

2026 Maths Explorer - Year 3 & 4

Resource Kit One

Teaching Problem Solving



Rationale and Syllabus Outcomes

Mathematics is a creative subject requiring abstract thought. Children naturally reason and use creative strategies when they seek patterns and relationships that will enable them to solve challenging unfamiliar problems. The generalisations they make can then be used to solve problems with the same mathematical structure.

Through the process of problem solving and class discussion of the strategies used, children will also develop skills they can use when faced with more unfamiliar problems. Year 3-4 students will be able to describe and represent mathematical situations, select and apply appropriate problem solving strategies and give valid reasons for supporting one possible solution over another.

There is a [Maths Explorer 2026 Program Guide](#) available for teachers to watch in the APSMO portal.

5 Steps to Explorer Success: Preparing your team for each Contest Paper

1 Guided Lesson PAGE 2

Each topic is introduced with a class video and accompanying activity sheets. These videos showcase problem solving strategies and introduce relevant mathematical terminology. There are challenges for students to complete throughout the video.

2 10 Task Cards PAGE 5

Developed for collaborative work, these task cards are designed to build familiarity and mathematical fluency. They are provided with or without hints. There are also 5 Challenge Questions for high achieving students.

3 Digital Activity PAGE 17

The digital activities are designed to let students explore and gain confidence as they problem solve. Each digital activity has different levels of difficulty.

4 Preparation Contest Paper PAGE 18

This is provided so that teachers can evaluate student progress and identify any concepts or strategies to review before the contest paper.

5 Contest Paper 1

The Contest Paper will be available in the APSMO portal for Wednesday, 6th May.

The four Resource Kits in 2026 will focus on:

1) Draw a Diagram

A diagram may reveal information that may not be obvious just by reading the problem. Diagrams are useful for keeping track of where the student is up to in a multi-step problem.

2) Find a Pattern

Students can often solve problems by recognising and extending a pattern. Finding patterns can help to simplify tricky problems.

3) Work Backwards

If a problem describes a procedure and then specifies the final result, this method usually makes the problem much easier to solve.

4) Logical Reasoning

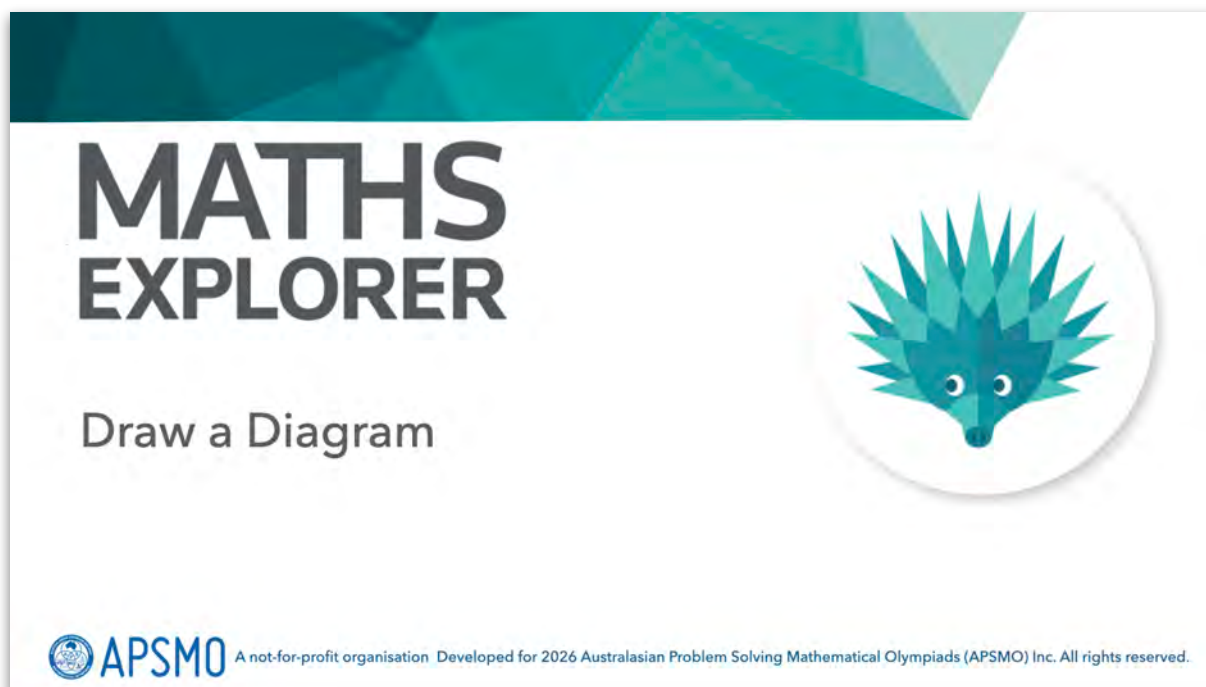
Using logic to solve a problem requires students to analyse information systematically, and apply logical steps to work towards potential solutions.



Step 1: Guided Lesson

The video is available in the APSMO portal, or you may click the image below.

Please print a copy of the accompanying Activity Sheet p.3 for your students.



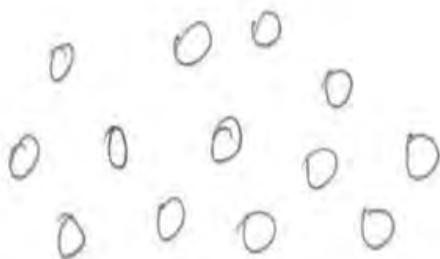
NB: Video link only available to Registered teams

Activity Sheet: Draw a Diagram



Name: _____

13 Shells



20 Stickers

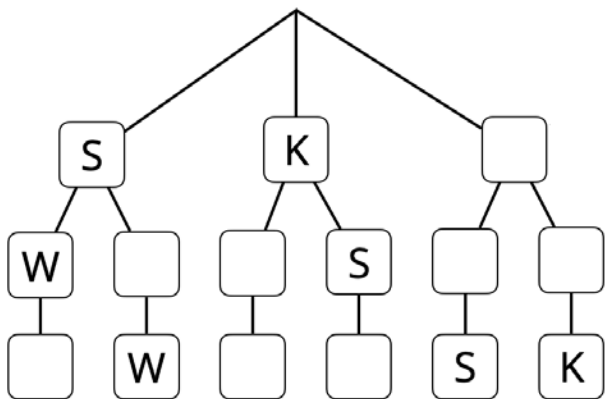
Baxter's Birthday



Lucy's Secret



Fruit Skewers - Fill in the blank spaces



Racing

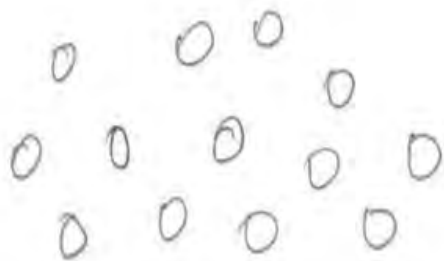
Activity Sheet: Draw a Diagram



Name: _____

ANSWERS

13 Shells



How many shells did Del find? **5**

20 Stickers

How many stickers does Ben have? **9**

Baxter's Birthday



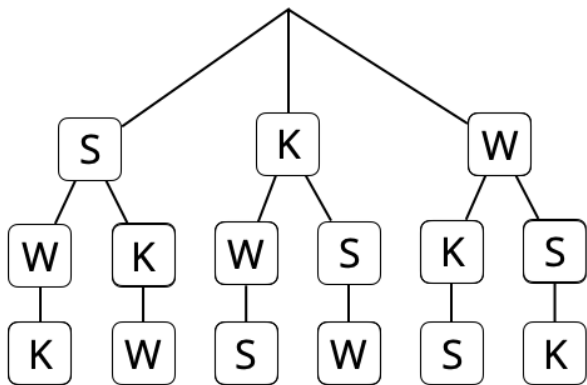
How many guests were invited to come? **15**

Lucy's Secret

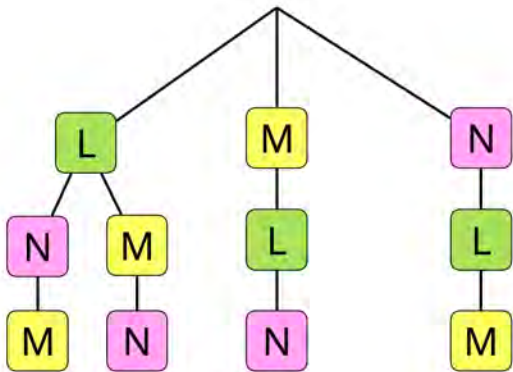


How many people know the secret now? **22**

Fruit Skewers - Fill in the blank spaces



Racing



How many outcomes can there be? **4**

1) Task Card 1

Safiya has 3 birthday invitations to open.

One invitation is in a green envelope, one in a purple envelope and one in a blue envelope.

She is going to open them one by one.

How many different ways can she open her envelopes?



Copyright © 2026 Australasian Problem Solving Mathematical Olympiads (APSMO) Inc. and Mathematical Olympiads for Elementary and Middle Schools. All rights reserved.



2) Task Card 2

Karina is baking a birthday cake.

The cake is a square shape.

Karina will put 1 candle in each corner of the cake, then 5 more on each side.

How many candles will Karina need?



Copyright © 2026 Australasian Problem Solving Mathematical Olympiads (APSMO) Inc. and Mathematical Olympiads for Elementary and Middle Schools. All rights reserved.



3) Task Card 3

Juan and Enya are going to see a movie together.

Juan invites 4 friends to come along.

Enya invites twice as many friends to come along as Juan did.

Everyone who was invited came along.

How many children went to see the movie together?



Copyright © 2026 Australasian Problem Solving Mathematical Olympiads (APSMO) Inc. and Mathematical Olympiads for Elementary and Middle Schools. All rights reserved.

4) Task Card 4

Omer is climbing up the steps to the library

On the 3rd step, he drops a book.

Omer climbs up 4 more steps before he sees that he has dropped a book.

He goes back for the book, then climbs 8 steps to the top and goes inside.

How many steps are there on the staircase up to the library?



Copyright © 2026 Australasian Problem Solving Mathematical Olympiads (APSMO) Inc. and Mathematical Olympiads for Elementary and Middle Schools. All rights reserved.

5) Task Card 5

There are 6 fence posts in a row on a farm.

Between each fence post there are 3 ducks and 1 sheep.

Altogether, how many legs are between the 6 fence posts?



Copyright © 2026 Australasian Problem Solving Mathematical Olympiads (APSMO) Inc. and Mathematical Olympiads for Elementary and Middle Schools. All rights reserved.

6) Task Card 6

Yasin is spending the day with his cousin.

They want to visit the skate park, the movies, a cafe and see their Grandma .

If their final stop is the cafe, how many different ways can they visit the other locations?



Copyright © 2026 Australasian Problem Solving Mathematical Olympiads (APSMO) Inc. and Mathematical Olympiads for Elementary and Middle Schools. All rights reserved.

7) Task Card 7

Together, Malik and Miranda spent \$22 at a funfair.

Miranda spent \$6 more than Malik.

How much money did Malik spend?



Copyright © 2026 Australasian Problem Solving Mathematical Olympiads (APSMO) Inc. and Mathematical Olympiads for Elementary and Middle Schools. All rights reserved.

8) Task Card 8

Jaydon told 3 friends and his sister a secret.

Each of his friends told 4 other people the secret.

His sister told the secret to some of her friends as well.

If 22 people now know the secret, how many people did Jaydon's sister tell the secret to?



SECRET

Copyright © 2026 Australasian Problem Solving Mathematical Olympiads (APSMO) Inc. and Mathematical Olympiads for Elementary and Middle Schools. All rights reserved.

9) Task Card 9



Mazie is exploring a museum.

She starts on level 2 and goes up 5 levels to see the dinosaur exhibit.

She then goes down 4 levels to visit the art gallery.

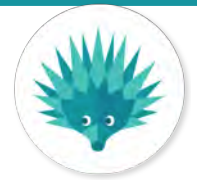
Mazie wants to go to level 9 next.

How many levels away is she?



Copyright © 2026 Australasian Problem Solving Mathematical Olympiads (APSMO) Inc. and Mathematical Olympiads for Elementary and Middle Schools. All rights reserved.

10) Task Card 10



Todd, Kiera and Cohen shared 23 marbles.

Cohen had 3 more marbles than Kiera.

Todd had 5 more marbles than Cohen.

How many marbles does Cohen have?



Copyright © 2026 Australasian Problem Solving Mathematical Olympiads (APSMO) Inc. and Mathematical Olympiads for Elementary and Middle Schools. All rights reserved.

1) Task Card 1



Safiya has 3 birthday invitations to open.

One invitation is in a green envelope, one in a purple envelope and one in a blue envelope.

She is going to open them one by one.

How many different ways can she open her envelopes?



Hint: How many different ways are possible if Safiya opens the blue envelope first?

Copyright © 2026 Australasian Problem Solving Mathematical Olympiads (APSMO) Inc. and Mathematical Olympiads for Elementary and Middle Schools. All rights reserved.

2) Task Card 2

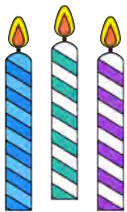


Karina is baking a birthday cake.

The cake is a square shape.

Karina will put 1 candle in each corner of the cake, then 5 more on each side.

How many candles will Karina need?



Hint: Draw the cake.

Copyright © 2026 Australasian Problem Solving Mathematical Olympiads (APSMO) Inc. and Mathematical Olympiads for Elementary and Middle Schools. All rights reserved.

3) Task Card 3



Juan and Enya are going to see a movie together.

Juan invites 4 friends to come along.

Enya invites twice as many friends to come along as Juan did.

Everyone who was invited came along.

How many children went to see the movie together?



Hint: Don't forget Juan and Enya

Copyright © 2026 Australasian Problem Solving Mathematical Olympiads (APSMO) Inc. and Mathematical Olympiads for Elementary and Middle Schools. All rights reserved.

4) Task Card 4

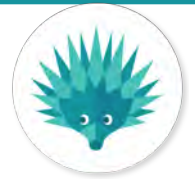
Omer is climbing up the steps to the library

On the 3rd step, he drops a book.

Omer climbs up 4 more steps before he sees that he has dropped a book.

He goes back for the book, then climbs 8 steps to the top and goes inside.

How many steps are there on the staircase up to the library?



Hint: Draw the steps.

Copyright © 2026 Australasian Problem Solving Mathematical Olympiads (APSMO) Inc. and Mathematical Olympiads for Elementary and Middle Schools. All rights reserved.

5) Task Card 5

There are 6 fence posts in a row on a farm.

Between each fence post there are 3 ducks and 1 sheep.

Altogether, how many legs are between the 6 fence posts?



Hint: Draw the fence posts.

Copyright © 2026 Australasian Problem Solving Mathematical Olympiads (APSMO) Inc. and Mathematical Olympiads for Elementary and Middle Schools. All rights reserved.

6) Task Card 6

Yasin is spending the day with his cousin.

They want to visit the the skate park, the movies, a cafe and see their Grandma .

If their final stop is the cafe, how many different ways can they visit the other locations?



Hint: Draw a tree diagram.

Copyright © 2026 Australasian Problem Solving Mathematical Olympiads (APSMO) Inc. and Mathematical Olympiads for Elementary and Middle Schools. All rights reserved.

7) Task Card 7

Together, Malik and Miranda spent \$22 at a funfair.

Miranda spent \$6 more than Malik.

How much money did Malik spend?



Hint: How much money is left if Miranda is given \$6 more?

Copyright © 2026 Australasian Problem Solving Mathematical Olympiads (APSMO) Inc. and Mathematical Olympiads for Elementary and Middle Schools. All rights reserved.

8) Task Card 8

Jaydon told 3 friends and his sister a secret.

Each of his friends told 4 other people the secret.

His sister told the secret to some of her friends as well.

If 22 people now know the secret, how many people did Jaydon's sister tell the secret to?



SECRET

Hint: Don't forget to include Jaydon.

Copyright © 2026 Australasian Problem Solving Mathematical Olympiads (APSMO) Inc. and Mathematical Olympiads for Elementary and Middle Schools. All rights reserved.

9) Task Card 9

Mazie is exploring a museum.

She starts on level 2 and goes up 5 levels to level 7 to see the dinosaur exhibit.

She then goes down 4 levels to visit the art gallery.

Mazie wants to go to level 9 next.

How many levels away is she?



Hint: What level is the art gallery on?

Copyright © 2026 Australasian Problem Solving Mathematical Olympiads (APSMO) Inc. and Mathematical Olympiads for Elementary and Middle Schools. All rights reserved.

10) Task Card 10

Todd, Kiera and Cohen shared 23 marbles.

Cohen had 3 more marbles than Kiera.

Todd had 5 more marbles than Cohen.

How many marbles does Cohen have?



Hint: Use counters to model the problem.

Copyright © 2026 Australasian Problem Solving Mathematical Olympiads (APSMO) Inc. and Mathematical Olympiads for Elementary and Middle Schools. All rights reserved.

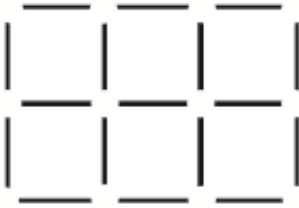


Task Card Answers

- 1) There are **6** ways: GPB, GBP, BGP, BPG, PGB AND PBG
- 2) **24** candles.
- 3) **14** children went to see the movie together.
- 4) **11** steps.
- 5) **50 legs**: 20 sheep legs and 30 duck legs.
- 6) There are **6** ways: GSMC, GMSC, MGSC, MSGC, SGMC AND SMGC.
- 7) **\$8** Miranda spent \$6 more, leaving \$16 to divide equally between the 2 children. This gives Malik \$8.
- 8) **5**: Jaydon, sister and 3 friends (5) + 12 friends of friends = 17. His sister must have told 5 people to get a total of 22 people knowing the secret.
- 9) **6** levels away.
- 10) **7**: Todd has 12 marbles, Kiera has 4 marbles and **Cohen has 7 marbles**. $12 + 4 + 7 = 23$

Challenge #1

In this diagram, 17 toothpicks are used to form a 2-square by 3-square rectangle.
How many toothpicks would be needed to form a 6-square by 8-square rectangle?

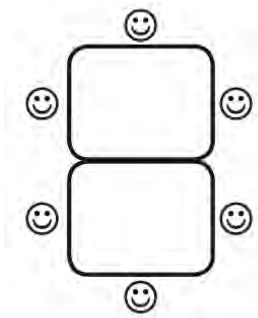


Copyright © 2026 Australasian Problem Solving Mathematical Olympiads (APSMO) Inc. and Mathematical Olympiads for Elementary and Middle Schools. All rights reserved.



Challenge #2

4 people can be seated at a single card table.
If two tables are placed end to end, 6 people can be seated as shown in the diagram.
How many tables must be placed end to end to seat 22 people?



Copyright © 2026 Australasian Problem Solving Mathematical Olympiads (APSMO) Inc. and Mathematical Olympiads for Elementary and Middle Schools. All rights reserved.



Challenge #3

The floor of a rectangular room is completely covered with square tiles.
The room is 9 tiles long and 5 tiles wide.
Find the number of tiles that touch the walls or door of the room.

Copyright © 2026 Australasian Problem Solving Mathematical Olympiads (APSMO) Inc. and Mathematical Olympiads for Elementary and Middle Schools. All rights reserved.

Challenge #4



A red counter is worth 25 cents and a blue counter is worth 5 cents.

Emma has 4 more red counters than blue counters.

The total value of her counters is \$3.10.

How many blue counters does Emma have?

Copyright © 2026 Australasian Problem Solving Mathematical Olympiads (APSMO) Inc. and Mathematical Olympiads for Elementary and Middle Schools. All rights reserved.

Challenge #5



On a standard circular 12-hour clock, the numerals 12 and 6 are opposite each other.

On the planet Bajor, they use a circular ten-hour clock with the numerals 1 to 10 equally spaced.

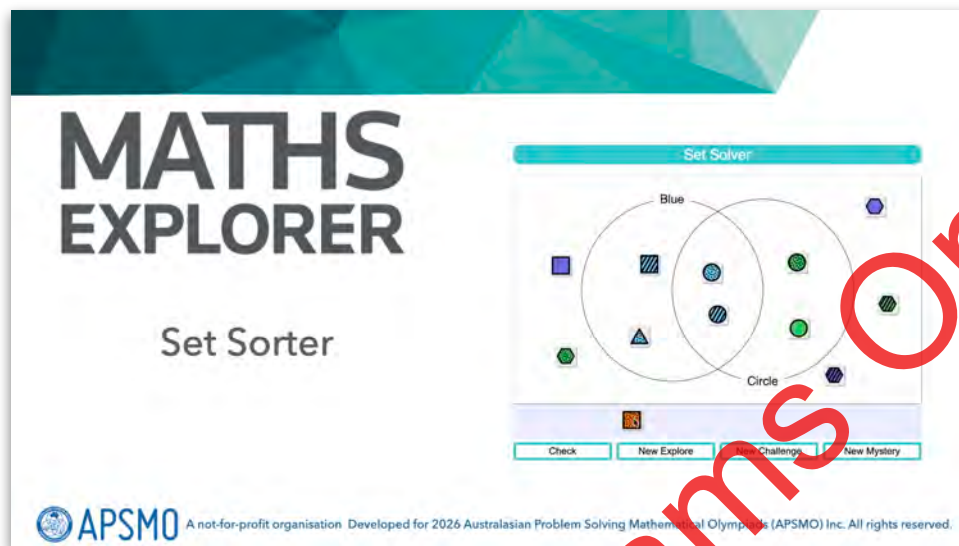
What pair of opposite numerals on a Bajorian clock has a sum of 11?

Copyright © 2026 Australasian Problem Solving Mathematical Olympiads (APSMO) Inc. and Mathematical Olympiads for Elementary and Middle Schools. All rights reserved.



Step 3: Digital Activity

The video guide for this activity is available in the APSMO portal, or you may click the image below.



Scan to Launch Set Solver

QR Code Available to Registered Teams Only

Solutions:

Challenge #1

110 toothpicks

In each row there is one more vertical toothpick than there are squares. This means a row that has 8 squares across would have 9 vertical toothpicks. Since the rectangle has 6 rows, there is a total of $6 \times 9 = 54$ vertical toothpicks. Each column has one more horizontal toothpick than there are squares. This means a column that has 6 squares down has 7 horizontal toothpicks. Since the rectangle has 8 columns, there is a total of $8 \times 7 = 56$ horizontal toothpicks.

$54 + 56 = \mathbf{110 \text{ toothpicks}}$ are needed to form the 6-square by 8-square rectangle.

Challenge #2

10 tables

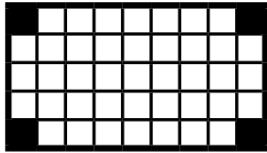
Remove the 2 people from the end seats. The remaining 20 people will be seated 2 to a table. This will require 10 tables. Reseating the 2 people in the end seats does not require any additional tables. Then 10 tables placed end to end will seat 22 people.

Challenge #3

24 tiles

Draw a diagram, and count the tiles that touch the edges.

24 tiles touch the walls.



Challenge #4

7 blue counters

After the blue counters are paired with red counters, there are 4 red counters left over, worth a total of \$1.00.

The paired counters are worth $\$3.10 - \$1.00 = \$2.10$.

Each pair is worth $\$0.05 + \$0.25 = \$0.30$.

The number of pairs is $210 \div 30 = 7$, so Emma has 7 blue counters.

Challenge #5

3 and 8

Draw the clock and construct a table



Number	1	2	3	4	5
Opposite	6	7	8	9	10
Sum	7	9	11	13	15

3 and 8 have a sum of 11.



Exploring

1.1) Lanterns

Samara is decorating her backyard fence with lanterns.

The backyard is a square space.

Samara will put a lantern in each corner and then place 6 lanterns along each side of the fence.

How many lanterns will she put up?



1.2) Up and Down

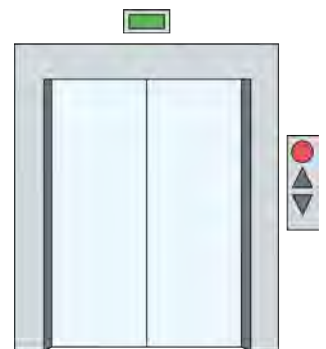
Nikhil is visiting a hotel.

He went down the lift to Level 2 to have breakfast at the buffet.

Then he went up 6 levels to brush his teeth in his hotel room.

Nikhil then went down 4 levels to the hotel gym.

Which level is he on now?



1.3) Row of Chairs

Elin is setting up chairs in the school hall.

Each chair is 50cm wide.

Between each chair, Elin will leave a 20cm space.

Elin makes a row of 4 chairs, leaving space in between each chair.

How many centimetres long is the row of chairs?





Extension

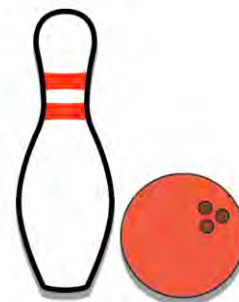
1.4) Bowling Invitation

Trey invited his sister and 6 friends to Strike Zone Bowling.

His sister invited her best friend to come as well.

Trey's friends each invited 2 more friends to come along.

How many people were invited to come to Strike Zone Bowling?



1.5) Keychain

Alistair is making a keychain for his mum.

He has 2 orange beads, 1 blue bead and 1 green bead.

How many different ways can he arrange the beads on the keychain so that the orange beads don't touch?





Solution 1.1: Lanterns

The question is:

Samara is decorating her backyard fence with lanterns.

The backyard is a square space.

Samara will put a lantern in each corner and then place 6 lanterns along each side of the fence.

How many lanterns will she put up?



Strategy: Draw a Diagram

We can draw a diagram and include the elements of this problem to find the solution.

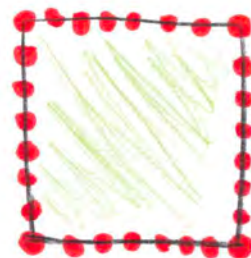
We start by drawing the square backyard:



Then we add a lantern in each corner:



Finally, we add 6 lanterns on each side.



Now we can count the lanterns.

Altogether, there are **28 lanterns**.

Strategy: Use a Table

We need to find out how many lanterns have been placed in the corners of the fence and how many have been placed along the sides of the fence.

We can use a table to find each total, then combine them to find the total number of lanterns hung on the fence.

	Lanterns
Fence Corners:	4
Fence Sides:	$4 \times 6 = 24$
Total:	$4 + 24 = \mathbf{28}$

There are 4 lanterns in the corners.

There are 24 lanterns on the sides.

Altogether, there are **28 lanterns**.



Solution 1.2: Up and Down

The question is:

Nikhil is visiting a hotel.

He went down the lift to Level 2 to have breakfast at the buffet.

Then he went up 6 levels to brush his teeth in his hotel room.

Nikhil then went down 4 levels to the hotel gym.

Which level is he on now?



Strategy: Use a Number Line

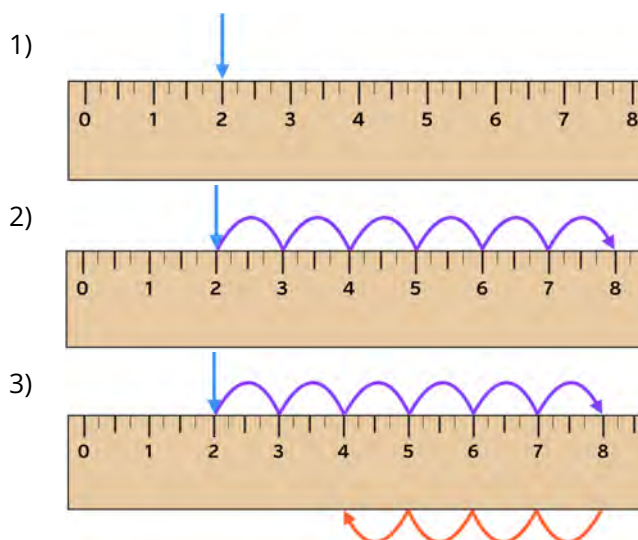
We can use a number line to track Nikhil's movement up and down in the hotel.

First, Nikhil went to Level 2 for breakfast.

Then he went up 6 levels to brush his teeth in his hotel room. This took him to Level 8.

Finally, Nikhil went down 4 levels to the hotel gym.

We can see on our number line that Nikhil is now on **Level 4**.



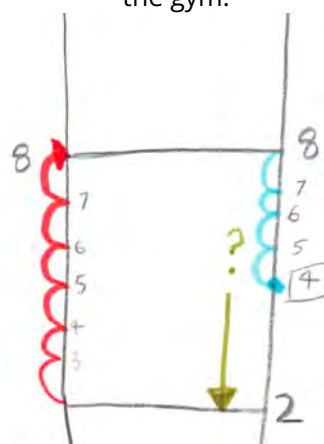
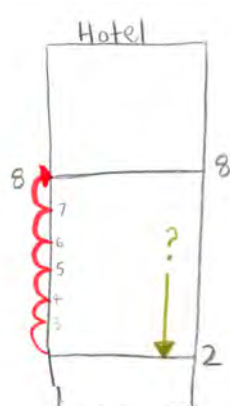
Strategy: Draw a Diagram

We can draw a diagram to show Nikhil's movement up and down in the hotel.

Nikhil went down to Level 2.

He went up 6 levels.
This took him to Level 8.

Nikhil went down 4 levels to
the gym.



The diagram shows that Nikhil is now on **Level 4**.



Solution 1.3: Row of Chairs

The question is:

Elin is setting up chairs in the school hall.

Each chair is 50cm wide.

Between each chair, Elin will leave a 20cm space.

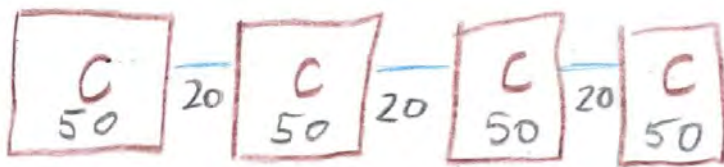
Elin makes a row of 4 chairs, leaving space in between each chair.

How many centimetres long is the row of chairs?



Strategy: Draw a Diagram

We can draw a diagram of the chairs and the spaces between them:



Let's find how long the 4 chairs are: $50\text{cm} + 50\text{cm} + 50\text{cm} + 50\text{cm} = \mathbf{200\text{cm}}$.

Now let's find out how long the 3 spaces are: $20\text{cm} + 20\text{cm} + 20\text{cm} = \mathbf{60\text{cm}}$.

The total length of the row is $200\text{cm} + 60\text{cm} = \mathbf{260\text{cm}}$.

Strategy: Use Concrete Materials

Let's use coloured counters to model the problem.

We can use **green** counters for the 50cm wide chairs, and **purple** counters for the 20cm space between them.

Start by placing the **green** counters for the chairs in a row - 4 counters altogether.



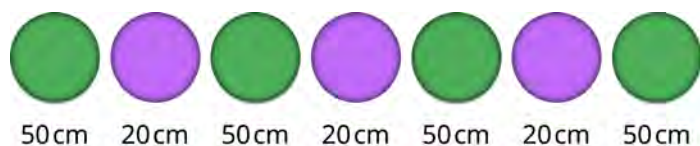
Now put a **purple** counter between each **green** counter.

The purple counters model the distance between each chair.



There are seven counters in our completed row.

We can add them as shown:

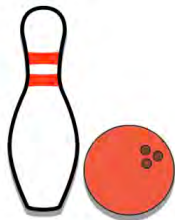


$50\text{cm} + 20\text{cm} + 50\text{cm} + 20\text{cm} + 50\text{cm} + 20\text{cm} + 50\text{cm} = \mathbf{260\text{cm}}$.



Solution 1.4: Bowling Invitation

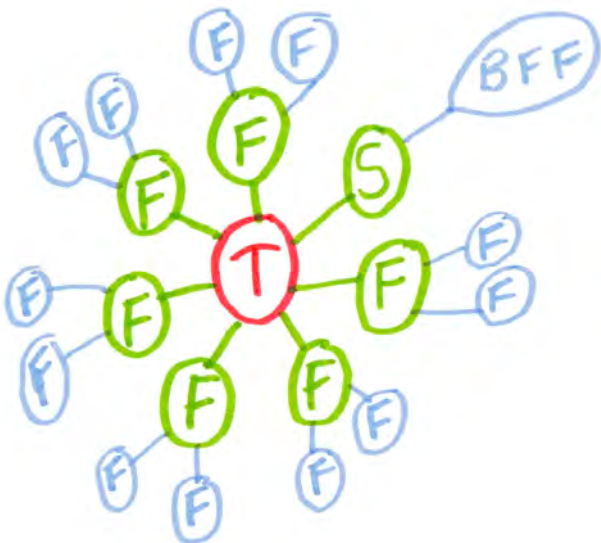
The question is:
Trey invited his sister and 6 friends to Strike Zone Bowling.
His sister invited her best friend to come as well.
Trey's friends each invited 2 more friends to come along.
How many people were invited to come to Strike Zone Bowling?



Strategy: Draw a Diagram

We can draw a diagram to track and record the number of children invited to Strike Zone Bowling.

Trey invited his **sister** and **6 friends**.
These people and invites are shown in **green**.
Trey's **sister** invited her best friend.
Trey's **6 friends** each invited **2** more friends.
These people and invites are shown in **purple**.
Trey invited his sister and 6 friends: **7 people**.
His sister invited her best friend: **1 person**.
Trey's 6 friends each invited 2 more friends: **12 people**.
 $7 + 1 + 12 = 20$ **people** invited to Strike Zone Bowling.



Strategy: Build a Table

We can build a table to list and count the number of children invited to Strike Zone Bowling.

Step 1 is to list the people that Trey invited directly: his **sister** and **6 friends**.

Trey invited **7** people to Strike Zone Bowling.

His **sister** invited 1 person and his **6 friends** invited **2** more friends each.

Together, Trey's sister and friends invited $1 + 12 = 12$ people to Strike Zone Bowling.

Altogether, $7 + 13 = 20$ **people** were invited to Strike Zone Bowling.

Step 1: Trey invited:							Tally
Sister	Friend	Friend	Friend	Friend	Friend	Friend	7
Step 2: His sister and friends invited:							
Best Friend	Friend	Friend	Friend	Friend	Friend	Friend	13
Total:							20



Solution 1.5: Keychain

The question is:

Alistair is making a keychain for his mum.

He has 2 orange beads, 1 blue bead and 1 green bead.

How many different ways can he arrange the beads on the keychain so that the orange beads don't touch?



Strategy: Draw a Diagram

There are 4 elements in this problem: 2 orange beads, 1 blue bead and 1 green bead.

We draw a diagram to find all the different sequences we can make that start with an **orange** bead, a **blue** bead and a **green** bead, taking care to ensure that the orange beads don't touch.

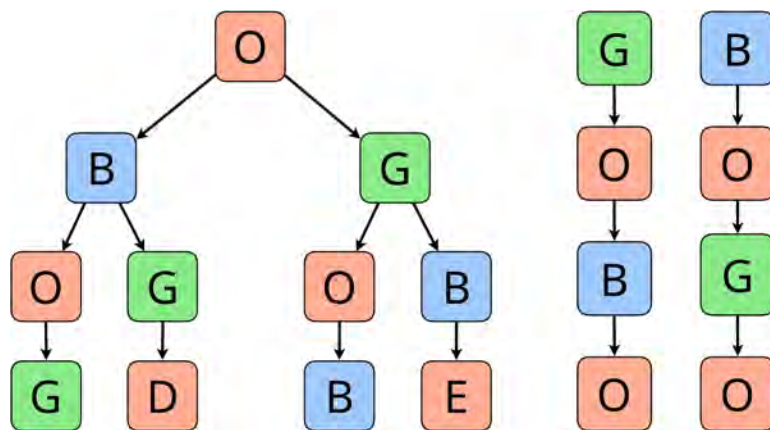


Altogether, there are **6** different ways that Alistair can sequence the beads on his keyring so that the orange beads don't touch.

Strategy: Draw a Tree Diagram

We can use a tree diagram to organise the beads and find how many sequences are possible.

One tree diagram can start with an **orange** bead, one with a **blue** bead and finally one with a **green** bead.



If an **orange** bead is followed by a **blue** bead, the third bead can be either **orange** or **green**.

The fourth bead will be the remaining colour.

If an **orange** bead is followed by a **green** bead, the third bead can be either **orange** or **blue**.

The fourth bead will be the remaining colour.

A **green** bead **must** be followed by an **orange** bead, so that the third bead is **blue**, separating the 2 **orange** beads.

Similarly, a **blue** bead **must** be followed by an **orange** bead, so that the third bead is **green**, separating the 2 **orange** beads.

Altogether, there are **6** different ways that Alistair can sequence the beads on his keyring.