Thinking Strategically: Extending the Fact Strategies beyond the Basic Facts Grades 3 -5

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PROFESSIONAL LEARNING origoeducation.com rev August 2018

The best strategies are:

- **Efficient** (*They have few steps*)
- Flexible (They can be varied)
- Generalizable (They can be used to operate on greater numbers efficiently)



NUMBER FACT STRATEGIES

ADDITION

- Count-on 1, 2 and 0
- Doubles and near doubles
- Make ten

SUBTRACTION

Think addition





Extensions Across Grades

Begin with a fact strategy.

Strategies	First Extension	Further Extensions	Decimal Extensions
Count-on 6 + 1	Count-on 16 + 1	Count-on 26 + 21	Count-on 3.6 + 2.1
9+2	19 + 2	29 + 12	2.9 + 1.2
Use doubles 7 + 7	Use doubles 25 + 25	Use doubles 27 + 27	Use doubles 2.5 + 2.5
6 + 5	26 + 25	126 + 125	1.26 + 1.25
Bridge-to-ten	Bridge-to-ten	Bridge-to-ten	Bridge-to-ten
9 + 4	39 + 4	198 + 25	1.98 + 0.06



Total Two

- 1			
117	84	128	139
76	59	77	104
106	47	95	99
68	114	67	85
98	76	66	78
55	103	87	95

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Fundamentals

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large to make cards more manages

	1	Numeral Carc	ls	Operatio	on Cards			
	24	36	45	+23	+31			
	53	72	86	86	86	86	+42	+53
	24	36	45	+23	+31			
	53	72	86	+42	+53			
	24	36	45	+23	+31			
	53	72	86	+42	+53			

Total T

Decimal Draw

5	4	З	2		Round
50	20	20	Ю	10	Target
					Numb
+	+	+	+	+	ber Sent
					ence
II	II	П	II	II	
					Sum
					How close?

Player One

Player Two

II	11	11	11	II
+	+	+	+	+
0	01	20	20	50
-	2	ß	4	Ū
	1 	1 2 10 10 10	1 2 1 1 1 1 1 1 1 1 1 1 1 1 1	1 10 2 10 3 20 4 + 4 + 50 + 4 + 50 + 4 + 50 + 50 + 4 + 50 + 50 +

Decimal Draw



Fundamentals

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1

Л	4	3	2	_1	Round	
					1st Score	
					2nd Score	Play
					Total	er Two
					How close to 100?	
					Running Total	

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Player One

	Running Total					
	How close to 100?					
	Total					
гау	2nd Score					
	1st Score					
	Round	Ļ	2	S	4	5

Over and Out

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	an after the second	Tool .		
90 - 15	95 - 20	90 - 25	95 - 30	90 - 35
80-15	85-20	80-25	85 - <u>3</u> 0	80-35
70-15	75-20	70-25	75-30	70-35
60-15	65-20	60-25	65 - 30	60-35
50-15	55 - 20	50 - 25	55 - 30	50-35
40 - 15	45 - 20	40 - 25	45 - 30	40 - 35

Up or Down

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Cube A: 92, 82, 72, 62, 52, and 42 Cube B: 17, 27, 37, 17, 27, and 37

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.5.

Fundamentals

Up or Down Again

Cube A: 18, 28, 38, 18, 28 and 38 Cube B: 93, 83, 73, 63, 53, and 43

Number Fact Strategies

MULTIPLICATION

- Use Tens (5s facts)
- Use Doubles (2s, 4s, and 8s facts)
- Use a Rule (1s and 0s facts)
- Build Up and Build Down (9s and 6s facts)

DIVISION

Think Multiplication

The Teaching Sequence



Nice and Easy

0 × 3	0 × 4	0 × 0	0 × 7	0 × 8	6 × 0
< 3 9	< 4 9	< 6 9	< 7 9	89	6 6
70 >	70 >	70 >	70 ×	70 >	70 ×
50 × 3	50 × 4	50 × 6	50 × 7	50 × 8	50 × 9
30 × 3	30 × 4	30 × 6	30 × 7	30 × 8	30 × 9

Nice and Easy Too!

06	150	210	270
120	200	280	360
180	300	420	540
210	350	490	630
240	400	560	720
270	450	630	810

Fraction Target

Z	て	S	\mathbf{O}
lumeral Car	3		
ds	4		
Fra	4	5	6
action Card	5	3 10	2
S	5	7	ک 5

Enlarge to make cards more manageable.

Fraction Target

How close?								
Product								
	II							
Number Sentence	X	×	×	×	×	×	×	×
Target	2	3	4	2	9	7	8	6
Round	٢	2	С	4	5	9	7	8

Do the Ds



Do the Ds Again



Game directions

<u>Up or Down</u>

Materials:

Cube A: 92,82,72,62,52, and 42; cube B: 17,27,37,17,27,and 37; and Up or Down game board The aim is to arrange three counters adjacently in a horizontal, vertical, or diagonal line.

- The first player rolls the number cubes.
- The player says the subtraction sentence represented by the cubes, then figures out and says an equivalent subtraction sentence.
 - Example: Reece rolls 42 and 17, and says 42 take away 17 is the same as 40 take away 15 or 45 take away 20.
- The players states the difference before claiming a corresponding space on the game board by covering it with a counter. If both choices are unavailable, the player misses a turn.
 - Example: Reece says, the answer is 25 and claims either 40-15 or 45-20 on the game board.
- The other player(s) has a turn.

Up or Down Again

Materials:

One cube: 18,28,38,18,28, and 38

Another cube: 93,83,73,63,53, and 43

The directions are the same as Up or Down but this time the students verbalize the equivalent number sentence and cover the answer.

Total Two

Materials:

One set of numeral cards, one set of operation cards, and the Total Two game board The aim is to arrange three counters adjacently in a horizontal, vertical, or diagonal line,

- The two sets of cards are shuffled and placed face down in two separate stacks.
- The first player draws two red cards and two yellow cards, and from these chooses a red and a yellow combination that will add to give a total on the game board.
 - Example: Ally draws two red cards showing 36 and 53, and two yellow cards showing +31 and +53. She can make a combination of 36 + 31, 36 + 53, 53 + 31, or 53 + 53.
- After deciding which combination to use, the player claims the total on the game board by covering it with a counter. If all possible totals are unavailable, the player misses a turn.
- The other player has a turn.

Over and Out

Materials: Three standard number cubes showing the numerals 1-6, Over and Out game board. The aim is to have lowest running total at the end of the game.

- The first player rolls the three number cubes and considers all the possible two-digit numbers that can be created using these numbers.
 - Example: Naomi rolls 3, 4, and 6. She could make 34, 36,43, 46, 63 or 64.
- The player choses and records one two digit number in the 1st Score column on the score sheet.
- The second player has a turn.

- The first player rolls again, then chooses and records another two-digit number in the 2nd Score column.
- The second player has a turn.
- The players add the two scores and records the total.
- The player calculates and records how close their total was to 100. A running total of these amounts is kept. If the player scores over 100 in any round, Over is written in the How close to 100 column and 50 is added to the running total.

Do the Ds

Materials: Do the Ds game board, One (1) 'doubling' cube. Using a blank cube, write 'double double' on three faces of the cube and 'double double double' on the remaining three faces. One (1) number cube showing numerals 3- 8. This can also be made from a blank cube, and four (4) counters (a different color for each player).

The aim is to arrange all 4 counters on the game board.

- The first player rolls the two cubes.
- The player follows the instruction, doubling the number two or three times. Example: Lily rolls 4 and 'double double double'. She thinks double 4 is 8, double 8 is 16, double 16 is 32. Four multiplied by 8 is 32.
- The player claims the answer on the game board by covering it with a counter. If an answer is unavailable, the player misses a turn.
- Each of the other players has a turn.
- The first player to place all four counters on the game board is the winner.

Decimal Draw

Materials: One (1) set of numeral cards. Make two copies of page 43. Cut out and laminate the cards to make one set. and one (1) set of symbol cards and a'Decimal Draw' score sheet. The aim is to make a sum that is as close as possible to the target number.

- The numeral cards are shuffled and placed face down in a stack.
- The symbol cards are placed separately face up.

• The first player draws six numeral cards and arranges them with the symbol cards to make an addition sentence that has a sum as close as possible to the first round's target number. Both numbers in the addition sentence must utilize three numeral cards and one decimal point.

• The player records the number sentence on his or her score sheet, then calculates and records the sum. Example: Bronte draws 1, 2, 2, 4, 7, and 8. She arranges the numerals with the symbol cards to show 8.22 + 1.74. She calculates the answer as 9.96.

- The player calculates and records how close the sum is to the target number.
- The numeral cards are returned and reshuffled.
- The other player has a turn.
- The player who is closer to the target is the winner of the round. This is indicated with a \checkmark .
- The player who wins the greater number of rounds is the overall winner.

Fraction Target

Materials: One (1) set of numeral cards. Make two copies of the left-hand grid on page 50 (shown below) on red paper (or another available color). Cut out and laminate the cards to make one set, one (1) set of fraction cards. Make two copies of the right-hand grid on page 50 (shown below) on yellow paper (or another available color). Cut out and laminate the cards to make one set and a 'Fraction Target' score sheet (page 51) as shown below.

The aims is to make a product that is as close as possible to the target number.

• The two sets of cards are shuffled and placed face down in separate stacks.

• The first player draws three red cards and three yellow cards. He or she considers all possible combinations before multiplying one of the numerals by one of the fractions to make a product that is as close as possible to the target number.

• The player records the number sentence on his or her score sheet then figures out and records how close the product is to the target.

- The cards are returned and the stacks are reshuffled.
- The other player has a turn.
- The player who is closer to the target is the winner for the round. This is indicated with a \checkmark .
- The player who wins the greater number of rounds is the overall winner.