

# Problem Solving Investigations Low Floor High Ceiling Puzzles

Maths Support Team

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Head of Department



**Maths is a game but not a  
spectator game**

# Take a dice - explore - discuss.

## Roly poly

2. Imagine rolling two dice.  
The dice do not touch each other.



The score is the total number of dots you can see.  
Which numbers are face down to score 30?

# Goal

The primary goal of  
problem solving is  
making sense of  
mathematics.

- two essential abilities – curiosity and fearlessness to take risks.
- foster a new mathematical mind set of self-confidence, self reliance, curiosity and perseverance.
- stretch their thinking and learn new things , not to finish every problem or get the right answer every time.



## How can we help?

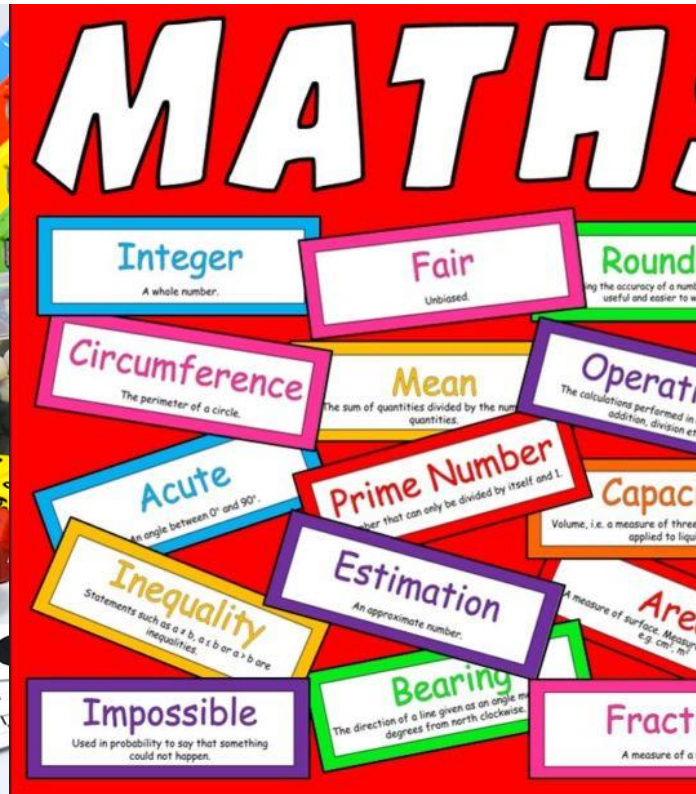
- Don't be scared of Maths.
- Train your children to think.
- Support but don't give answers.
- Praise the process not the outcome.
- Get to know how they learn.
- Create independence.
- Give children responsibility for their own learning.
- Talk Maths at home.



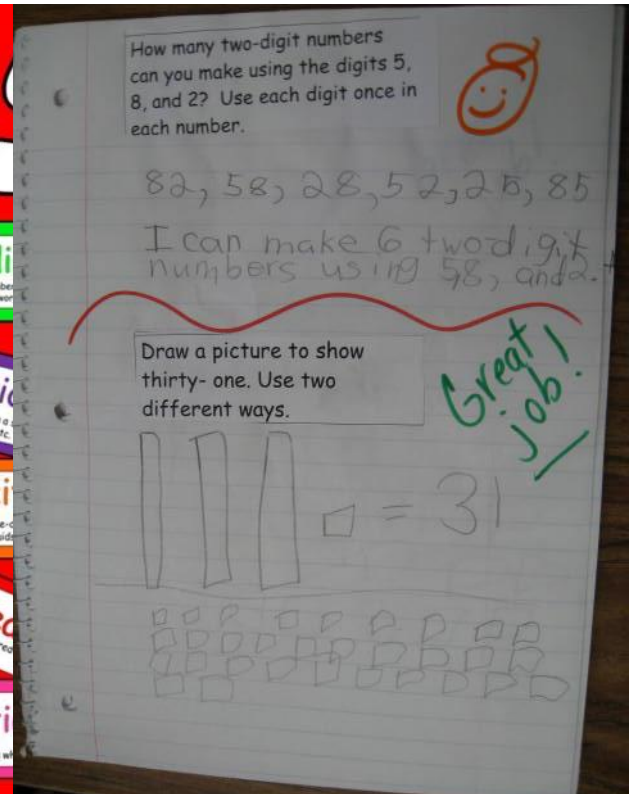
Tool box



Journal



Maths Word Wall



# Toolbox resources

- Numberline 1 to 10, 1 to 20
- 2 dice (one numbered, one spots)
- Deck of cards
- Dominoes
- Number fans
- Number cards (1 to 100)
- Double Ten-frames (1-10, 11-20)
- Base ten cut outs / 10 bunches of 10 straws
- and 9 ones
- Place value chart
- Hundred chart helper (1 less, 1 more, 10 less, 10 more)
- Number grid 1 – 100
- 2 diff Colours - bottle caps or pompoms (15 and 15)
- 1 minute sand timer and digital timeline
- Printable clock face / analogue clock with movable hands
- Purse with real money coins (1 - €2, 1 - €1, 2 - 50c, 5 - 20c, 10 - 10c, 10 - 5c, 10 - 2c, 20 - 1c coins)
- Small whiteboard, whiteboard marker and eraser
- ABCD Hinge point answers
- Self-assessment resources (rubric 1-4, smiley thumbs up/down/neutral chart...)







**CONCRETE**



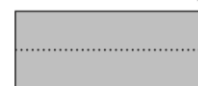
**PICTORIAL**

$$2 + 1 = 3$$

**ABSTRACT**



Mandy folds a rectangle of paper along the dotted line and cuts out some shapes.



She unfolds the paper and turns it around.

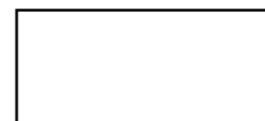
Which of these is Mandy's paper?



☐

☐

Draw the lines of symmetry.

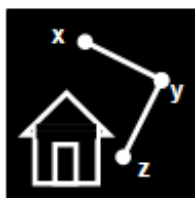


# What is a problem?

A problem is a task that requires the learner to reason through a situation that will be challenging but not impossible.



# Problem Solving Strategies



Draw a Picture or Diagram



Find a Pattern



Guess, Check & Revise



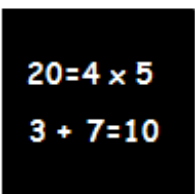
Use Objects



Make an Organized List



Make a Table



Use a Number Sentence



Work Backwards



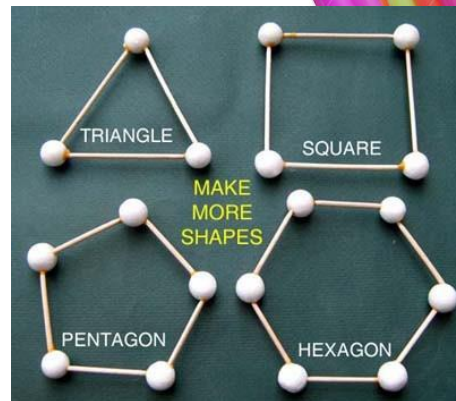
Use Logical Reasoning



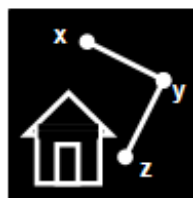
Make It Simpler

- Make a shape with four sides.
- Make a shape with 7 sides.
- Use 20 straws. Make as many different shapes as you can.
- How many straws are left

## Shape and space



# Problem Solving Strategies



Draw a Picture or Diagram



Find a Pattern



Guess, Check & Revise



Use Objects



Make an Organized List

A	B	C
2	4	6

Make a Table

$$20 = 4 \times 5$$
$$3 + 7 = 10$$

Use a Number Sentence



Work Backwards



Use Logical Reasoning

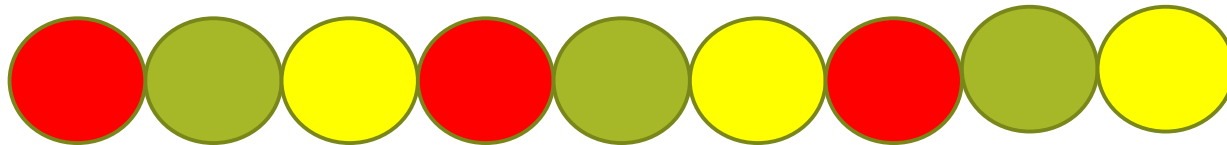


Make It Simpler

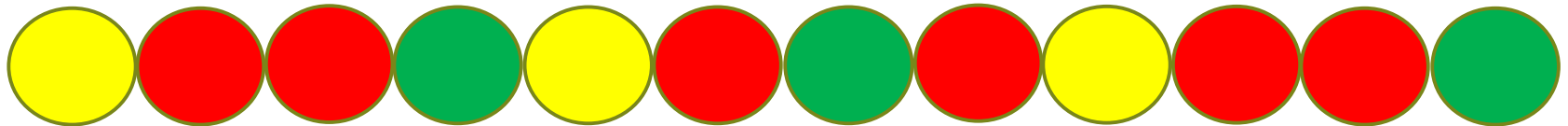


Explain.

What colour is the next cap?

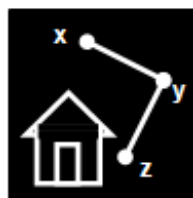


What about this one. Discuss.



Make another repeated pattern using these caps.  
Explain your

# Problem Solving Strategies



Draw a Picture or Diagram



Find a Pattern



Guess, Check & Revise



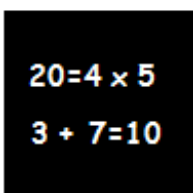
Use Objects



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Use Logical Reasoning

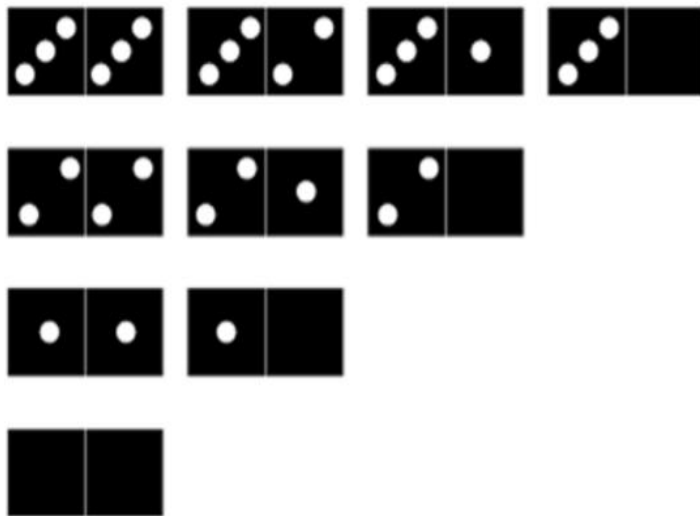


Make It Simpler

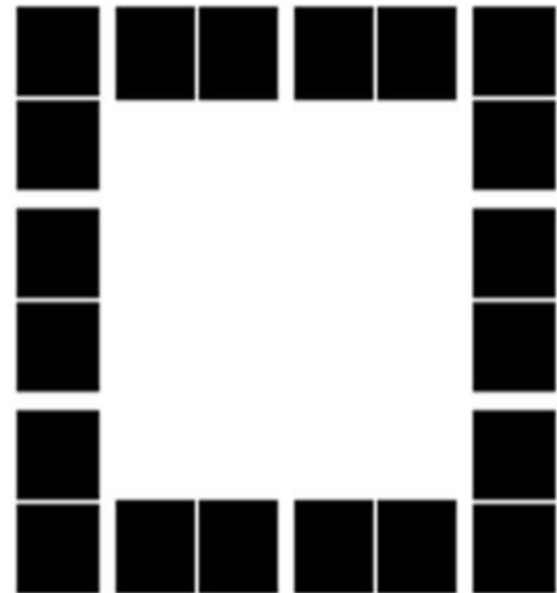
# Domino Square



These are the 'double-3 down'  
dominoes.



Use these dominoes to make this  
square so that each side has eight  
dots.



2017 NOVEMBER						
SUN	MON	TUE	WED	THU	FRI	SAT
		holidays	holidays	holidays		
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16 	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

www.free-printable-calendar.com

- ◆ Fill in birthdays.
- ◆ Holidays
- ◆ Special occasions

Opportunities to get to know time and introducing Problem Solving

# Problem Solving through Puzzles and Games!

			1		6
6		4			
1		2			
			5		1
			6		3
5		6			

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## KEN 2nd grade KEN



### KANGAROO Addition Puzzle 1 (4x4)

Put on your thinking cap! Using the numbers 1 through 4, fill in the boxes below. Watch out! Every row and column can only contain each number once. Check each area to find its sum.

+			
7+	6+		3+
	7+		
3+		1	9+
	4		

More worksheets at [education.com/worksheets](http://education.com/worksheets)

education.com



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Low Floor High Ceiling

Observe the colours.



How would you draw 21?  
Explain.

# Problem Solving Culture

Educators have a responsibility to promote the experience of problem-solving strategies in their classrooms, and to foster in their students a positive attitude towards problem solving.

With exposure, experience, and shared learning, children will develop a repertoire of problem-solving strategies that they can use flexibly when faced with new problem-solving situations.

*Maths Support Team Homepage*

<https://primarymaths.skola.edu.mt/>

*Malta Education and Curriculum homepage*

<https://curriculum.gov.mt/en/Pages/Home.aspx>

*An interesting article*

[file:///C:/Users/Schools\\_home/Downloads/tcm2014-08-18a.pdf](file:///C:/Users/Schools_home/Downloads/tcm2014-08-18a.pdf)

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THANK  
YOU

