Café Conundrum

curious questions

tantalising tasks

remarkable riddles

perplexing puzzles

enticing enigmas

Chat & be Challenged

Menu Maths @ Café Conundrum

WELCOME
please select from our

Challenging Choices

Today's Special

Poly Plug Puzzles A

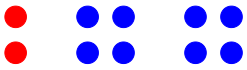
Ingredients ... 1 Poly Plug set

Lining Up

The yellow person is 4th from either end of this line. Suppose you are 15th from either end, how many people are in the line?

- If I tell you any number from either end, can you tell me three different ways to work out the number of people in the line?

Crossing The River 1



Eight adults and two children have to cross a river. Their canoe can only take 1 child or 2 children or 1 adult. Everyone can paddle.

- What is the least number of crossings for everyone to reach the other side?
- What happens if we change the number of adults? ...change the number of children?

Make A Snake

When Mungo the Maths Snake is born she has only one yellow ring. This is Season Zero.

- Season 0: 

Each season she grows and her rings change by the rule that each old yellow becomes yellow/blue/yellow but each old blue stays the same. The blues are just 'pushed along' as the old yellows grow.

- Season 1: 
- Season 2: 

Investigate Mungo's ring patterns as she grows.

- Can you predict the number of rings at Season 10?
- Can you predict yellow and blue numbers for any season?
- Suppose you found a Mungo fossil. Explain to someone else how to work out how many seasons she lived.

13 Away

Make a collection of 13 red plugs in any way:

Take turns to remove 1 or 2 or 3. The person who takes the last plug loses.

- Is there a winning strategy?

Jumping Kangaroos

Place 7 stepping stones like this:

Now place 3 girl kangaroos on one side and 3 boy kangaroos on the other like this:

Boys and girls have to swap sides. Kangaroos can hop into an adjacent empty space. Kangaroos can jump one kangaroo of the other sort.

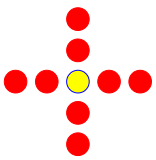
- What is the least number of moves to change sides?
- What happens if we change the number of kangaroos?

---

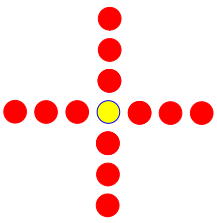
4 Arm Shapes

The pictures show north, south, east and west pathways to the centre of a park.

Arm Size 2



Arm Size 3



- If I tell you any arm size, can you tell me three different ways to work out the number of circular tiles needed to build the 4 arm shape?

Menu Maths @ Café Conundrum

WELCOME
please select from our

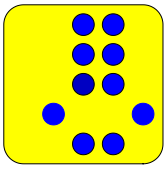
Challenging Choices

Today's Special

Poly Plug Puzzles B

Ingredients ... 1 Poly Plug set and 1 placemat

Back To Back Building


Example

Sit back to back.
Person A has the yellow/blue board and Person B has the red board. Person A makes any design. Person A tells Person B which red plugs to push out.
When Person A has finished telling, the red board should fit over the yellow board and only the blue plugs will show.
Swap over and try again.

- What is the best language to use?

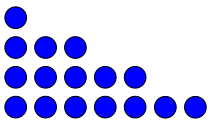
Crossing The Desert

Two travellers set out on a 9 day journey across a desert to deliver a message and bring back an answer. Each traveller can only carry enough food for 12 days. The placemat shows the desert. Red plugs can be the piles of food.

- Explain how the message can be delivered and an answer returned.
- How many solutions are there?
- How do you know when you have found them all?

Nim

Arrange plugs like this:



Take turns to remove plugs. The person who has to take the last plug loses. The rule is:

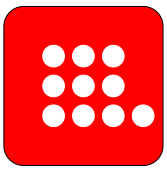
- On each turn, a player may remove any number of plugs from just one row. This includes removing the whole row.

Play a few games for fun then work together on these challenges.

- Find one arrangement which forces the other player to lose on the next turn.
- How many of these 'end game' arrangements can you find?
- Is there a winning strategy?

Big Toe Noughts & Crosses

Arrange your red board like this:

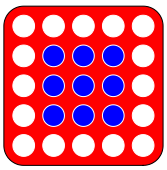


One person plays yellow and one plays blue. Take turns to place plugs. To win make three in a row in any direction.

- Is there a winning strategy?

Human Moves Monster

Nine monsters are arranged like this:

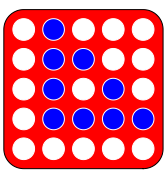


The human is shown by a yellow plug and begins in any of the empty spaces. The human must move one step forward (up, down, left or right) and one step diagonally each time.

- The human captures a monster if the diagonal step lands on a monster.
- The human may step on a monster on the forward move.

The human is trying to capture all the monsters and remove them from the board.

- What is the least number of moves to capture all the monsters?
- What happens if the monsters start like this?



Crossing The Desert

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

Menu Maths @ Café Conundrum

WELCOME
please select from our

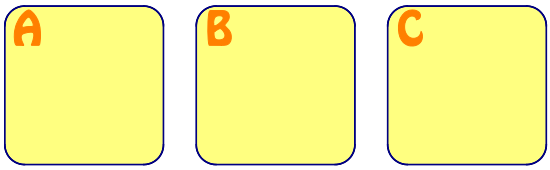
Challenging Choices

Today's Special

Poly Plug Puzzles C

Ingredients ... 1 Poly Plug set, 1 placemat and 4 dice

Counter Escape



Put 3 plugs in the cells in any way. Remove plugs by rolling a dice.

- If you roll 1 remove a plug from A.
- If you roll 2 or 3 remove a plug from B.
- If you roll 4, 5, or 6 remove a plug from C.

Count the rolls it takes to remove all the plugs.

- What is the best way to place plugs so they are removed in the least number of rolls?

The Frog Pond

Put 5 frogs in the pond. Roll a dice to put more frogs in or to take frogs out.

- 1, 2, 3 = 1 IN, 2 IN, 3 IN
- 4, 5, 6 = 1 OUT, 2 OUT, 3 OUT

Count the number of rolls to empty the pond.

- What is the most likely number of rolls to empty the pond?
- What happens if you start with 4 or 6 frogs in the pond?

Walk The Plank

Set up 15 red plugs then add yourself like this:

You are walking the plank on a pirate ship. If you go off the end to the left you are eaten by sharks. You are safe if you go off to the right.
Roll 2 dice to make one turn.
Colour A: Even = face sharks. Odd = face boat.
Colour B: 1, 2, 3 = 1, 2, 3 steps forward
4, 5, 6 = 1, 2, 3 steps backward

- What is the most likely number of turns to end a game?
- What happens if the plank length is changed to a different odd number?

12 Counters

Twelve plugs are placed in the cells in any way.

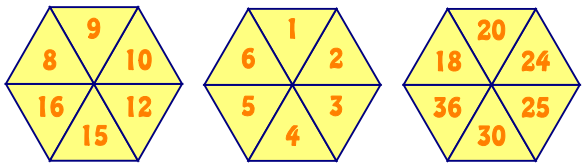
1	2	3	4	5	6
7	8	9	10	11	12

Roll 2 dice and calculate their sum.

If there are plugs in that cell, ONE plug is removed. Count the number of rolls until all the cells are empty.

- What is the best way to place plugs so they are removed in the least number of rolls?

Have A Hexagon



Roll 2 dice and calculate their product.
Use a red plug to claim the hexagon section with that product. Continue until all sections of one hexagon are claimed. Pile up red plugs if the product is repeated.

- Which hexagon is claimed first?
- Which one is most likely to be claimed first?

Dice Differences

Six plugs are placed in the cells in any way.

0	1	2	3	4	5

Roll 2 dice and calculate their difference.

If there are plugs in that cell, ONE plug is removed. Count the number of rolls until all the cells are empty.

- What is the best way to place plugs so they are removed in the least number of rolls?

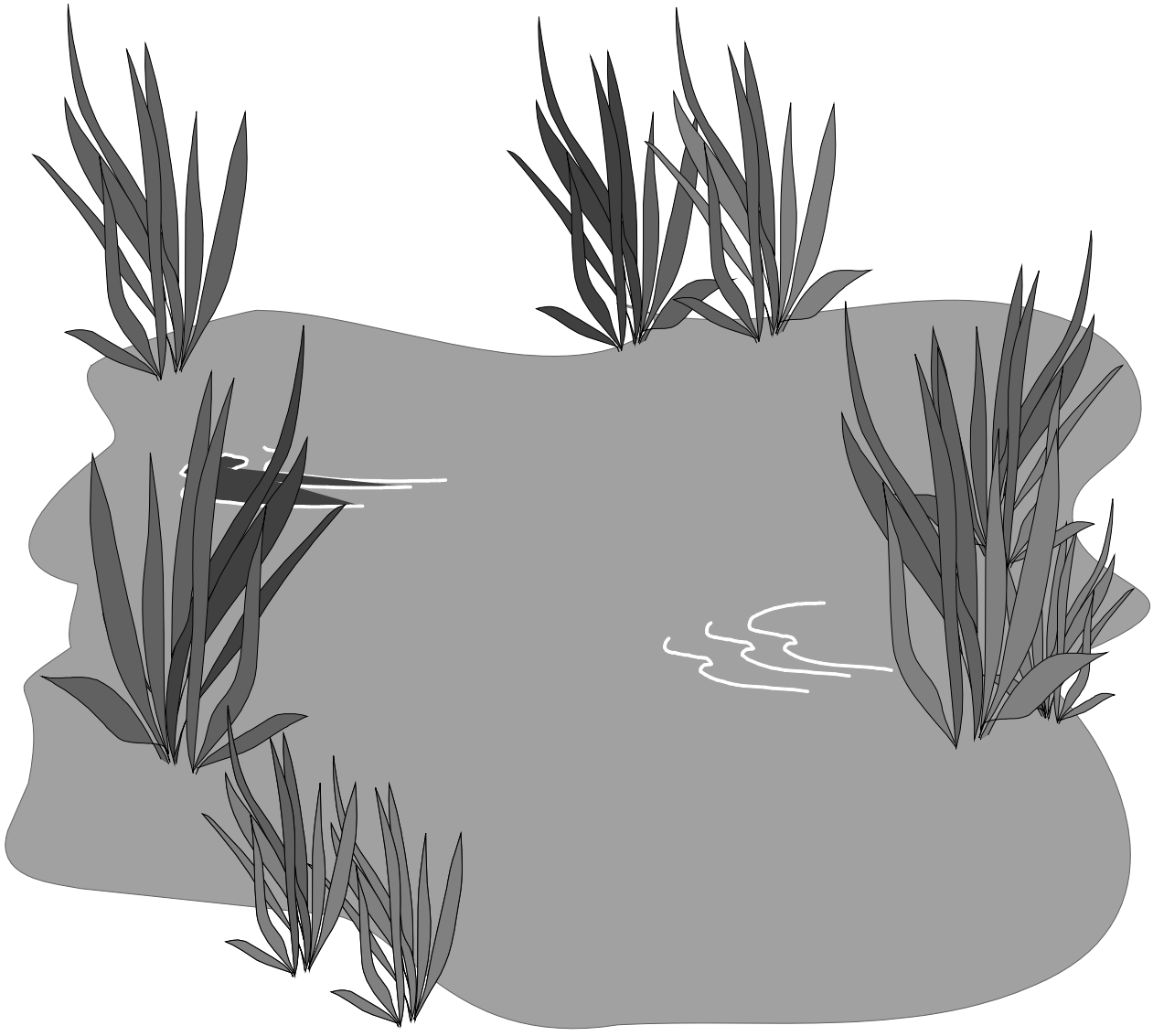
Counter Escape

A

B

C

The Frog Pond



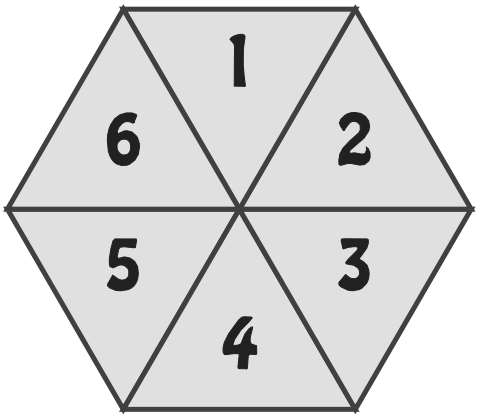
Dice Differences

0	1	2	3	4	5

12 Counters

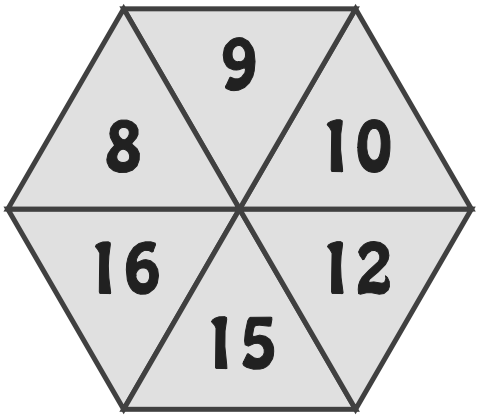
1	2	3	4	5	6
7	8	9	10	11	12

Have A Hexagon

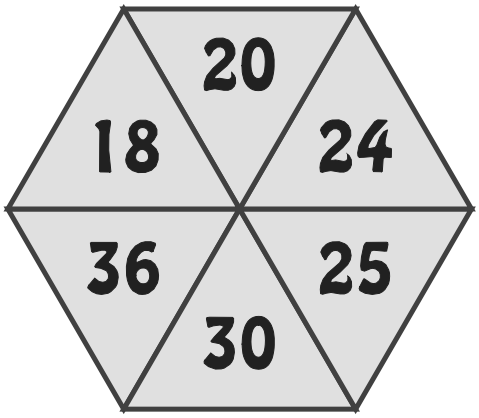


MIDDLE

LEFT



RIGHT



Menu Maths @ Café Conundrum

WELCOME
please select from our

Challenging Choices

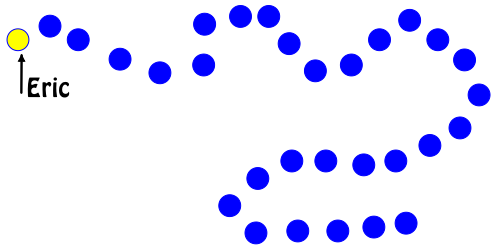
Today's Special

Poly Plug Puzzles D

Ingredients ... 1 Poly Plug set and 1 placemat

Eric The Sheep

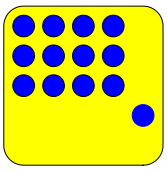
Eric is last in a long line of sheep that are waiting to be shorn.



Eric doesn't want to wait, so each time the shearer turns around to shear a sheep at the other end, naughty Eric sneaks past two sheep.

- If there are 8 sheep in front of Eric, how many are shorn before Eric gets to the front?
- If there are 24 sheep in front of Eric, how many are shorn before Eric?
- If I tell you any number of sheep in front of Eric, can you tell me how many sheep will be shorn before Eric?

Row Points



Turn over 13 plugs in a yellow board. It doesn't matter what pattern, just make sure you only turn over 13.

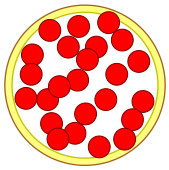
- Find three ways to convince someone that 13 have been turned over in this board.
- Find three ways to convince someone that 13 have been turned over in your board.

You get points for making rows horizontally, vertically and diagonally.

Any 3 in a row = 3 points
Any 4 in a row = 4 points
Any 5 in a row = 5 points

- What is the score for the board above?
- What is the score for your board?
- Make a board with the lowest score.
- Make a board with the highest score.

Cookie Count



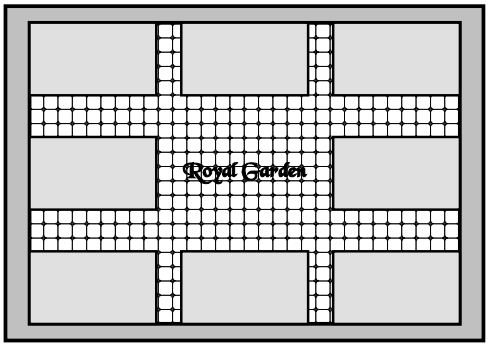
Make a plate of 24 cookies.

- Suppose all the cookies are shared between 2 people, how many do they get each?
- What happens if it's:
  4 people? ...5 people?
  ...6 people? ... keep on investigating?
- What happens if we change the starting number of cookies?

---

4 & 20 Red Birds

The royal garden has bird feeding trays arranged around its perimeter like this:



One day the queen notices that 24 red birds are feeding on the trays and there are 9 along each of the four sides.

- Find 5 ways the birds could have been arranged in lines of nine?
- How many solutions are there for 24 birds in lines of nine?

Bob's Buttons

Bob has some buttons to share with his friends.
If he shares them between 4 friends there are 2 left over.
If he shares the same number between 5 friends there is 1 left over.

- How many buttons might Bob have?
- How many solutions can you find?

4 & 20 Red Birds