

# Unit 2 Multiplication & Division Relationship

Content Area: **Math**  
Course(s): **Sample Course**  
Time Period: **NovDec**  
Length: **9 weeks & Grade 4**  
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## **Title Section**

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Department of Curriculum and Instruction



**Belleville Public Schools**

**Curriculum Guide**

Math, Fourth Grade

Unit 2: Multiplication & Division Relationship

**Belleville Board of Education**

**102 Passaic Avenue**

**Belleville, NJ 07109**

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## Unit Overview

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- **Use extra week to build in Assessment for each Topic and or Unit, as well as Re-teaching and Enrichment.**
- Multiply by multiples of 10, 100, and 1,000.
- Round to estimate products.
- Distributive property.
- Math strategies for multiplication.
- Arrays and partial products.
- Use partial products to multiply by 1-digit numbers.
- Multiply 2 and 3-digit numbers by 1-digit numbers.
- Multiply 4-digit by 1-digit numbers.
- Find quotients.
- Estimate quotients.
- Interpret remainders.
- Use partial quotients to divide.
- Divide with 1-digit numbers.
- Solve multi-step problems.
- Learn factors and multiples.
- Multiply multiples of 10, 100, and 1,000 using mental math and place value.
- Use rounding to estimate products and check if answers are reasonable.
- Use the Distributive Property to multiply larger numbers.
- Use arrays and partial products to multiply 3 and 4-digit numbers by 1-digit numbers.
- Use place value and the standard algorithm to multiply 2 and 3-digit numbers by 1-digit numbers.
- Use the standard algorithm to multiply 2, 3, and 4-digit numbers by 1-digit numbers.
- Use mental-math and place-value strategies to divide multiples of 10 and 100 by 1-digit divisors.
- Use compatible numbers to estimate quotients.
- Use place-value patterns and division facts to estimate quotients for 4-digit dividends.

- Solve division problems and interpret remainders.
- Use place value and drawings to divide 2 and 3-digit numbers by 1-digit numbers.
- Use partial quotients to divide.
- Use partial quotients and place-value understanding to divide with greater dividends.
- Divide 2 and 3-digit numbers by 1-digit numbers using the standard division algorithm.
- Divide 4-digit numbers by 1-digit numbers using the standard division algorithm.
- Use previously-learned concepts and skills to model and solve problems.

## NJSLS

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MA.4.OA.A.1	Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.
MA.4.OA.A.2	Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.
MA.4.OA.A.3	Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
MA.4.OA.B.4	Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.
MA.4.NBT.A.2	Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using $>$ , $=$ , and $<$ symbols to record the results of comparisons.
MA.4.NBT.B	Use place value understanding and properties of operations to perform multi-digit arithmetic.
MA.4.NBT.B.5	Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
MA.4.NBT.B.6	Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

## Exit Skills

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By the end of Grade 4 Mathematics, students in the Belleville Public Schools will be able to:

- **Develop an understanding and fluency with multi-digit multiplication and develop an understanding of dividing to find quotients involving multi-digit dividends. Students will also work toward fluency in addition and subtraction within 1,000,000 using the standard algorithm:** Students generalize their understanding of place value to 1,000,000, understanding the relative sizes of

numbers in each place. They apply their understanding of models for multiplication (equal-sized groups, arrays, and area models), place value, and properties of operations, in particular the distributive property, as they develop, discuss, and use efficient, accurate, and generalizable methods to compute products of multi-digit whole numbers. Depending on the numbers and the context, they select and accurately apply appropriate methods to estimate or mentally calculate products. They develop fluency with efficient procedures for multiplying whole numbers; understand and explain why the procedures work based on place value and properties of operations; and use them to solve problems. Students apply their understanding of models for division, place value, properties of operations, and the relationship of division to multiplication as they develop, discuss, and use efficient, accurate, and generalizable procedures to find quotients involving multi-digit dividends. They select and accurately apply appropriate methods to estimate and mentally calculate quotients, and interpret remainders based upon the context.

- **Develop an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers:**

Students develop understanding of fraction equivalence and operations with fractions. They recognize that two different fractions can be equal (e.g.,  $15/9 = 5/3$ ), and they develop methods for generating and recognizing equivalent fractions. Students extend previous understandings about how fractions are built from unit fractions, composing fractions from unit fractions, decomposing fractions into unit fractions, and using the meaning of fractions and the meaning of multiplication to multiply a fraction by a whole number.

- **Understand that geometric figures can be analyzed and classified based on their properties, such as having parallel sides, perpendicular sides, particular angle measures, and symmetry:**

Students describe, analyze, compare, and classify two-dimensional shapes. Through building, drawing, and analyzing two-dimensional shapes, students deepen their understanding of properties of two-dimensional objects and the use of them to solve problems involving symmetry.

## Enduring Understanding

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- Basic facts and place value patterns can be used to find products when one factor is 10, 100, or 1,000.
- The properties of multiplication can be used to simplify computation and to verify mental math and paper and pencil algorithms.
- Properties of multiplication and place value understanding can be used to multiply without paper and pencil.
- The expanded algorithm for multiplication can be represented with arrays. In the algorithm, numbers are broken apart using place value, and the parts are used to find partial products.
- The expanded algorithm for multiplication breaks numbers apart using place value, and the parts are used to find partial products. The partial products are then added together to find the product.
- The standard multiplication algorithm is a shortcut for the expanded algorithm. Regrouping is used rather than showing all the partial products.
- The standard algorithm for multiplication involves breaking apart numbers using place value, finding partial products, and then adding partial products to get a final product. The process is the same regardless of the size of the factors.
- Good math thinkers choose and apply math they know to show and solve problems from everyday life.
- Place value blocks, area models, and arrays provide ways to visualize and find products.
- Products of 2-digit by 2-digit multiplication problems can be estimated by replacing each factor with the closest multiple of ten.
- The distributive property can be used to multiply two 2-digit numbers by breaking the computation down into 4 simpler products and adding the partial products together.
- Good math thinkers make sense of problems and think of ways to solve them. If they get stuck, they don't give up.
- Basic facts and place-value patterns can be used to divide multiples of 10 and 100 by 1-digit numbers.
- There is more than one way to estimate a quotient. Substituting compatible numbers is an efficient technique for estimating quotients.
- When dividing, the remainder must be less than the divisor. When solving a real-world problem, the kind of questions asked determines how to interpret the remainder.
- Sharing is one way to think about division.

- Division with partial quotients involves breaking apart the dividend, dividing the parts, and adding the partial quotients.
- The standard division algorithm breaks the calculation into simpler calculations using basic facts, place value, the relationship between multiplication and division, and estimation.

## Essential Questions

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- How can you multiply by multiples of 10, 100, and 1,000?
- How can you estimate when you multiply?
- How are strategies useful in solving computation problems?
- Why does it help to know inverse relationships?
- How can you use a model to multiply?
- How can you use the Distributive Property to multiply?
- How can you use multiplication to solve problems?
- How can mental math be used to divide?
- How can quotients be estimated?
- How can the steps for dividing be explained?
- How is comparing with multiplication different from comparing with addition?
- How can you use equations to solve multi-step problems?
- How can you use arrays or multiplication to find the factors of a number?
- How can you identify prime and composite numbers?
- How can you find multiples of a number?

## Learning Objectives

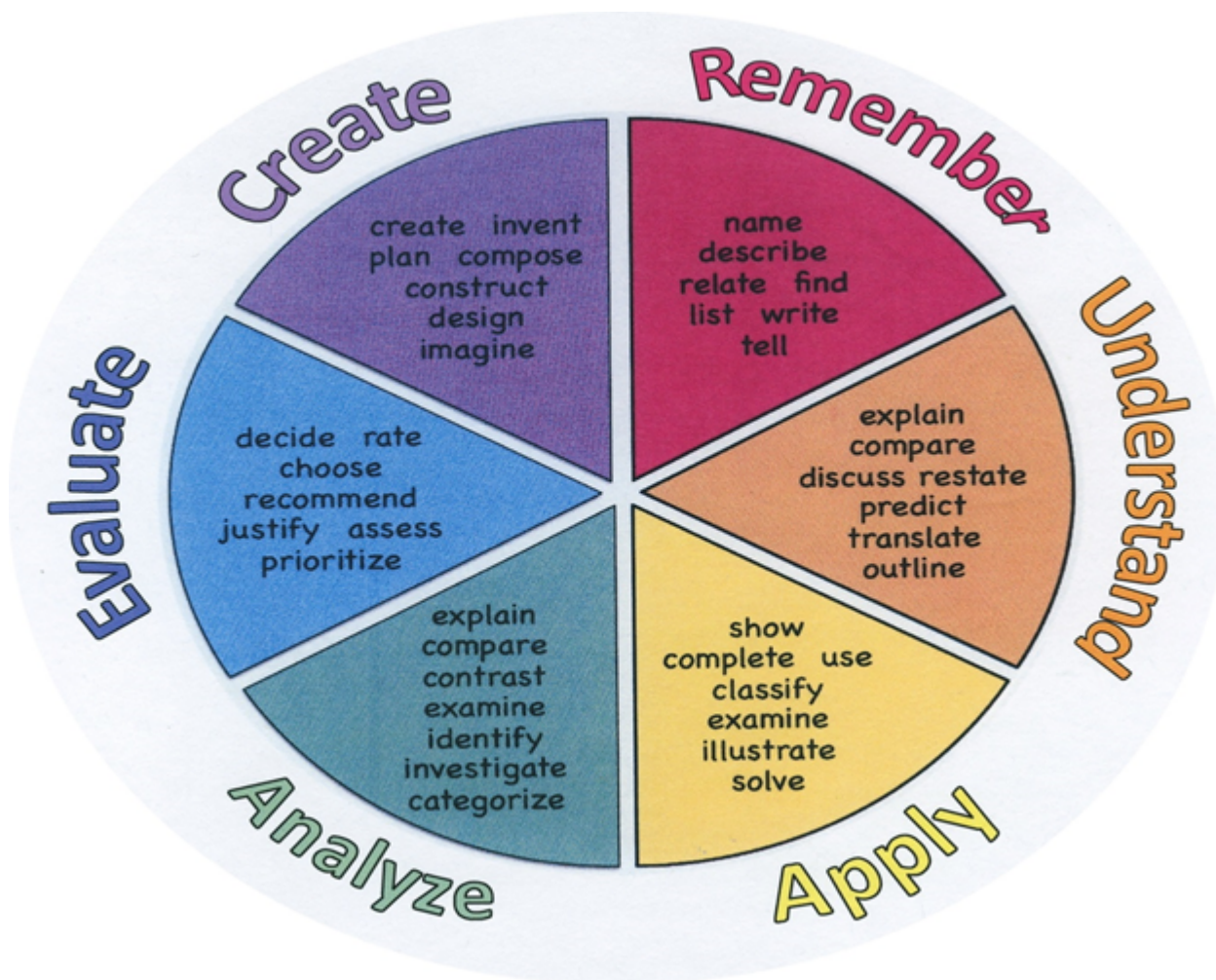
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**After using strategies and properties to multiply by 1-digit numbers, students will be able to:**

- **Recognize** numbers in their place value.
- **Demonstrate** and **show** the use of standard algorithm.
- **Breakdown** using **regrouping** to **determine** and **generate** the product.

Remember	Understand	Apply	Analyze	Evaluate	Create
Choose	Classify	Choose	Categorize	Appraise	Combine
Describe	Defend	Dramatize	Classify	Judge	Compose
Define	Demonstrate	Explain	Compare	Criticize	Construct
Label	Distinguish	Generalize	Differentiate	Defend	Design
List	Explain	Judge	Distinguish	Compare	Develop
Locate	Express	Organize	Identify	Assess	Formulate
Match	Extend	Paint	Infer	Conclude	Hypothesize
Memorize	Give Examples	Prepare	Point out	Contrast	Invent
Name	Illustrate	Produce	Select	Critique	Make
Omit	Indicate	Select	Subdivide	Determine	Originate
Recite	Interrelate	Show	Survey	Grade	Organize
Select	Interpret	Sketch	Arrange	Justify	Plan

State	Infer	Solve	Breakdown	Measure	Produce
Count	Match	Use	Combine	Rank	Role Play
Draw	Paraphrase	Add	Detect	Rate	Drive
Outline	Represent	Calculate	Diagram	Support	Devise
Point	Restate	Change	Discriminate	Test	Generate
Quote	Rewrite	Classify	Illustrate		Integrate
Recall	Select	Complete	Outline		Prescribe
Recognize	Show	Compute	Point out		Propose
Repeat	Summarize	Discover	Separate		Reconstruct
Reproduce	Tell	Divide			Revise
	Translate	Examine			Rewrite
	Associate	Graph			Transform
	Compute	Interpolate			
	Convert	Manipulate			
	Discuss	Modify			
	Estimate	Operate			
	Extrapolate	Subtract			
	Generalize				
	Predict				



## Interdisciplinary Connections

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LA.K-12.NJSLSA.R	Reading
LA.K-12.NJSLSA.W	Writing
SOC.6.1.4.C.10	Explain the role of money, savings, debt, and investment in individuals' lives.
SOC.6.1.4.C.11	Recognize the importance of setting long-term goals when making financial decisions within the community.
SOC.6.1.4.C.13	Examine the qualities of entrepreneurs in a capitalistic society.
SOC.6.1.4.C.CS2	Economics is a driving force for the occurrence of various events and phenomena in societies.
SOC.6.1.4.C.CS5	Understanding of financial instruments and outcomes assists citizens in making sound decisions about money, savings, spending, and investment.
SOC.6.1.4.C.CS7	Economic opportunities in New Jersey and other states are related to the availability of resources and technology.
TECH.8.1.5	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.

## Alignment to 21st Century Skills & Technology

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- English, reading or language arts
- World languages
- Arts
- Mathematics
- Economics
- Science
- Geography
- History
- Government and Civics

## 21st Century/Interdisciplinary Themes

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- Civic Literacy
- Environmental Literacy
- Financial, Economic, Business and Entrepreneurial Literacy
- Global Awareness
- Health Literacy

## 21st Century Skills

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- Communication and Collaboration
- Creativity and Innovation
- Critical thinking and Problem Solving
- ICT (Information, Communications and Technology) Literacy
- Information Literacy
- Life and Career Skills
- Media Literacy

## Differentiation

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Utilize **Quick Check** in order to determine differentiation of instruction. **Assess and differentiate** page will prescribe the differentiated instruction activity.

- Intervention activity.
- Reteach.
- Technology center.
- On-level and advanced activity center.
- Leveled Assignment.

Resources:

- NJDOE: Instructional Supports and Scaffolds for Success in Implementing the Common Core State Standards <http://www.state.nj.us/education/modelcurriculum/success/math/k2/>

## Special Education

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- printed copy of board work/notes provided
- additional time for skill mastery
- assistive technology
- behavior management plan
- Center-Based Instruction
- check work frequently for understanding
- computer or electronic device utilizes
- extended time on tests/ quizzes
- have student repeat directions to check for understanding
- highlighted text visual presentation
- modified assignment format
- modified test content
- modified test format



- modified test length
- multiple test sessions
- multi-sensory presentation
- preferential seating
- preview of content, concepts, and vocabulary
- reduced/shortened reading assignments
- Reduced/shortened written assignments
- secure attention before giving instruction/directions
- shortened assignments
- student working with an assigned partner
- teacher initiated weekly assignment sheet
- Use open book, study guides, test prototypes

## **ELL**

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- teaching key aspects of a topic. Eliminate nonessential information
- using videos, illustrations, pictures, and drawings to explain or clarify
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student's learning;
- allowing students to correct errors (looking for understanding)
- allowing the use of note cards or open-book during testing
- decreasing the amount of work presented or required
- having peers take notes or providing a copy of the teacher's notes
- modifying tests to reflect selected objectives
- providing study guides
- reducing or omitting lengthy outside reading assignments
- reducing the number of answer choices on a multiple choice test
- tutoring by peers
- using computer word processing spell check and grammar check features
- using true/false, matching, or fill in the blank tests in lieu of essay tests

## **Intervention Strategies**

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- allowing students to correct errors (looking for understanding)
- teaching key aspects of a topic. Eliminate nonessential information
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student's learning
- allowing students to select from given choices
- allowing the use of note cards or open-book during testing
- collaborating (general education teacher and specialist) to modify vocabulary, omit or modify items to

reflect objectives for the student, eliminate sections of the test, and determine how the grade will be determined prior to giving the test.

- decreasing the amount of work presented or required
- having peers take notes or providing a copy of the teacher's notes
- marking students' correct and acceptable work, not the mistakes
- modifying tests to reflect selected objectives
- providing study guides
- reducing or omitting lengthy outside reading assignments
- reducing the number of answer choices on a multiple choice test
- tutoring by peers
- using authentic assessments with real-life problem-solving
- using true/false, matching, or fill in the blank tests in lieu of essay tests
- using videos, illustrations, pictures, and drawings to explain or clarify

## **Evidence of Student Learning-CFU's**

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- Admit Tickets
- Anticipation Guide
- Choral response
- Common benchmarks
- Compare & Contrast
- Create a Multimedia Poster
- Define
- Describe
- Evaluate
- Evaluation rubrics
- Exit Tickets
- Explaining
- Fist- to-Five or Thumb-Ometer
- Illustration
- Journals
- KWL Chart
- Newspaper Headline
- Outline
- Question Stems
- Quickwrite
- Quizzes
- Red Light, Green Light
- Self- assessments
- Socratic Seminar

- Study Guide
- Teacher Observation Checklist
- Think, Pair, Share
- Think, Write, Pair, Share
- Thumbs up
- Top 10 List
- Unit tests

## Primary Resources

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- en-Vision math 2.0
- en-Vision math 2.0 Digital Resources

## Ancillary Resources

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New Jersey Center for Teaching and Learning: [www.njctl.org](http://www.njctl.org)

PARCC site: [www.parcconline.org](http://www.parcconline.org)

Khan Academy: [www.khanacademy.org](http://www.khanacademy.org)

<http://www.mathworksheets4kids.com/activities/4th-grade.html>

<http://www.education.com/worksheets/fourth-grade/math/>

<http://www.math-drills.com/privacy.php>

[http://www.internet4classrooms.com/printables/common\\_core/math\\_mathematics\\_4th\\_fourth\\_grade/](http://www.internet4classrooms.com/printables/common_core/math_mathematics_4th_fourth_grade/)

<http://imathworksheets.com/geometry-worksheets-2complementary-angles-worksheets/volume-worksheets/volume-of-a-rectangular-prism/>

<http://illuminations.nctm.org/Search.aspx?view=search&type=ls&gr=3-5>

<http://www.k6-geometric-shapes.com/4th-grade-math-Worksheets.html>

<http://www.math-aids.com/>

<http://www.mathworksheetsland.com/>

<http://www.mathsisfun.com/worksheets/multiplication.php>

<http://www.softschools.com/mathg.jsp>

<http://interactivesites.weebly.com/addition.html>

<http://www.worksheetworks.com/math/geometry/measuring-figures/volume.html>

<http://www.math-salamanders.com/equivalent-fractions-worksheet.html>

<http://www.printable-math-worksheets.com/multiplication-array.html>