Calgary Board of Education

Number Fact Fluency – Supporting Document

Addition and Subtraction Number Fact Learning Progression

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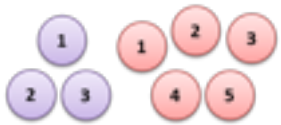
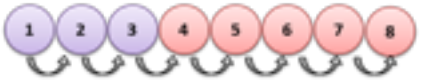
Counting

Counting all/ Counting three times
Count each set of objects separately, then count all objects together

e.g. *"3 + 5"*



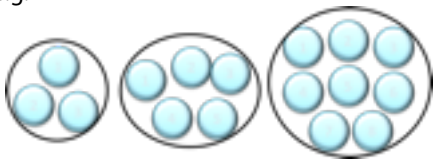
"1, 2, 3" *"1, 2, 3, 4, 5"*



"1, 2, 3" *"4, 5, 6, 7, 8"*

Subitize
See a set of objects and know how many there are without counting.

e.g.



"I see three." "I see five." "I see eight."

Counting on / Counting back
Start with either quantity and count up (+) by the other quantity. e.g. "6" + 3"

"Start with 6 count up (+) 3 to make 9"

Start with first quantity and count down (-) by the other quantity. e.g. "10-4"

"Start at 10 and count down (-) 4 to make 6"

Counting on/back from larger number
Start with the larger quantity and count up (+) or down (-) by the other quantity.
e.g. "3 + 8"

"Start at 8 and count up (+) 3 to make 11"

e.g. "15 - 7"
Start at 15 and count down (-) 7 to make 8"

"15, 14, 13, 12, 11, 10, 9, 8"

Flexible

Using a known fact
A student might choose a nearby fact that they know. e.g. 5 + 8 a student might know 5 + 6 = 11 and then add two more.
e.g. *"5 + 8"*
= (5 + 6) + 2
= 11 + 2
= 13

Near doubles
A student might choose a nearby doubles fact (a number added to itself) and adjust.
e.g. "5 + 7", a student might adjust the calculation and take 1 from 7 and add it to the 5 to make 6 + 6.

Using the 5 or 10 anchor
A student might try to make 10 or 5 to help.
e.g. 8 + 5, a student might see 2 + 3 = 5 and add the 2 to the 8 to make 10 and then adding the remaining 3 to the 10 to make 13.
"8 + 5"
= 8 + 2 + 3
= 10 + 3
= 13

e.g. 13 - 5, a student might see 3 + 2 = 5 by and subtract 3 from 13 to get 10 and then subtract the remaining 2 to get 8
"13 - 5"
= 13 - 3 + 2
= 10 - 2
= 8

Mastery

Recall number facts
Automatically knowing the answer as a result of developing strategies and understanding number relationships.

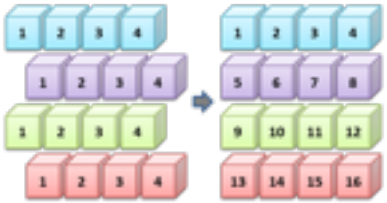
Mastery of basic facts when students can understand and recall facts. Students have not achieved mastery if they simply recall without understanding. As well, students who understand but are not able to recall have not achieved mastery.

Multiplication and Division Number Fact Learning Progression

Counting

Counting all
Counting a group of objects multiple times and then count all the objects or counting objects and then separating objects into groups and counting the groups

e.g. "4 x 4"
"Count four groups of 4 objects, put them together and then count the entire group"



"Four groups of 4 objects each is 16 objects all together"

Subitize
See a set of objects and know how many there are without counting.
e.g.
"2 x 5"

"I see two sets of five, therefore I see ten."

Flexible Numbers

Skip counting
Count forward (+) by a number other than one.
e.g. 5 x 4 Skip count forward by 5's

"5, 10, 15, 20"

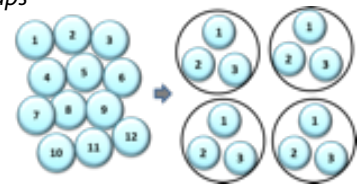
e.g. 20 ÷ 4 *Skip count by a number four times to see if the last count is 20*

Try 5: 5, 10, 15, 20

Trial and error
Draw placeholders for groups and then trial a number of objects in each group, then adjust the until the total is reached.

For example 12 ÷ 4, a student might draw 4 empty groups, put a trial number of objects in each group and then count the objects in all 4 groups, adjusting until the total is 12.
e.g. "12 ÷ 4"

"Draw four empty spaces and by trial and error distribute the objects evenly into the groups"



"12 objects in four groups is 3 objects per group"

Using doubling and repeated addition
6 x 4, a student might double and then add on two more 6's
"6 x 4"
= 6 x 2 + 6 x 2
= 12 + 12
= 24

Using repeated subtraction
21 ÷ 3, a student might repeatedly subtract 3 mentally until reaching 0, saying: 21, 18, 15, 12, 9, 6, 3, 0 and count the number of times they subtracted 3. "I subtracted 7 times"

Using familiar facts
A student might recall a known fact and use that fact to help them.
e.g.6 x 8,
a student might recall 5 x 8 = 40, and add another group of 8, 40 + 8 = 48

e.g. 45 ÷ 9,
a student might recall that
5 x 9 = 45 and understanding the relationship between multiplication and division recognizes
that 45 ÷ 9 = 5

Mastery

Recall number facts
Automatically knowing the answer as a result of developing strategies and understanding number relationships.

Mastery of basic facts is when students can understand and recall facts. Students have not achieved mastery if they simply recall without understanding. As well, students who understand but are not able to recall have not achieved mastery.

Adapted from: Lawson, A. (2016). What to look for: understanding and developing student thinking in early numeracy. Don Mills, ON: Pearson Canada Inc. and
A., V. D., Karp, K., Bay-Williams, J. M., & Wray, J. A. (2018). Elementary and middle school mathematics: teaching developmentally (5th ed., Canadian Edition). Don Mills, ON: Pearson.