced triangular numbers? The triangular numbers crop up quite often, so watch out for them.

Activity 2: Spot the patterns



1 This pattern of tall and short houses continues along the street.

a Which of these are numbers belonging to tall houses?

16, 27, 32, 40, 60

b Which of these numbers are on the right of a tall house?

(4 is on the right of 3)

17, 21, 25, 31, 35

Which numbers are on the left?

What rules are you using to decide?

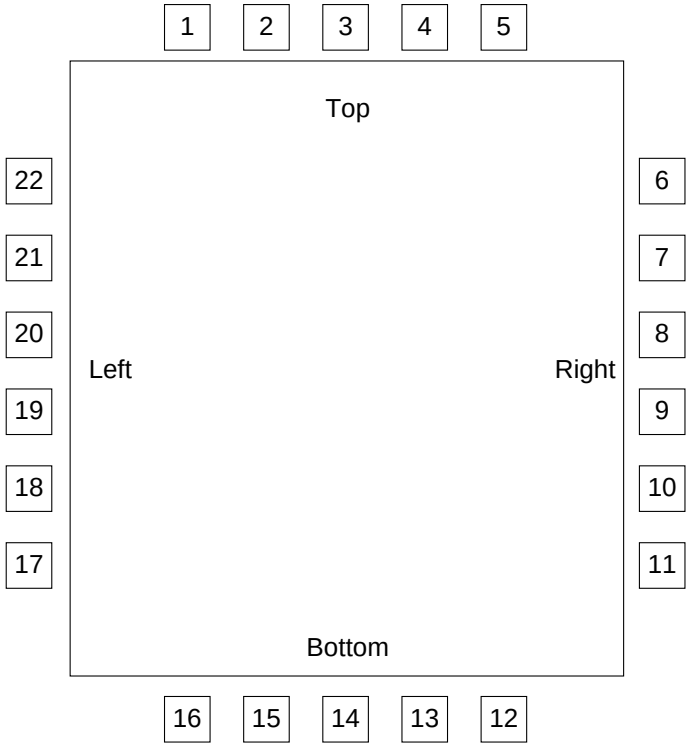
2 This is a plan of seats around a table.

Chair 16 is opposite chair 1.

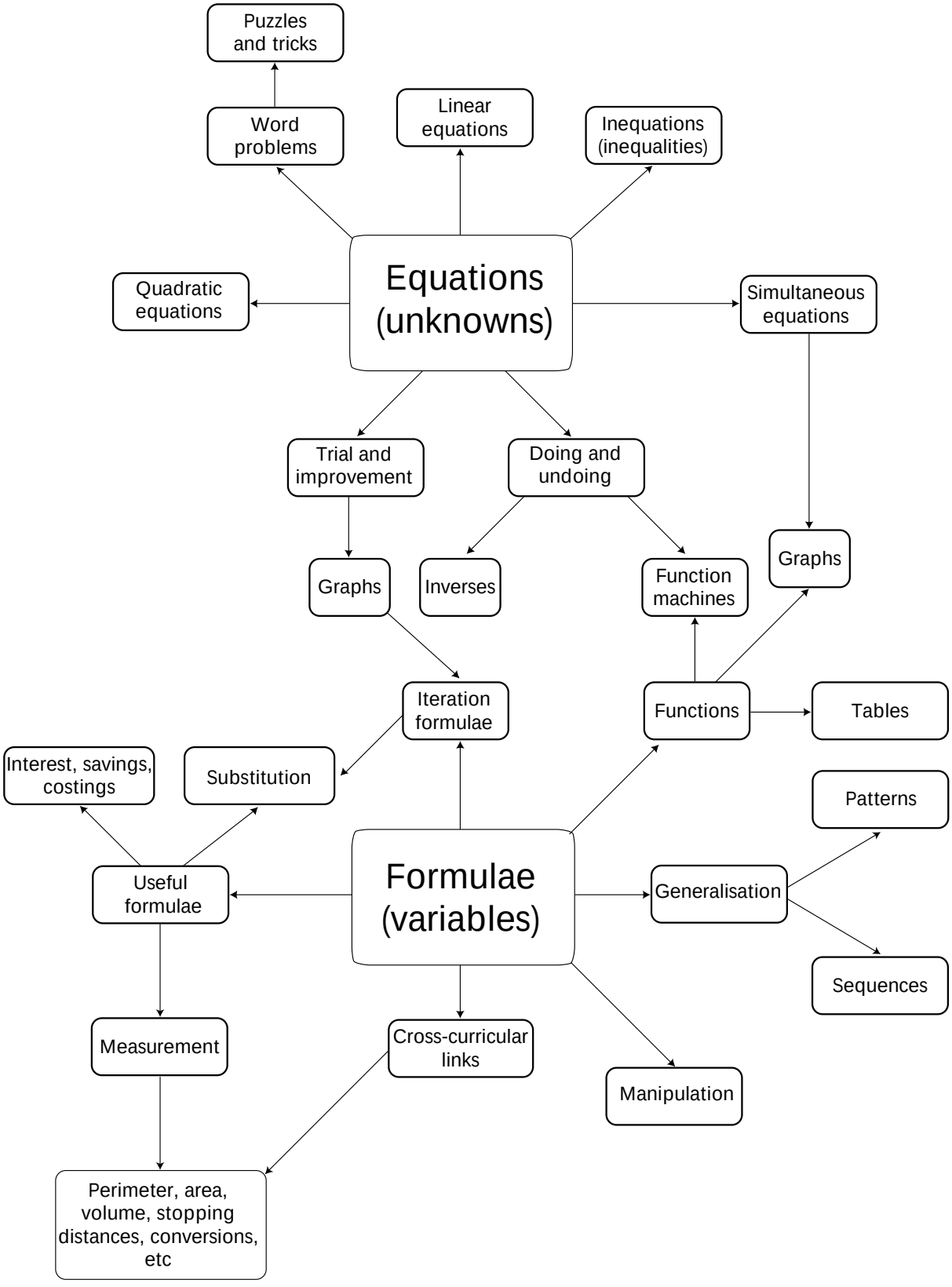
Chair 10 is opposite chair 18.

Can you find any rules for the numbers on opposite chairs?

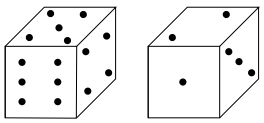
Write down any rules that you find.



Brainstorm

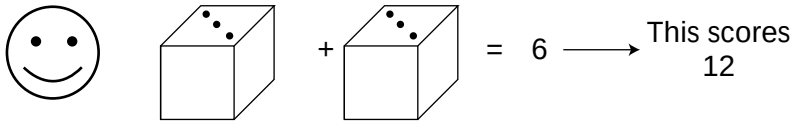

Puzzles and tricks
Word problems
Linear equations
Inequations (inequalities)
Equations (unknowns)
Quadratic equations
Simultaneous equations
Trial and improvement
Doing and undoing
Graphs
Inverses
Function machines
Graphs
Iteration formulae
Functions
Tables
Interest, savings, costings
Substitution
Patterns
Useful formulae
Formulae (variables)
Generalisation
Sequences
Measurement
Cross-curricular links
Manipulation
Perimeter, area, volume, stopping distances, conversions, etc

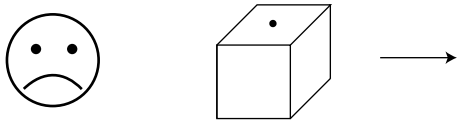
Activity 3: Pig



Pig is a game for several people, using two dice. The winner in this game is the first person to score 100.

Each player throws the two dice and adds the numbers together. A player may have throw after throw to build up the score by adding on. A double is worth twice its face value.





If a 1 is thrown the accumulated score for that turn is lost and the dice must be passed to the next player.

You can pass the dice on to the next player whenever you want.

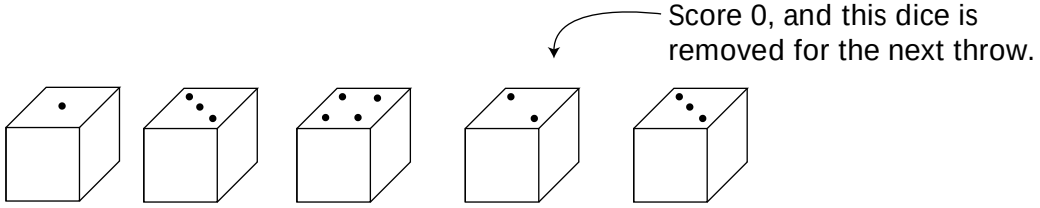
The secret of the game is to know when to stop!

▲ How many throws will you gamble on? Investigate.

▲ Why do you think the game is called ‘pig’?

Activity 4: Drop dead

You need five dice and paper. Each player throws the dice several times during their turn, adding up the numbers on the dice each time. A 2 or a 5 scores nothing and these dice are removed, eg:



Score 11 on this throw: 1 + 3 + 4 + 3 = 11.

Continue until the player has only one dice left. When this shows a 2 or a 5 the player has ‘dropped dead’. The player’s total score is recorded and play moves on to the next person. The winner is the person who has the highest score after five turns each, although you can change this to any number of turns.

▲ Find out about other dice games.