Purposeful Puzzles, Problems and Games

Dr Paul Swan

BOARD GAME PACK
YEARS 1-2
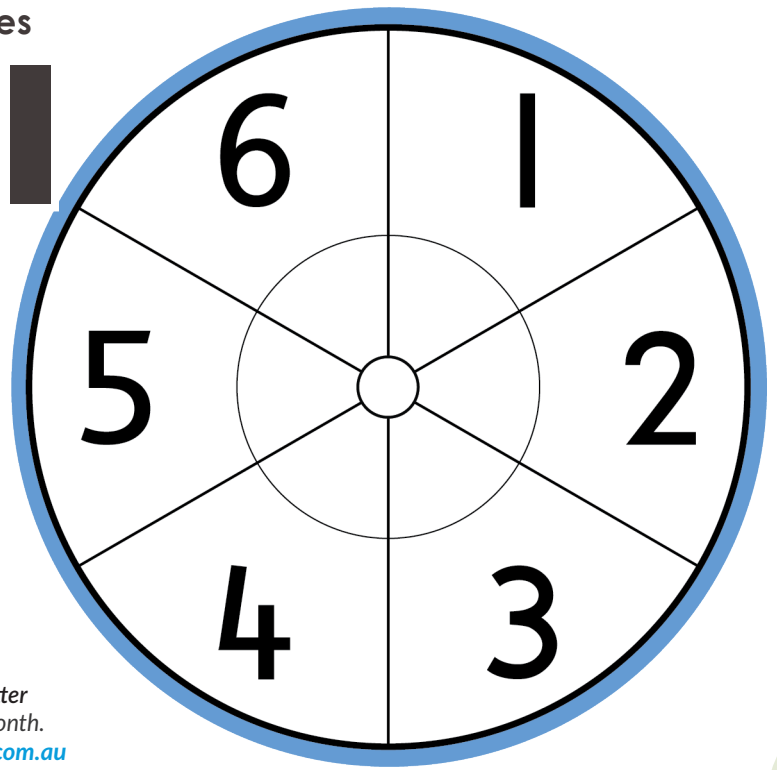
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Game	Year Level & Topic	Content	AC Link(s)
Think Big Count Small	Year 1 | Adding on from a smaller number		ACMNA015
Build To	Year 1 | Build to Ten (or decade)	Number, Basic Facts, Addition	ACMNA015
Count On...+1	Year 1 | Counting On	Number, Basic Facts, Addition	ACMNA015
Count On...+2	Year 1 | Counting On	Number, Basic Facts, Addition	ACMNA015
Count Back ... -1	Year 1 | Counting On	Number, Basic Facts, Addition	ACMNA015
One More Bingo	Year 1 | Counting On	Number, Basic Facts, Addition	ACMNA015
One Fewer Bingo	Year 1 | Counting On	Number, Basic Facts, Addition	ACMNA015
Teen Place Value	Year 1 | Place Value	Number, Place Value,	ACMNA014
Place Value: Two Digit	Year 1 | Place Value	Number, Place Value,	ACMNA014
Place Value: Two Digit (Different Representations)	Year 1 | Place Value	Number, Place Value,	ACMNA014
Money Match 1	Year 1 | Recognising Coins	Number, Money,	ACMNA017
Money Match 2	Year 1-2 | Adding Coins	Number, Money,	ACMNA017, ACMNA034
Time Match (Hour)	Year 1 | Time to the Hour (Year 1)	Measurement, Time,	ACMMG020
Time Match (Half Hour)	Year 1 | Time to the Half Hour (Year 1)	Measurement, Time,	ACMMG020
Doubles	Year 2 | Doubling	Number, Basic Facts, Addition	ACMNA030
Doubles + 1	Year 2 | Near Doubles	Number, Basic Facts, Addition	ACMNA030
Doubles - 1	Year 2 | Near Doubles	Number, Basic Facts, Addition	ACMNA030
Double Dominoes (6)	Year 2 | Doubling, Recognising Dots (Subitising)	Number, Basic Facts, Addition	ACMNA030
Double Dominoes (9)	Year 2 | Doubling, Recognising Dots (Subitising)	Number, Basic Facts, Addition	ACMNA030
Ten More	Year 2 | Basic Facts, Addition,, Basic Facts, Subtraction	Number, Basic Facts, Addition	ACMNA030
__ More	Year 2 | Addition/Subtraction, Mental Strategies	Number, Basic Facts, Addition	ACMNA030
Eight and 8+	Year 2 | Bridging 10	Number, Basic Facts, Addition	ACMNA030
Nine and 9+	Year 2 | Bridging 10	Number, Basic Facts, Addition	ACMNA030
Time Match (Quarter Hour)	Year 2 | Time to the Quarter Hour (Year 2)	Measurement, Time	ACMMG039
Thrice Dice	Years 2-3 | Addition	Number, Basic Facts, Addition	ACMNA030, ACMNA055

Spinners

Spinners are a fantastic resource for maths games, probability concepts and more. Spinners can come in a number of forms.
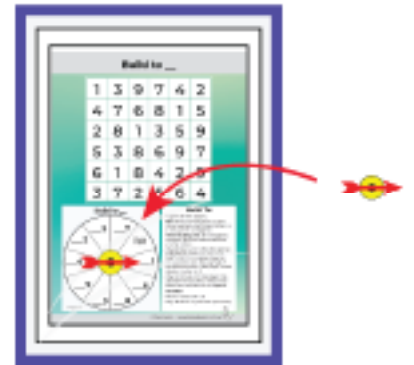
Temporary Spinners
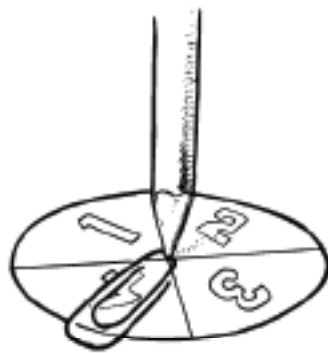
1. **Need a spinner in a pinch?** Place **a paperclip** onto the spinner circle so that one end of the paperclip goes around the centre on the point of a pen. It should spin around the pen point and land on different outcomes.

2. **A Round Spinner** is a general purpose spinner that sits on top of paper, printed / laminated games or Write and Wipe Sleeves.

3. **A Suction Spinner** is another easy-to-use spinner that is particularly good together with whiteboards and write and wipe sleeves

available from www.drpaulswan.com.au

Permanent Spinners

For a more permanent solution you can purchase **plastic spinner arrows** (available from www. drpaulswan.com.au) and use a nail to make a hole through a laminated spinner. Spinner arrows come in three parts – a base, and arrow and the cap.
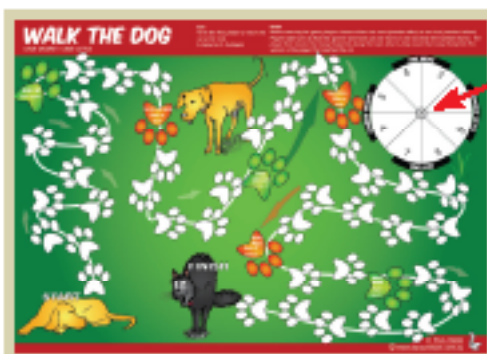
1. Use a nail to create a hole in a laminated spinner template.

2. Insert the spinner base from the back of the laminated spinner through the nail hole.

3. Click the spinner together.

BACK

SPINNER BASE

MIDDLE

SPINNER ARM

SPINNER BASE

FRONT

CAP
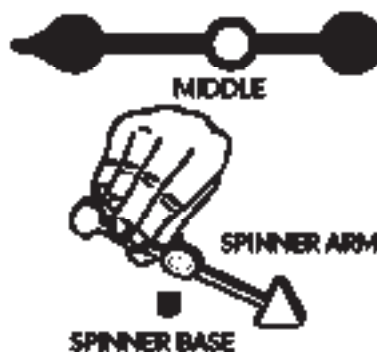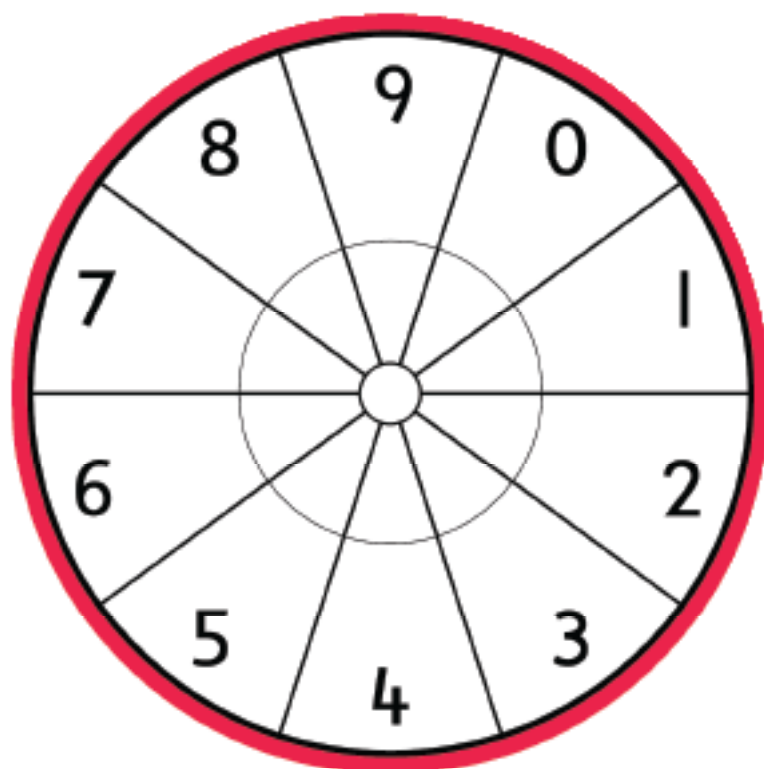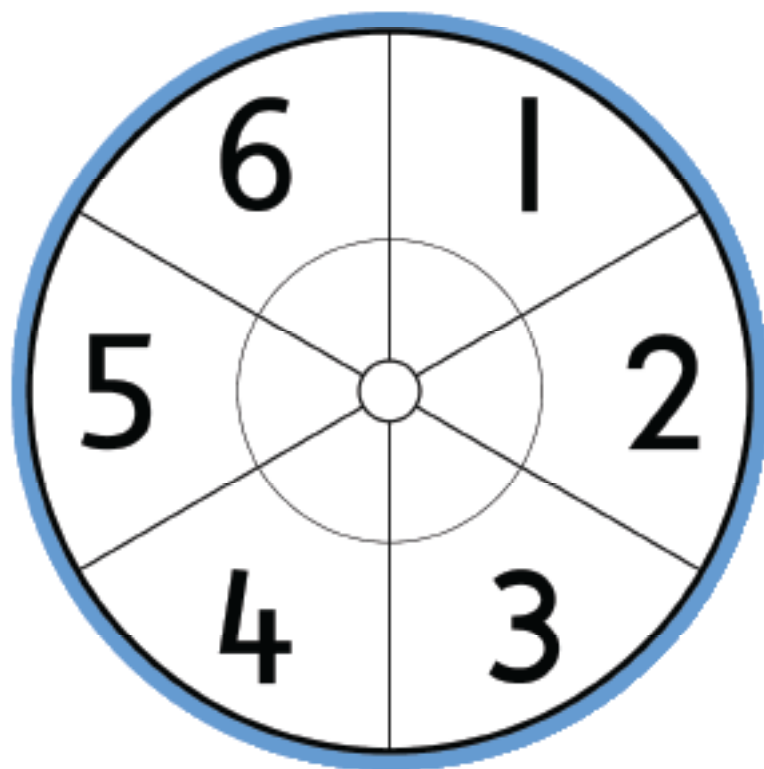
Think Big, Count Small

| 9	8	7	6		
10	9	8	7	11	10
9	8	12	11	10	9
10	9	8	7	9	8
7	11	10	9	8	7
	6	7	8	9	

A game for two players.

Aim: To be the first player to place three counters, next to each other, in a row, column or diagonal.

Materials Required: 32 transparent counters, 16 of one colour and 16 of another colour.

Players take turns to flick the spinners and add the two numbers

Play continues until one player has placed three counters, next to each other, in a row, column or diagonal.

One player can remove another player's counter if the player gets the same total.

Spinner 1: 9, 8, 6, 7

Spinner 2: 3, 2, 0, 1
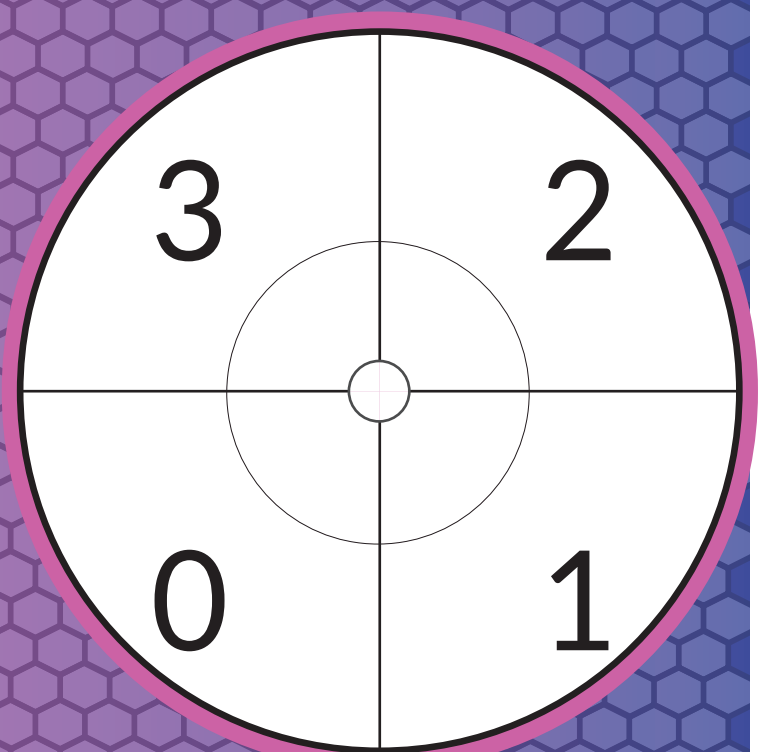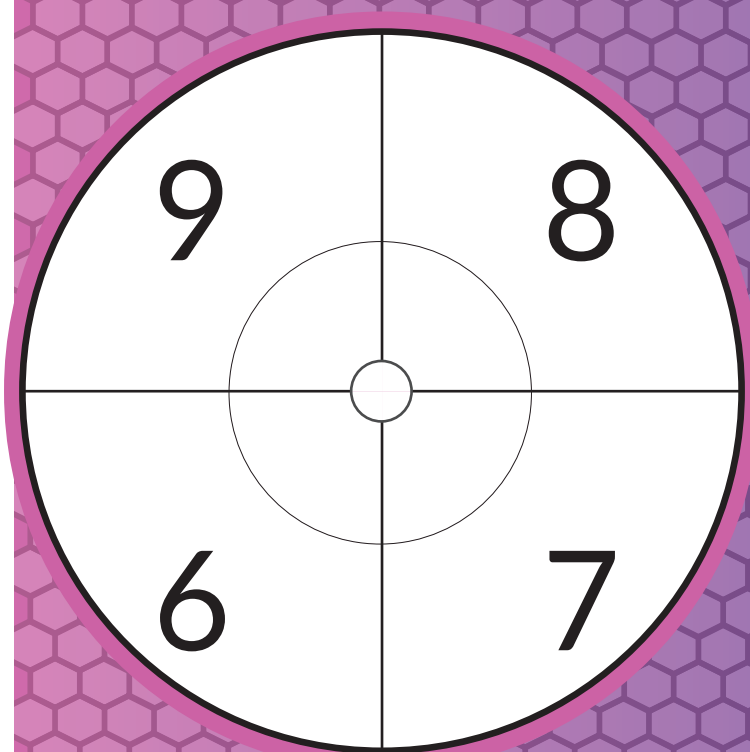
Think BIG: Count Small

Over half the basic addition facts may be calculated using a 'Think BIG: Count small strategy'. It is the first stratgey students should be taught for adding single-digit numbers.

Australian Curriculum Links

Yr 1 (ACMNA015): Solve simple addition and subtraction problems using a range of strategies

Yr 2: ACMNA030 Solve simple addition ... problems using a range of efficient mental ... strategies

Elaborations

Becoming fluent with a range of mental strategies for addition ..., such as *commutativity for addition*, building to 10, doubles, 10 facts and adding 10

Teacher notes

When adding two single-digit numbers some students are inclined to 'count all'. For example, when adding 3 and 6 the student would count 1, 2, ,3, 4, 5, 6, 7, 8, 9. Other students will hold the three in their head and count 4, 5, 6, 7, 8, 9. It is far more efficient to begin with the bigger number - 6 and count 7, 8, 9. A young child can hold about four things in their head, hence the encouragement to thing BIG, or start from the larger number and count small. I would recommend that a student only counts on 1, 2 , 3 or 0. The student has to **hold a number in their head** and remember to **start the count at the next number** in the sequence and **count on a maximum of 3**, otherwise the student runs the risk of losing count. Students who give answers one more or less than the actual answer typically have lost count because they are using inefficient 'count all strategies. Remember counting is counting and addition is addition - NOT lots of counting. It is inefficient and if left unchecked will result in failure as the numbers become larger.

In order to think BIG and count small students will need to:

- be able to identify the bigger number when presented with two numbers

- count reliably (trust the count)

- understand the commutative property of addition, that is, the order in which an addition is performed does not affect the result.

Dominoes are an ideal manipulative that will help children understand the commutative property of addition. They can be combined with Unifix in two colours to highlight the action of combing which is associated with addition.

1	3	9	7	4	2
4	7	6	8	1	5
2	8	1	3	5	9
5	3	8	6	9	7
6	1	8	4	2	9
3	7	2	5	6	4

Build to ___

___5   ___7

Choose A Spot

___2

___1

___4

___9

___6

___3   ___8
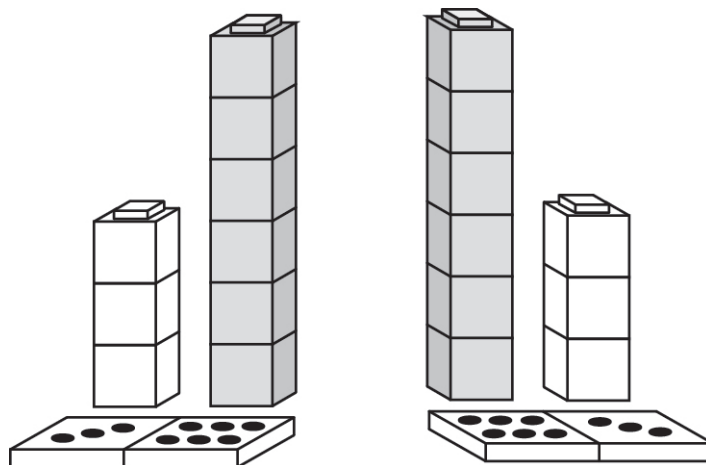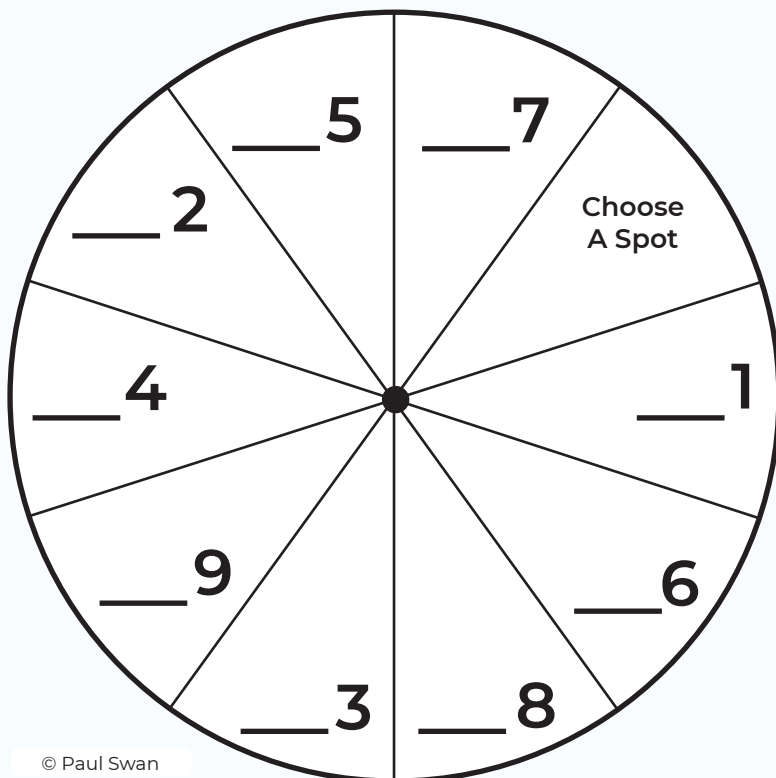
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Build To:

A game for two players.

Aim: To be the first player to place three counters, next to each other, in a row, column or diagonal.

Materials Required: 36 transparent counters, 18 of one colour and 18 of another colour.

· Players take turns to flick the spinner and place a counter on the board that 'builds the number shown on the spinner to ten'. For example, if the spinner shows 7, the player would place a counter on 3.

· Play continues until one player has placed three counters, next to each other, in a row, column or diagonal.

Variation

· Allow a 'bump off' rule

· Play "Build to any Decade" (see back).

Build to ...

Initially students would play 'Build to Ten'.

Later students can play 'Build to any Decade (ten)'. For example, they could play 'Build to 30'. When playing build to 30 the digit '2' should be inserted in the ten's place on the spinner. When playing 'Build to 50', the digit '4' would be inserted in the tens place on the spinner.

Variation

Allowing a bump off rule, that is, where one player may remove another player's counter from the board and replace it with one of their own. Encourages strategic thinking.

Australian Curriculum Links

Yr 1 (ACMNA015): Solve simple addition and subtraction problems using a range of strategies.

Yr 2: ACMNA030 Solve simple addition ... problems using a range of efficient mental ... strategies.

Elaborations

Becoming fluent with a range of mental strategies for addition ..., such as commutativity for addition, **building to 10**, doubles, 10 facts and adding 10.

Yr 3: (ACMNA055): Recall addition facts for single-digit numbers ... to develop increasingly efficient mental strategies for computation.

Elaborations

Recognise that certain single-digit number combinations always result in the same answer.
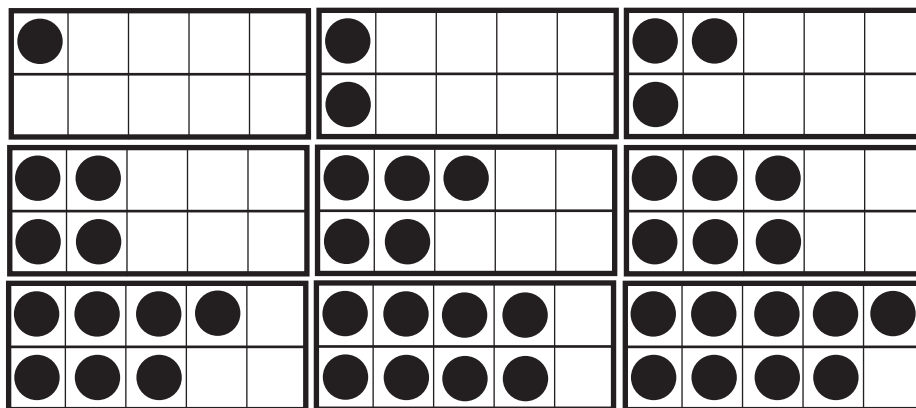
Teacher notes

Prior to learn the 'build to ten' facts students will have partitioned numbers such as 7, eg 7 + 0, 6 + 1, 5 + 2, 4 + 3, 3 + 4, 2 + 5, 1 + 6, 0 + 7. Eventually they will partition ten; 10 + 0, 9 + 1, 8 + 2 ...
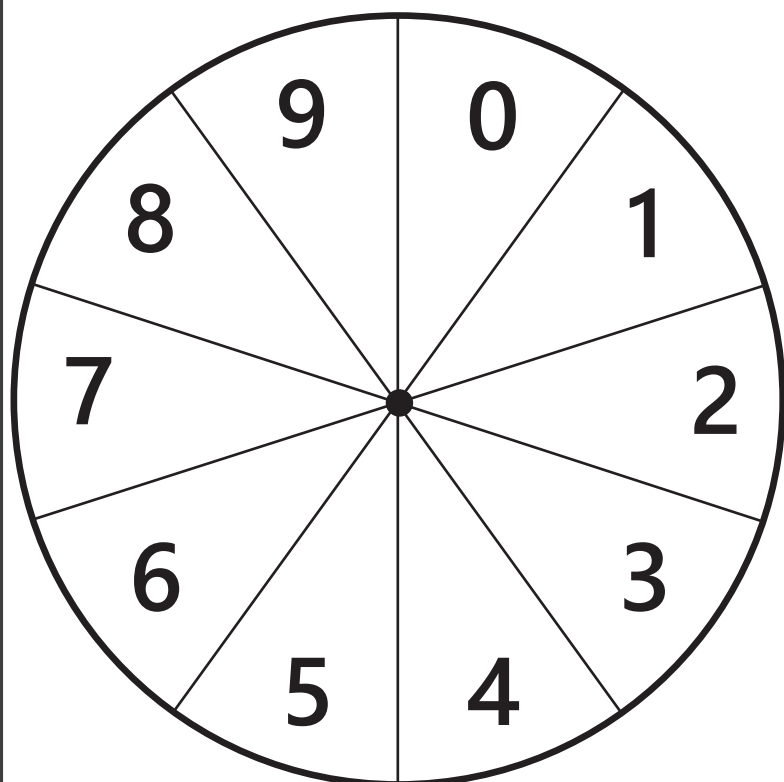
Ten frames are an ideal manipulative that will help children to learn 'build to ten facts'.

Cuisenaire Rods provide a different model.

Count On... + 1

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

Count On... + 1

A game for two players.

Aim: To be the first player to place three counters, next to each other, in a row, column or diagonal.

Materials Required: 36 transparent counters, 18 of one colour and 18 of another colour.

- Players take turns to flick the spinner and place a counter on a spot that is one more than the number spun. For example, if a player spins a 1, they will add one to that number and put their counter on a 2.

- Play continues until one player has placed three counters, next to each other, in a row, column or diagonal.

Variations
- Allow a 'bump off' rule
- For a longer game play 'four in a row.'

Spinner numbers: 9, 0, 1, 2, 3, 4, 5, 6, 7, 8

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ACMNA015

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Count On... + 2

6	9	7	5	10	8	7
10	11	10	6	9	11	10
8	6	11	10	7	5	11
5	7	10	8	11	9	8
9	6	6	11	5	7	5
8	9	5	7	8	6	9

Spinner: 8, 9, choose a spot, 3, 4, 5, 6, 7

Count On.. + 2

A game for two players.

Aim: To be the first player to place three counters, next to each other, in a row, column or diagonal.

Materials Required: 36 transparent counters, 18 of one colour and 18 of another colour.

• Players take turns to flick the spinner and place a counter on a spot that is two more than the number spun. For example, if a player spins a 3, they will add two to that number and put their counter on a 5.

• Play continues until one player has placed three counters, next to each other, in a row, column or diagonal.
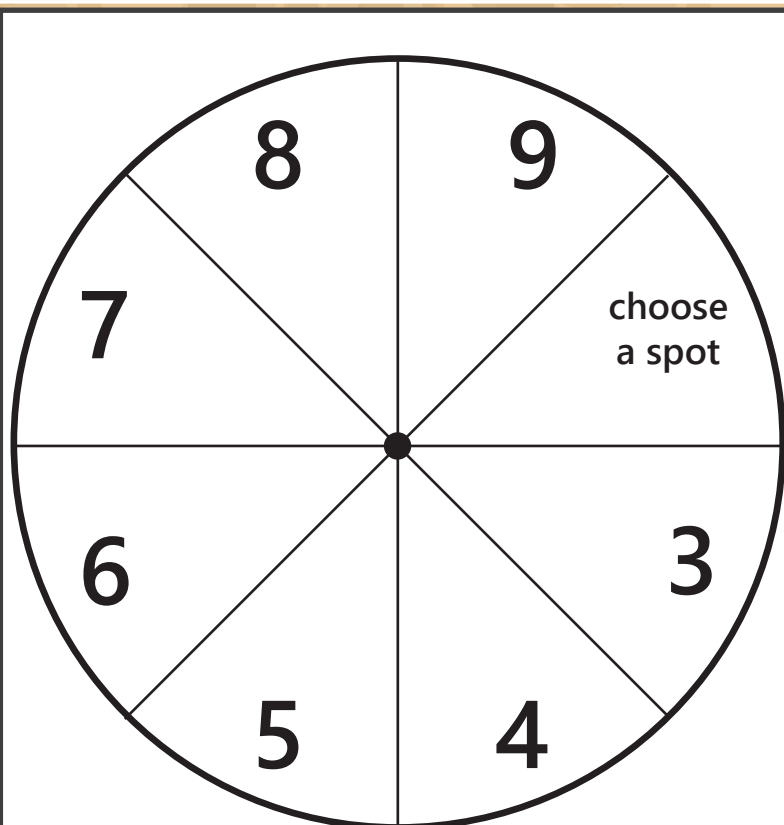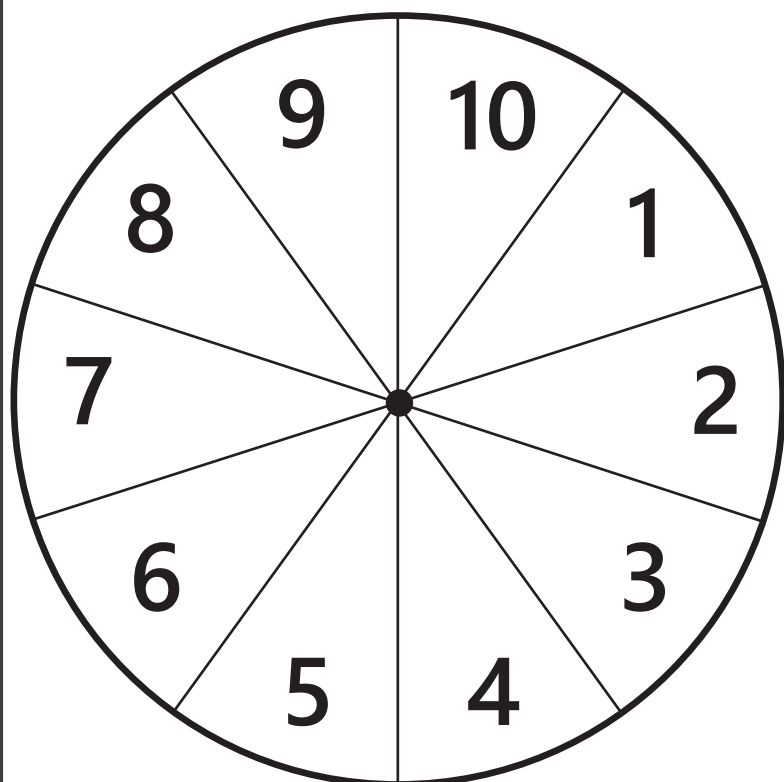
Variations
• Allow a 'bump off' rule
• For a longer game play 'four in a row.'

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ACMNA015

Count Back... - 1

	0	3	6	1	4	
1	6	9	0	8	5	2
2	8	5	2	4	7	8
7	4	9	0	3	6	9
5	8	3	5	9	7	1
3	1	6	0	7	4	2

Count Back... - 1

A game for two players.

Aim: To be the first player to place three counters, next to each other, in a row, column or diagonal.

Materials Required: 36 transparent counters, 18 of one colour and 18 of another colour.

- Players take turns to flick the spinner and place a counter on a spot that is one less than the number spun. For example, if a player spins a 1, they will subtract one from that number and put their counter on a 0.

- Play continues until one player has placed three counters, next to each other, in a row, column or diagonal.
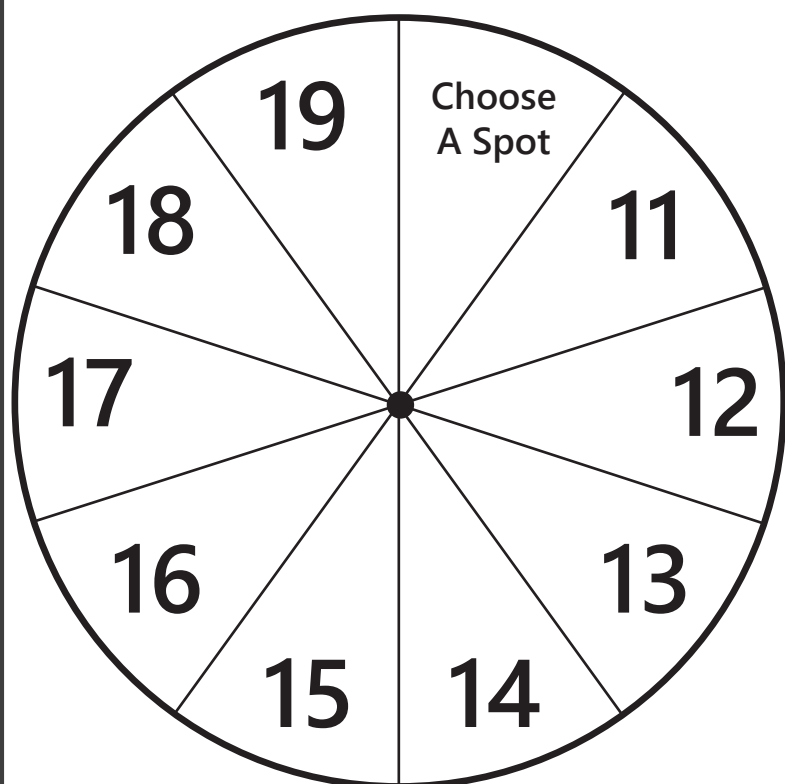
Variations

- Allow a 'bump off' rule
- For a longer game play 'four in a row.'

Spinner: 9, 10, 8, 1, 7, 2, 6, 3, 5, 4

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ACMNA015

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Teen Place Value

1 ten 2 ones	10+3	18	10+7	1 ten 3 ones	10+9
15	1 ten 5 ones	10+1	11	1 ten 7 ones	10+6
10+8	1 ten 4 ones	19	1 ten 8 ones	14	10+4
1 ten 6 ones	10+2	10+5	16	1 ten 1 one	10+3
1 ten 9 ones	10+7	1 ten 2 ones	10+8	12	10+5
10+1	13	10+4	10+6	10+9	17

Choose A Spot

19 11 18 17 12 16 13 15 14

Teen Place Value

A game for two players.

Aim: To be the first player to place three counters, next to each other, in a row, column or diagonal.

Materials Required: 36 transparent counters, 18 of one colour and 18 of another colour.

• Players take turns to flick the spinner and place a counter on a spot on the board that matches the 'teen number' on the spinner. For example, 17 matches with 17, 10+7 or 1 ten 7 ones.

• Play continues until one player has placed three counters, next to each other, in a row, column or diagonal.
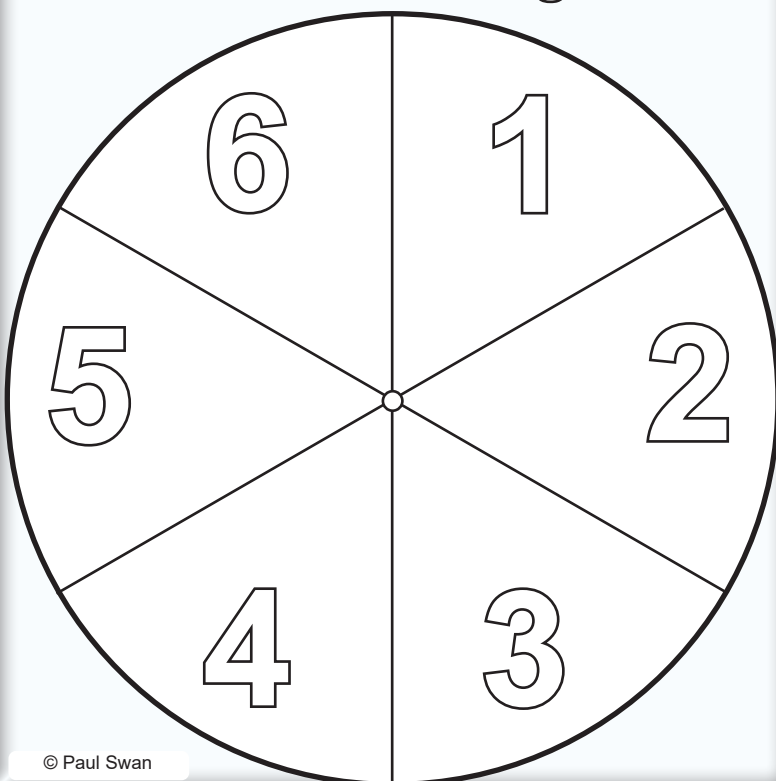
Variations
• Allow a 'bump off' rule
• For a longer game play 'four in a row.'

ACMNA014

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One More Bingo

7	° ° °	6	° ° ° °	2	° ° °
° ° ° ° ° °	° °	° ° ° °	° ° ° ° ° °	5	° ° ° ° ° °
6	° ° ° °	3	5	° ° °	° °
° ° ° ° ° °	2	° ° ° ° ° °	° °	° ° ° °	4
4	° ° °	7	3	° ° ° ° °	° ° ° ° ° °
° ° ° ° ° ° °	° ° °	° °	° ° °	° ° ° ° ° °	° ° ° ° ° °

One More Bingo

A game for two players.

Aim: To be the first player to place three counters, next to each other, in a row, column or diagonal.

Materials Required: 36 transparent counters, 18 of one colour and 18 of another colour.

- Players take turns to flick the spinner and place a counter on the board that shows the number that is **one more than** the number shown on the spinner. For example, if a player spins a six then counter would be placed on 7.
- Play continues until one player has placed three counters, next to each other, in a row, column or diagonal.
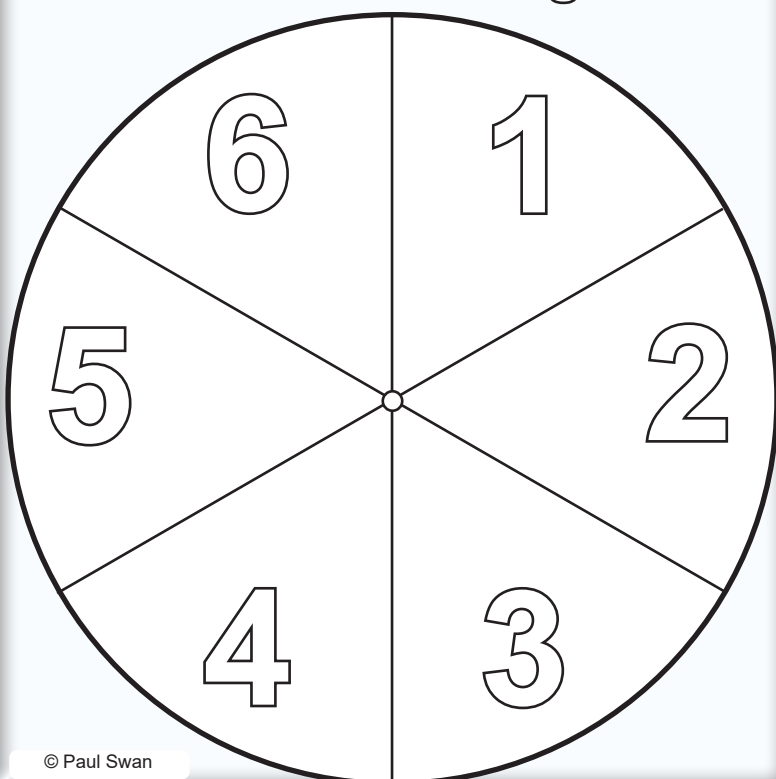
Variation
- Play "Number After" bingo.
- Allow a 'bump off' rule.

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One Fewer Bingo

0	∘∘∘	6	∘∘∘∘	2	∘∘∘
∘∘∘∘∘∘	∘∘	∘∘∘∘		5	
6	∘∘∘∘	3	5	∘∘∘	∘∘
	2	∘∘∘∘∘∘	∘∘	∘∘∘∘∘	4
4	∘∘∘	0	3	∘∘∘∘∘∘	∘∘∘∘∘∘
∘∘∘∘∘∘	∘∘∘∘∘	∘∘∘	∘∘∘∘∘		∘∘∘∘∘∘∘

One Fewer Bingo

6 · 1 · 5 · 2 · 4 · 3

A game for two players.

Aim: To be the first player to place three counters, next to each other, in a row, column or diagonal.

Materials Required: 36 transparent counters, 18 of one colour and 18 of another colour.

- Players take turns to flick the spinner and place a counter on the board that shows the number that is **one fewer than** the number shown on the spinner. For example, if a player spins a six then counter would be placed on 5.
- Play continues until one player has placed three counters, next to each other, in a row, column or diagonal.

Variation
- Play "Number After" bingo.
- Allow a 'bump off' rule.

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Place Value: Two Digit

10+5	5 tens 5 ones	30+1	40+7	1 ten 3 ones	20+6
3 tens 1 one	70+4	1 ten 5 ones	20+4	7 tens 4 ones	1 ten 8 ones
70+4	10+3	2 tens 4 ones	1 ten 8 ones	7 tens 4 ones	10+5
5 tens 5 ones	4 tens 7 ones	10+8	20+6	2 tens 6 ones	4 tens 7 ones
20+4	3 tens 1 one	30+1	1 ten 5 ones	10+3	50+5
1 ten 3 ones	50+5	2 tens 6 ones	10+8	40+7	2 tens 4 ones

A game for two players.

Aim: To be the first player to place three counters, next to each other, in a row, column or diagonal.
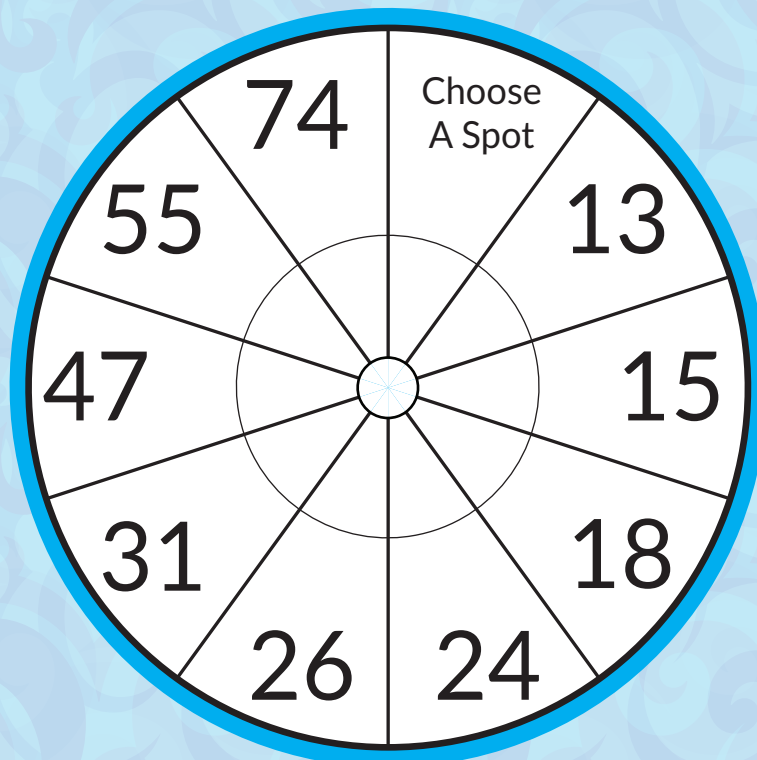
Materials Required: 36 transparent counters, 18 of one colour and 18 of another colour.

Players take turns to flick the spinner and place a counter on a corresponding spot on the board.

Play continues until one player has placed three counters, next to each other, in a row, column or diagonal.
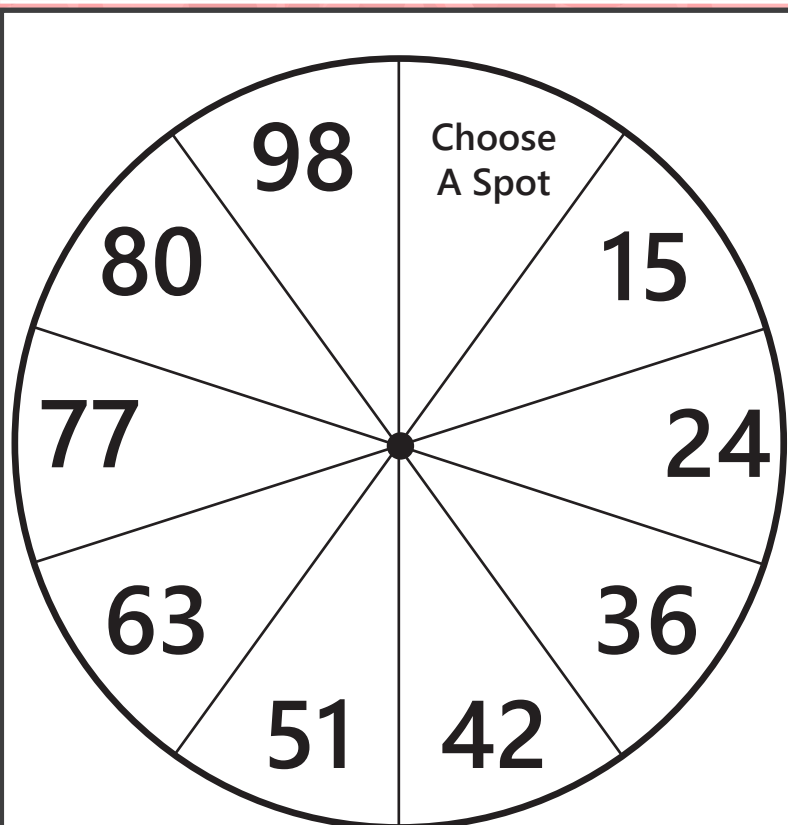
Variations

- Allow a 'bump off' rule
- For a longer game play 'four in a row.'

Spinner with sections: 74, Choose A Spot, 13, 15, 18, 24, 26, 31, 47, 55

Place Value: Two Digit (Different Representations)

20+4	40+2	tens | ones 5 | 1	2 tens 4 ones	60+3	9 x 10 +8 x 1
6 tens 3 ones	90+8	70+7	40+2	tens | ones 5 | 1	30+6
tens | ones 3 | 6	60+3	7 tens 7 ones	20+4	8 x 10 +0 x 1	tens | ones 2 | 4
80+0	4 tens 2 ones	tens | ones 1 | 5	1 ten 5 ones	90+8	6 x 10 +3 x 1
3 tens 6 ones	80+0	10+5	50+1	tens | ones 4 | 2	70+7
50+1	9 tens 8 ones	7 x 10 +7 x 1	30+6	8 tens 0 ones	10+5

Spinner: 98, Choose A Spot, 15, 24, 36, 42, 51, 63, 77, 80

Place Value: 2 Digit

Different Representations

A game for two players.

Aim: To be the first player to place three counters, next to each other, in a row, column or diagonal.

Materials Required: 36 transparent counters, 18 of one colour and 18 of another colour.

- Players take turns to flick the spinner and place a counter on a corresponding spot on the board. For example, if a 15 is spun, the player would put a counter on 10 + 5, or one of the spots that says 1 ten 5 ones.
- Play continues until one player has placed three counters, next to each other, in a row, column or diagonal.

Variations

- Allow a 'bump off' rule
- For a longer game play 'four in a row.'

ACMNA015

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Money Match 1

5c	10c	$1	$2	ten cents	$0.05
20c	$2	50c	$1.00	5c	50c
10c	one dollar	$0.50	20c	twenty cents	$1
$0.20	$0.10	$1.00	$0.50	$2.00	two dollars
fifty cents	5c	$2.00	20c	five cents	$1
10c	$2	$0.05	$0.20	50c	$0.10

Money Match 1

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Money Match 1

A game for two players.

Aim: To be the first player to place three counters, next to each other, in a row, column or diagonal.

Materials Required: 36 transparent counters, 18 of one colour and 18 of another colour.

- Players take turns to flick the spinner and place a counter on a spot on the board that matches the coin shown. For example, if the spinner shows fifty cents, the player would place a counter on $0.50 or 50c or 'fifty cents'.

- Play continues until one player has placed three counters, next to each other, in a row, column or diagonal.

Variation

- Allow a 'bump off' rule

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Money Match

Children need many and varied experiences handling money in order to develop Financial Literacy. When children accompany their parents to the shop they rarely see coins and notes being exchanged but rather a credit or debit card is swiped. Classroom shops are an ideal way of encouraging children to pick out the closest amount to the total and then for the "shop keeper" to count back change using the "shop keepers'" method. This game is just a first step in developing financial literacy - **recognising coins**.

Australian Curriculum Links

Yr 1 ACMNA017

Recognise, describe and order Australian coins according to their value.

Elaborations

- understanding that the value of Australian coins is not related to size.
- describing the features of coins that make it possible to identify them.

Teacher notes

Money concepts with coins can be difficult to teach as the relationship between one coin and another coin is not obvious. Physically the coins are not in proportion to one another. The 20c coin is NOT twice the size or twice as heavy as a 10c coin. The $1 coin is larger than the $2 coin, which doesn't really make sense to young children.

A variety of coin recognition activities may be found on pages 20 - 47 of Swan, P., & Marshall, L. (2009). *Money Matters: A teachers handbook for developing money concepts*. Perth: R.I.C. Publications.

Rubbing a soft pencil on a piece of paper that covers a coin will help to focus children on the features and sizes of the various coins.

Note that the five cent coin has an echidna pictured on it; the ten cent coin, a lyrebird; the twenty cent coin, a platypus and kangaroos are shown on the $1 coin. The fifty cent coin is the only coin that is NOT round. It is twelve-sided - a do-decagon and depicts the Australian coat of arms.
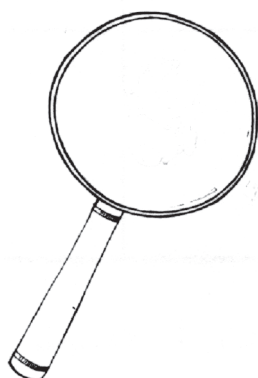
If children use a magnifying glass they will note other features of the coins. The shield on the fifty cent coin shows the six state badges and a kangaroo and emu - the animal emblems of Australia. In the background is the national flower of Australia - the golden wattle. The two dollar coin is the only double-headed coin, containing a picture of the regning monarch on one side and a picture of an Aboriginal elder on the other side. The Southern Cross is shown in the background and a grass tree is depicted to the right of the number 2.

Money Match 2

10c	$0.50	forty cents	$1.50	$0.80	twenty cents
80c	one dollar fifty	120c	$2	ten cents	$1
$0.20	$2.00	$0.10	fifty cents	$1.00	$0.40
one dollar	50c	two dollars	$1.20	40c	$1.50
$1.20	10c	$2	eighty cents	20c	40c
50c	150c	20c	$1	one dollar twenty	80c

Money Match 2

Choose A Spot
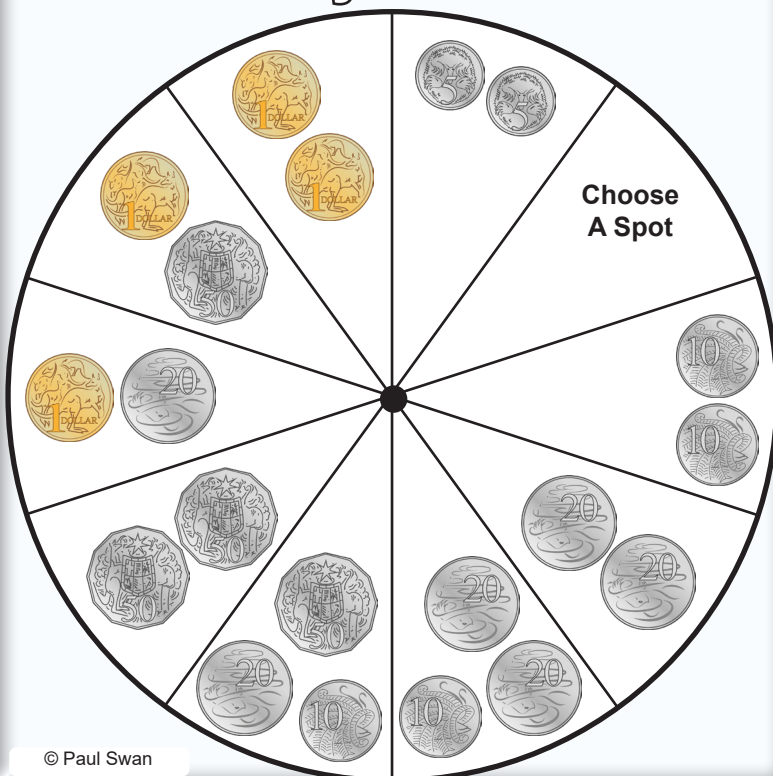
© Paul Swan

Money Match 2

A game for two players.

Aim: To be the first player to place three counters, next to each other, in a row, column or diagonal.

Materials Required: 36 transparent counters, 18 of one colour and 18 of another colour.

- Players take turns to flick the spinner and place a counter on a spot on the board that matches the total of the coins shown on the spinner. For example, if the spinner shows 10c + 10c, the player would place a counter on 20c, $0.20 or 'twenty cents'.
- Play continues until one player has placed three counters, next to each other, in a row, column or diagonal.

Variation
- Allow a 'bump off' rule

Money Match 2

Children need many and varied experiences handling money in order to develop Financial Literacy. When children accompany their parents to the shop they rarely see coins and notes being exchanged but rather a credit or debit card is swiped. Classroom shops are an ideal way of encouraging children to pick out the closest amount to the total and then for the "shop keeper" to count back change using the "shop keepers' " method. This game is just one step in developing financial literacy - **counting or adding coins**.

Australian Curriculum Links

Yr 2 ACMNA034

Count and order small collections of Australian *coins* ... according to their value.

Elaborations

- identifying equivalent values in collections of *coins* ..., such as two five-cent coins having the same value as one 10-cent coin.

- counting collections of *coins* ... to make up a particular value.

Teacher notes

In order to count coins, children need to be able to:

- recognise coins and separate coins of the same denomination from a collection of coins, and

- count by 5s, 10s, 20s, 50s, 1s and 2s.

A variety of coin recognition activities may be found on pages 49 - 74 of Swan, P., & Marshall, L. (2009). *Money Matters: A teachers handbook for developing money concepts*. Perth: R.I.C. Publications.
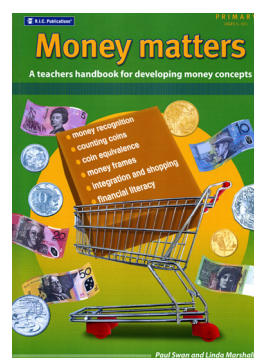
What to look for

- Counting coins is an extension of the counting principles.

- Do they know the counting sequence in the right order, eg 5, 10, 15, 20 25 ...?

- Do children touch (and move) the counts as they say the counting word? Check there is a one-to-one correspondence.

- Do they realise that the last word that they say when touching the last coin in the group indicates the total amount of coins?

- Do they count to milestones, eg $1?

For further experience with money try setting up and running a class shop.

Collect and Count is another coin counting game that is harder than this game and involves collecting a variety of coins and either keeping a cumulative total as the game progresses or counting a pile of coins at the end.
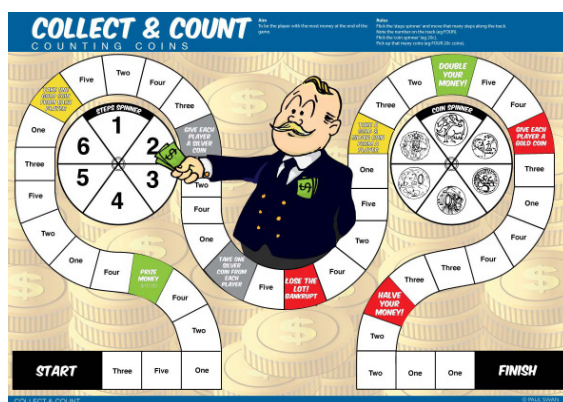
Time Match (Hour)
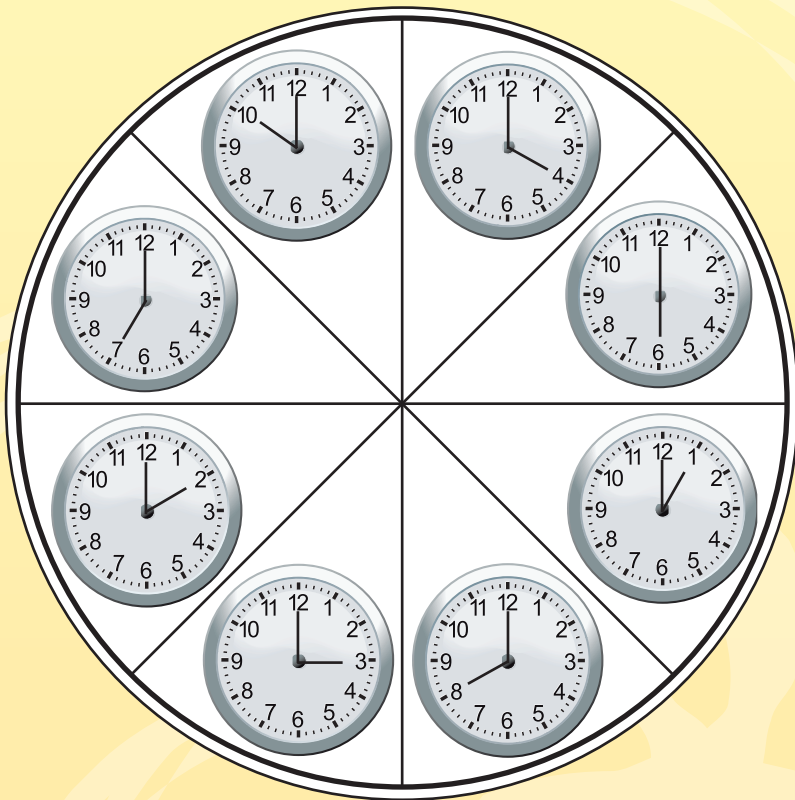
Time Match Hour

A game for two players.

Aim: To be the first player to place three counters, next to each other, in a row, column or diagonal.

Materials Required: 36 transparent counters, 18 of one colour and 18 of another colour.

- Players take turns to flick the spinner and place a counter on the board that is equivalent to the time shown on the spinner.

- Play continues until one player has placed three counters, next to each other, in a row, column or diagonal.

  Variation

- Play 4 in a row column or diagonal.

- Allow a 'bump off' rule.

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3:00	7 o'clock	10:00	8 o'clock	4 o'clock	1:00	6 o'clock	8:00
10 o'clock	8:00	4 o'clock	1 o'clock	2:00	3 o'clock	2:00	10 o'clock
7:00	1:00	6 o'clock	3:00	10 o'clock	6:00	7:00	2:00
8 o'clock	6:00	10:00	2 o'clock	1 o'clock	4 o'clock	8:00	7 o'clock
4:00	3:00	1 o'clock	7:00	2 o'clock	6 o'clock	3 o'clock	4:00
7 o'clock	6:00	3 o'clock	4:00	8 o'clock	10:00	2 o'clock	1:00

Time Match (Hour)

Students may be exposed to time in several ways prior to the formal teaching of clock reading. An analogue and digital clock should hang at the front of every classroom. Reference may be made to various times in the day. For example, 'It is nearly 12 o'clock and we have lunch at 12 o'clock' or 'it is nearly 3 o'clock; time to pack up.'

Australian Curriculum Links

- Children in Year 1 are expected to tell time to the nearest half hour (ACMMG020) so the 'Time Match' series of games begin with telling the time to the hour. Children are introduced to analogue clocks, digital representations of time and the o'clock language.

- The second game in the series targets telling time to the half hour (ACMMG020). In this version, children have to link the analogue representation of time with the digital representation. The language of 'half past' and 'thirty' is introduced.

- The third game in the series targets telling the time to the quarter hour. Children in Year 2 are expected to tell the time to the nearest quarter of an hour (ACMMG039). In this version, children have to link the analogue representation of time with the digital representation. The language of 'quarter past', 'quarter to', and 'fifteen' and 'forty-five' is introduced.

Teacher notes

Half Past

A geared clock may be used to model the movement of the hands around the clock face. Point out that as the minute or longer hand moves around the clock so does the hour hand (shorter one). Turn the gears on the back of the clock and highlight the fact that at 'half past', the long hand is pointing at 6, the hour hand will be half-way between two numbers on the clock. For example, at 'half past ten' the hour hand will be positioned half way between 10 and 11.

Quarter Past and Quarter to

The idea of 'past' and 'to' can cause difficulty for young children because of the language used to describe a time. For example 8:45, may be expressed as 'eight forty-five' and 'quarter to nine'. Note that in the first two instances the 'eight' is highlighted, whereas 'eight' is not mentioned in the third example.
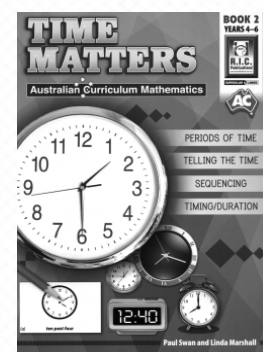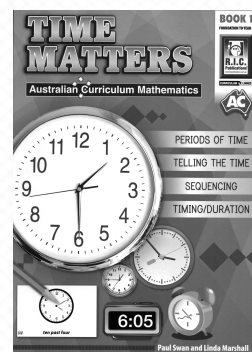
Try to expose the children to a variety of clock faces so that they become familiar with the standard clock face, a 12, 3, 6 and 9 clock face, Roman numeral clock faces and so on.

5 Minutes and 1 Minute

At Year 3 level, students are expected to tell the time to the nearest minute (ACMMG062). Students will need to read the calibration marks between each 5 minute interval. Initially students might be taught to read to the nearest 5 minutes (children will need to be able to skip count by 5s). Later they will need to count on in one minute periods from the previous five minute interval. Students may then notice that in the case of "19 minutes past", it is easier to look at the 20 minute interval marker and count back one minute. Students will need to make judgments when the minute hand points between two one-minute interval markers. There are clear links between reading a calibrated scale, such as an analogue clock face, and number lines. so Teachers may wish to consider teaching number lines in detail prior to teaching children to reading a sophisticated number line, with a double scale, that goes around a circle.
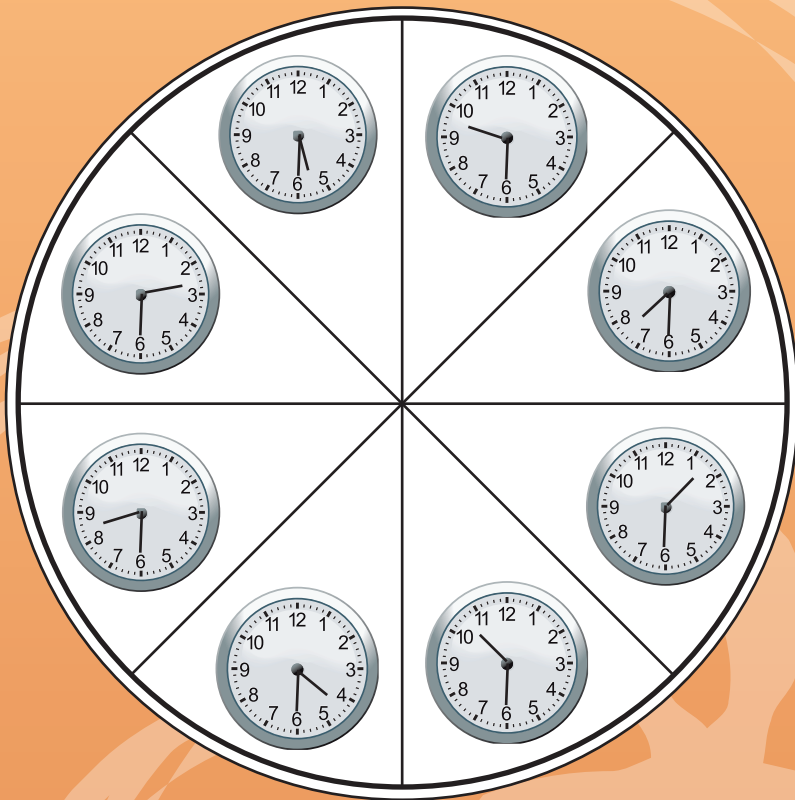
Extensions to the rules

- Allow a 'bump off' rule, that is, one player may remove another player's counter from the board and replace it with one of their own.

- Require the players to place 4 counters in a row, diagonal or column.

Time Match (Half Hour)

Time Match Half Hour

A game for two players.

Aim: To be the first player to place three counters next to each other, in a row, column or diagonal.

Materials Required: 36 transparent counters, 18 of one colour and 18 of another colour.

- Players take turns to flick the spinner and place a counter on the board that is equivalent to the time shown on the spinner.

- Play continues until one player has placed three counters next to each other, in a row, column or diagonal.

Variation
- Allow a 'bump off' rule

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8:30	Half Past One	4 Thirty	9:30	7 Thirty	Half Past 5	Half Past 7	8 Thirty
5 Thirty	Half Past 2	7 Thirty	Half Past 10	4 Thirty	1 Thirty	2:30	9 Thirty
Half Past 9	7:30	10 Thirty	1:30	Half Past 8	2 Thirty	Half Past 7	5:30
10:30	4 Thirty	1:30	5 Thirty	9:30	Half Past 10	2:30	Half Past 2
Half Past 1	5:30	1 Thirty	Half Past 8	4:30	8 Thirty	Half Past 9	4 Thirty
4:30	9 Thirty	10:30	2 Thirty	Half Past 5	7:30	10 Thirty	8:30

Time Match (Half Hour)

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Teacher notes

Half Past

A geared clock may be used to model the movement of the hands around the clock face. Point out that as the minute or longer hand moves around the clock so does the hour hand (shorter one). Turn the gears on the back of the clock and highlight the fact that at 'half past', the long hand is pointing at 6, the hour hand will be half-way between two numbers on the clock. For example, at 'half past ten' the hour hand will be positioned half way between 10 and 11.

Quarter Past and Quarter to

The idea of 'past' and 'to' can cause difficulty for young children because of the language used to describe a time. For example 8:45, may be expressed as 'eight forty-five' and 'quarter to nine'. Note that in the first two instances the 'eight' is highlighted, whereas 'eight' is not mentioned in the third example.
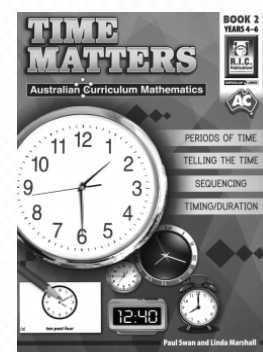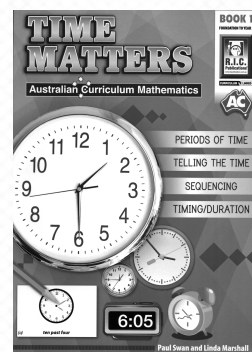
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5 Minutes and 1 Minute

At Year 3 level, students are expected to tell the time to the nearest minute (ACMMG062). Students will need to read the calibration marks between each 5 minute interval. Initially students might be taught to read to the nearest 5 minutes (children will need to be able to skip count by 5s). Later they will need to count on in one minute periods from the previous five minute interval. Students may then notice that in the case of "19 minutes past", it is easier to look at the 20 minute interval marker and count back one minute. Students will need to make judgments when the minute hand points between two one-minute interval markers. There are clear links between reading a calibrated scale, such as an analogue clock face, and number lines. so Teachers may wish to consider teaching number lines in detail prior to teaching children to reading a sophisticated number line, with a double scale, that goes around a circle.

Extensions to the rules

- Allow a 'bump off' rule, that is, one player may remove another player's counter from the board and replace it with one of their own.

- Require the players to place 4 counters in a row, diagonal or column.

Time Match (Quarter Hour)
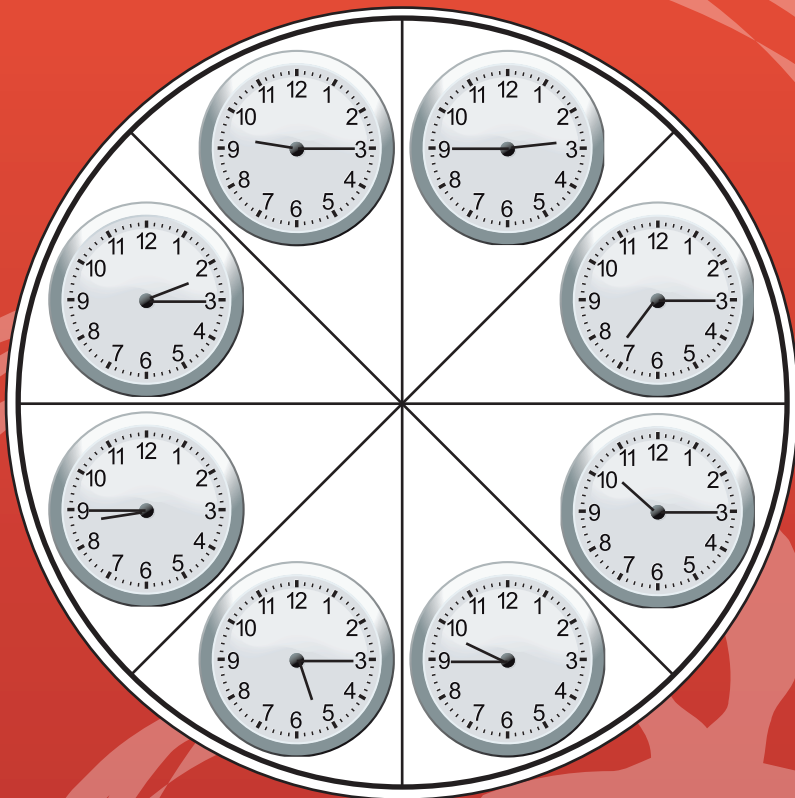
Time Match Quarter Hour

A game for two players.

Aim: To be the first player to place three counters, next to each other, in a row, column or diagonal.

Materials Required: 36 transparent counters, 18 of one colour and 18 of another colour.

• Players take turns to flick the spinner and place a counter on the board that is equivalent to the time shown on the spinner.

• Play continues until one player has placed three counters, next to each other, in a row, column or diagonal.

Variation
• Allow a 'bump off' rule.

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quarter past 7	5 fifteen	quarter past 9	9:45	quarter to 9	2 fifteen	quarter to 3	10:15
9:15	2 forty-five	7:15	2 fifteen	quarter past 10	5:15	7 fifteen	quarter past 5
8:45	quarter to 10	2:45	9 fifteen	9 forty-five	quarter past 2	10:15	8 forty-five
quarter past 9	5:15	10 fifteen	2:15	quarter past 7	9 fifteen	2 forty-five	quarter to 10
quarter past 2	7 fifteen	9:15	9 forty-five	quarter past 5	2:45	quarter past 10	8:45
9:45	quarter to 9	5 fifteen	7:15	8 forty-five	10 fifteen	2:15	quarter to 3

Time Match (Quarter Hour)

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Teacher notes

Half Past

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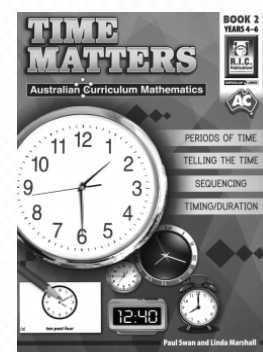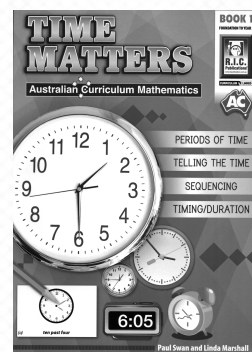
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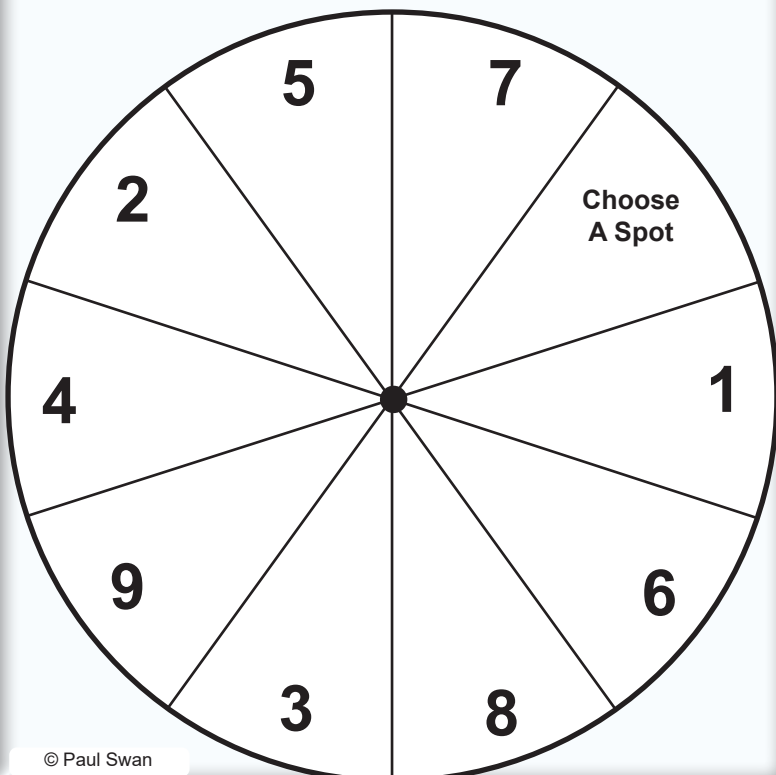
Extensions to the rules

- Allow a 'bump off' rule, that is, one player may remove another player's counter from the board and replace it with one of their own.

- Require the players to place 4 counters in a row, diagonal or column.

Doubles

2	6	18	14	8	4
8	14	12	16	2	10
4	16	2	6	10	18
10	6	16	12	18	14
12	2	16	8	4	18
6	14	4	10	12	8

Doubles

Spinner segments: 5, 7, Choose A Spot, 1, 6, 8, 3, 9, 4, 2

© Paul Swan

Doubles:

A game for two players.

Aim: To be the first player to place three counters, next to each other, in a row, column or diagonal.

Materials Required: 36 transparent counters, 18 of one colour and 18 of another colour.

- Players take turns to flick the spinner and place a counter on a spot on the board that is double the number shown on the spinner. For example, if the spinner shows 7, the player would place a counter on 14.

- Play continues until one player has placed three counters, next to each other, in a row, column or diagonal.

Variation
- Allow a 'bump off' rule

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Doubles

Initially students would play 'Doubles'.

Later students can play 'Doubles add one' and 'Doubles take one'.

Australian Curriculum Links

Yr 1 (ACMNA015): Solve simple addition and subtraction problems using a range of strategies

Yr 2: ACMNA030 Solve simple addition ... problems using a range of efficient mental ... strategies

Elaborations

Becoming fluent with a range of mental strategies for addition ..., such as commutativity for addition, building to 10, **doubles**, 10 facts and adding 10

Yr 3: (ACMNA055): Recall addition facts for single-digit numbers ... to develop increasingly efficient mental strategies for computation

Elaborations

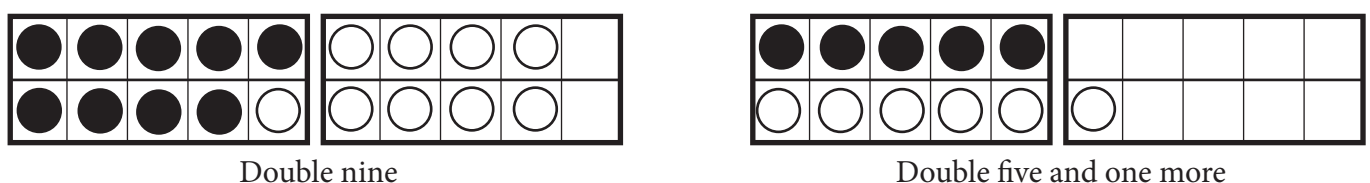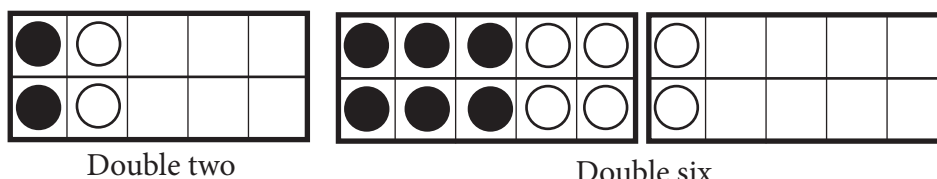Recognise that certain single-digit number combinations always result in the same answer.

Teacher notes

Prior to learning the 'near doubles facts' students will need to have developed some fluency with doubles facts. Doubles facts (and near doubles facts) may be developed using Unifix materials and Dominoes. Initially students may be exposed to all the doubles and near doubles from a standard double six domino set. Students may be asked to build towers with Unifix that are the same height as the number of dots shown on the domino. One tower should be built in one colour and the second tower built in a different colour. The two towers may be combined (added) and the total number of Unifix counted. Using two colours will help link the initial addition question to the answer.

Later near doubles may be combined and the double nine dominoes may be used to complete all the doubles and near doubles facts to 9 + 9.
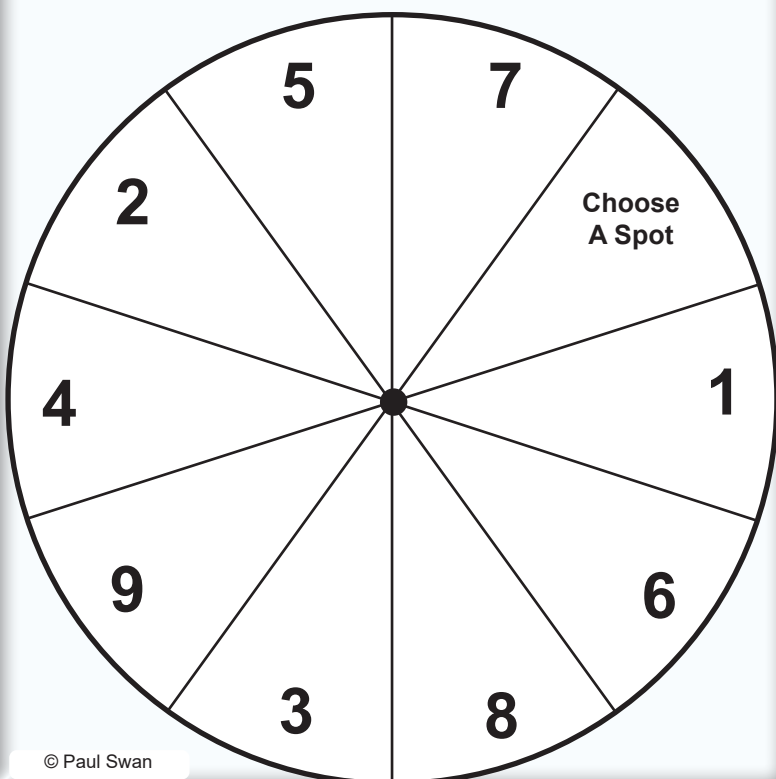

Ten frames are an ideal manipulative that will help children to learn 'doubles and near doubles'. For example,

Double two   Double six

Double nine   Double five and one more

Near Doubles: Doubles + 1

3	7	19	15	9	5
9	15	13	17	3	11
5	17	3	7	11	19
11	7	17	13	19	15
13	3	17	9	5	19
7	15	5	11	13	9

Near Doubles: Doubles + 1

Spinner: Choose A Spot — 5, 7, 1, 6, 8, 3, 9, 4, 2

© Paul Swan

Doubles + 1:

A game for two players.

Aim: To be the first player to place three counters, next to each other, in a row, column or diagonal.

Materials Required: 36 transparent counters, 18 of one colour and 18 of another colour.

- Players take turns to flick the spinner and place a counter on a spot on the board that is the number shown on the spinner doubled and with one added. For example, if the spinner shows 7, the player would place a counter on 15 (7 x 2 + 1).
- Play continues until one player has placed three counters, next to each other, in a row, column or diagonal.

Variation
- Allow a 'bump off' rule

drpaulswan.com.au

Doubles

Initially students would play 'Doubles'.

Later students can play 'Doubles add one' and 'Doubles take one'.

Australian Curriculum Links

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Yr 2: ACMNA030 Solve simple addition ... problems using a range of efficient mental ... strategies

Elaborations

Becoming fluent with a range of mental strategies for addition ..., such as commutativity for addition, building to 10, *doubles*, 10 facts and adding 10

Yr 3: (ACMNA055): Recall addition facts for single-digit numbers ... to develop increasingly efficient mental strategies for computation

Elaborations

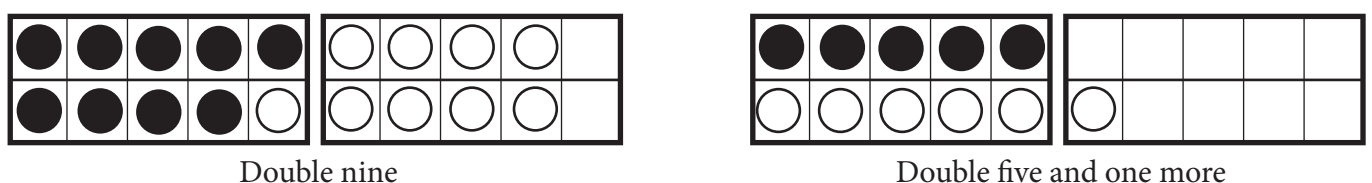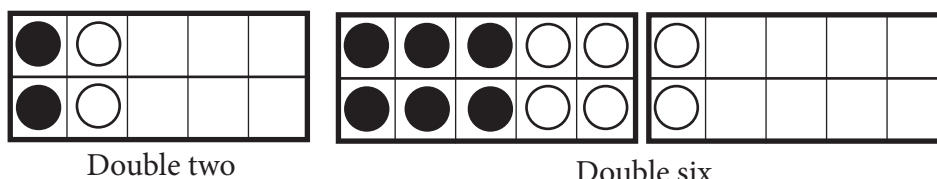Recognise that certain single-digit number combinations always result in the same answer.

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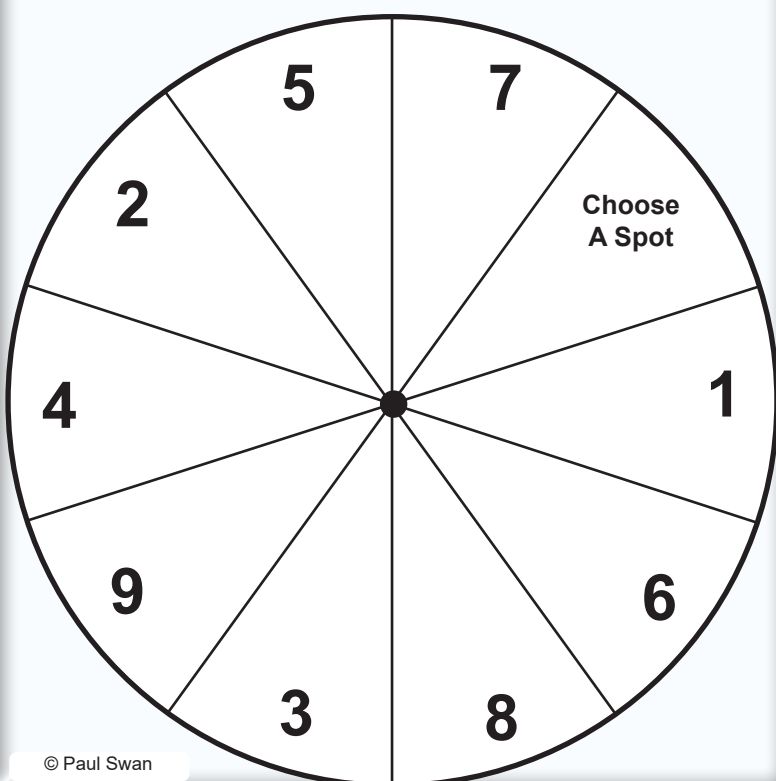Ten frames are an ideal manipulative that will help children to learn 'doubles and near doubles'. For example,

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Near Doubles: Doubles - 1

1	5	17	13	7	3
7	13	11	15	1	9
3	15	1	5	9	17
9	5	15	11	17	13
11	1	15	7	3	17
5	13	3	9	11	7

Near Doubles: Doubles - 1

Spinner numbers: 5, 7, 2, 4, 9, 3, 8, 6, 1 — **Choose A Spot**

© Paul Swan

Doubles - 1:

A game for two players.

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- Players take turns to flick the spinner and place a counter on a spot on the board that is the number shown on the spinner doubled and with one subtracted. For example, if the spinner shows 7, the player would place a counter on 13 (7 x 2 - 1).
- Play continues until one player has placed three counters, next to each other, in a row, column or diagonal.

Variation
- Allow a 'bump off' rule

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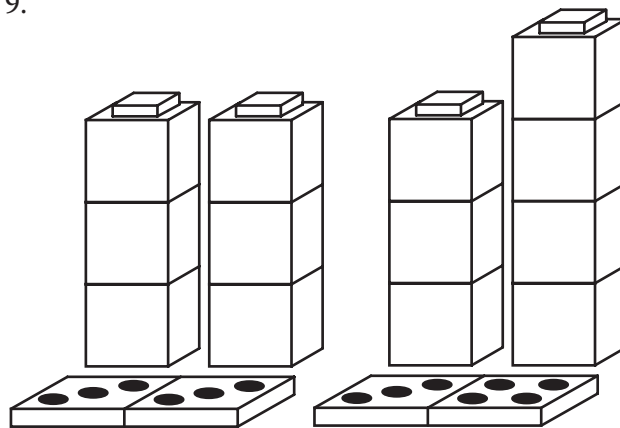
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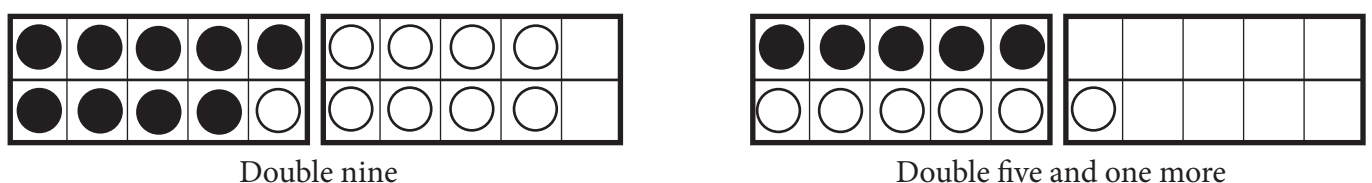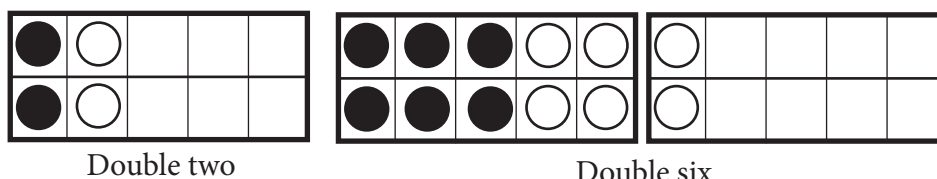Recognise that certain single-digit number combinations always result in the same answer.

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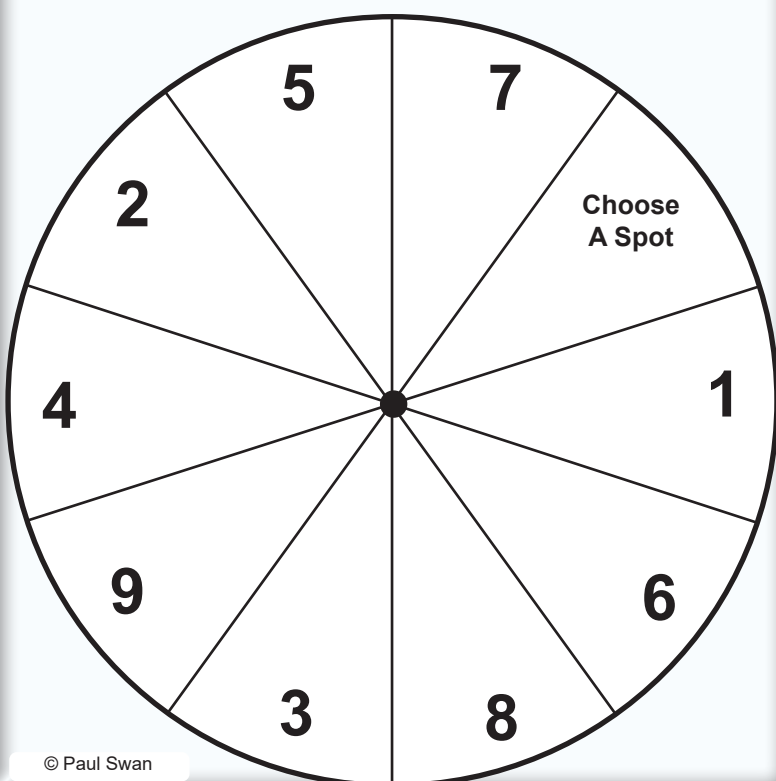

Ten frames are an ideal manipulative that will help children to learn 'doubles and near doubles'. For example,

Double two   Double six

Double nine   Double five and one more

Near Doubles: Doubles - 2

0	4	16	12	6	2
6	12	10	14	0	8
2	14	0	4	8	16
8	4	14	10	16	12
10	0	14	6	2	16
4	12	2	8	10	6

Near Doubles: Doubles - 2

Spinner:
5, 7, Choose A Spot, 1, 6, 8, 3, 9, 4, 2

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Doubles - 2:

A game for two players.

Aim: To be the first player to place three counters, next to each other, in a row, column or diagonal.

Materials Required: 36 transparent counters, 18 of one colour and 18 of another colour.

- Players take turns to flick the spinner and place a counter on a spot on the board that is the number shown on the spinner doubled and with one subtracted. For example, if the spinner shows 7, the player would place a counter on 12 (7 x 2 - 2).
- Play continues until one player has placed three counters, next to each other, in a row, column or diagonal.

Variation
- Allow a 'bump off' rule

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Doubles

Initially students would play 'Doubles'.

Later students can play 'Doubles add one' and 'Doubles take one'.

Australian Curriculum Links

Yr 1 (ACMNA015): Solve simple addition and subtraction problems using a range of strategies

Yr 2: ACMNA030 Solve simple addition ... problems using a range of efficient mental ... strategies

Elaborations

Becoming fluent with a range of mental strategies for addition ..., such as commutativity for addition, building to 10, **doubles**, 10 facts and adding 10

Yr 3: (ACMNA055): Recall addition facts for single-digit numbers ... to develop increasingly efficient mental strategies for computation
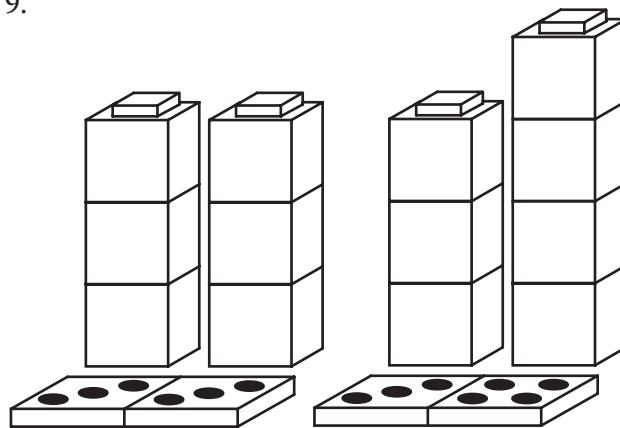
Elaborations

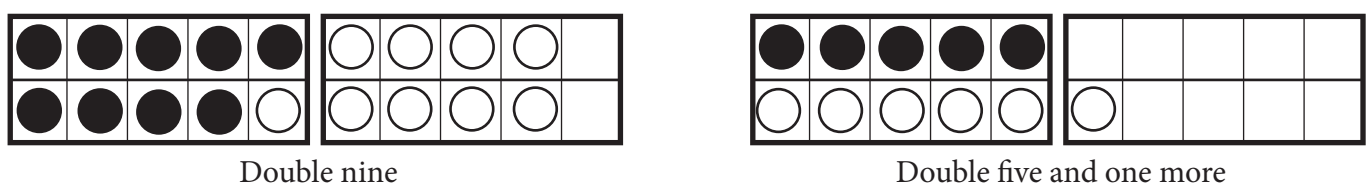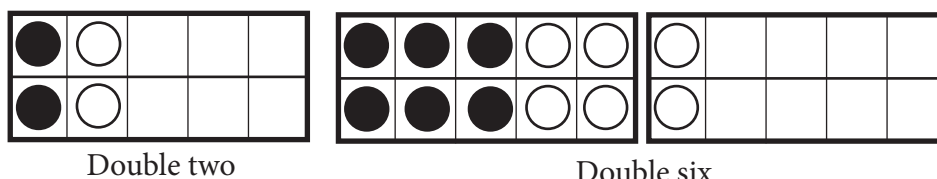Recognise that certain single-digit number combinations always result in the same answer.

Teacher notes

Prior to learning the 'near doubles facts' students will need to have developed some fluency with doubles facts. Doubles facts (and near doubles facts) may be developed using Unifix materials and Dominoes. Initially students may be exposed to all the doubles and near doubles from a standard double six domino set. Students may be asked to build towers with Unifix that are the same height as the number of dots shown on the domino. One tower should be built in one colour and the second tower built in a different colour. The two towers may be combined (added) and the total number of Unifix counted. Using two colours will help link the initial addition question to the answer.

Later near doubles may be combined and the double nine dominoes may be used to complete all the doubles and near doubles facts to 9 + 9.
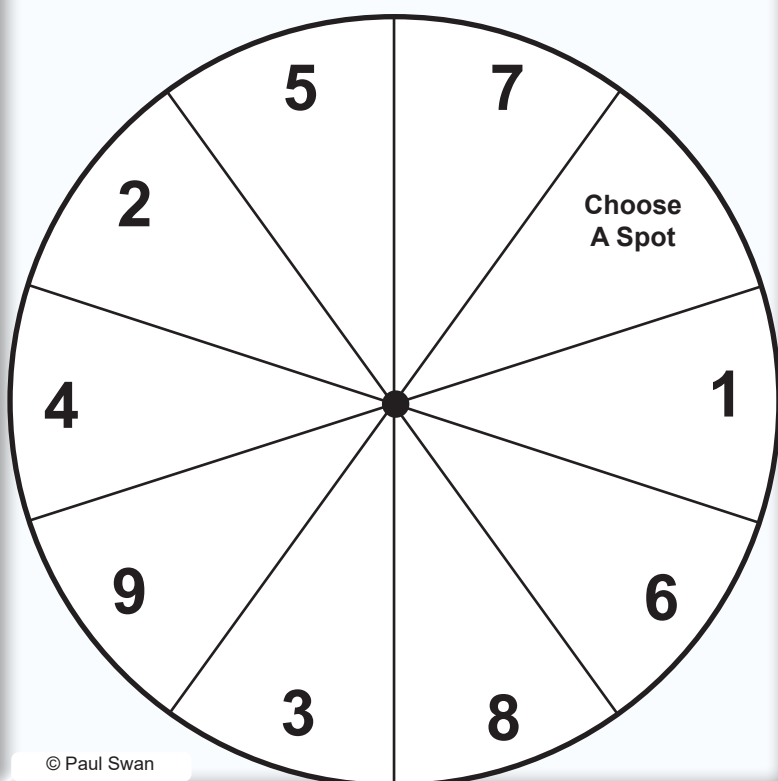

Ten frames are an ideal manipulative that will help children to learn 'doubles and near doubles'. For example,

Double two   Double six

Double nine   Double five and one more

Near Doubles: Doubles + 2

4	8	20	16	10	6
10	16	14	18	4	12
6	18	4	8	12	20
12	8	18	14	20	16
14	4	18	10	6	20
8	16	6	12	14	10

Near Doubles: Doubles + 2

Spinner: 5, 7, Choose A Spot, 1, 6, 8, 3, 9, 4, 2

© Paul Swan

Doubles + 2:

A game for two players.

Aim: To be the first player to place three counters, next to each other, in a row, column or diagonal.

Materials Required: 36 transparent counters, 18 of one colour and 18 of another colour.

- Players take turns to flick the spinner and place a counter on a spot on the board that is the number shown on the spinner doubled and with two added. For example, if the spinner shows 7, the player would place a counter on 16 (7 x 2 + 2).
- Play continues until one player has placed three counters, next to each other, in a row, column or diagonal.

Variation
- Allow a 'bump off' rule

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Doubles

Initially students would play 'Doubles'. Later students can play 'Doubles add one' and 'Doubles take one'.

Later still students can play 'Doubles add 2' or 'Doubles subtract 2.'

Australian Curriculum Links

Yr 1 (ACMNA015): Solve simple addition and subtraction problems using a range of strategies

Yr 2: ACMNA030 Solve simple addition ... problems using a range of efficient mental ... strategies

Elaborations

Becoming fluent with a range of mental strategies for addition ..., such as commutativity for addition, building to 10, *doubles*, 10 facts and adding 10

Yr 3: (ACMNA055): Recall addition facts for single-digit numbers ... to develop increasingly efficient mental strategies for computation
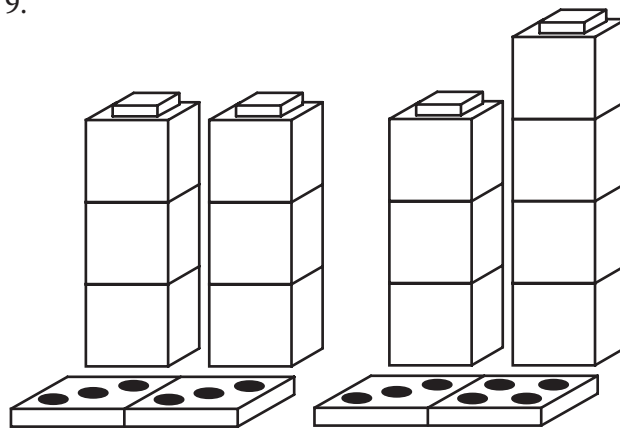
Elaborations

Recognise that certain single-digit number combinations always result in the same answer.
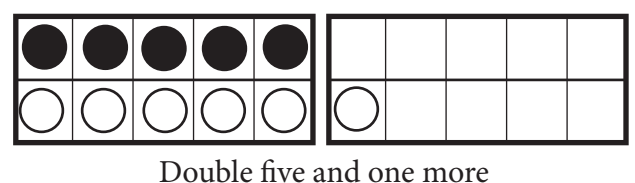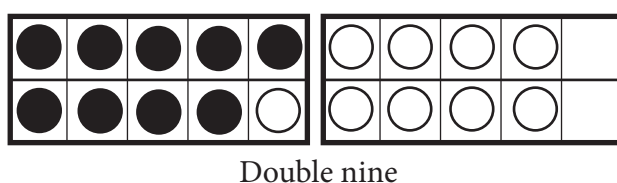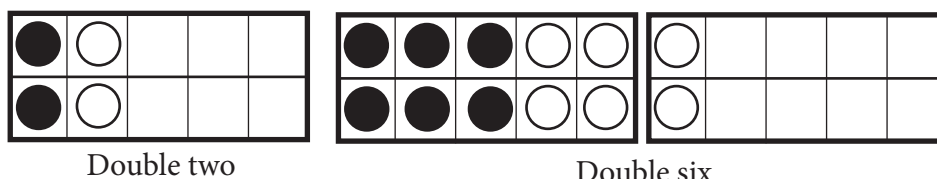
Teacher notes

Prior to learning the 'near doubles facts' students will need to have developed some fluency with doubles facts. Doubles facts (and near doubles facts) may be developed using Unifix materials and Dominoes. Initially students may be exposed to all the doubles and near doubles from a standard double six domino set. Students may be asked to build towers with Unifix that are the same height as the number of dots shown on the domino. One tower should be built in one colour and the second tower built in a different colour. The two towers may be combined (added) and the total number of Unifix counted. Using two colours will help link the initial addition question to the answer.

Later near doubles may be combined and the double nine dominoes may be used to complete all the doubles and near doubles facts to 9 + 9.

Ten frames are an ideal manipulative that will help children to learn 'doubles and near doubles'. For example,

Double two

Double six

Double nine

Double five and one more

Double Dominoes (6)

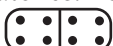|					
12	0	2	4	6	8
10	12	0	2	4	10
8	10	⊘	2	6	12
6	8	6	4	8	0
4	2	0	12	10	2
0	12	10	8	6	4

Double Dominoes (6)

A game for two players.

Aim: To be the first player to place three counters, next to each other, in a row, column or diagonal.

Materials Required: 36 transparent counters, 18 of one colour and 18 of another colour.

- Players take turns to flick the spinner and place a counter on a spot on the board that matches. For example, if the spinner shows ⸦∷∶∷⸧, the player would place a counter on 8.
- Play continues until one player has placed three counters, next to each other, in a row, column or diagonal.

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Double Dominoes (6 and 9)

Prior to playing this game, students should have used dominoes and separated all the doubles dominoes that are in a double six set, 6-6, 5-5, 4-4, 3-3, 2-2, 1-1, and 0-0. These dominoes are represented on the spinner. Likewise the double 9 game features all the double nine dominoes. Children may be challenged to find specific 'doubles dominoes' from the physical set. Individual dot counting should be discouraged.

Australian Curriculum Links

Yr 1 (ACMNA015): Solve simple addition and subtraction problems using a range of strategies

Yr 2: ACMNA030 Solve simple addition ... problems using a range of efficient mental ... strategies

Elaborations

Becoming fluent with a range of mental strategies for addition ..., such as ..., **doubles**.

Yr 3: (ACMNA055): Recall addition facts for single-digit numbers ... to develop increasingly efficient mental strategies for computation.
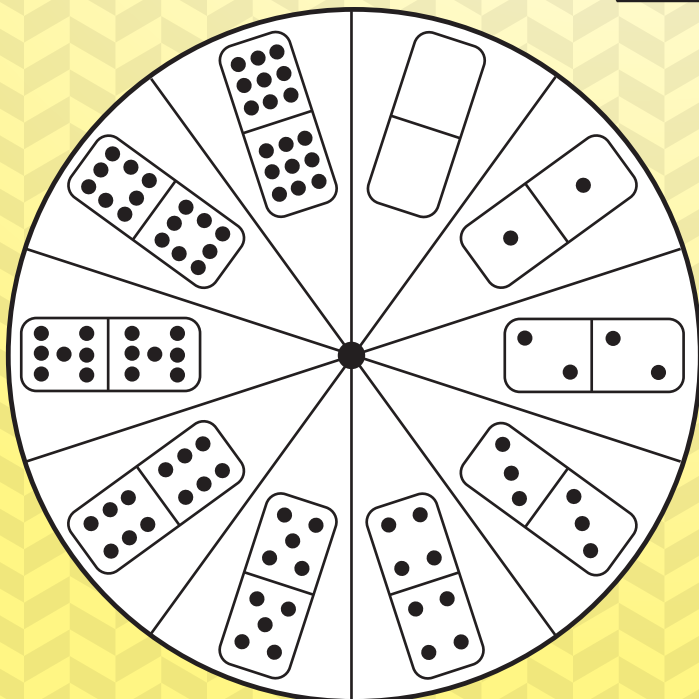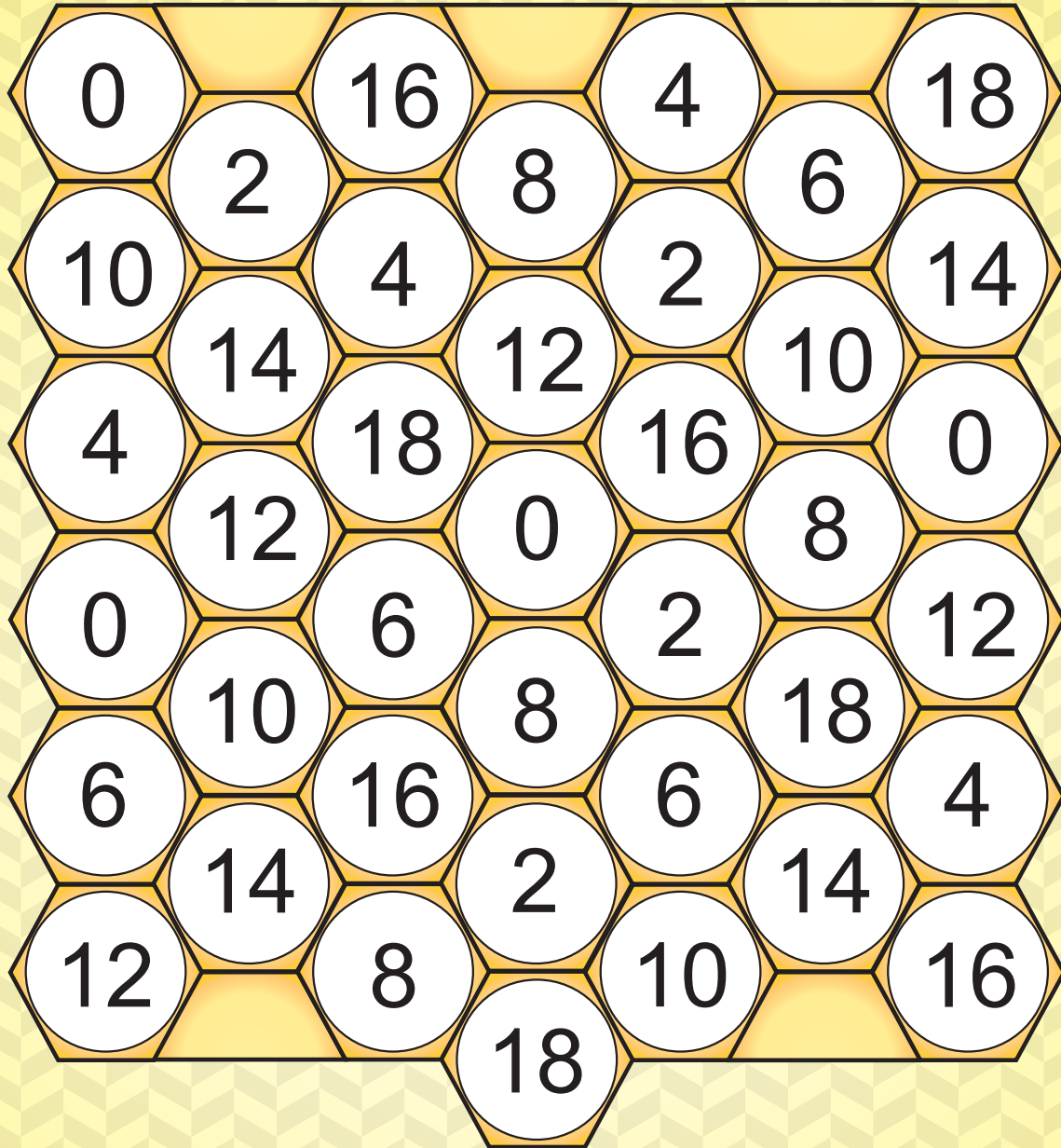
Variations

Play four in a row, column or diagonal.

Allow a bump off rule where a player may remove their opponent's counter if their double is the same as the cell that is occupied by their opponent.

Double Dominoes (9)

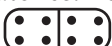|				
0	16	4	18	
2	8	6		
10	4	2	14	
14	12	10		
4	18	16	0	
12	0	8		
0	6	2	12	
10	8	18		
6	16	6	4	
14	2	14		
12	8	10	16	
	18			

Double Dominoes (9)

A game for two players.

Aim: To be the first player to place three counters, next to each other, in a row, column or diagonal.

Materials Required: 36 transparent counters, 18 of one colour and 18 of another colour.

- Players take turns to flick the spinner and place a counter on a spot on the board that matches. For example, if the spinner shows [::|::], the player would place a counter on 8.

- Play continues until one player has placed three counters, next to each other, in a row, column or diagonal.

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Double Dominoes (6 and 9)

Prior to playing this game, students should have used dominoes and separated all the doubles dominoes that are in a double six set, 6-6, 5-5, 4-4, 3-3, 2-2, 1-1, and 0-0. These dominoes are represented on the spinner. Likewise the double 9 game features all the double nine dominoes. Children may be challenged to find specific 'doubles dominoes' from the physical set. Individual dot counting should be discouraged.

Australian Curriculum Links

Yr 1 (ACMNA015): Solve simple addition and subtraction problems using a range of strategies

Yr 2: ACMNA030 Solve simple addition ... problems using a range of efficient mental ... strategies

Elaborations

Becoming fluent with a range of mental strategies for addition ..., such as ..., **doubles**.

Yr 3: (ACMNA055): Recall addition facts for single-digit numbers ... to develop increasingly efficient mental strategies for computation.
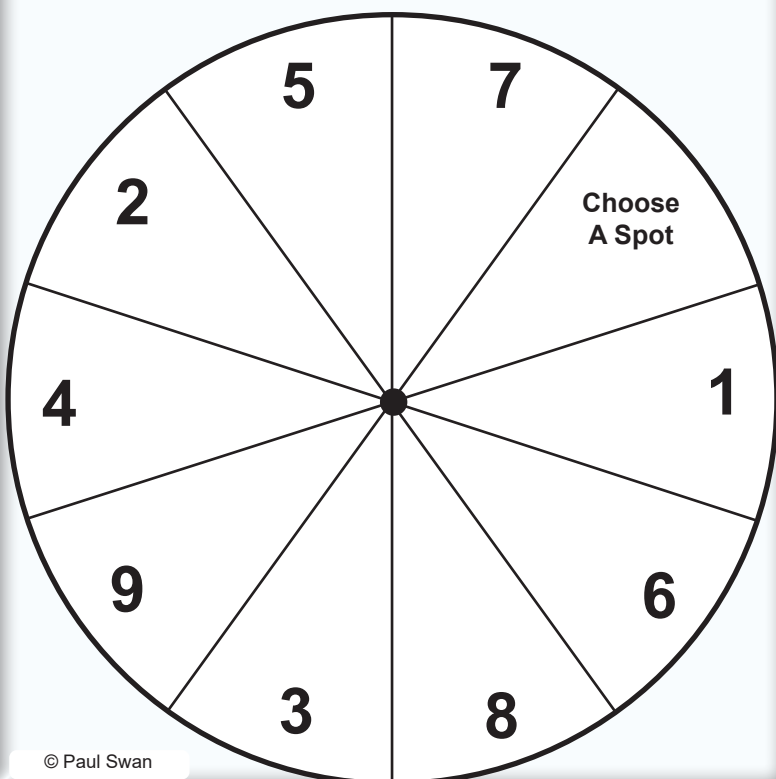
Variations

Play four in a row, column or diagonal.

Allow a bump off rule where a player may remove their opponent's counter if their double is the same as the cell that is occupied by their opponent.

Ten More

11	13	19	17	14	12
14	17	16	18	11	15
12	18	11	13	15	19
15	13	18	16	19	17
16	11	18	14	12	19
13	17	12	15	16	14

Ten More

Spinner: 5, 7, 2, Choose A Spot, 4, 1, 9, 6, 3, 8

© Paul Swan

Ten More:

A game for two players.

Aim: To be the first player to place three counters, next to each other, in a row, column or diagonal.

Materials Required: 36 transparent counters, 18 of one colour and 18 of another colour.

- Players take turns to flick the spinner and place a counter on the board spot that is ten more than the number shown on the spinner. For example, if the spinner shows 7, the player would place a counter on 17.
- Play continues until one player has placed three counters, next to each other, in a row, column or diagonal.

Variation
- Allow a 'bump off' rule
- Play "__ More"

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Ten More and ... More

Initially students would play 'Ten More.

Later students can play '... More'.

Australian Curriculum Links

Yr 1 (ACMNA015): Solve simple addition and subtraction problems using a range of strategies

Yr 2: ACMNA030 Solve simple addition ... problems using a range of efficient mental ... strategies

Elaborations

Becoming fluent with a range of mental strategies for addition ..., such as commutativity for addition, building to 10, doubles, 10 facts and **adding 10.**
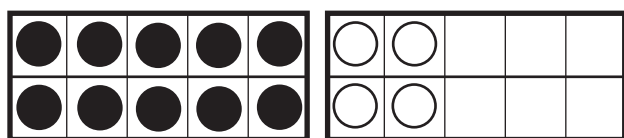
Yr 3: (ACMNA055): Recall addition facts for single-digit numbers ... to develop increasingly efficient mental strategies for computation
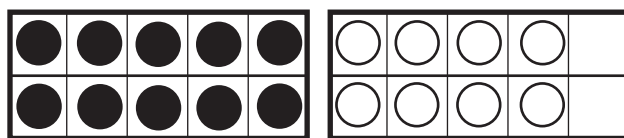
Elaborations

Recognise that certain single-digit number combinations always result in the same answer.
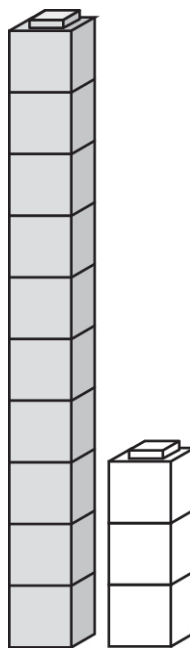
Teacher notes

Learning to add ten will involve linking place value understanding with addition. Students will learn that adding ten to a single-digit number produces a ten number. Initially this may be modelled using ten frames. A bundle of ten Unifix of a single colour may be used to model what happens when ten is added to a single-digit number However, students will soon observe a pattern when ten is added to a single digit number. This pattern may be extended to adding a multiple of ten to a single-digit number.

10 + 4 is 4 + 10 or 14
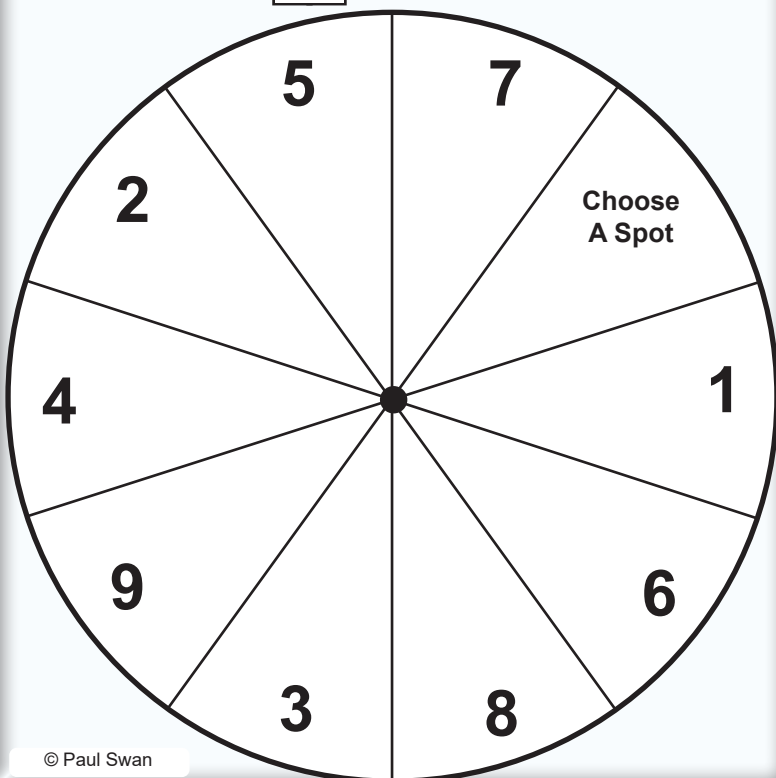
10 + 8 is 8 + 10 or 18

Later a calculator may be used to generate patterns to show what happens when 10 is added to two, three and four-digit numbers.

__ More

_1	_3	_9	_7	_4	_2
_4	_7	_6	_8	_1	_5
_2	_8	_1	_3	_5	_9
_5	_3	_8	_6	_9	_7
_6	_1	_8	_4	_2	_9
_3	_7	_2	_5	_6	_4

__ More

Spinner: 5, 7, 2, Choose A Spot, 1, 4, 6, 9, 3, 8

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__ More:

A game for two players.

Aim: To be the first player to place three counters, next to each other, in a row, column or diagonal.

Materials Required: 36 transparent counters, 18 of one colour and 18 of another colour.

- Players take turns to flick the spinner and place a counter on the board spot that is ten more than the number shown on the spinner. For example, if you are playing 30 more and the spinner shows 7, the player would place a counter on 37.
- Play continues until one player has placed three counters, next to each other, in a row, column or diagonal.

Variation
- Allow a 'bump off' rule

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Ten More and ... More

Initially students would play 'Ten More.

Later students can play '... More'.

Australian Curriculum Links

Yr 1 (ACMNA015): Solve simple addition and subtraction problems using a range of strategies

Yr 2: ACMNA030 Solve simple addition ... problems using a range of efficient mental ... strategies

Elaborations

Becoming fluent with a range of mental strategies for addition ..., such as commutativity for addition, building to 10, doubles, 10 facts and *adding 10.*
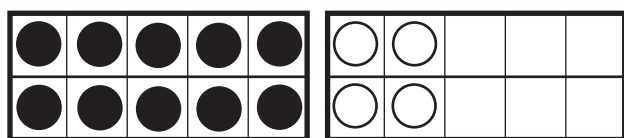
Yr 3: (ACMNA055): Recall addition facts for single-digit numbers ... to develop increasingly efficient mental strategies for computation
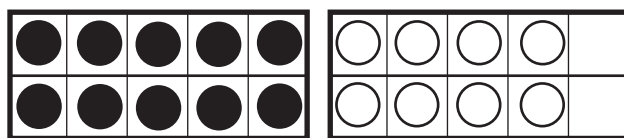
Elaborations

Recognise that certain single-digit number combinations always result in the same answer.
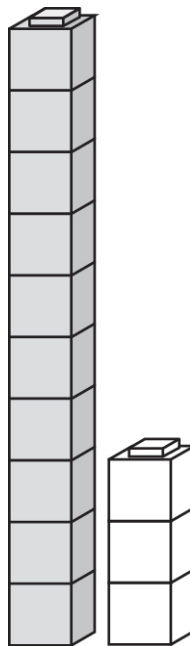
Teacher notes

Learning to add ten will involve linking place value understanding with addition. Students will learn that adding ten to a single-digit number produces a ten number. Initially this may be modelled using ten frames. A bundle of ten Unifix of a single colour may be used to model what happens when ten is added to a single-digit number However, students will soon observe a pattern when ten is added to a single digit number. This pattern may be extended to adding a multiple of ten to a single-digit number.

10 + 4 is 4 + 10 or 14

10 + 8 is 8 + 10 or 18

Later a calculator may be used to generate patterns to show what happens when 10 is added to two, three and four-digit numbers.

EIGHT AND ...

8+

1	2	3	4	5	6	4	5	6
9								7
8	12	15	13	9	14	14		8
7	17	12	10	16	15	12		9
6	13	16	13	12	17	10		1
5	15	12	14	9	13	11		2
4	11	14	16	12	14	11		3
6	13	9	14	10	13	17		4
5								5
4	START		← - - - - - - - - - ●					6

NINE AND ...
9+

Materials: A dice, counters in two colours.
A game for two players.
Aim: To place four counters in a row, column or diagonal.

Rules: Roll the dice and move along the track. Add nine to the number you land on and place a counter on that number in the centre square. The first player with four in a row wins.

4	5	6	7	1	2	3	8	9
9								4
8	13	15	18	14	17	11		5
3	17	14	12	16	13	10		6
2	11	16	13	15	10	18		7
1	10	15	16	12	18	14		1
7	12	13	16	17	11	18		2
6	15	14	11	10	12	17		3
5								8
4	START							9

THRICE DICE

Materials: 3 dice, different coloured counters for each player. A game for 2-3 players.
Aim: To place four counters in a row, horizontally, vertically or diagonally.

Rules: Players take turns to roll three dice and add the numbers shown. If a player rolls triple 1 then the player may choose a spot.

18	8	9	10	11	12	13	5
13	16	6	12	7	15	8	14
11	9	17	10	6	13	9	4
14	7	11	15	8	10	12	7
8	13	5	12	12	16	11	15
10	14	9	6	15	5	17	9
6	11	4	7	13	8	10	16
14	12	10	9	8	14	13	11