M.I.T.
TUSD

TUSD Demo ▸ Home

Search this site...

Home

Grades

Kindergarten

Grade 1

Grade 2

Grade 3

Grade 4

Grade 5

Grade 6

Grade 7

Grade 8

Grade 9

Grade 10

Grade 11

Grade 12

Supporting Websites

Common Core Standards

Department of Education

PARCC Testing

Test question Prototypes

Engage New York

Illustrative Mathematics

Illuminations (NCTM)

National Library of VM

All Site Content

Welcome to TUSD's Math eSource

To do...
- Grade papers
- Lesson Plans
- Visit TUSD's MATH eSource!
- Relax

Year at a Glance

Semester 1

Semester 2

New Users
Click Here

TUSD

M.I.T.
TUSD

TUSD Demo ▸ Home

TUSD Demo

Home

Grades

Kindergarten

Grade 1

Grade 2

Grade 3

Grade 4

Grade 5

Grade 6

Grade 7

Grade 8

Grade 9

Grade 10

Grade 11

Grade 12

Supporting Websites

Common Core Standards

Department of Education

PARCC Testing

Test question Prototypes

Engage New York

Illustrative Mathematics

Illuminations (NCTM)

Welcome to TUSD's Math eSource

TUSD Demo

Home

Grades

Kindergarten

Grade 1

Grade 2

Grade 3

Grade 4

Grade 5

Grade 6

Grade 7

Grade 8

Grade 9

Grade 10

Grade 11

Grade 12

Supporting Websites

Common Core Standards

Department of Education

PARCC Testing

Test question Prototypes

6th Grade Year at a Glance

Semester 1

Unit 1
Multi-digit number fluency

10 Days

Standards
6.NS.2
6.NS.3
6.NS.4

6.EE.3
(apply the distributive property strictly in a numerical context, work with variables will occur later)

Unit 2
Ratios and Rates

20 Days

Standards
6.RP.1
6.RP2
6.RP.3a
6.RP.3b
6.RP.3d

Unit 3
Fraction Division and percent

19 Days

Standards
6.NS.1
AZ.6.NS.9
6.RP.3c

Unit 4
Rational Numbers

18 Days

Standards
6.NS.5
6.NS.6a
6.NS.6c
6.NS.7a
6.NS.7b
6.NS.7c
6.NS.7d

Unit 5
Relationships in the Coordinate Plane

10 Days

Standards
6.NS.6b
6.NS.6c
6.NS.8
6.G.3

Semester 2

Unit 6
Expressions

20 Days

Standards
6.EE.1
6.EE.2a
6.EE.2b
6.EE.2c
6.EE.3
6.EE.4

Unit 7
Equations and Inequalities

25 Days

Standards
6.EE.5
6.EE.6
6.EE.7
6.EE.8
6.EE.9

Unit 8
Area, Surface Area and Volume

15 Days

Standards
6.G.1
6.G.2
6.G.4
6.EE.2c

Unit 9
Data and Statistics

20 Days

Standards
6.SP.1
6.SP.2
6.SP.3
6.SP.4
6.SP.5a
6.SP.5b
6.SP.5c
6.SP.5d

Printab

Printable Year at a

Unit 1

Multi-digit number fluency

10 Days

Standards
6.NS.2
6.NS.3
6.NS.4

6.EE.3
(Apply the distributive property strictly in a numerical context; work with variables will occur later)

Grade: 6th

Overview: In this unit, students are expected to fluently and accurately divide multi-digit whole numbers and preform all four operations on multi-digit decimals using the standard algorithm. When using the standard algorithm, students' language should reference place value. Students are also expected to the distributive property to generate equivalent expressions in strictly numerical contexts. This work is to be continued and interwoven throughout the yea many units as possible.

Mathematical Background

Standards	Essential Concepts	Essential Questions	Vocabulary
Compute fluently with multi-digit numbers and find common factors and multiples. ***6.NS.2** Fluently divide multi-digit numbers using the standard algorithm. ***6.NS.3** Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. **6.NS.4** Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. *For example, express 36 + 8 as 4(9+2).* ****6.EE.3** Apply the properties of operations to generate equivalent expressions. *For example, apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y.*	• Standard algorithms improve fluency of addition, subtraction, multiplication and division with multi-digit numbers and decimals. • Properties of operations are used to simplify and fluently compute problems with multi-digit numbers and decimals. • Prime factorization is a method for finding greatest common factors (GCF) and least common multiples (LCM). • Properties of operations such as the commutative, associative and distributive are used to make and identify equivalent expressions.	• How do the standard algorithms improve fluency of the basic operations on multi-digit numbers and decimals? • How can estimation and place value be used when solving problems involving decimals? • How does the standard algorithm for division connect to place value? • How can the distributive property be used to rewrite large multi-digit addition problems? • How can prime factorization be used to find a greatest common factor or least common multiple of two given numbers? • How can you show that two expressions are equivalent?	Algorithm Decimal Difference Distributive property Dividend Divisor Estimate Factor Greatest common factor Least common multiple Minuend Multiple Prime factorization Product Quotient Subtrahend Sum

# 6th Grade ~ Conceptual Foundations for The Number System: Computational Fluency and Common Factors & Multiples

Compute fluently with multi-digit numbers and find common factors and multiples.

Standard 2: Fluently divide multi-digit numbers using the standard algorithm.

Standard 3: Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

Standard 4: Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equa...
Use the distributive property to express a sum of two whole numbers 1-100 with a common factor as a multiple of a sum of two whole numbers with no common factor.
example, express 36 + 8 as 4(9 + 2).

Connections to Other Grade Levels: In previous grades, students construct understanding of addition, subtraction, and multiplication through concrete models and v... representations, applying that understanding to standard algorithms. Division is introduced through concrete and pictorial representations, and 6th grade students form... work with division computation using the standard algorithm. Students begin working with factors and multiples in 3rd grade and continue building fluency through 5th g... includes attention to prime and composite numbers. Special types of multiples such as Least Common Multiple and factors such as Greatest Common Factor are not i... until 6th grade. In 7th grade, factoring linear expressions with rational coefficients is supported by elementary work with factors and multiples. Students will continue thi... in more abstract terms throughout Secondary I. In Secondary 2, they will apply this thinking to the factoring of polynomials.

FLEXIBLY
ACCURATELY   EFFICIENTLY
APPROPRIATELY
FLUENT PROBLEM SOLVER
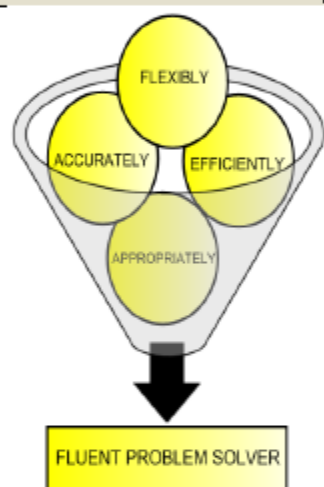
WHAT DOES IT MEAN TO COMPUTE FLUENTLY?

Procedural fluency is defined by the Common Core as, "skill in carrying out procedures flexibly, accurately, efficiently and appropriately... 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 flue... Fluency implies a much richer kind of mathematical knowledge and experiences. Therefore, the building blocks for developing fluency... 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... determine the correct answer to a task or problem whether... 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 appro... able to discern more than just a fast way to solve the proble... also able to recognize why and when a particular strategy... standard algorithm is the best choice.

Students should leave sixth grade fluent in the use of standard algorithms when operating with whole and decimal numbers. That means that they engage in the proces... efficiently, accurately, and appropriately. Ideally, this fluency is based on deep understanding of why the standard algorithms work developed in previous grade le...

Least Common Multiple and Greatest Common Factor

The Fundamental Theorem of Arithmetic states that every number > 1 can be written as a unique product of primes.

Factors and Multiples are only associated with the operations of multiplication and division. In earlier grades, student... and decompose numbers using addition and subtraction. In the upper grades, students compose and decompose num... multiplication and division. Factors and multiples play an important role in that work.

Why do students struggle with GCF and LCM?

- The Greatest Common Factor (GCF) and Least Common Multiple (LCM) are often taught as isolated topics. As a result, it is common for students to confuse the t... especially if they lack an understanding of the relationship between factors and multiples. If students fail to see factors and multiples in a general sense, they will... struggle to understand specialized factors and multiples such as GCF and LCM.
- The language associated with GCF and LCM also creates some confusion for students. Finding the "greatest" seems like it should be a number larger than the on... factored. Likewise, "least" seems like it should be a number smaller than the numbers being factored.

Common Misconceptions

When dividing numbers, students often use the larger number as a dividend. For example, when converting $\frac{1}{3}$ to a decimal, they interpret $\frac{1}{3}$ as $3 \div 1$, as opposed to $1 \div 3$.

When dividing, students often express remainders as decimals. For example, the quotient with a remainder of $32 \div 5$ would be 6r2. When asked to express the quotient with a decimal students may often write 6.2.

Student errors suggest that students interpret and treat multi-digit numbers as single-digit numbers placed adjacent to each other, rather than using place value meanings for the digits in different positions. For example, they see 762 as a 7, a 6 and a 2 as opposed to 700+60+2 = 762.

Students do not understand how place value relates to the US standard division algorithm. Many students do not see the relationship between place value and the standard division algorithm. For example in $32{\overline{)8456}}$ with a 2 above, students may interpret the 2 as 2 ones not 2 hundreds.

Students carry over their prior knowledge of work with adding and subtracting decimals. They believe that you line up the decimals prior to performing any operation. For example, students believe that when you multiply with decimals you must line up the decimals the same way you do in addition and subtraction.

Students 12.5 x 0.512 might be rewritten as:

$$\begin{array}{r} 12.5 \\ \underline{\times 0.512} \end{array} \quad \text{instead of} \quad \begin{array}{r} 12.5 \\ \underline{\times 0.512} \end{array}$$

As a result of this misconception, students often simply "bring down" the decimal according to place value.

Resources		
Print Resources	**Instructional Resources**	**Assessment**
Professional Literature (Van De Walle) Articles from professional journals Connected Math(CMP2) course 1(grade 6 -bits and pieces and prime time) CMP2- Math in Context course 1 (Models You Can Count On, Fraction Times, More or Less, Re-Allotment) Holt (Ch.5, Ch. 11) **Literature** Books that can be used to highlight mathematical concepts		**Formative** Graphic organizers Exit tickets Bell work Guided practice Whiteboard Randomly selecting students Connection to math solutions site on formative assessment **Summative** **COMING SOON**

Performance Task – Common Formative/Summative Assessment
COMING SOON

Web Resources			
Interactive tools and Games	**Lessons and Tasks**	**Video Segments**	**Professional Development**
Games Khan academy – practice modules Multiple choice practice from ixl math N.7 Greatest common factor N.8 Least common multiple N.9 GCF and LCM: word problems L.5 Divide whole numbers - 2-digit divisors L.6 Divide whole numbers - 3-digit divisors Game on Multiples Khan academy practice NLVM – Factor tree for GCF Factor Tress Game	GCF, LCM multiple lesson from illuminations Long Division lesson from promethean planet Adding and multiplying fractions and decimals from illuminations **Illustrative Mathematics** Interpreting a Division Computation Buying Gas Gifts from Grandma, Variation 3 Jayden's Snacks Movie tickets Reasoning about Multiplication and Division and Place Value, Part 1 Reasoning about Multiplication and Division and Place Value, Part 2	Page of videos related to the standard division algorithm (website) Video on understanding the division algorithm(Video) CMP2 Video Tutorial on LCM and finding factors Video on LCM and GCF	Teacher tube Inside mathematics Articles from professional journals NCSM Article "Standard Algorithms in the Common Core State Standards" Interpreting the Standard Division Algorithm in a "Candy Factory" (article from NCTM) Video about deriving the standard algorithm for division

Home   Search this site...   🔍   ❓

Libraries
Site Pages
Shared Documents

Lists
Calendar
Tasks

Discussions
Team Discussion

🗑 Recycle Bin
📄 All Site Content

TUSD's Math eSource

- **Curriculum Maps (Year-at-a-Glance)**
- **Unit Guides**
- **Resources (print and web-based)**
- **Assessments** (formative and summative - Coming Soon)

M.I.T.
USD

Math Innovation Team

---> **Click on the Shared Documents link on the left-hand side of the screen.**

TUSD Math Curriculum ▸ Shared Documents ▸ All Documents ▾
Share a document with the team by adding it to this document library.

Home

Libraries
Site P...
Shared Documents

Lists
Calendar
Tasks

☐ Type	Name	Modified	☐ Modified By
📁	6-8	1/18/2013 9:51 AM	Burkholder, Margaret
📁	9-12	1/18/2013 9:51 AM	Burkholder, Margaret
📁	K-5	1/18/2013 9:51 AM	Burkholder, Margaret

➕ Add document

☐ Type	Name
📁	6
📁	7
📁	8
📁	Correlations to Standards
📁	Curation Workshop March 2013
📁	Progressions

📁	6th grade docs for unit guides links
📄	6.1 Multi Digit Number Fluency 10 Days
📄	6.2 Ratios and Rates 20 days
📄	6.3 Fraction Division and Percent 19 Days
📄	6.4 Rational Numbers 18 Days
📄	6.5 Relationships in the Coordinate Plane 10 days
📄	6.6 Expressions 20 Days
📄	6.7 Equations and Inequalities 25 Days
📄	6.8 Area, Surface Area and Volume 15 Days
📄	6.9 Data and Statistics 20 Days
📄	6th grade year at a glance in BW
📄	6th grade year at a glance in BW
📄	6th grade year at a glance in BW
📄	6th grade year at a glance
📄	6th grade year at a glance
📄	6th grade year at a glance