

You Need

- Thirty-one [31] objects of Colour A and twenty [20] objects of Colour B to represent sections of the snake

The Story

Mungo the Maths Snake has a skin made of sections in two colours. When she is born her body is just one Colour A section. Each season she sheds her skin and grows longer. When she sheds, each Colour A section in her old skin is replaced by ABA in her new skin. Each Colour B section stays as B.



Your Task

1. Make and draw Mungo at birth (Season 0) and Seasons 1, 2, 3 & 4.

Record the number of each colour for each season.

2. Predict the number of each colour after ten [10] seasons.

Can you check your answer another way?

Challenge

Invent your own skin changing rule for Mungo and explore its patterns.

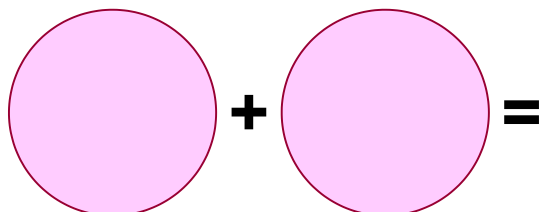
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You Need

- Nineteen [19] discs numbered from 0 to 16 and one extra of 5 & 6

Your Task

- How many pairs of discs can you find that add to eleven [11]?



How do you know when you have found them all?

Record the pairs in your journal and count how many there are.

Challenge 1

- What happens if the numbers must add to twelve [12]?

How many pairs are there?

How do you know when you have found them all?

- What happens if the numbers must add to thirteen [13]?

How many pairs are there?

How do you know when you have found them all?

- Suppose you have all the discs you need.

What happens if the numbers must add to ninety-nine [99]?

How many pairs are there? How do you know?

Challenge 2

If I tell you any total, can you tell me how many pairs there will be?

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You Need

- Seven [7] counters: one side is numbered 8, 9, 10, 11, 13, 14, 15
one side is numbered 0, 1, 2, 3, 4, 5, 7

Your Task

- Place the start and finish counters:

11						8
----	--	--	--	--	--	---

Place all the other counters to make a pattern.

If the pattern kept going to the *right*, what would the next number be?

If the pattern kept going to the *left*, what would the next number be?

- Place the start and finish counters:

1						7
---	--	--	--	--	--	---

Place all the other counters to make a pattern.

If the pattern kept going to the *right*, what would the next number be?

If the pattern kept going to the *left*, what would the next number be?

Challenge

Make up a similar pattern of your own.

- Predict the 5th number to the right or left.
- Predict the 10th number to the right or left.
- If I tell you any number to the right or left, can you tell me what it is?

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THE FROG POND

You Need

- Two [2] 'ponds' and about twenty [20] 'frogs'
- One [1] dice labelled 1 IN, 2 IN, 3 IN, 1 OUT, 2 OUT, 3 OUT

This is a game for 2 players.

Your Task

1. Players put five [5] frogs in their pond to start.

2. The dice tells you to put frogs IN the pond, or take frogs OUT of the pond.

Take turns to roll the dice.

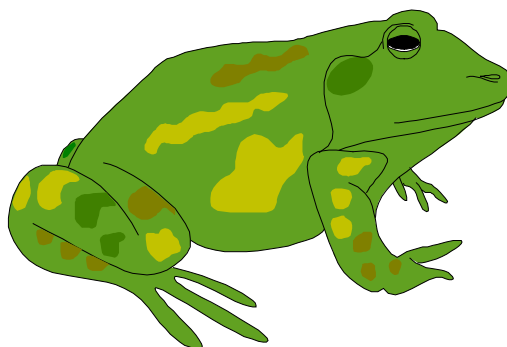
Here are some examples:

- If you roll 3 IN you ADD three frogs to the pond.
- If you roll 2 OUT you TAKE AWAY two frogs from the pond.

3. The winner is the first player with an empty pond.

4. Play some games. Record the number of turns to empty the pond.

5. What happens if you change the starting number of frogs?



Challenge

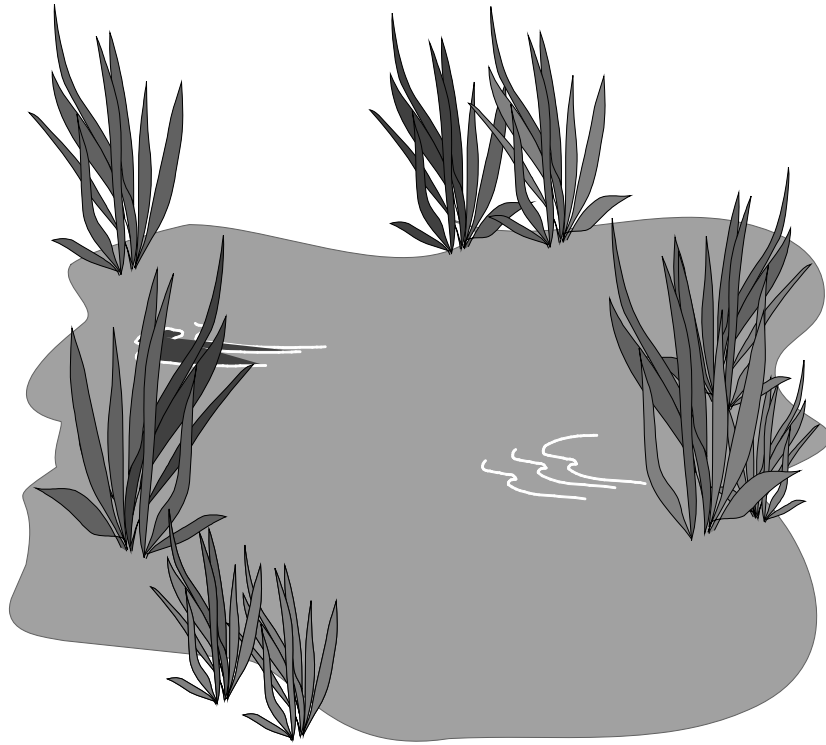
Pretend you are making this game to sell. You have to choose a starting number of frogs so the game is not too short and not too long.

What will be your starting number?

How many turns do you think it will take to empty the pond?

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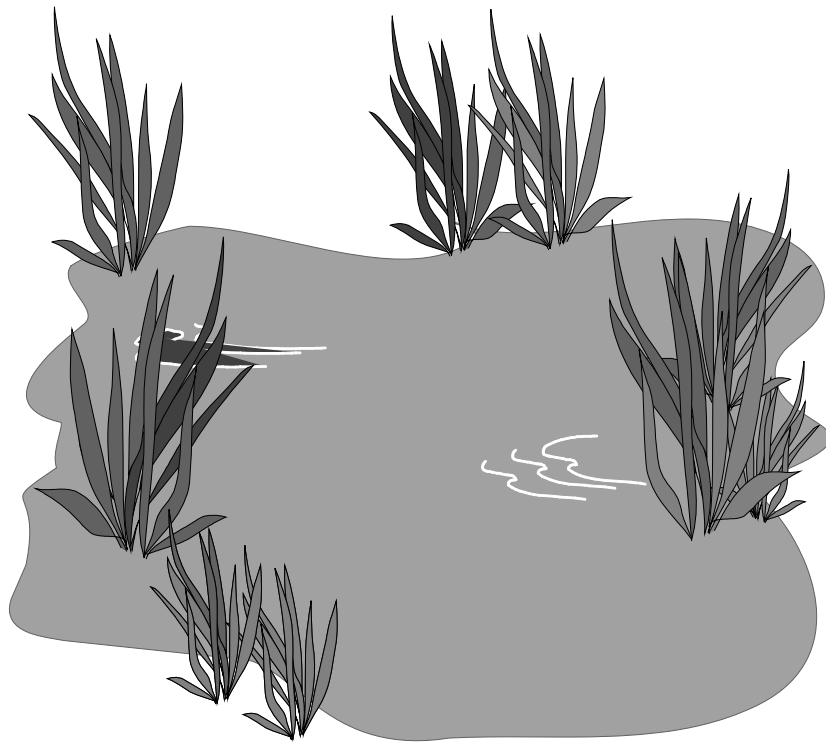
The Frog Pond



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Mathematics Task Centre

Task 13

The Frog Pond



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Mathematics Task Centre

Task 13

You Need

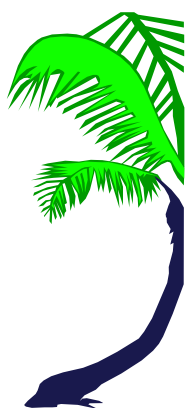
- Twenty-four [24] counters and two [2] blocks
- Playing board

The Story

Two people have to deliver a message from the Start to the Oasis. It takes nine [9] days to cross the desert. Each person can only carry enough food to last them for twelve [12] days. No food is available at the oasis, however, food may be buried on the way to the oasis so it can be eaten on the return journey.

- One block represents one person.
- One counter represents one day of food for one person.

Challenge




Your challenge is to discover how the message can be delivered. Both messengers must come back to the start without running short of food.

How many solutions can you find?

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Crossing The Desert

	<i>Desert View Caravan Park & Kiosk</i>	
Day 1	Start 	Day 1
Day 2		Day 2
Day 3		Day 3
Day 4		Day 4
Day 5		Day 5
Day 6		Day 6
Day 7		Day 7
Day 8		Day 8
Day 9	 Oasis	Day 9

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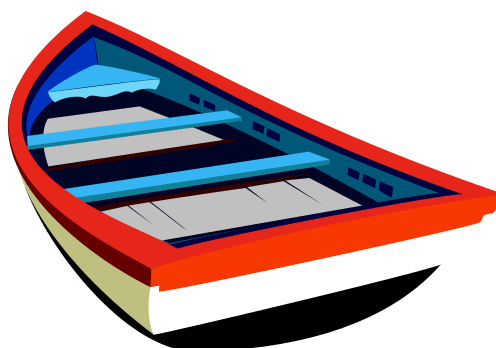
You Need

- Three [3] 'adults' and three [3] 'children'
One child looks different

The Story

This is a famous logic problem from the history of mathematics. You can find it on the web as 'Missionaries and Cannibals'.

- Three adults and three children arrive at a river.
- They find a row boat, but it can only carry two people.
- All the adults can row, but only one child can row.
- *At no time can the children outnumber the adults.*



Challenge

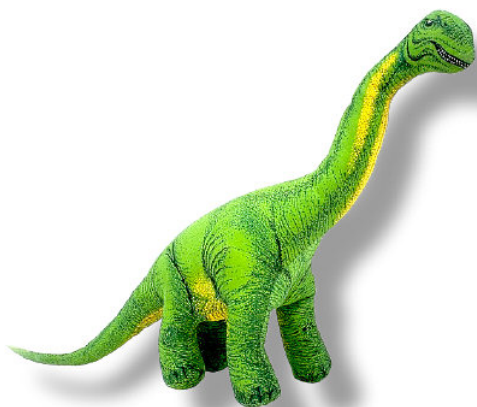
How many trips will it take for everyone to cross the river?

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You Need

- Nine [9] 'monsters' and a playing board
- One [1] 'person'

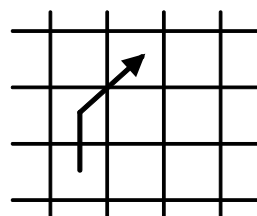
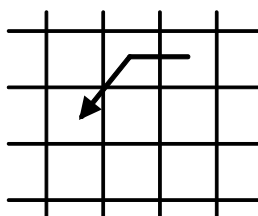
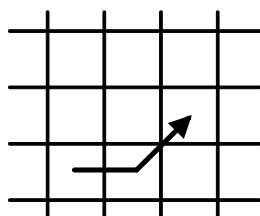
Your Task



1. Put one monster in each black dot square.

Starting anywhere on the board, move the person to catch the monsters in the least number of moves.

The person's move must only be one [1] step forward and one [1] step diagonally each time, eg:

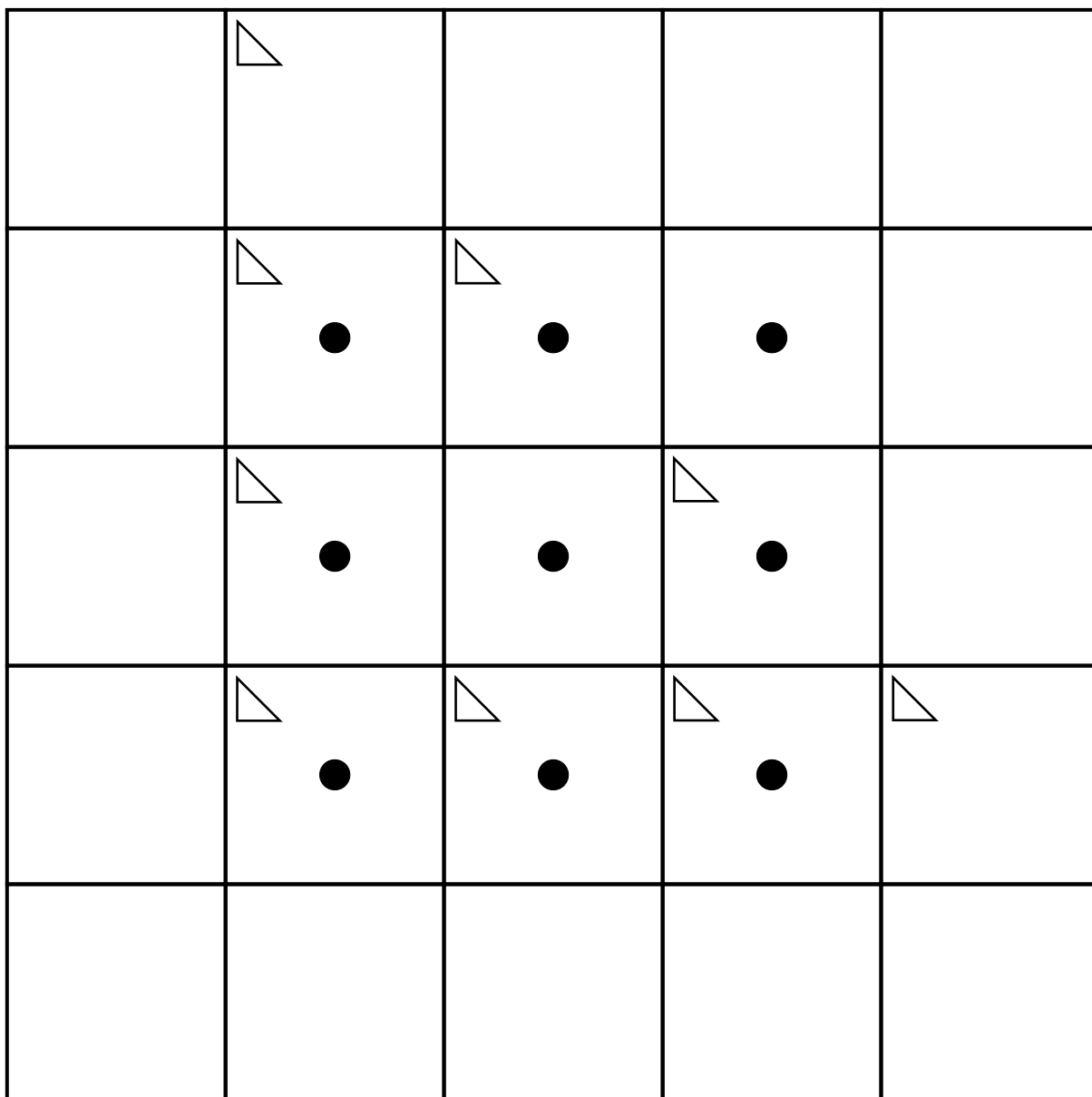


Challenge

Put one monster in each square marked with a triangle.
Now try the task again.

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Human Moves Monster



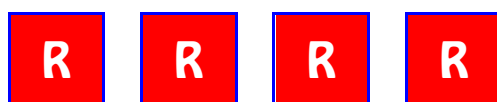
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You Need

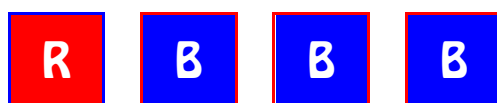
- About ten [10] tiles: blue one side ... red the other (Colours may vary)

Rules

Put four [4] reds in a row like this:



Turn over *all except one* (any one) at a time, for example:



Keep turning until you make the whole row blue.

Your Task

- What is the least number of moves to make the row blue?
- Start with three [3] reds and turn over *all except one* - that means turn over any two [2].
- Explore starting with other numbers of red. The turning rule is always the same - turn over *all except one*.

Challenge

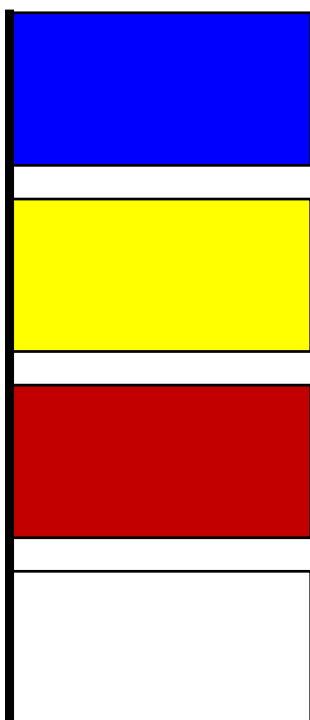
If I tell you any number of reds, can you tell me:

- if the problem can be done, and
- the number of moves?

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You Need

- Four [4] blocks in four different colours



The Story

Captains sometimes use flags to silently pass messages between ships. Flags in four colours are raised on the mast. The arrangement of the colours sends a coded message.

Your Task

1. Make all the different messages you can. (All four colours must be used.)

Challenge

How many messages are possible?

How do you know when you have found them all?

What happens if there are only three [3] flag colours? ... or only five [5]?

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You Need

- Twelve [12] 'gold nuggets' numbered:
5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17 and 40

The Story

Peter, Paul and Mary
were seeking gold -
and they found it!



- Peter found
three [3]
nuggets.
- Paul found four [4] nuggets.
- Mary found five [5] nuggets.
- The weight of Paul's four nuggets was twice the
weight of Peter's three nuggets.

The weight in grams is shown on each nugget.

Your Task

- Which nuggets did Mary find?
- Can you find another solution for Mary's nuggets?

Challenge

Find as many solutions as you can for Mary's nuggets.

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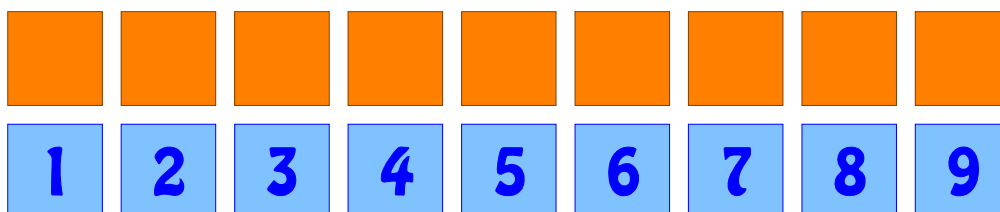
You Need

- Nine [9] plain tiles and nine tiles numbered 1 to 9
- Two [2] dice

This is a game for two players.

Rules

- Arrange your tiles like this:



- Take turns to roll the dice and add the numbers.
- Use this total to cover up *one or two* of the numbered tiles:

Example: If you roll 1 and 6 you can cover 7 (the total) and...

1 and 6, 2 and 5, 3 and 4 because these pairs total 7.



- Just 8 and 9 remain uncovered. Their sum is your score on this turn.
- Keep on playing and scoring until one person reaches 45 and wins.

Challenge

What dice total do you think is best to get? Explain in your journal.

Why do you think 45 was chosen as the winning score?

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CROSSING THE RIVER 1

You Need

- Eight [8] 'adults' and two [2] 'children'

The Story

Eight adults and two children have to cross this river.

Everyone can row their small boat but it can only carry one adult, or one child, or two children.



Challenge

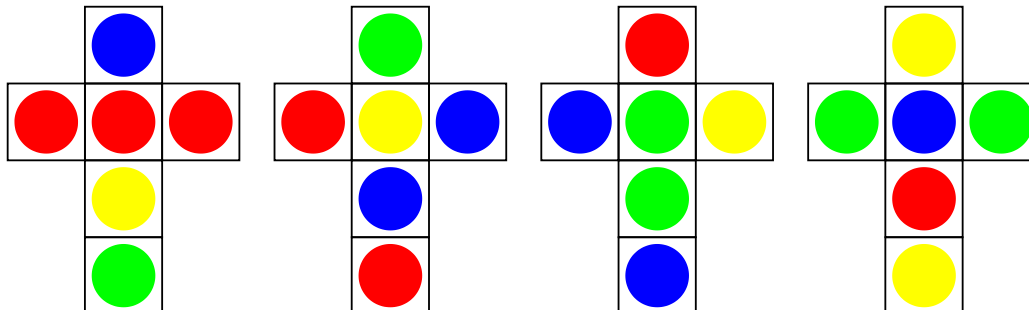
How many crossings to get everyone to the other side?

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You Need

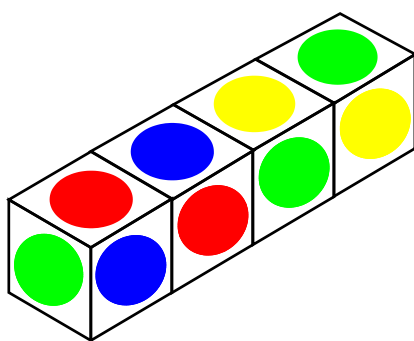
- Four [4] cubes coloured with sticky dots

Each of these nets represents one of the cubes.



Challenge

Arrange the cubes in a line so that the four different colours show on each of the four sides.



This arrangement has four different colours on two sides. However, it is not a solution. If you make it and check the other two sides you will find colours are repeated.

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You Need

- Playing board with two [2] sets of six [6] cookie frames
- One cube dice
- About seventy [70] 'chocolate chips'

The Story

When the D-Licious Cookie Company makes a batch of cookies, the chocolate chips are stirred into the mixture randomly. The company wants to guarantee customers that each cookie they sell has at least three [3] chocolate chips in it. In this task you carry out an experiment to help them work out the number of chocolate chips to put into the mixture to get a minimum of 3 in every cookie.

Your Task

1. Roll the dice.

Place one 'chocolate chip' in the 'cookie' with that number.

2. Keep rolling and adding 'chocolate chips' until every cookie has at least three 'chocolate chips'.

Record the total number of 'chocolate chips' you had to add.

3. Repeat the experiment several times and record the total each time.



Challenge

Each experiment probably produces a different total.

What advice would you give the D-Licious Cookie Company about the number of chocolate chips to add to their mixture?

Explain in your journal.

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Chocolate Chip Cookies

Cookie 1

Cookie 2

Cookie 3

Cookie 4

Cookie 5

Cookie 6

Cookie 1

Cookie 2

Cookie 3

Cookie 4

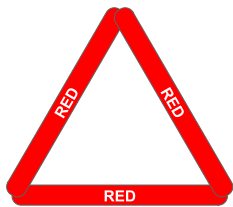
Cookie 5

Cookie 6

You Need

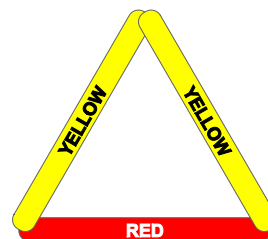
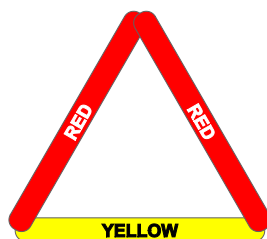
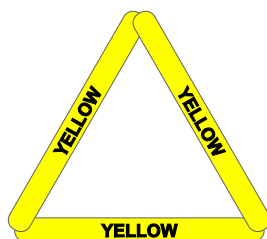
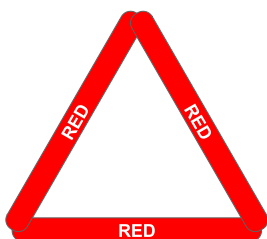
- Coloured sticks (at least fifteen [15] in each of four [4] colours)

Your Task



- With one [1] colour (eg: red) only one triangle can be made.
- Lay out all the coloured triangles that can be made with two [2] colours.

For example if you use red and yellow there are these four.



- Lay out all the coloured triangles that can be made with three [3] colours.
- Lay out all the coloured triangles that can be made with four [4] colours.

Challenge

Look for patterns in your data and predict the answer for five [5] colours.

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You Need

- One 'mouse' and one [1] dice
- Two [2] playing boards

Rules

- Place the Mouse on the start.
- Take turns to roll the dice and move the Mouse.
- This is an investigation you do together, not a game to win.
- If the number you roll is ODD, the Mouse moves in the O direction.
- If the number you roll is EVEN, the Mouse moves in the E direction.
- The game is over when the mouse eats the cheese, or the cat catches the mouse.

Your Task

1. Play ten [10] games on Board A and record the outcome each time.

- Mouse eats the cheese?
- Cat catches the mouse?



2. What does your data suggest about which event has the greater chance of happening?

Challenge

Imagine playing 64 games.

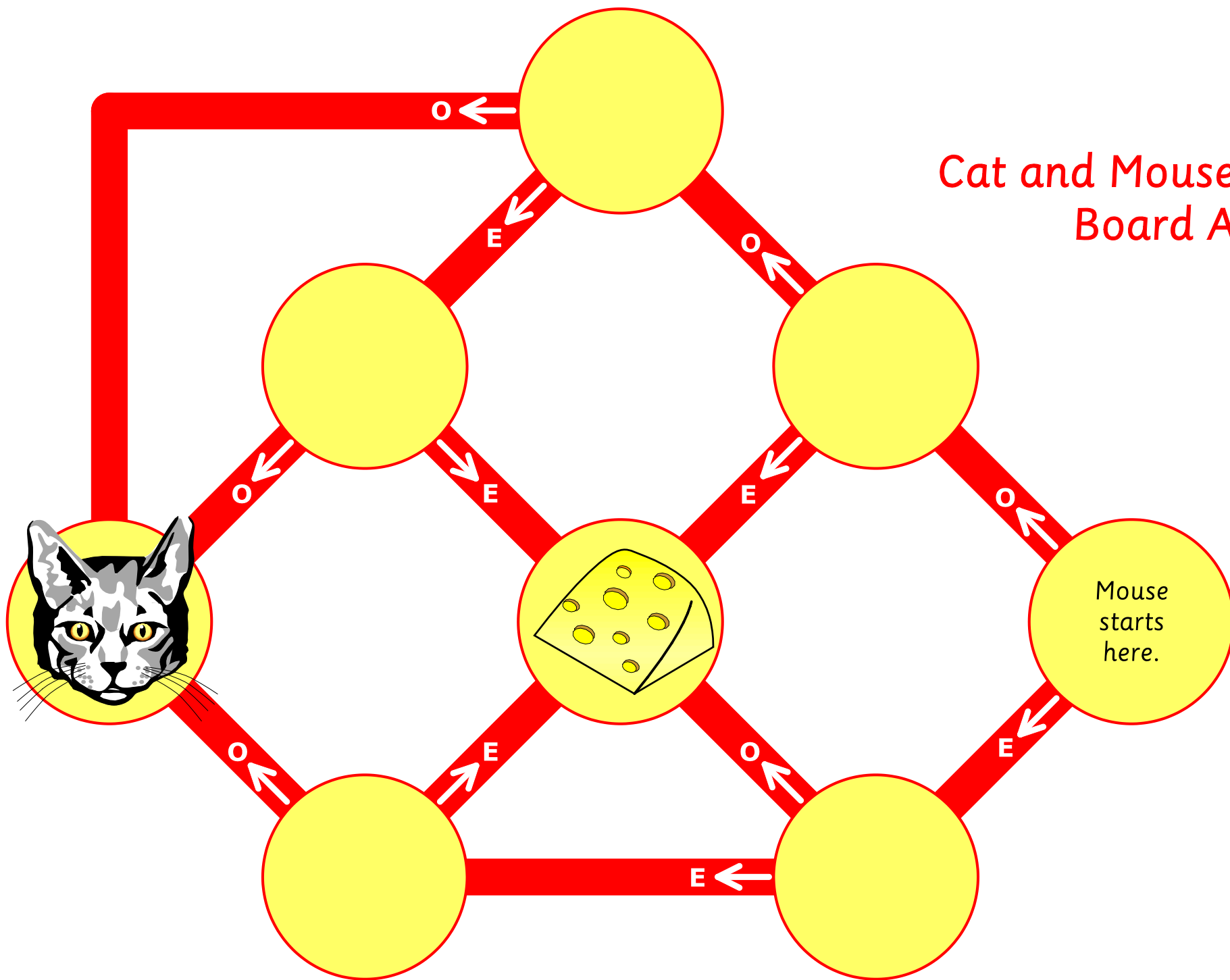
How many times would you expect to go down each path?

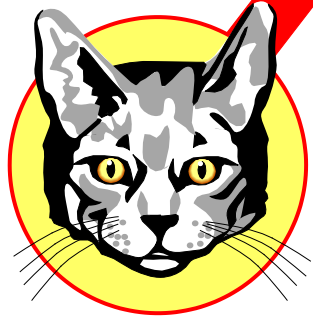
Repeat 1 & 2 for Board B.

Design your own Cat and Mouse board. Repeat 1 & 2.

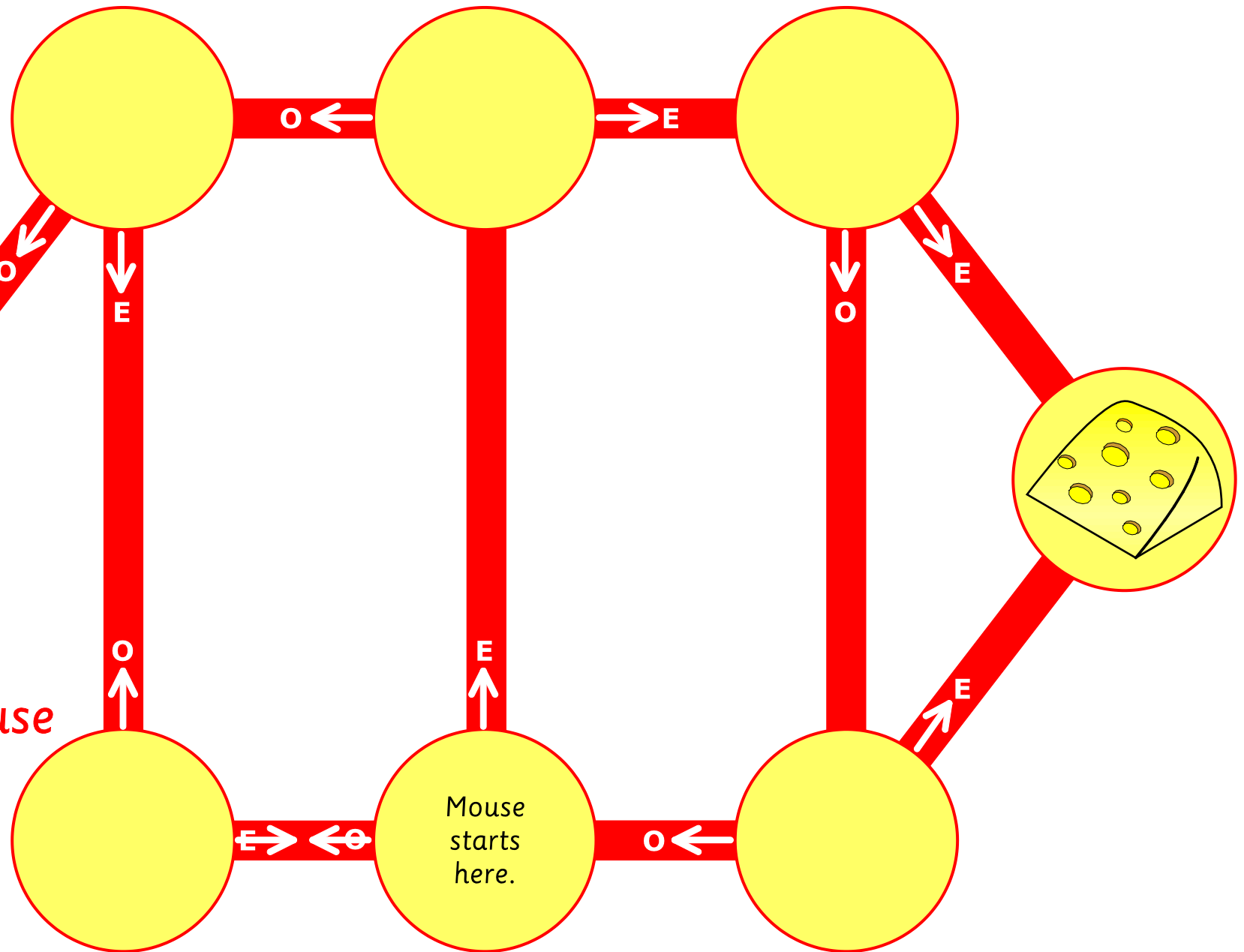
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Cat and Mouse Board A





Cat and Mouse Board B



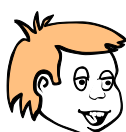
You Need

- Six [6] face cards and six [6] name cards

The Story

A teacher wanted to learn the names of students in one of his groups. He made name tags to put in front of each person. Unfortunately, the helper who handed out the cards decided to play a trick, shuffled them, and gave any card to any student without looking.

Your Task



1. Suppose there were four [4] students in the group.

How many correct matches would you expect?

Design an experiment that will test your prediction.



2. Suppose there were three [3] students in the group.

How many correct matches would you expect?

Design an experiment that will test your prediction.



3. Suppose there were five [5] students in the group.

How many correct matches would you expect?

Design an experiment that will test your prediction.



Challenge

If I tell you *any number* of students in the group can you tell me the number of correct matches to expect.?

Try to explain in your journal.

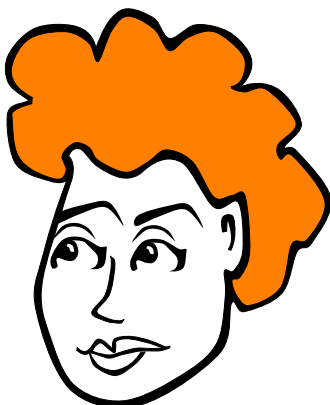


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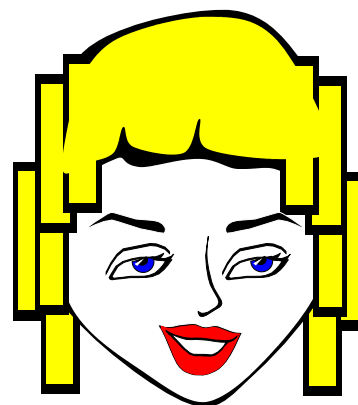
MATCHING FACES



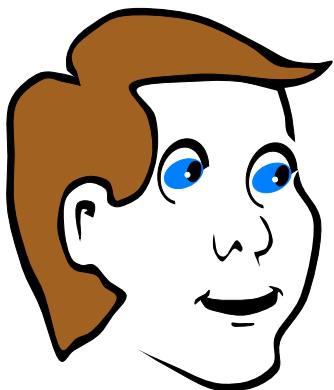
Cassie



Nancy



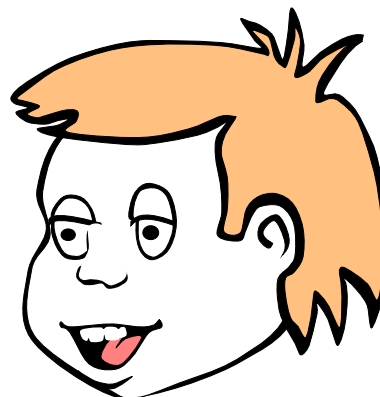
Helga



Mario



Edward



Campbell

EDWARD

CAMPBELL

MARIO

CASSIE

NANCY

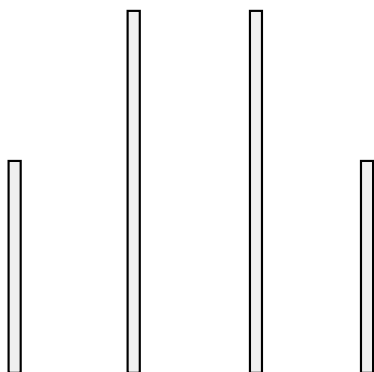
HELGA

To prepare the task cut out the face cards and the name cards.

You Need

- Four [4] dice - two [2] for each player
- One [1] footy oval, marker and wiping cloth

The Story



Through the middle = 1 Goal
Collect 6 Points for your team.

Through the right or left side = 1 Behind
Score 1 Point for your team.

In Aussie Rules football you score by kicking the ball between posts like these. The game is played in four quarters.

Your Task

1. Roll your first dice to know your goals for the *1st quarter*.

Roll your second dice to know your behinds for the *1st quarter*.

2. Enter your 1st quarter score and calculate your points.
3. Play all four quarters and record the final score for this first game.
4. Play five [5] games with your partner.
Record ten [10] total scores altogether.
5. Work out the average of the 10 scores (av. goals, av. behinds, av. points).

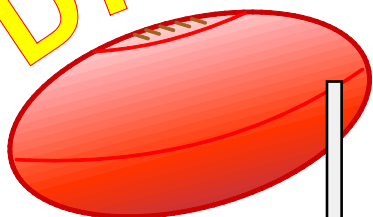
Challenge

Explain how you might have *predicted* this average before you started.

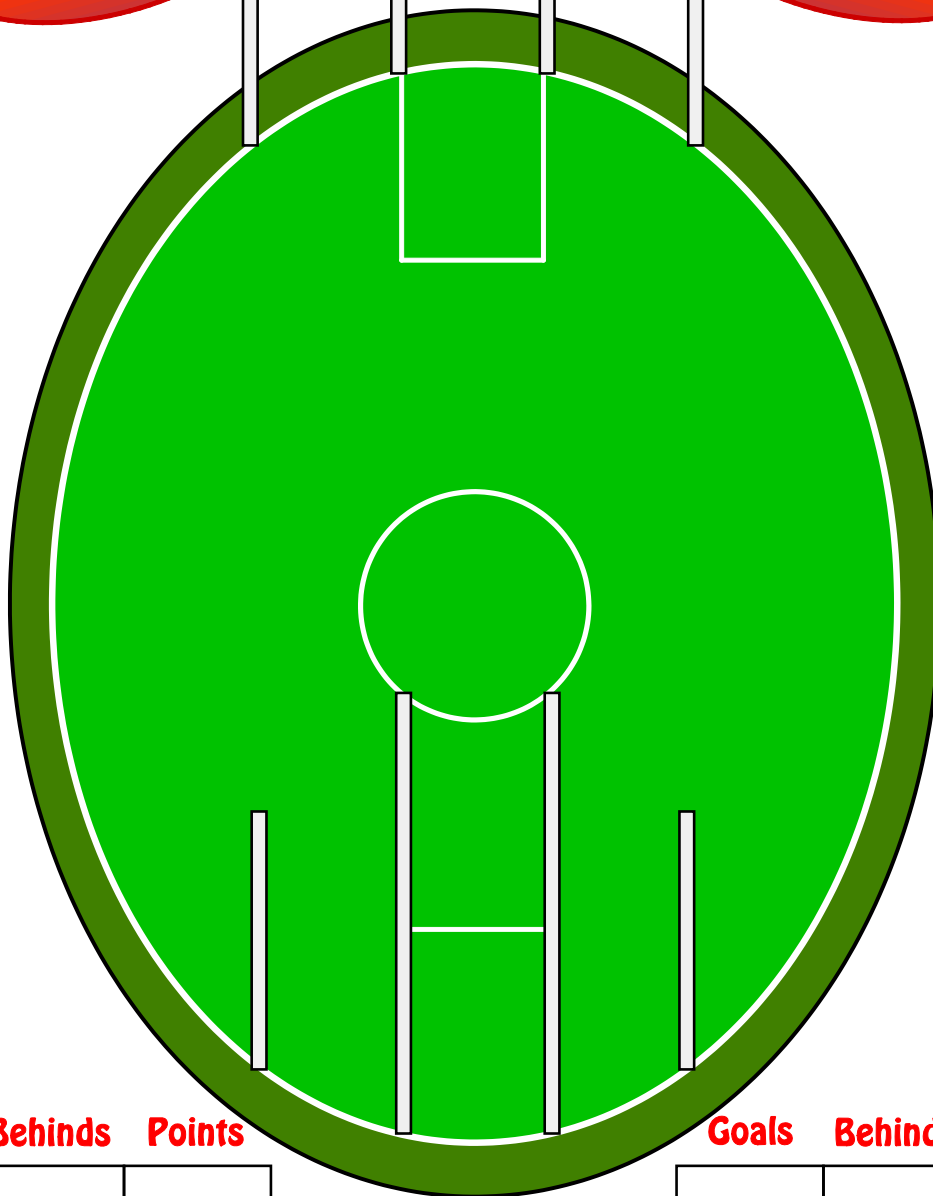
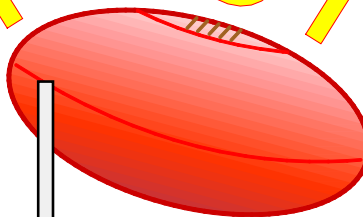
What is the largest possible score? ...Smallest?

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DICE



FOOTY



Goals Behinds Points

$\frac{1}{4}$ Time Score

$\frac{1}{2}$ Time Score

$\frac{3}{4}$ Time Score

Final Score

Goals Behinds Points

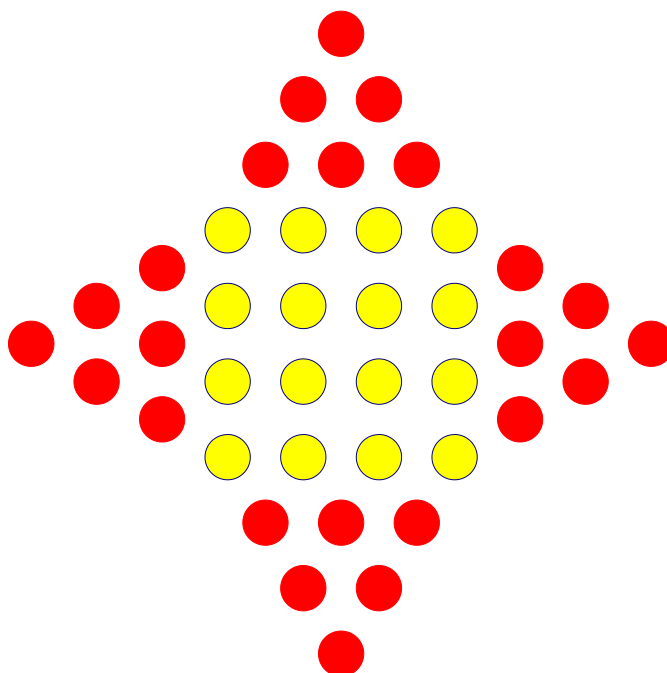
You Need

- Twenty-five [25] counters in each of two [2] colours

This is a Size 4 Star Number.

Your Task

1. Make your own
Size 4 Star
Number.
Record the total
number of plugs.
2. Make other size
Star numbers and
record the number
of plugs.



Challenge

Calculate the number of plugs needed to make a Size 10 Star Number.

Can you check your calculation another way?

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