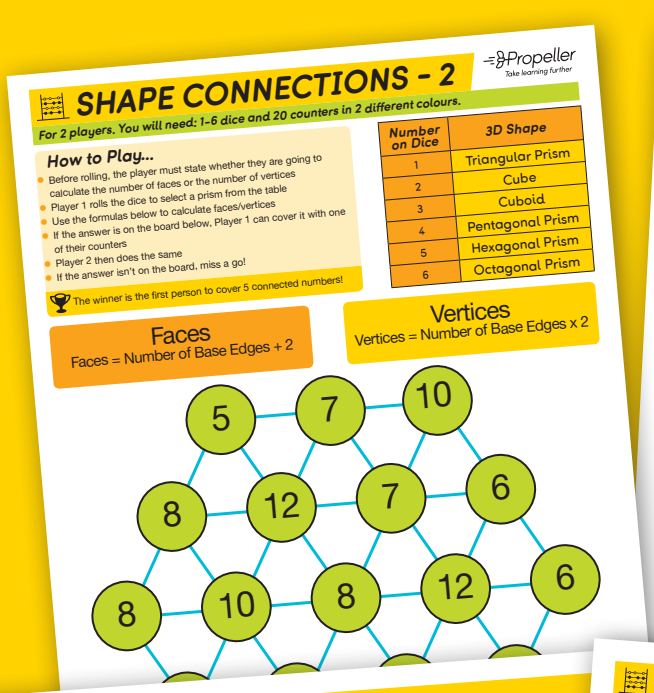
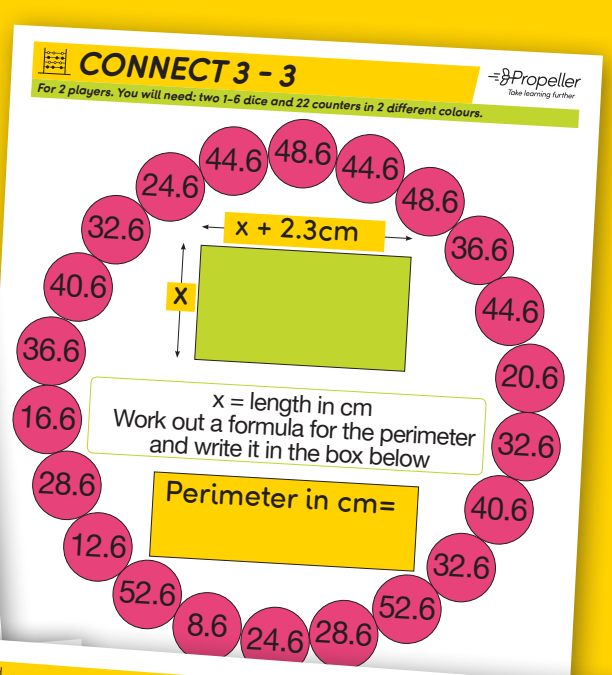
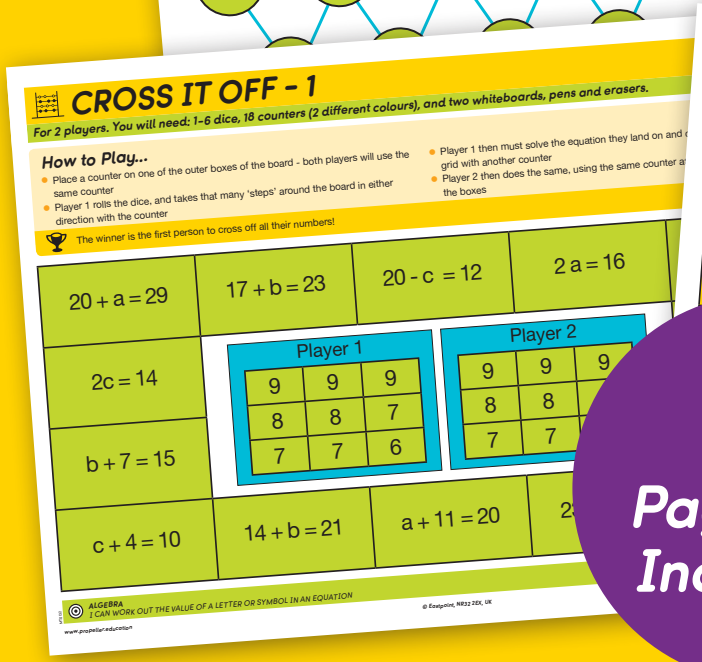
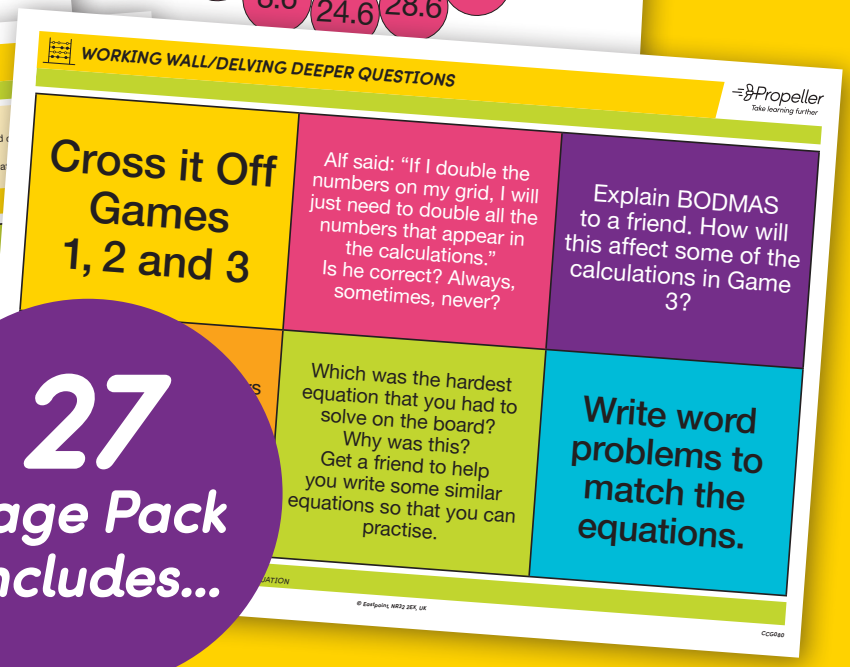
UKS2 Games to Develop Algebra









27 Page Pack Includes...

- *3 games each with 3 levels of challenge*
- *Editable games templates*
- *Linked questions to encourage reasoning and mastery*

@propeller_learn

www.propeller.education

Propeller
Take learning further

Year 6 Algebra eBook

Propeller
Take learning further

We've compiled 3 of our favourite games for tackling algebra, and each game has been differentiated 3 ways so that you can have the whole class playing at the same time.

Included in Each Game...	Instructions	National Curriculum objective written as an 'I can' statement
3 differentiated versions of the same game - Game 1 the least challenging, Game 3 the most	List of simple classroom equipment required to play the game	Delving Deeper questions for whole class or individual investigations and working walls
Speech bubble templates for children to use on working walls to show their learning	Where possible, an answer board for self checking	Editable versions of each game for meeting every child's needs, or for pupils to make their own games

Below are the contents of this eBook...

How do I use the editable templates?

The last few pages of this eBook are editable PDF templates of each game. You can use these to adapt the games or challenge your students to make their own. We'd love to see your creations, so make sure you share them with us on Twitter (*@propeller_learn*) or Facebook (*@PropellerLearn*).

CROSS IT OFF - 1

Propeller
Take learning further

For 2 players. You will need: 1-6 dice, 18 counters (2 different colours), and two whiteboards, pens and erasers.

How to Play...

- Place a counter on one of the outer boxes of the board - both players will use the same counter
- Player 1 rolls the dice, and takes that many 'steps' around the board in either direction with the counter
- Player 1 then must solve the equation they land on and cover the answer on their grid with another counter
- Player 2 then does the same, using the same counter as Player 1 to move around the boxes

The winner is the first person to cross off all their numbers!

$20 + a = 29$	$17 + b = 23$	$20 - c = 12$	$2a = 16$	$b + 13 = 20$
$2c = 14$				$10 + c = 19$
$b + 7 = 15$				$a - 3 = 4$
$c + 4 = 10$	$14 + b = 21$	$a + 11 = 20$	$23 - c = 15$	$2b = 12$

Player 1

9	9	9
8	8	7
7	7	6

Player 2

9	9	9
8	8	7
7	7	6

ALGEBRA
I CAN WORK OUT THE VALUE OF A LETTER OR SYMBOL IN AN EQUATION

MT0132

CROSS IT OFF - 2

Propeller
Take learning further

For 2 players. You will need: 1-6 dice, 18 counters (2 different colours), and two whiteboards, pens and erasers.

How to Play...

- Place a counter on one of the outer boxes of the board - both players will use the same counter
- Player 1 rolls the dice, and takes that many 'steps' around the board in either direction with the counter
- Player 1 then must solve the equation they land on and cover the answer on their grid with another counter
- Player 2 then does the same, using the same counter as Player 1 to move around the boxes

The winner is the first person to cross off all their numbers!

$20 + a = 32 - 3$	$17 + b = 9 + 14$	$18 - c = 80 \div 8$	$2a = 32 \div 2$	$10b = 14 \times 5$
$8 + c = 5 + 10$				$100 - c = 200 - 109$
$4c = 8 \times 4$				$1a = 7 \div 1$
$a \div 2 = 15 \div 5$	$35 \div b = 19 - 14$	$c = 81 - 72$	$16 - c = 24 - 16$	$b = 0.6 \times 10$

Player 1

9	9	9
8	8	7
7	7	6

Player 2

9	9	9
8	8	7
7	7	6

ALGEBRA
I CAN WORK OUT THE VALUE OF A LETTER OR SYMBOL IN AN EQUATION

MT0132

CROSS IT OFF - 3

Propeller
Take learning further

For 2 players. You will need: 1-6 dice, 18 counters (2 different colours), and two whiteboards, pens and erasers.

How to Play...

- Place a counter on one of the outer boxes of the board - both players will use the same counter
- Player 1 rolls the dice, and takes that many 'steps' around the board in either direction with the counter
- Player 1 then must solve the equation they land on and cover the answer on their grid with another counter
- Player 2 then does the same, using the same counter as Player 1 to move around the boxes

The winner is the first person to cross off all their numbers!

$2a + 8 = a + 15$	$4 + 4 \div 2 = b$	$1001 - c = 3 \times 331$	$10a \div 4 = 20$	$7 = 49 \div a$
$c + 13 = 100 \div 5$				$81 = c^2$
$-4 + 12 = b$				$12a = 84$
$2 + 5 = c - 1$	$0.25 \times 28 = b$	$a \div 4 = 2.25$	$2 + 3 \times 2 = c$	$4b \div 2 = 12$

Player 1

9	9	9
8	8	7
7	7	6

Player 2

9	9	9
8	8	7
7	7	6

ALGEBRA
I CAN WORK OUT THE VALUE OF A LETTER OR SYMBOL IN AN EQUATION

MT0132

CROSS IT OFF - ANSWER SHEET FOR 1, 2 AND 3

Propeller
Take learning further

9	6	8	8	7
7				9
8				7
6	7	9	8	6

ALGEBRA
I CAN WORK OUT THE VALUE OF A LETTER OR SYMBOL IN AN EQUATION

MT0132

Cross it Off Games 1, 2 and 3	Alf said: "If I double the numbers on my grid, I will just need to double all the numbers that appear in the calculations." Is he correct? Always, sometimes, never?	Explain BODMAS to a friend. How will this affect some of the calculations in Game 3?
Choose different numbers to put in your score grid. Can you now create a new game board so that the answers match your new score grid?	Which was the hardest equation that you had to solve on the board? Why was this? Get a friend to help you write some similar equations so that you can practise.	**Write word problems to match the equations.**

ALGEBRA
I CAN WORK OUT THE VALUE OF A LETTER OR SYMBOL IN AN EQUATION

SHAPE CONNECTIONS - 1

Propeller
Take learning further

For 2 players. You will need: a 0-9 dice and 20 counters in 2 different colours.

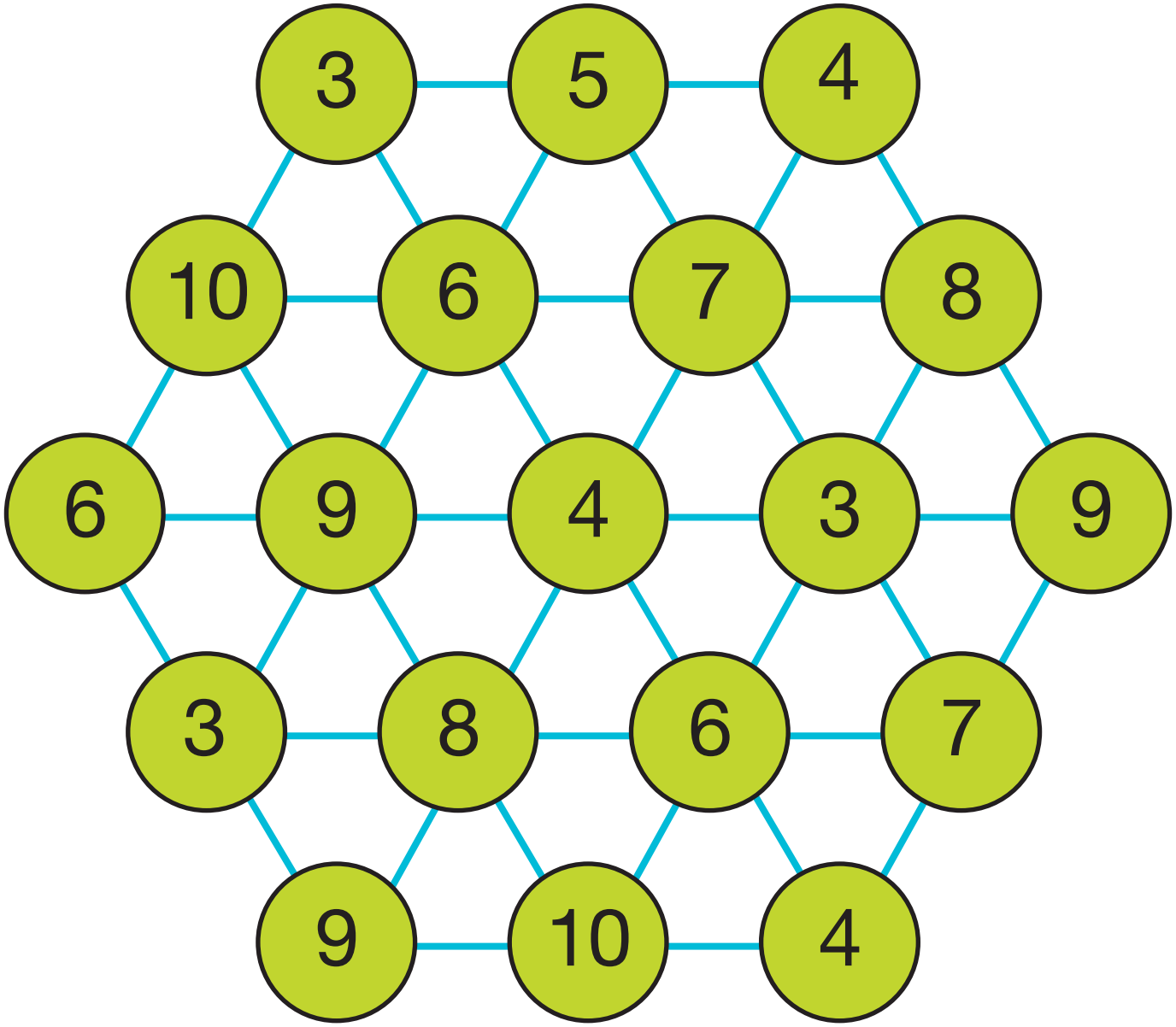
How to Play...

- Player 1 rolls the dice to select a shape from the table
- y = the number of sides of your shape
- If Player 1 can find 'y' on the board below, they can cover it with their colour counter
- It is then Player 2's turn to do the same
- Keep taking it in turns until someone is the winner!

The winner is the first person to cover 5 connected numbers!

y = number of sides of shape

Number on Dice	2D Shape
0	Miss a go
1	Decagon
2	Square
3	Hexagon
4	Octagon
5	Heptagon
6	Pentagon
7	Nonagon
8	Triangle
9	Choose a shape!



ALGEBRA
I CAN REPLACE LETTERS WITH VALUES TO WORK OUT THE VALUES I DON'T KNOW

MT0132

Shape Connections Game 1

Change the game so that y = the number of vertices. Would you need to change the numbers on the game board? If so, how?

Can you create a 'Learning Mat' to accompany the game? On the mat you would need to draw each shape and label it with its name, its number of sides, and its number of vertices.

Caroline says "If I start in the middle of the game board, I will always win." Is she correct?

Choose one of the shapes named in the game and create a page showing as many different examples of this shape as possible. How are these shapes the same? How are they different?

Why not change the game to use shapes with over 10 sides? Create a new game using these shapes. What numbers would you put on the game board?

SHAPE CONNECTIONS - 2

Propeller
Take learning further

For 2 players. You will need: 1-6 dice and 20 counters in 2 different colours.

How to Play...

- Before rolling, the player must state whether they are going to calculate the number of faces or the number of vertices
- Player 1 rolls the dice to select a prism from the table. Use the formulas below to calculate faces/vertices
- If the answer is on the board below, Player 1 can cover it with one of their counters
- Player 2 then does the same
- If the answer isn't on the board, miss a go!

The winner is the first person to cover 5 connected numbers!

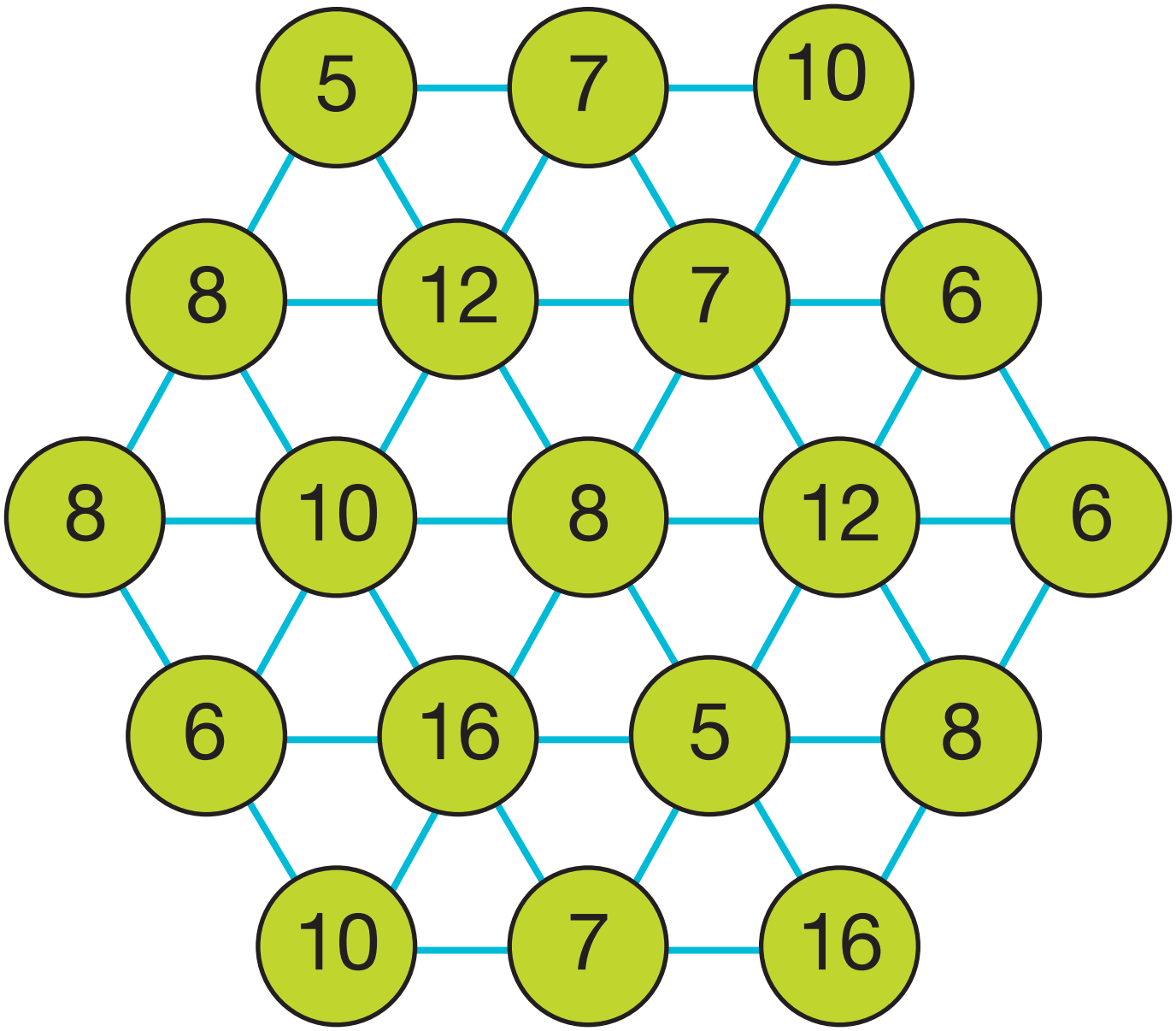
Number on Dice	3D Shape
1	Hexagonal Prism
2	Cube
3	Octagonal Prism
4	Pentagonal Prism
5	Triangular Prism
6	Cuboid

Faces

Faces = Number of Base Edges + 2

Vertices

Vertices = Number of Base Edges x 2



ALGEBRA
I CAN REPLACE LETTERS WITH VALUES TO WORK OUT THE VALUES I DON'T KNOW

MT0132

Shape Connections Game 2

Investigate the number of faces and the number of vertices for different pyramids. Could you create a game based on this? What patterns do you notice about the base of the pyramid and the number of faces/vertices?

Look at different prisms. Can you explain to a partner why the number of faces can be calculated by the number of base edges + 2?

Is a cube a prism? Why/why not?

Is a cylinder a prism? Why/why not?

Look at different prisms. Can you express algebraically how to find the number of edges on a prism? Create a new game based on finding the number of edges on different prisms.

SHAPE CONNECTIONS - 3

Propeller
Take learning further

For 2 players. You will need: 0-9 dice and 20 counters in 2 different colours.

How to Play...

- Player 1 rolls the dice to select a 3D shape from the table
- They then write down the number of faces and vertices on their selected shape, and rework Euler's Formula (below) to work out the number of edges
- If the answer is on the board below, cover it with a counter, but if not, miss a go!
- Player 2 then does the same

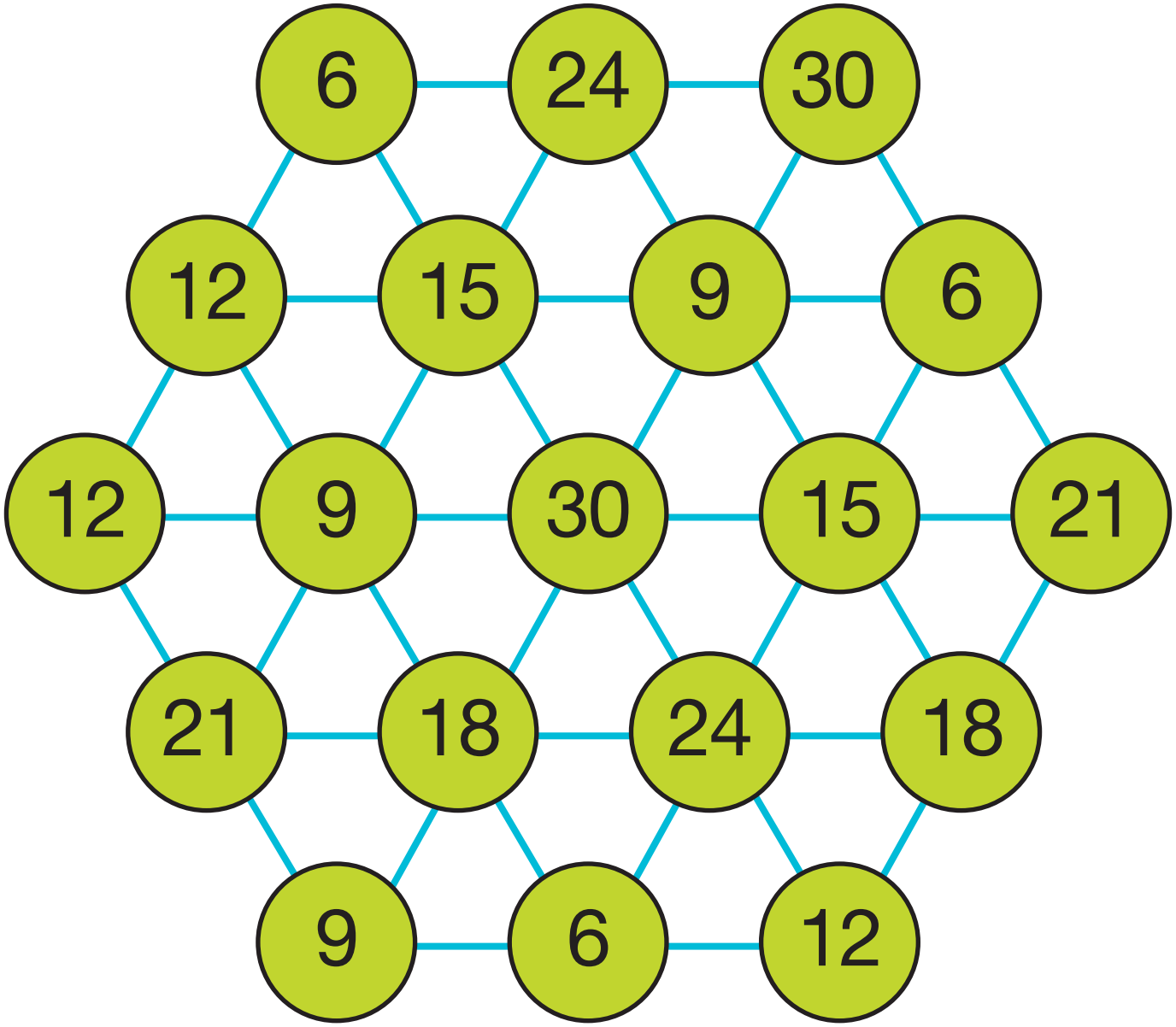
The winner is the first person to cover 5 connected numbers!

Euler's Formula

Faces = F Vertices = V Edges = E

F + V - E = 2

Number on Dice	3D Shape
0	Heptagonal Prism
1	Tetrahedron
2	Cube
3	Octahedron
4	Dodecahedron
5	Icosahedron
6	Pentagonal Prism
7	Octagonal Prism
8	Hexagonal Prism
9	Triangular Prism



ALGEBRA

I CAN REPLACE LETTERS WITH VALUES TO WORK OUT THE VALUES I DON'T KNOW

MT0132

Shape Connections Game 3

Create a fact-file about Leonhard Euler, the Swiss Mathematician

Can you change Euler's formula so that you can work out the number of faces if you know the number of vertices and edges?

Which 3D shapes do **not** fit Euler's formula?

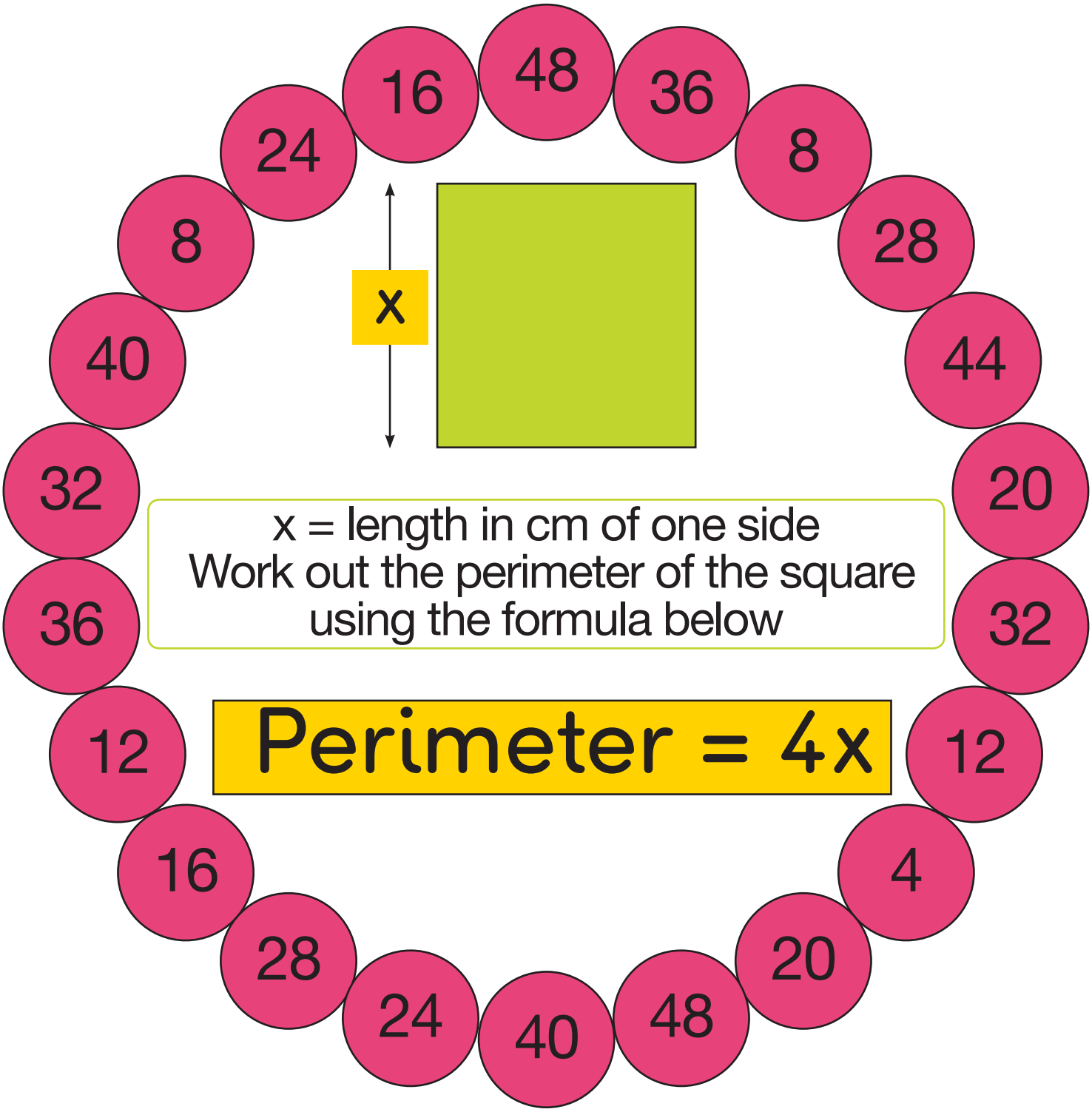
Create a shape mat that will support children playing this game. On the mat, include the names of all of the shapes used in the game labelled with their key properties.

Find a real life example of all the shapes mentioned in the game. Perhaps you could create a photo fact file for each shape? How about trying to create some of these 3D shapes using nets?

CONNECT 3 - 1

Propeller
Take learning further

For 2 players. You will need: two 1-6 dice and 22 counters in 2 different colours.



How to Play...

- Players should take it in turns to roll two 1-6 dice
- Players can choose either of the numbers landed on, or can add the two together to give the value of x
- They then must work out the perimeter and, if they can find the answer on the ring, they can cover it with a counter in their colour
- If the answer isn't there, miss a go!

The winner is the first person to cover three touching circles!

ALGEBRA
I CAN REPLACE LETTERS WITH VALUES TO WORK OUT THE VALUES I DON'T KNOW

MT0132

Connect 3 Game 1

If the dice were used to represent the perimeter of the square, what would you do to calculate the length of one side?

What numbers would need to go in the pink circles if you used two dice to produce the perimeter?

Can you create a game to work out the perimeter of a regular pentagon when the dice is used as the length of one side?

Can you create a game to work out the perimeter of a regular hexagon when the dice is used as the length of one side?

Can you write an algebraic expression to work out the perimeter of any regular shape?

WORKING WALL/DELVING DEEPER QUESTIONS FOR CONNECT 3 - 1

Propeller
Take learning further

An extra rule has been introduced to the game. You must now **double** the dice number to represent x. What would you have to do to the numbers around the outside of the game?	How about if you halved the dice number? What would happen to the numbers in the circles now?	Mark says that the perimeter of any square is always an even number. Is he right? Always, sometimes, never?
Can you create a game to work out the perimeter of an equilateral triangle when the dice is used as the length of one side?		

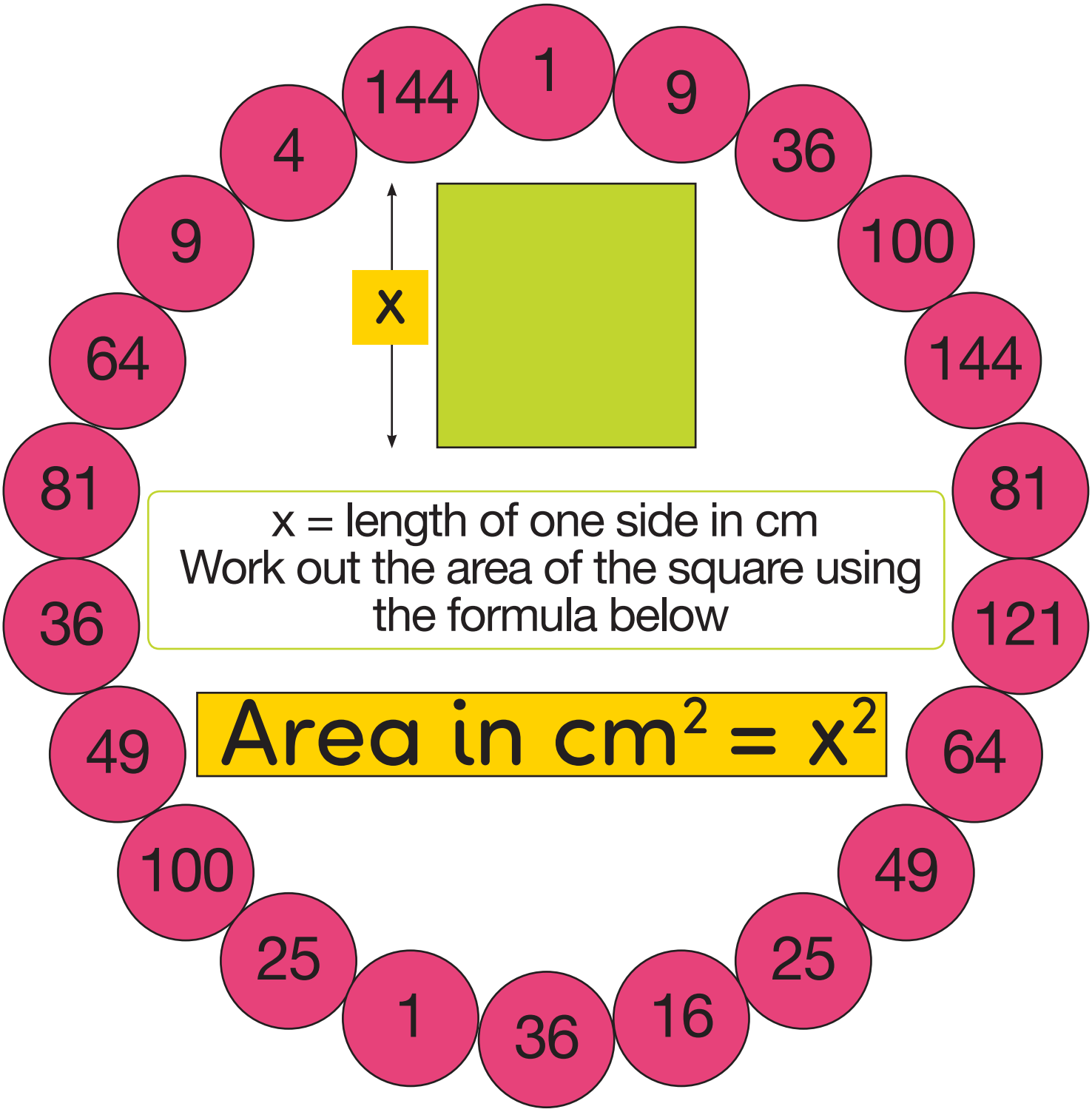
ALGEBRA
I CAN WORK OUT THE VALUE OF A LETTER OR SYMBOL IN AN EQUATION

MT0132

CONNECT 3 - 2

Propeller
Take learning further

For 2 players. You will need: two 1-6 dice and 22 counters in 2 different colours.



How to Play...

- Players should take it in turns to roll two 1-6 dice
- Players can choose either of the numbers landed on, or can add the two together to give the value of x
- They then must work out the area and, if they can find the answer on the ring, they can cover it with a counter in their colour
- If the answer isn't there, miss a go!

The winner is the first person to cover three touching circles!

ALGEBRA
I CAN REPLACE LETTERS WITH VALUES TO WORK OUT THE VALUES I DON'T KNOW

MT0132

Connect 3 Game 2

Holly says that the area of a square will be an odd number if the length of one side is even. Is this correct? When does the area result in an even or odd number?

Oscar decides to create a new game. This time, the dice number would represent the area of the square. What algebraic expression would show how to calculate the area of one side if he knew the area?

Can you create a new game to find the area of an equilateral triangle? What would be the algebraic expression? What numbers would you place in the circles for this game?

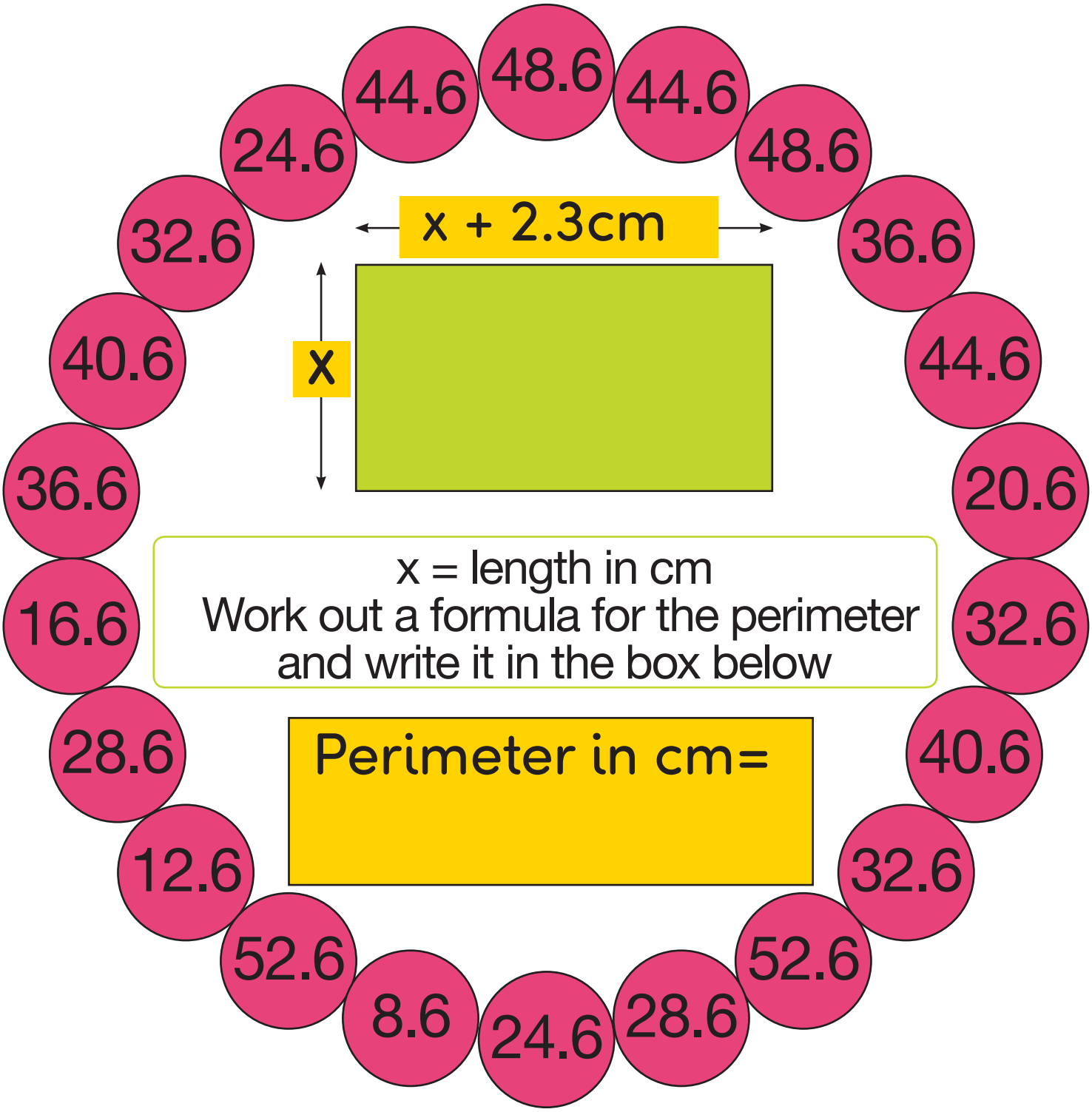
Can you create a new game to find the area of any triangle if the height was always 4cm and a 1-6 dice was used to represent the length of the base? What numbers would you need to write in the circles?

What do you notice about the numbers in the pink circles?

CONNECT 3 - 3

Propeller
Take learning further

For 2 players. You will need: two 1-6 dice and 22 counters in 2 different colours.



x = length in cm
Work out a formula for the perimeter and write it in the box below

Perimeter in cm=

How to Play...

- Players should take it in turns to roll two 1-6 dice
- Players can choose either of the numbers landed on, or can add the two together to give the value of x
- They then must work out the perimeter and, if they can find the answer on the ring, they can cover it with a counter in their colour
- If the answer isn't there, miss a go!

The winner is the first person to cover three touching circles!

ALGEBRA
I CAN REPLACE LETTERS WITH VALUES TO WORK OUT THE VALUES I DON'T KNOW

MT0132

Connect 3 Game 3

A new rectangle was created where ‘x’ represented the height and ‘x - 2’ represented the length. Can you create a new game to calculate the perimeter of this rectangle?

Polly created a new rectangle where the formula to find the perimeter was ‘4x’. What type of rectangle would this be?

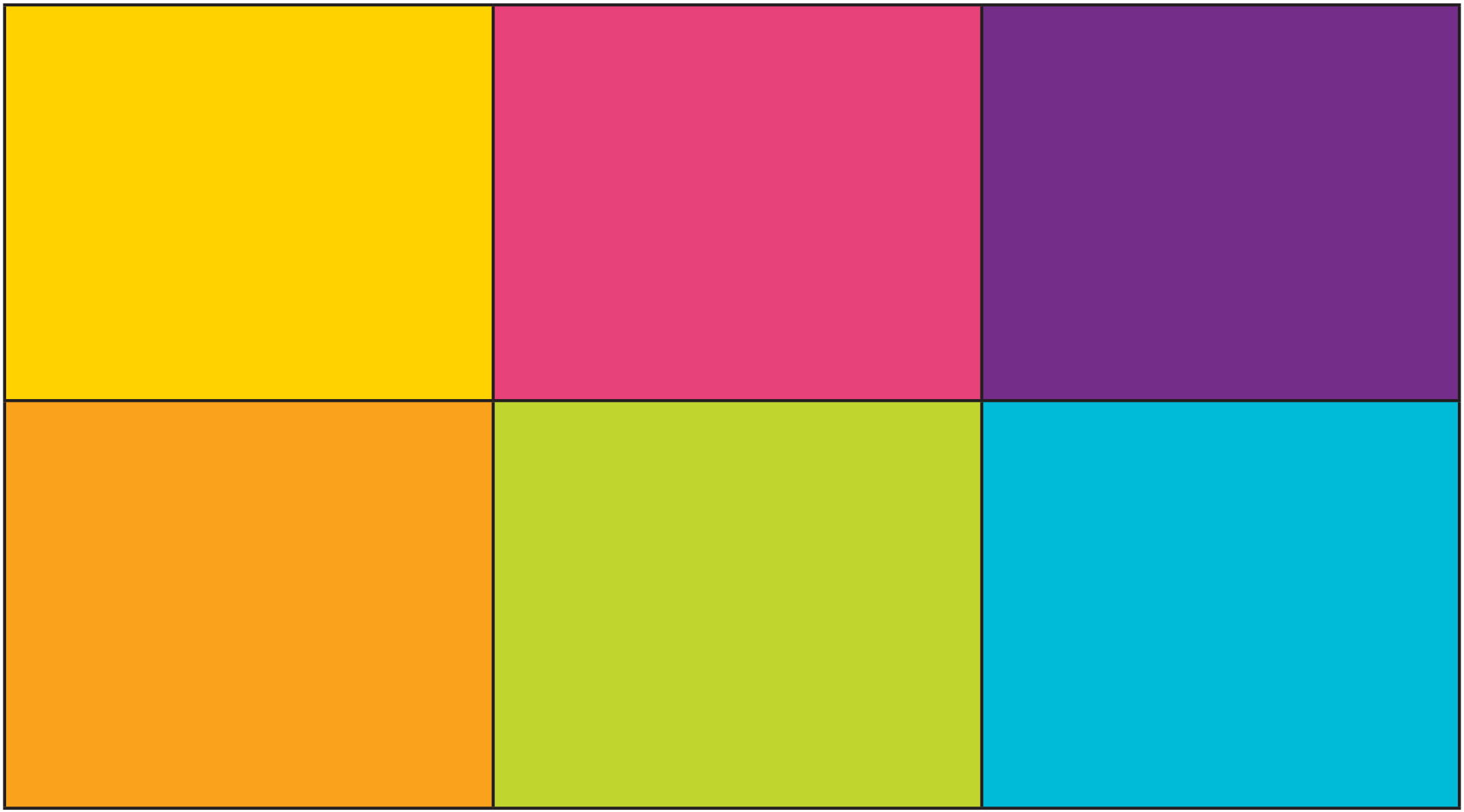
Jason said that if the formula for the perimeter of a rectangle used a decimal number, the perimeter would never be a whole number. Would this always, sometimes or never happen?

Can you change the game so that you now have to calculate the area of the rectangle? How would you calculate this? What numbers would you place in the circles?

A new game was created where you had to double the dice number and use the result to represent x. What would you need to do to the numbers in the circles?

WORKING WALL QUESTION TEMPLATES

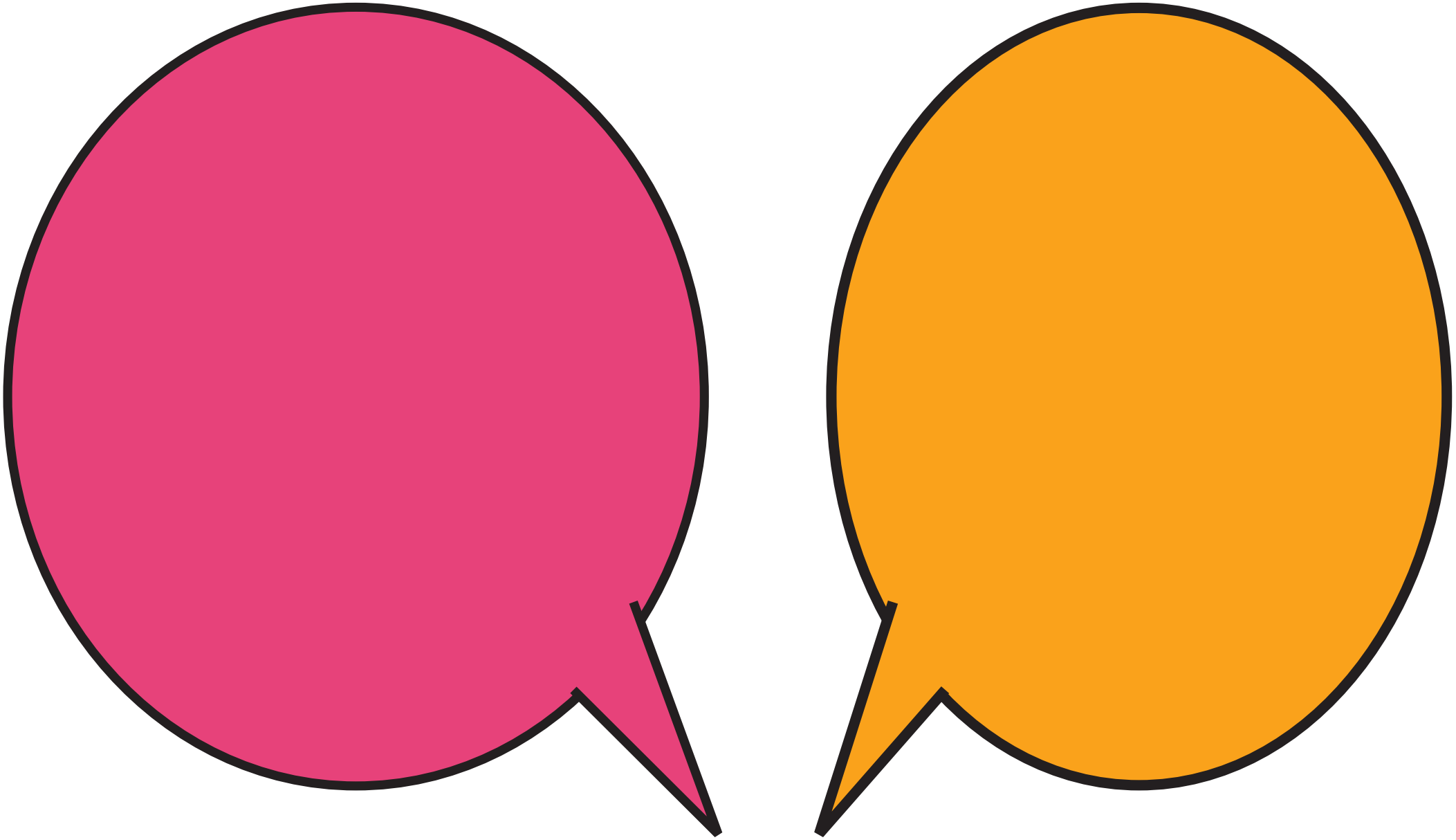
Propeller
Take learning further



MT0132

SPEECH BUBBLE TEMPLATES TO USE ON WORKING WALLS

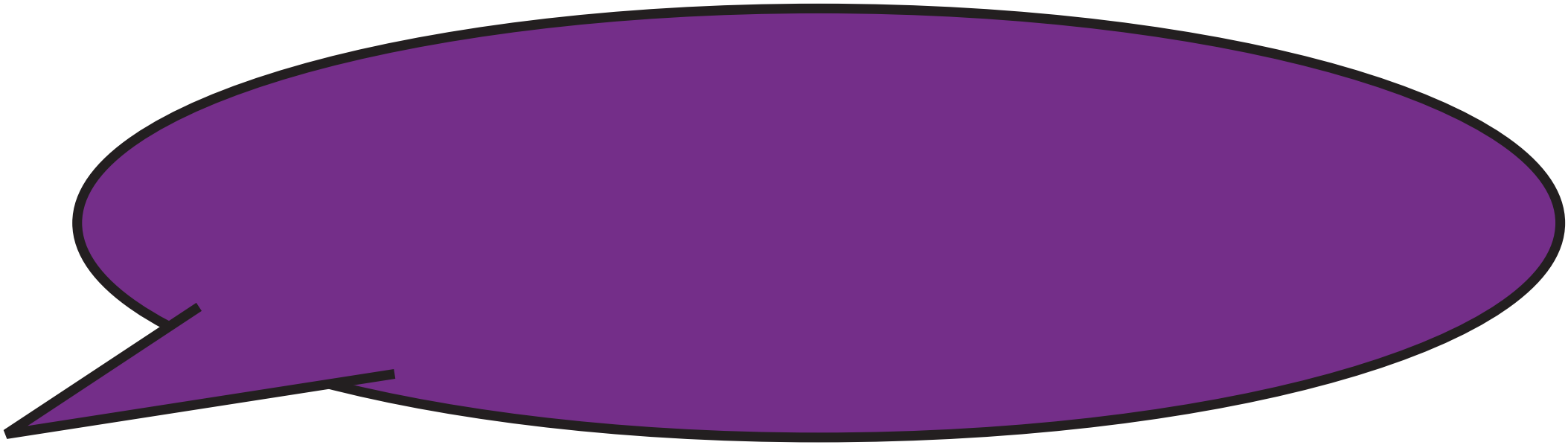
Propeller
Take learning further

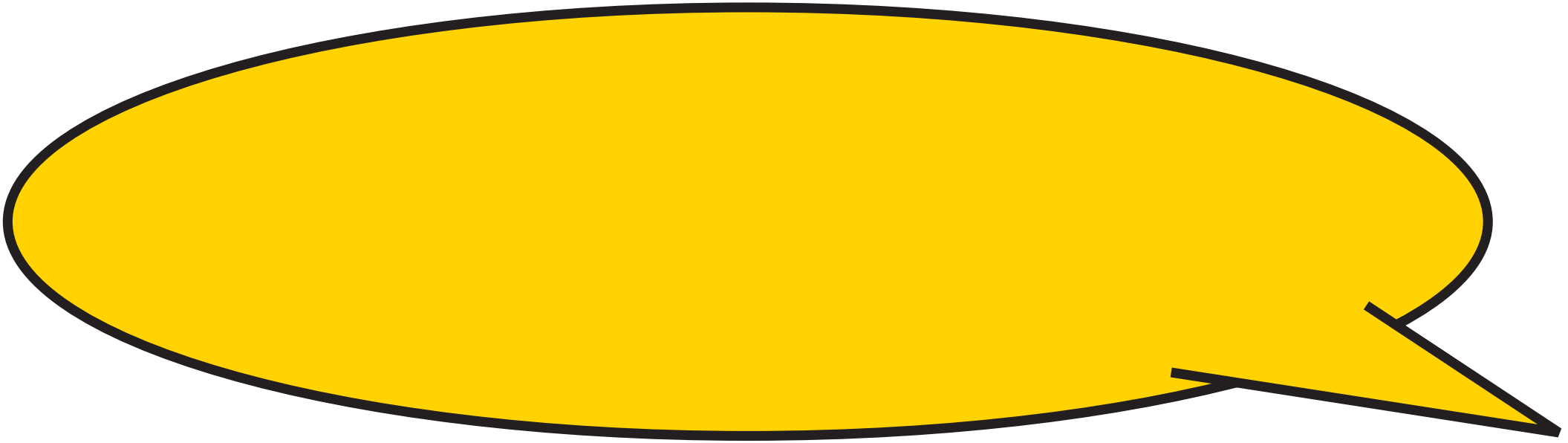


MT0132

SPEECH BUBBLE TEMPLATES TO USE ON WORKING WALLS

Propeller
Take learning further

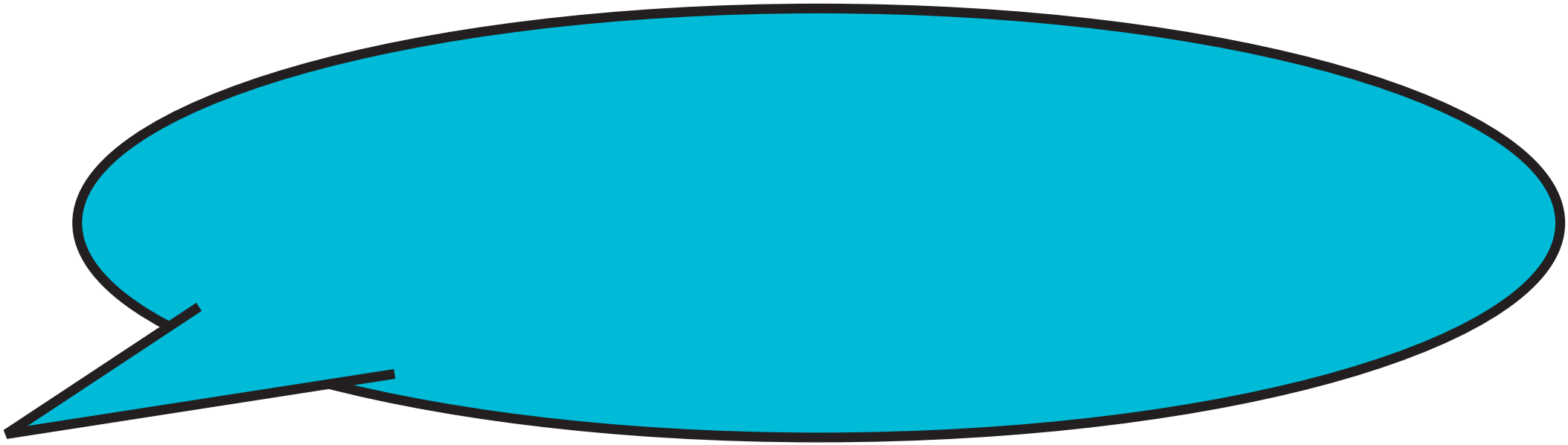


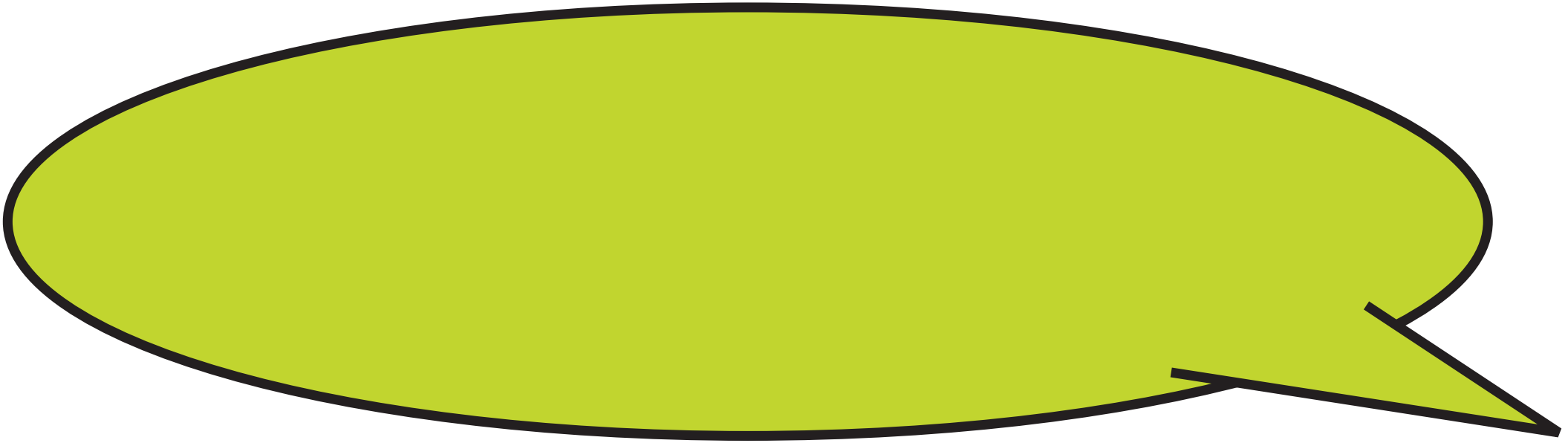


MT0132

SPEECH BUBBLE TEMPLATES TO USE ON WORKING WALLS

Propeller
Take learning further



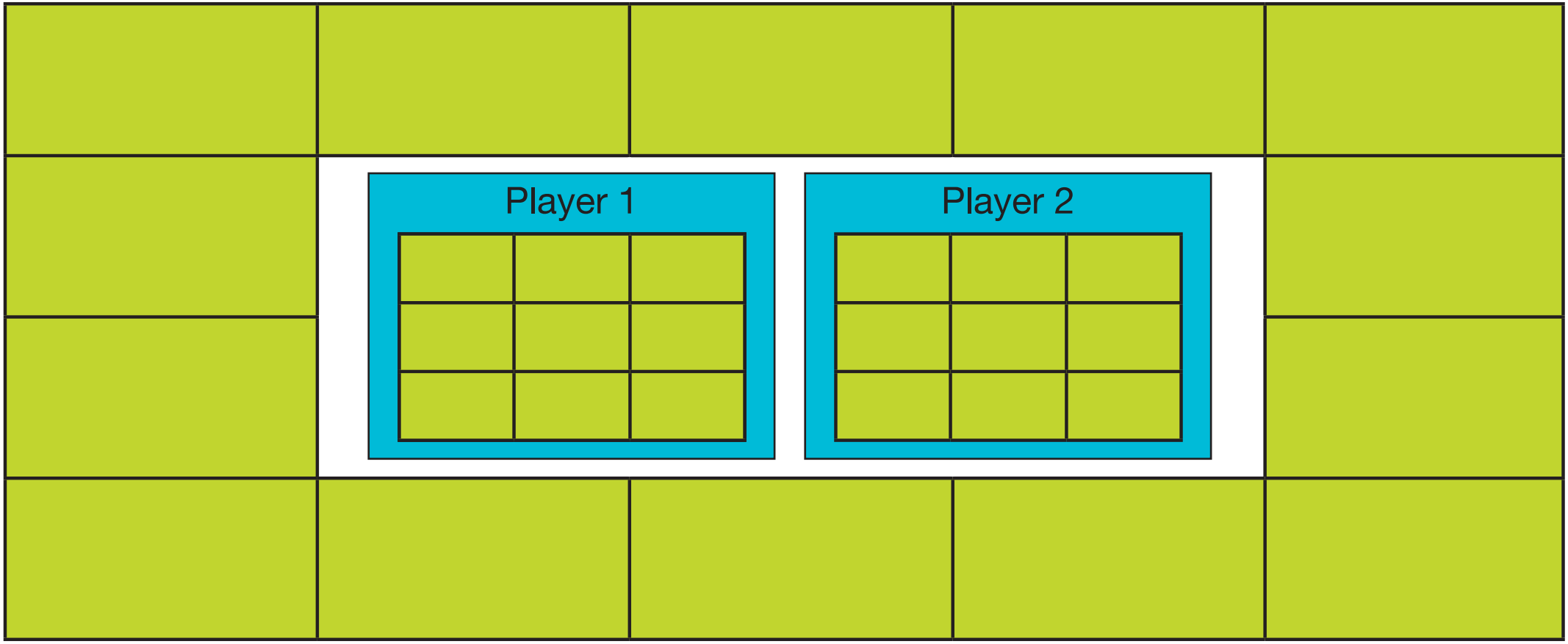


MT0132

Propeller
Take learning further

You will need:

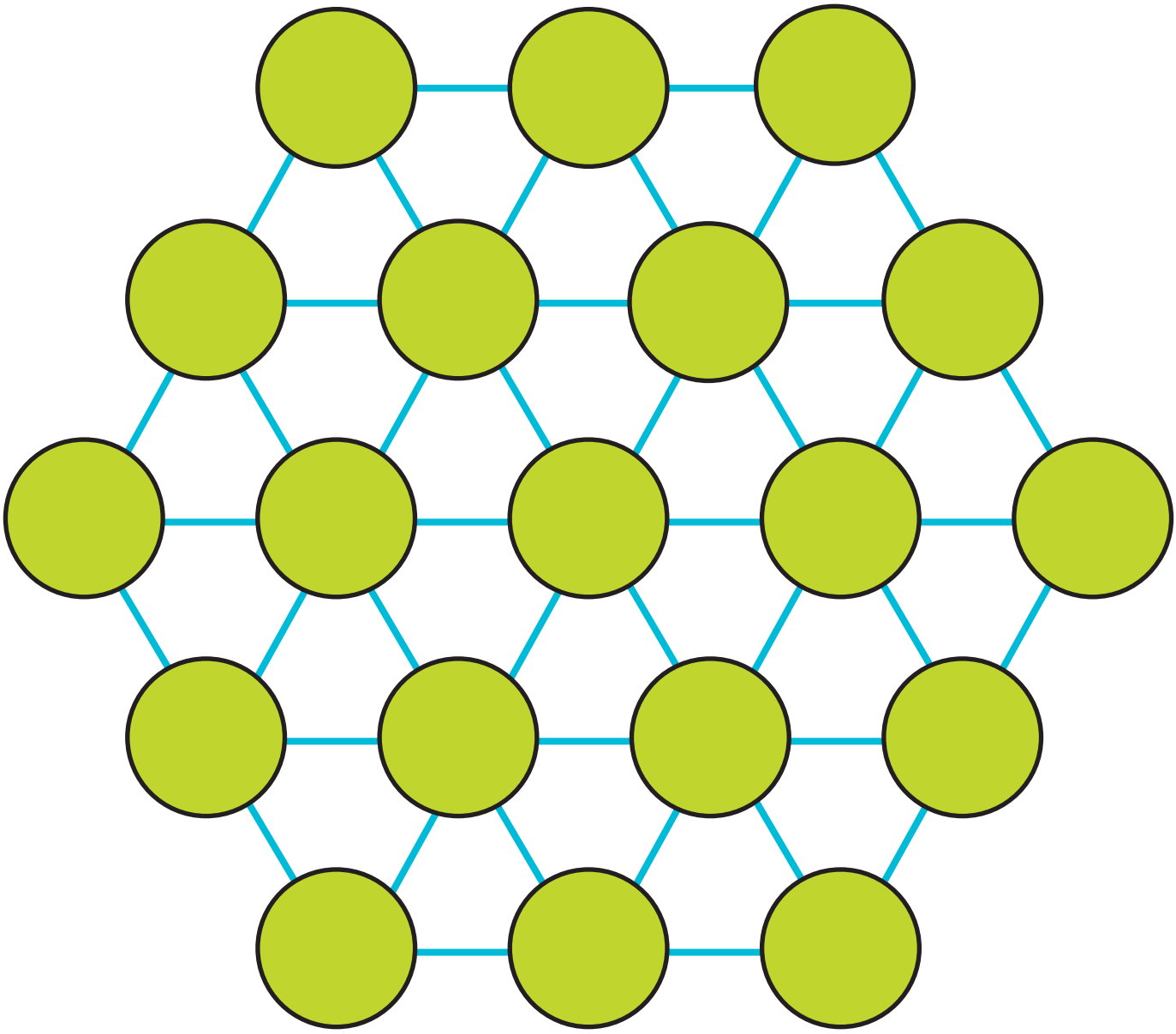
How to Play...

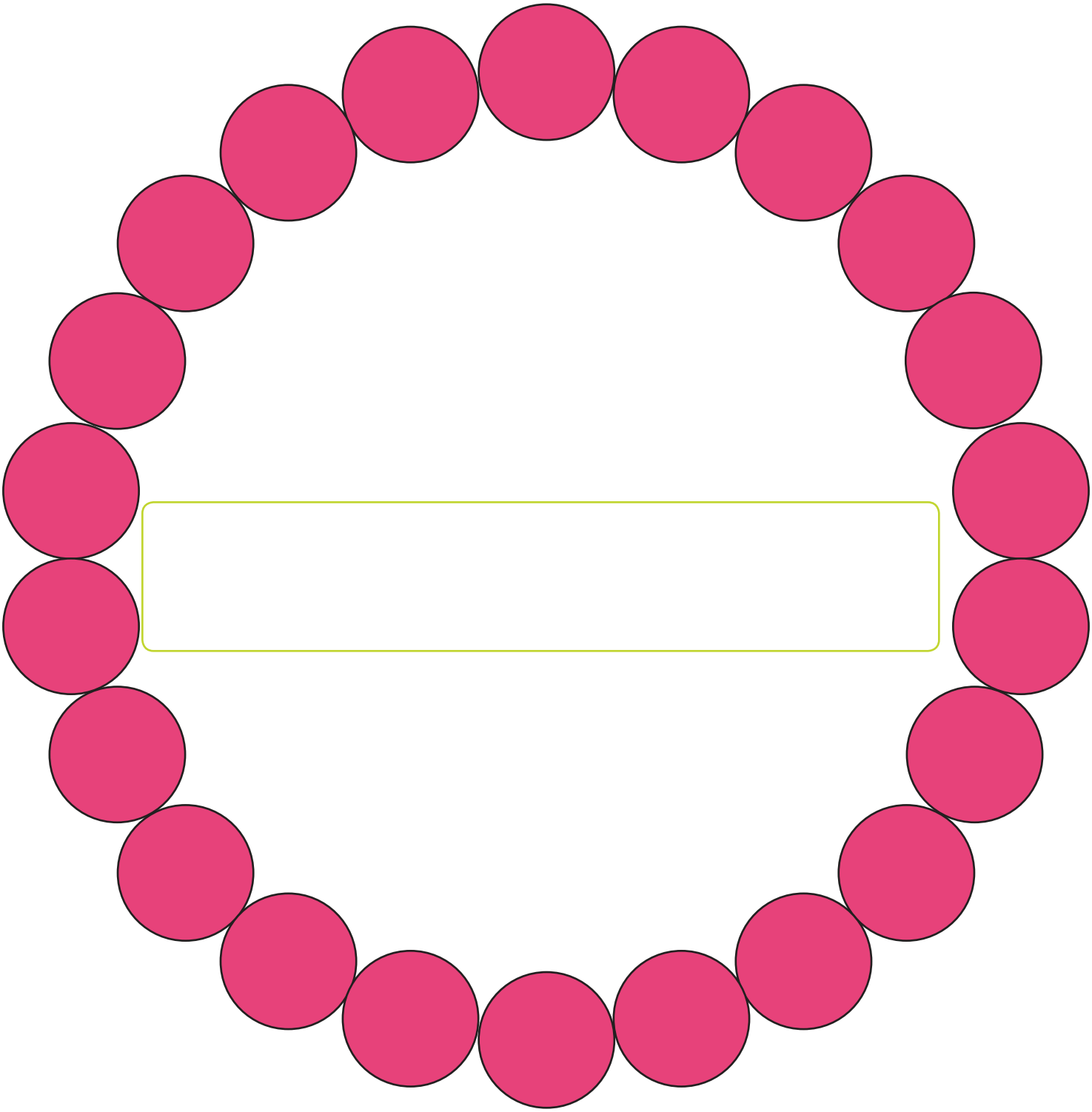


MT0132

Propeller
Take learning further

How to Play...





How to Play...

Who are Propeller?

Propeller makes meeting National Curriculum objectives easy and provides teachers with fun and engaging learning activities for Primary Schools. We seek out inspiring teachers to create our time-saving resources and test them with their children before we share them with you.

Master Key Concepts

Promote Discussion

Develop Recall

Meet Curriculum Objectives

Find our more about Propeller products at

www.propeller.education

DDGEBOOK1

MT0132

Propeller®
Take learning further