

Computation of Whole Numbers and Decimals and the Utah Core Standards for Mathematics



The Utah Core Standards for Mathematics defines stages of learning Computation of Whole Numbers and Decimals for elementary students.

The chart below outlines the grade level expectations.

	Concrete Models	Strategies	Fluency	Use of Standard Algorithm
Kindergarten	Addition Facts within 10	Addition Facts within 10	Addition Facts within 5	-----
	Subtraction Facts within 10	Subtraction Facts within 10	Subtraction Facts within 5	-----
1st Grade	Addition Facts within 20	Addition Facts within 20	Addition Facts within 10	-----
	Add 3 addends less than or equal to 20	Add 3 addends less than or equal to 20	-----	-----
	Add within 100 (including a two-digit number and a one-digit number, a two-digit number and a multiple of 10, and a two-digit number and a two-digit number)	Add within 100 (including a two-digit number and a one-digit number, a two-digit number and a multiple of 10, and a two-digit number and a two-digit number)	-----	-----
	Subtraction Facts within 20	Subtraction Facts within 20	Subtraction Facts within 10	-----
	Subtract multiples of 10 (in the range 10-90)	Subtract multiples of 10 (in the range 10-90)	-----	-----

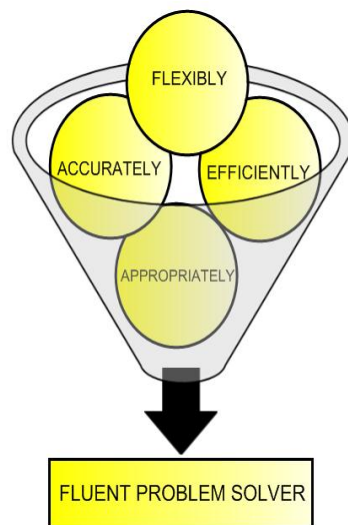
	Concrete Models	Strategies	Fluency	Use of Standard Algorithm
2nd Grade	-----	-----	Addition Facts within 20	Memorize Addition Facts within 20
	Add within 1,000	Add within 1,000	Add within 100	-----
	-----	Add up to 4 two-digit numbers	-----	-----
	-----	-----	Subtraction Facts within 20	-----
	Subtract within 1,000	Subtract within 1,000	Subtract within 100	-----
3rd Grade	-----	-----	Add within 1,000	-----
	-----	-----	Subtract within 1,000	-----
	Multiplication Facts within 100	Multiplication Facts within 100	Multiplication Facts within 100	Memorize Multiplication Facts within 100
	-----	Multiply a one-digit number by a multiple of 10 (in the range 10-90)	-----	-----
	Division Facts within 100	Division Facts within 100	Division Facts within 100	-----

	Concrete Models	Strategies	Fluency	Use of Standard Algorithm
4th Grade	-----	-----	Add multi-digit whole numbers	Add multi-digit whole numbers
	-----	-----	Subtract multi-digit whole numbers	Subtract multi-digit whole numbers
	Multiply a whole number of up to 4 digits by a one-digit whole number and multiply 2 two-digit numbers	Multiply a whole number of up to 4 digits by a one-digit whole number and multiply 2 two-digit numbers	-----	-----
	Divide up to a four-digit dividend and a one-digit divisor	Divide up to a four-digit dividend and a one-digit divisor	-----	-----
5th Grade	Add decimals to hundredths	Add decimals to hundredths	-----	-----
	Subtract decimals to hundredths	Subtract decimals to hundredths	-----	-----
	-----	-----	Multiply multi-digit whole numbers	Multiply multi-digit whole numbers
	Multiply decimals to hundredths	Multiply decimals to hundredths	-----	-----
	Divide up to a four-digit dividend and a two-digit divisor	Divide up to a four-digit dividend and a two-digit divisor	-----	-----
	Divide decimals to hundredths	Divide decimals to hundredths	-----	-----

	Concrete Models	Strategies	Fluency	Use of Standard Algorithm
6th Grade	-----	-----	Add multi-digit decimals	Add multi-digit decimals
	-----	-----	Subtract multi-digit decimals	Subtract multi-digit decimals
	-----	-----	Multiply multi-digit decimals	Multiply multi-digit decimals
	-----	-----	Divide multi-digit whole numbers	Divide multi-digit whole numbers
	-----	-----	Divide multi-digit decimals	Divide multi-digit decimals

WHAT DOES IT MEAN TO COMPUTE FLUENTLY?

Procedural fluency is defined by the Utah Core Standards for Mathematics as, “skill in carrying out procedures flexibly, accurately, efficiently and appropriately”. Fluent problem solving does not necessarily mean solving problems within a certain time limit, though there are reasonable limits to how long computation should take. *Memorization* is the rapid recall of arithmetic facts or mathematical procedures and is often confused with fluency. Fluency implies a much richer kind of mathematical knowledge and experiences. Therefore, the building blocks for developing fluency occur through connecting concrete, pictorial, and abstract understanding or skills within any given Domain or Standard.



FLEXIBLY: A student who is mathematically flexible recognizes that numbers can be composed and decomposed. They recognize relationships between numbers and/or operations and use them as a tool for simplifying problems and can solve them quickly.

ACCURATELY: A student who is mathematically accurate is able to determine the correct answer to a task or problem whether it is contextualized or de-contextualized.

EFFICIENTLY: A student who is mathematically efficient is able to choose an effective computation or problem solving strategy including the standard algorithm given the constraints or conditions within the problem. Short cuts are understood and used deliberately.

APPROPRIATELY: A student who is mathematically appropriate is able to discern more than just a fast way to solve the problem, but is also able to recognize why and when a particular strategy or the standard algorithm is the best choice.