Unit 1 Understand Multiplication and Division

Content Area: **Math**
Course(s): **Sample Course**
Time Period: **SeptOct**
Length: **17-20 Days 3rd Grade**
Status: **Published**

Title Section

Department of Curriculum and Instruction

Belleville Public Schools

Curriculum Guide

Math, Third Grade

Unit 1: Understand Multiplication & Division

Belleville Board of Education

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Board Approved: August 30, 2017

Unit Overview

Unit 1 is made up of two topics. These topics focus on interpreting the meaning of multiplication and division, and using patterns to begin to build fluency with multiplication facts. Students will work through different multiplication and division situations. These situations can be used to help students understand that an operation can have various interpretations.

In Topic 1, Understand Multiplication and Division of Whole Numbers, the students will:

- use repeated addition to show the relationship between multiplication and addition.
- use number lines to join equal groups.
- use arrays as one way to think about and understand multiplication.
- understand and use the Commutative Property of Multiplication.
- use sharing to separate equal groups and to think about division.
- use repeated subtraction to show the relationship between divison and subtraction.
- think strategically about available tools that can be used to solve problems.

In Topic 2, Multiplication Facts: Use Patterns, the students will:

- practice using 2 and 5 as factors
- practice using 9 as a factor
- apply properties of 0 and 1
- multiply by 10
- practice multiplications facts: 0,1,2,5,9, and 10
- problem solve by modeling math

NJSLS

Below are the New Jersey Student Learning Standards associated with the student learning objectives for Unit 1; in addition, the

Mathematical Practices (the habits of mind, processes, and dispositions that enable a learner to understand mathematics and to use or do mathematics with understanding) are listed below:

MA.3.OA.A	Represent and solve problems involving multiplication and division.
MA.3.OA.A.1	Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each.
MA.3.OA.A.3	Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
MA.3.3	In Grade 3, instructional time should focus on four critical areas: (1) developing understanding of multiplication and division and strategies for multiplication and division within 100; (2) developing understanding of fractions, especially unit fractions (fractions with numerator 1); (3) developing understanding of the structure of rectangular arrays and of area; and (4) describing and analyzing two-dimensional shapes.

Exit Skills

By the end of Grade 3 Mathematics, students in the Belleville Public Schools will be able to:

- **Develop an understanding of multiplication and division and strategies for multiplication and division within 100. Students will also work toward fluency in addition and subtraction within 1,000 and multiplication and division within 100. In addition, students will know all products of two one-digit numbers from memory:**
  Students develop an understanding of the meanings of multiplication and division of whole numbers through activities and problems involving equal- sized groups, arrays, and area models; multiplication is finding an unknown product, and division is finding an unknown factor in these situations. For equal-sized group situations, division can require finding the unknown number of groups or the unknown group size. Students use properties of operations to calculate products of whole numbers, using increasingly sophisticated strategies based on these properties to solve multiplication and division problems involving single-digit factors. By comparing a variety of solution strategies, students learn the relationship between multiplication and division.
- **Develop an understanding of fractions, especially unit fractions (fractions with numerator 1):**
  Students develop an understanding of fractions, beginning with unit fractions. Students view fractions in general as being build out of unit fractions, and they use fractions along with visual fraction models to represent parts of a whole. Students understand that the size of a fractional part is relative to the size of the whole. For example, ? of the paint in a small bucket could be less paint than 1/3 of the paint in a large bucket, but 1/3 of a ribbon is longer than 1/5 of the same ribbon because when the ribbon is divided into 3 equal parts, the parts are longer than when the ribbon is divided into 5 equal parts. Students are able to use fractions to represent numbers equal to, less than, and greater than one. The solve problems that involve comparing fractions by using visual fraction models and strategies based on noticing equal numerators or denominators.
- **Develop an understanding of the structure of rectangular arrays and of area:**
  Students recognize area as an attribute of two-dimensional regions. They measure the area of a shape by finding the total number of same-size units of area required to cover the shape without gaps or overlaps, a square with sides of unit length being the standard unit for measuring area. Students understand that rectangular arrays can be decomposed into identical rows or into identical columns. By decomposing rectangles into rectangular arrays of squares, students connect area to multiplication and justify using multiplication to determine the area of a rectangle.

Enduring Understanding

Topic 1 Understand Multiplication and Division of Whole Numbers

1. Some real-world problems that involve joining or separating equal groups or making comparisons can be solved using multiplication. Multiplication on the number line can involve joining equal groups and is one way to think about multiplication.

2. Two numbers can be multiplied in any order and the product remains the same.

3. Sharing involves separating equal groups and is one way to think about division.

4. Some real-world problmes that involve joining or separating equal groups or making comparisons can be solved using multiplication adn division. Repeated subtraction involves separating equal groups and is one way to think about division.

5. Good math thinkers know how to pick the right tools to solve math problems.

Topic 2 Multiplication Facts: Use Patterns

1. There are patterns in the products for multiplication with factors of 2 or 5.

2. There are patterns in the products for multiplication with a factor of 9.

3. There are patterns in the products for multiplication facts with 0 ad 1. The product of 0 and any number is 0. The product of 1 and any number is that same number.

4. Patterns can be used to solve multiplication problems with a factor of 10.

5. Basic multiplication facts can be found by identifying patterns.

6. Good math thinkers choose and apply math they know to show and solve problems from everyday life.

Essential Questions

Topic 1 Understand Multiplication and Division of Whole Numbers

1. What are different meanings of multiplication and division?

Topic 2 Multiplication Facts: Use Patterns

2. How can unknown multiplication facts be found using patterns and properties?

Learning Objectives

Unit 1 Student Learning Objectives:

Topic 1 Understand Multiplication and Division of Whole Numbers

1. Students will be able to use repeated addition to show the relationship between multiplication and addition.
2. Students will be able to use number lines to join equal groups.
3. Students will be able to use arrays as one way to think about and understand multiplication.
4. Students wil be able to understand and use the Commutative Property of Multiplication.
5. Studnets will be able to use sharing to separate equal groups and to think about division.
6. Students will be able to use repeated subtraction to show the relationship between division and subtraction.
7. Students will be able to think strategically about available tools that can be used to solve problems.

Topic 2 Multipication Facts: Use Patterns

1. Students wil be able to gain fluency in multiplication when using 2 and 5 as factors.
2. Students will be able to gain fluency in multiplication when using 9 as a factor.
3. Students will be able to gain fluency in multiplication when multiplying by 0 or 1.
4. Students will be able to gain fluency in multiplication when multiplying by 10.
5. Students wil be able to use number relationships and patterns to develop reasoning strategies to support their recall of the basic multiplication facts.
6. Students will be able to use previously learned concepts and skills to represent and solve problems.

Interdisciplinary Connections

Math and Science Project STEM

Topic 1: Forming Groups

- Have students help you list animals that form groups, such as ants, fish, birds, and elephants.
- Talk about why being in a group can hep some birds survive. (Living in a group may help birds find food. Being in a large group can protect brids from predators. Birds can also huddle together in cold weather to keep warm.
- Do research on different animal groups
- Journal: Write a report to include the information learned.

Topic 2: Motion Patterns

- Ask students to look at the children in the photo on page 57 and discuss what would be moving in this situation. Ask them to explain what could cause the movement.
- Ask studnets to think about waht would happen if the girl moves away from the swing.
- Do research on playground objects that move.
- Journal: Write a report explaining any patterns you may have found. Tell how you can use your patterns to predict how the objects will move in the future. Write an equation for one of the patterns. Explain what the numbers in your equation represent.

LA.K-12.NJSLSA.R	Reading
LA.K-12.NJSLSA.W	Writing
SCI.3-5-ETS1	Engineering Design
SCI.3-LS2-1	Construct an argument that some animals form groups that help members survive.
SCI.3-PS2-2	Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.
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

Key SUBJECTS AND 21st CENTURY THEMES

Mastery of key subjects and 21st century themes is essential for all students in the 21stcentury.

Key subjects include:

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

21st Century/Interdisciplinary Themes

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

21st Century Skills

- 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

Technology Infusion

What technology can be used in this unit to enhance learning?

Differentiation

enVision Math 2.0 Differentiated Instruction

Ongoing Intervention

- During the core lesson, monitor progress, reteach as needed, and extend students' thinking.
- Utilize the Guiding Questions found in the Teacher's Edition Guide during the lesson.

Strategic Intervention

- At the end of the lesson, assess to identify students' strengths and needs and then provide appropriate support.
- Provide extra and differentiated practice via the On-Level and Advanced Activity Centers

Intensive Intervention

- As needed, provide more instruction that is on or below grade level for students who are struggling.
- Utilize the Math Diagnosis and Intervention System 2.0

English Language Learners

- Provide ELL supporth through visual learning throughout the program, ELL instruction in every lesson, and additional ideas in an ELL Toolkit.

Math Vocabulary

- Build math vocabulary using the vocabulary cards, vocabulary activities, vocabulary eview, and glossary plus the online glossary and vocabulary game.

Math and Reading

- Connect reading and math using a data-filled reading mat for the topic with accompanying activity masters and guide.

Special Education

- 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
- multi-sensory presentation
- multiple test sessions
- 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

- teaching key aspects of a topic. Eliminate nonessential information
- using videos, illustrations, pictures, and drawings to explain or clarif
- 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)
- decreasing the amount of workpresented or required
- modifying tests to reflect selected objectives
- providing study guides
- tutoring by peers

Intervention Strategies

- 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 workpresented 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

Please list ways educators may effectively check for understanding in this secion.

- Admit Tickets
- Anticipation Guide
- 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
- Top 10 List
- Unit tests

Primary Resources

Please list all resources available to you that are located either within the district or that can be obtained by district resources.

- ELL Kit
- enVision Math 2.0 Centers
- Intervention Kit
- Teacher's Guide

Ancillary Resources

Please list ALL other resources available to strengthen your lesson.

- Grade Level Curriculum Guide
- Model Curriculum

Sample Lesson

Unit Name:

Unit 2 Multiply by 10

NJSLS:

3.OA.A.2, 3.OA.A.3, 3.OA.D.9

Interdisciplinary Connection:

N/A

Statement of Objective:

Students will be able to gain fluency in multiplication when multiplying by 10.

Anticipatory Set/Do Now:

Pose the Solve-and-Share Problem on page 79. Build understanding by ensuring that students understand what they are being asked to. Rephrase the question. Ask for pertinent information. Share and Discuss solutions

Learning Activity:

Use structures to demonstrate patterns in the 10s Table. Reinforce that multiples of 10 follow the same pattern: they have a 0 in the ones place, to the right of the factor being multiplied by 10.

Student Assessment/CFU's:

Utilize Quick Checks to differentiate instruction

Materials:

Student Workbook, Activity Centers for differentiation

21st Century Themes and Skills:

Critical Thinking and Problem Solving

Differentiation/Modifications:

Intervention Reteaching Activity, On-Level and Advanced Activity Centers

Integration of Technology:

Math Tools and Math Games at pearsonrealize.com