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Nurturing your children's mathematical development: CALCULATING

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To **CALCULATE CONFIDENTLY**, students need to

1. **UNDERSTAND NUMBERS**, their magnitude, their composition, their relationship to other numbers,
   e.g. 35 is between 30 and 40, and
   can be broken to (30 + 5) or (20 + 15) or (33 + 2)

2. **RECALL NUMBER FACTS**
   addition and related subtraction facts
   multiplication and related division facts

3. **SELECT and APPLY a VARIETY OF MENTAL CALCULATING STRATEGIES**, e.g.
   counting on, doubling, halving, working from the left, partitioning, rounding to nearest 10 and adjusting, commutative property of addition, factorising

Helping your children to calculate confidently

1. Highlight number facts in your environment.

2. Practice recall of number facts by playing games using cards, dice, dominoes.

3. Engage in conversations and share methods for solving calculation problems. Emphasise the different ways the problems can be solved.

How did you do it?

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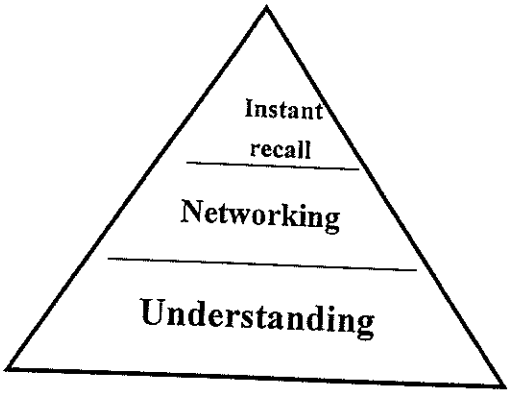
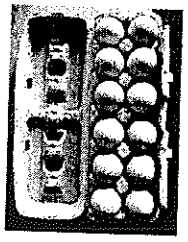
MODEL FOR LEARNING NUMBER FACTS



NUMBER FACTS



In order to recall number facts, students need to

1. **UNDERSTAND,** model or visualise the fact:
   2 groups of 6 make 12
   6 + 6 **2 x 6**
   12 ÷ 2 = 6 **12 – 6 – 6 = 0**

2. **NETWORK,** link or connect the number facts to others
   2 x 6 and 6 x 2 (Commutative Property of addition)
   2 x 6 = 12 and 20 x 6 = 120 (ten times greater)
   2 x 6 and 2 x (2 x 3)
   linking **3x** and **6x** tables
   All multiples of 6 are even numbers.

3. **RECALL** the number facts accurately and instantly. This can be done through games to provide practice and regular checks.

MENTAL CALCULATING STRATEGIES

17 x 4 =

HOW DID YOU DO IT?

- Tell me how you worked it out.
- What did you do to simplify the calculation task?
- Which numbers did you change? Why?
- Could you check using another strategy?
- Why does that strategy work?
- Is the strategy useful for other problems?

MENTAL CALCULATING STRATEGIES FOR SOLVING 17 x 4 =

(10 x 4) + (7 x 4)
= 40 + 28
= 68
WORKING FROM LEFT

17 x 2 x 2
= 34 x 2
= 68
DOUBLING

(15 x 4) + (2 x 4)
= 60 + 8
= 68
PARTITIONING – KNOWN FACT

(20 x 4) – (3 x 4)
= 80 - 12
= 68
ROUNDING TO NEAREST TEN AND ADJUSTING

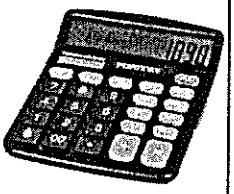
It's better to solve one problem

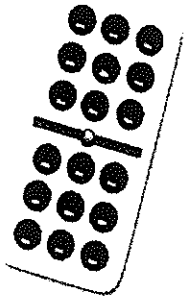
five different ways

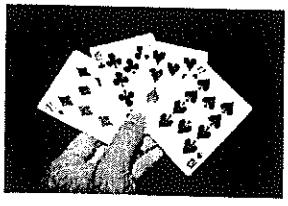
than to solve five different problems.

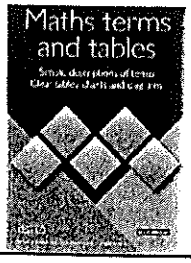
George Polya (1887 – 1985)

USEFUL MATHS RESOURCES IN THE HOME









HIGHER / LOWER

Organization

This is a game for 2 players with one set of ***Double Six dominoes.***
This game would suit students from Pre-Primary to Year 3.

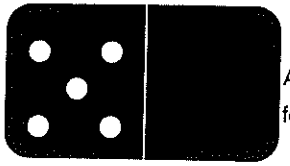
Rules

1. Arrange all 28 dominoes face down in random order.
2. Players take it in turns to choose any domino. They must then add the two numbers on the domino.
3. The player with the higher total wins a point for that round.
4. Recording of points can be carried out using the dominoes themselves. If a player wins a round, he / she places the domino **face up.** If a player loses a round, he / she places the domino **face down.** If the players have the same total, they both win a point. The winner is the player who has more points after the 14 rounds.
5. Initially students will count all the dots to work out the total. As they gain experience and confidence with this game, they will recognize the arrangement of dots and the associated number without needing to count all the dots. At this stage, they can be shown how to '**count on**' from the larger number. If necessary, turn the domino around. They will also quickly recognize the '**doubles**' in the set, (4 + 4) and later '**near doubles**' (4 + 5).
6. It is important to allow students plenty of time to explore, trial and appreciate these strategies.
7. Older students could play the same game using ***Double Nine Dominoes or Double Twelves.***
8. Another challenge for older students is to pick up two dominoes at a time and add the numbers.
9. Vary the game by 'multiplying' the two numbers, or subtracting the lower number from the higher number.

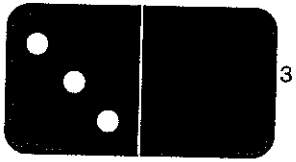
DOMINOES - HIGHER / LOWER

Mental Calculating Strategies to Emphasise

- **ARRANGEMENT OF DOTS TO MAKE THE NUMBERS**
- **ADDING ZERO**

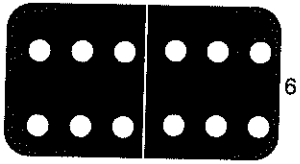


Arrangement for **5**

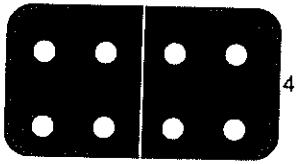


3 + 0 = 3

- **DOUBLES**

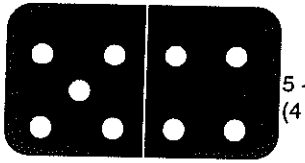


6 + 6 = 12

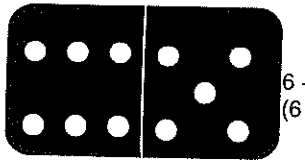


4 + 4 = 8

- **NEAR DOUBLES**

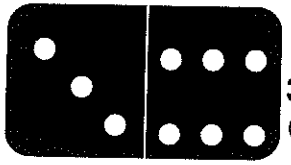


5 + 4 is (4 + 4) + 1

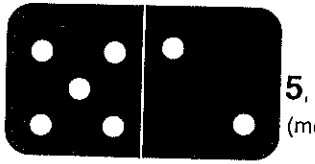


6 + 5 is (6 + 6) – 1

- **COUNTING ON**
- **COUNTING ON FROM HIGHER NUMBER AS A MORE EFFICIENT STRATEGY**

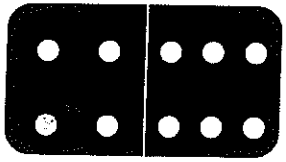


3,4,5,6,7,8,9 (inefficient)

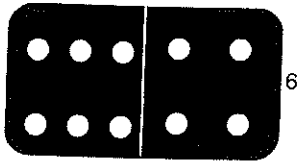


5, 6,7 (more efficient)

- **COMMUTATIVE PROPERTY OF ADDITION**



4 + 6 = 10



6 + 4 = 10

YAHTZE RECORDING SHEET

Name ______________________ Year level ______ Date ________

No. of dice	No. on dice	Total
	x 1 =	
	x 2 =	
	x 3 =	
	x 4 =	
	x 5 =	
	x 6 =	
	Total score	

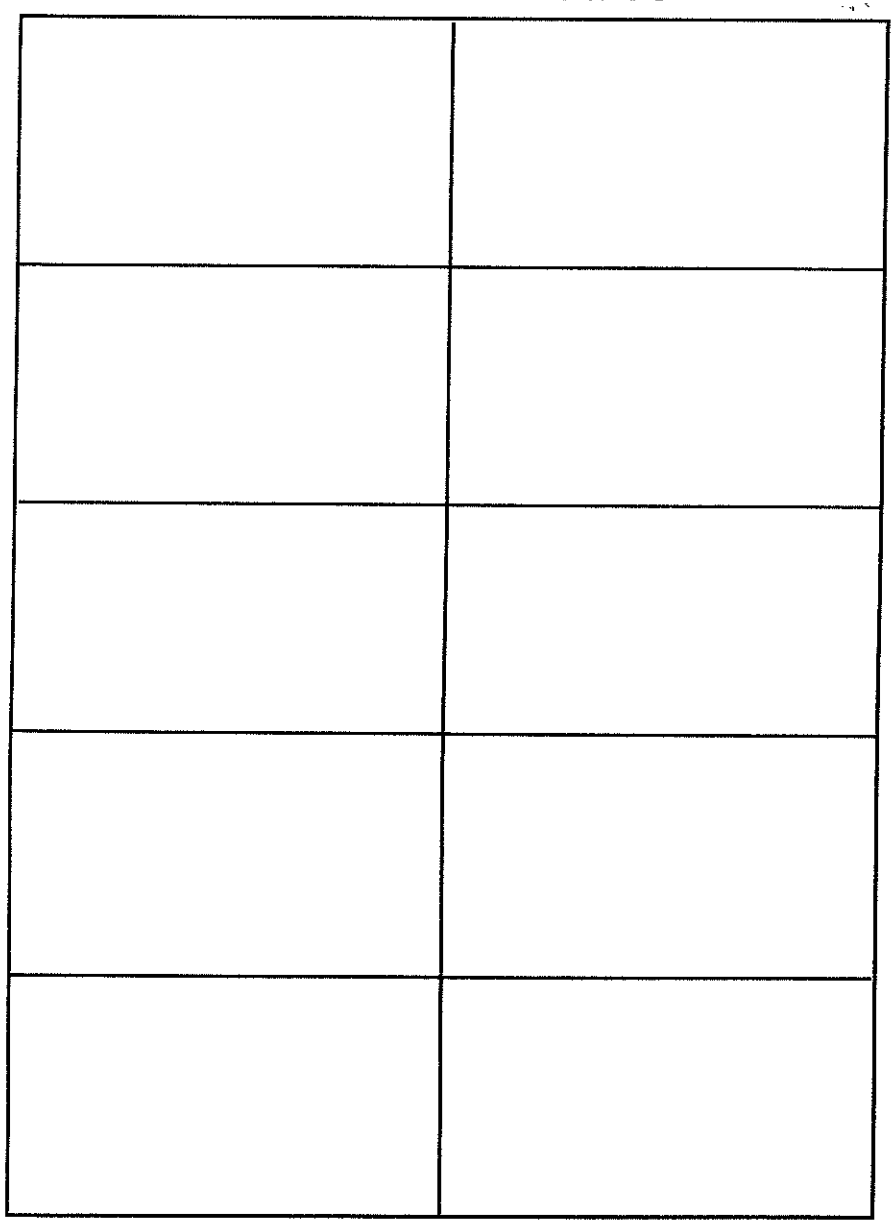
No. of dice	No. on dice	Total
	x 1 =	
	x 2 =	
	x 3 =	
	x 4 =	
	x 5 =	
	x 6 =	
	Total score	

No. of dice	No. on dice	Total
	x 1 =	
	x 2 =	
	x 3 =	
	x 4 =	
	x 5 =	
	x 6 =	
	Total score	

No. of dice	No. on dice	Total
	x 1 =	
	x 2 =	
	x 3 =	
	x 4 =	
	x 5 =	
	x 6 =	
	Total score	

APPENDIX 7

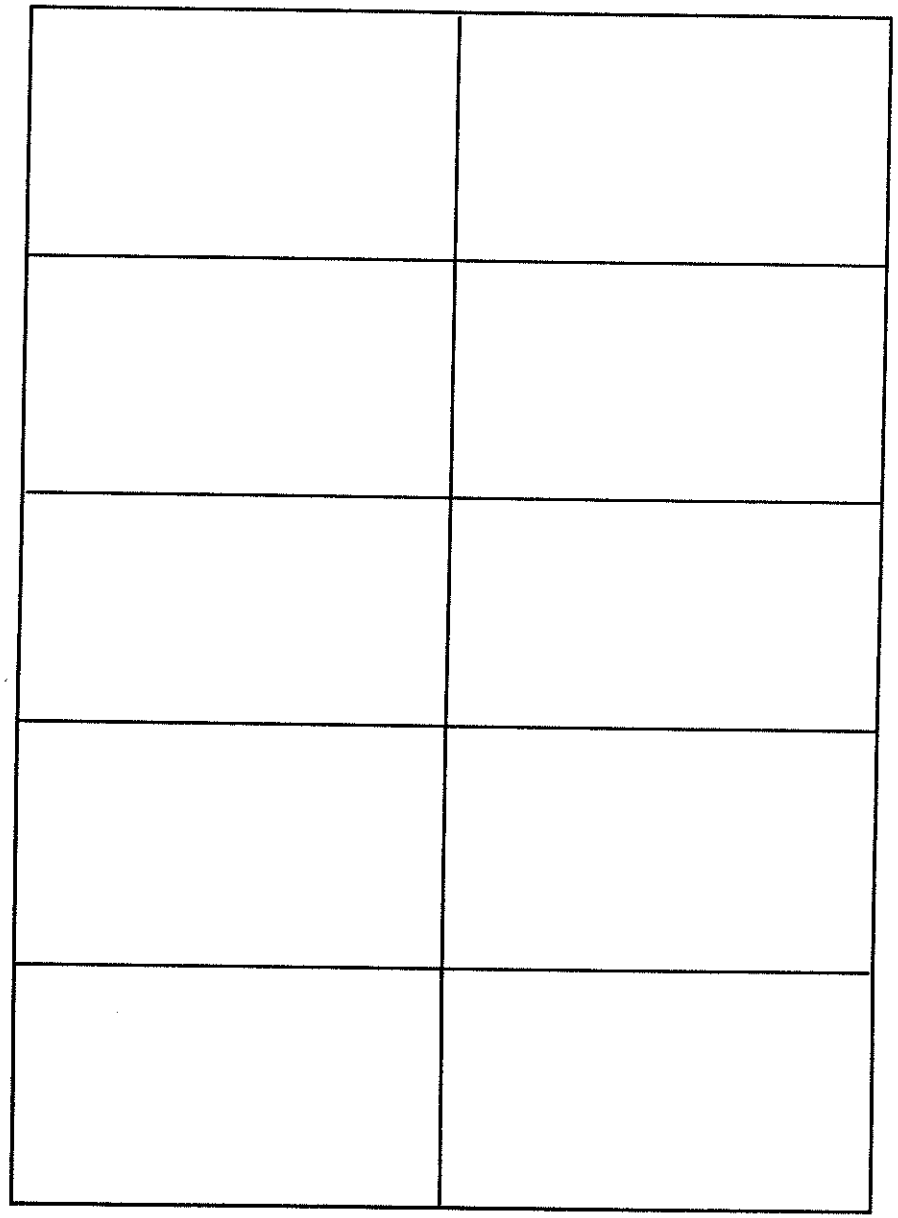
Concentration Cards



Photocopied from Turn the Tables by Ellita De Nardi

APPENDIX 7

Concentration Cards



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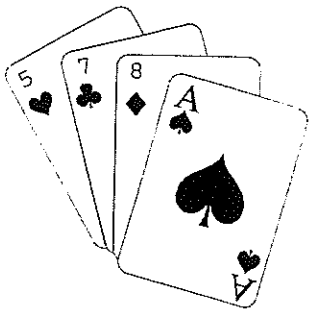
ADDING MACHINE GAME

Organisation



This is a game for 2 - 4 players with one or more decks of cards. Remove the K, Q, J and Jokers. Ace = 1. This game would suit students from Year 2 - 7.

Rules

1. Shuffle the cards and deal out 10 cards to each player, face up.
2. Each player needs to find the total of their cards. This can be done by re-arranging the cards or grouping certain cards together to make 'compatible numbers'. **Any arrangement that makes the adding task easier is allowed provided the correct total is obtained.**
3. In turn, players then explain their groupings to the others in their group. If the other group members are satisfied that the total is correct, then this total is recorded.
4. For example, if Player One has cards **7, 4, 8, 3, 1, 2, 8, 5, 8, 5, 3, 6,** he/she may wish to group them like this:
   (7 + 3) and **(6 + 4)** and **(3 + 2 + 5)** and **(8 + 8 + 1)**, making
   10 and **10** and **10** and **17**, so the total is **47**.

   Another way to group the cards is:
   (8 + 8 + 4) and **(7 + 3 + 6 + 3 + 1)** and **(2 + 5),** making
   20 and **20** and **7**, so the total is **47**.

   Another way to group the cards might be:
   (8 and 8) and **(5 + 3)** and **(6 + 2)** and **(4 + 3 + 1)** and **7**, making
   5 groups of 8 = 40 and 7, so the total is **47**.
5. After everyone has explained their groupings and totals are recorded, the cards are shuffled and another round is dealt.
6. Players keep a progressive record of their score after each turn.
7. The winner is the first player to reach 200 or a nominated target.
8. This game can be varied by
   - having students play in pairs and working together;
   - varying the number of cards dealt in each round; e.g., deal out only 6 cards in each round;
   - varying the target number;
   - awarding one point, (a counter) to the winner of each round and the first player to reach five points is the winner.