COMPUTATIONAL FLUENCY

COMPUTATIONAL FLUENCY

GRADE 2

- Introduce computational strategies for facts to 20 (eg doubles; doubles plus 1)
- Addition and subtraction to 100
- change in quantity (pictorial/symbolic)
- symbolic representation of equality and inequality

GRADE 3

- Emerging computational fluency to 20
- Addition and subtraction to 1000
- Multiplication and division concepts
- one-step addition and subtraction equations with unknown number

GRADE 4

- Developing computational fluency to 20
- Introduce computational strategies for multiplication and division facts to 100
- Addition and subtraction to 10 000
- Multiplication and division of two- or three-digit numbers by one-digit numbers
- Addition and subtraction of decimals to hundredths
- Algebraic relationships among quantities
- One-step equations with an unknown number using all operations

Grade 5

- Extending computational fluency to 20
- Emerging strategies for multiplication and division facts to 100
- Addition and subtraction of whole numbers to 1 000 000
- Multiplication and division to three digits, including division with remainders
- Addition and subtraction of decimals to thousandths
- One-step equations with variables

Grade 6

- Developing strategies for multiplication and division facts to 100
- Order of operations with whole numbers
- Multiplication and division of decimals
- One-step equations with whole number coefficients and solutions

Grade 7

- Extending strategies for multiplication and division facts to 100
- Operations with integers (addition, subtraction, multiplication, division, and order of operations)
- Operations with decimals (addition, subtraction, multiplication, division, and order of operations)
- Two-step equations with whole number coefficients, constants, and solutions

Grade 8

- Operations with fractions (addition, subtraction, multiplication, division, and order of operations)
- Expressions – writing and evaluating using substitution
- Two-step equations with integer coefficients, constants, and solutions

CLASSROOM EXPERIENCES TO SUPPORT COMPUTATIONAL FLUENCY

- Number line routines (eg Clothesline Math)
- Number Talks
- Interactive Read Alouds
- Small group instruction
- Math Stations
- Vertical Surfaces
- Critical thinking problem-solving
- Land-based learning opportunities

STAGES OF COMPUTATIONAL FLUENCY

COUNTING

- Counts with objects or mentally
- Example: 8+4 make a group of 8 and group of 4 and count to 12

DERIVING

- Uses reasoning strategies based on known facts
- Provide multiple strategies and students select
- Example: 8+4= make 10 and then add 2 (8+2+2)
- Example: 8+4= 6+6

MASTERY

- Efficiently produces answers
- Example: 8+4=12 student is able to select a strategy to efficiently produce an answer

ASSESSMENT FOR COMPUTATIONAL FLUENCY

- SNAP
- SNAP Zoom-Ins
- Observation
- Conferences
- Observational Data Collection Sheet

RESOURCES/SUPPORTS FOR MATHEMATICAL COMPUTATIONAL FLUENCY

- *Math Fact Fluency* by Jennifer Bay-Williams
- Math Games
- Fact Fluency Practice
- Small group instruction

ADDITION, SUBTRACTION AND MULTIPLICATION PROGRESSIONS

ADDITION/SUBTRACTION PROGRESSIONS

Add/subtract 0, 1, 2
6-1
Doubles
6+6
Combos of 10 (10 partners)
2+8; 7+3; 6+4
Near Doubles
6+7
Making 10
6+4+2

MULTIPLICATION/DIVISION PROGRESSIONS

Multiples of 0, 1, 2, 5, 10 (skip counting)
5, 10, 15, 20...
Squares
4x4=16
Doubling
If 2x6=12, then 4x6=24, and 8x6=48
Adding A Group
6x6= 5x6+6= 30+6=36
Subtracting A Group
9x8=10x8-8=80-8=72
Near Squares
7x6=6x6+6=36+6=42
Break Apart
10x4= 5x4 and 5x4 ... 20+20=40

Math Fact Fluency by Jennifer Bay-Williams