## Mathematics Curriculum – Grade 6

#### Unit 1

Overview	Standards for Mathematical Content	Unit Focus	Standards for Mathematical Practice
<u>Unit 1</u> Operations and Reasoning about Ratios	<ul> <li>6.NS.A.1</li> <li>6.NS.B.2</li> <li>6.RP.A.1</li> <li>6.RP.A.2</li> <li>6.RP.A.3*</li> <li>6.NS.B.3</li> <li>6.NS.B.4</li> </ul>	<ul> <li>Apply and extend previous understandings of multiplication and division to divide fractions by fractions</li> <li>Compute fluently with multi-digit numbers and find common factors and multiples</li> <li>Understand ratio concepts and use ratio reasoning to solve problems</li> </ul>	<ul><li>MP.1 Make sense of problems and persevere in solving them.</li><li>MP.2 Reason abstractly and quantitatively.</li><li>MP.3 Construct viable arguments and critique the reasoning of others.</li><li>MP.4 Model with mathematics.</li></ul>
<u>Unit 1:</u> Suggested Open Educational Resources	6.NS.A.1 Traffic Jam 6.RP.A.1 Games at Rec 6.RP.A.2 Price per pou 6.RP.A.3 Voting for TI 6.RP.A.3c Shirt Sale 6.NS.B.3 Reasoning at 6.NS.B.4 Factors and C 6.NS.B.4 Multiples and	<u>cess</u> nd and pounds per dollar pree, Variation 1 pout Multiplication and Division and Place Value, Part 1 <u>Common Factors</u> 1 Common Multiples	<ul><li>MP.5 Use appropriate tools strategically.</li><li>MP.6 Attend to precision.</li><li>MP.7 Look for and make use of structure.</li><li>MP.8 Look for and express regularity in repeated reasoning.</li></ul>

Major Supporting Additional (Identified by PARCC Model Content Frameworks).

#### Mathematics Curriculum – Grade 6

			Pacing	
Curriculum Unit 1		Standards		Unit Days
	• 6.NS.A.1	Compute quotients of fractions. Construct visual fraction models to represent quotients of fractions and use the relationship between multiplication and division to explain division of fractions. Solve real-world problems involving quotients of fractions and interpret the solutions in the context given.	4	
	• 6.NS.B.2	Fluently divide multi-digit numbers using the standard algorithms.	2	
Unit 1	• 6.RP.A.1	Explain the relationship of two quantities in given ratio using ratio language.	2	
<b>Operations and</b>	• 6.RP.A.2	Use rate language, in the context of the ratio relationship, to describe a unit rate.	2	
Reasoning about Ratios	• 6.RP.A.3*	Create and complete tables of equivalent ratios to solve real world and mathematical problems using ratio and rate reasoning that include making tables of equivalent ratios, solving unit rate problems, finding percent of a quantity as a rate per 100. Use ratio and rate reasoning to convert measurement units and to transform units appropriately when multiplying or dividing quantities.	15	45
	• 6.NS.B.3	Fluently add, subtract, multiply and divide multi-digit decimals.	9	
	• 6.NS.B.4	Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two numbers less than or equal to 12.	8	
		Assessment, Re-teach and Extension	3	

Mathematics Curriculum – Grade 6

Unit 1 Grade 6			
Content Standards	Suggested Standards for Mathematical Practice	Critical Knowledge & Skills	
<ul> <li>6.NS.A.1. Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem.</li> <li>For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi?</li> </ul>	MP.4 Model with mathematics.	<ul> <li>Concept(s): No new concept(s) introduced</li> <li>Students are able to: <ul> <li>divide a fraction by a fraction.</li> <li>represent division of fractions using visual models.</li> <li>interpret quotients of fractions in the context of the problem.</li> <li>compute quotients of fractions in order to solve word problems.</li> <li>write equations to solve word problems involving division of fraction by a fraction.</li> <li>use the relationship between multiplication and division to explain division of fractions.</li> </ul> </li> <li>Learning Goal 1: Compute quotients of fractions models to represent quotients of fractions and use the relationship between multiplication is petween multiplication of fractions.</li> <li>Learning Goal 3: Solve real-world problems involving quotients of fractions and interpret the solutions in the context given.</li> </ul>	
<ul> <li>6.NS.B.2. Fluently divide multi-digit numbers using the standard algorithm.</li> <li>6.RP.A.1. Understand the concept of a ratio and use ratio language to describe a ratio relationship.</li> </ul>	MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning MP.2 Reason abstractly and quantitatively.	Concept(s): No new concept(s) introduced Students are able to: • use the standard algorithm to divide multi-digit numbers with speed and accuracy. Learning Goal 4: Fluently divide multi-digit numbers using the standard algorithms. Concept(s): • A ratio shows relative sizes or values of two quantities.	
between two quantities. example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."		<ul> <li>Students are able to:         <ul> <li>describe a ratio relationship between two quantities using ratio language.</li> </ul> </li> <li>Learning Goal 5: Explain the relationship of two quantities in given ratio using ratio language.</li> </ul>	
<ul> <li>6.RP.A.2. Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠ 0, and use rate</li> </ul>	MP.2 Reason abstractly and quantitatively.	<ul> <li>Concept(s):</li> <li>A rate is a ratio comparing two different types of quantities.</li> <li>Students will be able to:</li> </ul>	

### Mathematics Curriculum – Grade 6

<ul> <li>language in the context of a ratio relationship.</li> <li>For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar," "We paid \$75 for 15 hamburgers, which is a rate of \$5 per hamburger."</li> <li>6.RP.A.3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. *(benchmarked)</li> <li>6.RP.A.3a. Make tables of equivalent ratios relating quantities with whole number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.</li> <li>6.RP.A.3b. Solve unit rate problems including those involving unit pricing and constant speed. For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?</li> <li>6.RP.A.3d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.</li> </ul>	MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically MP.6 Attend to precision. MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning	<ul> <li>determine the unit rate given a ratio relationship.</li> <li>describe a unit rate relationship between two quantities using rate language.</li> <li>Learning Goal 6: Use rate language, in the context of the ratio relationship, to describe a unit rate.</li> <li>Concept(s): No new concept(s) introduced</li> <li>Students are able to:         <ul> <li>use ratio and rate reasoning to create tables of equivalent ratios relating quantities with <i>whole number</i> measurements, find missing values in tables and plot pairs of values.</li> <li>compare ratios using tables of equivalent ratios.</li> <li>solve real world and mathematical problems involving unit rate (including unit price and constant speed).</li> <li>calculate a percent of a quantity and solve problems by finding the whole when given the part and the percent.</li> <li>convert measurement units using ratio reasoning.</li> <li>transform units appropriately when multiplying and dividing quantities.</li> </ul> </li> <li>Learning Goal 7: Create and complete tables of equivalent ratios, solving unit rate problems, finding percent of a quantity as a rate per 100.</li> <li>Learning Goal 8: Use ratio and rate reasoning to convert measurement units appropriately when multiplying or dividing quantities.</li> </ul>
• 6.NS.B.3. Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.	MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning	Concept(s): No new concept(s) introduced Students are able to:

### Mathematics Curriculum – Grade 6

		<ul> <li>multiply and divide multi-digit decimals with accuracy and efficiency.</li> <li>Learning Goal 9: Fluently add, subtract, multiply and divide multi-digit decimals</li> </ul>
• 6.NS.B.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.	MP.7 Look for and make use of structure.	<ul> <li>Concept(s): No new concept(s) introduced</li> <li>Students are able to: <ul> <li>create lists of factors for two whole numbers less than or equal to 100; find the largest factor common to both lists.</li> <li>create lists of multiples for two whole numbers less than or equal to 12; find the smallest multiple common to both lists.</li> </ul> </li> </ul>
		Learning Goal 10: Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two numbers less than or equal to 12.

### Mathematics Curriculum – Grade 6

Unit 1 Grade 6		
School/District Formative Assessment Plan	School/District Summative Assessment Plan	
Pre-Assessment, Quizzes Exit Tickets Daily Monitoring	Unit Benchmark LinkIt!	
Focus Ma	thematical Concepts	
Focus Mathematical Concepts           Prerequisite skills:           Achieve the Core Concord/coherence-map/           Standards:           6ANS.A.1:         5.NF.7           6ANS.B.2:         5.NT.6           6.RP.A.1:         5.NF.3           6.RP.A.2:         5.NF.3           6.RP.A.3:         5.OA.3           6.NS.B.3:         5.NBT.7           6.NS.B.4:         4.OA. 4, 5.OA.2		

#### Mathematics Curriculum – Grade 6

Unit 1

#### **Common Misconceptions:**

#### 6.NS.A.1

Students may believe that dividing by 1/2 is the same as dividing in half. Dividing by half means to find how many 1/2s there are in a quantity, whereas, dividing in half means to take a quantity and split it into two equal parts. Thus 7 divided by 1/2 = 14 and 7 divided in half equals 3 1/2.

#### 6.RP.A.1 & 6.RP.A.2 & 6.RP.A.3

Fractions and ratios may represent different comparisons. Fractions always express a part-to-whole comparison, but ratios can express a part-to-whole comparison or a part-to-part comparison which can be written as: *a* to *b*, *a/b*, or *a:b*. Even though ratios and fractions express a part-to-whole comparison, the addition of ratios and the addition of fractions are distinctly different procedures. When adding ratios, the parts area added, the wholes are added and then the total part is compared to the total whole. For example, (2 out of 3 parts) + (4 out of 5 parts) is equal to six parts out of 8 total parts (6 out of 8) if the parts are equal. When dealing with fractions, the procedure for addition is based on a common denominator: (2/3) + (4/5) = (10/15) + (12/15) which is equal to (22/15). Therefore, the addition process for ratios and for fractions is distinctly different. Often there is a misunderstanding that a percent is always a natural number less than or equal to 100. Provide examples of percent amounts that are greater than 100%, and percent amounts that are less 1%.

#### Number Fluency:

**6.NS.2** Students fluently divide multi-digit numbers using the standard algorithm. This is the culminating standard for several years' worth of work with division of whole numbers.

6.NS.3 Students fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

#### **Fluency Support for Grades 6-8**

https://www.engageny.org/resource/mathematics-fluency-support-grades-6-8

### Mathematics Curriculum – Grade 6

District/School Tasks	District/School Primary and Supplementary Resources and Technology Integration
PARCC Released Items	Text – Go Math
http://www.parcc-assessment.org/released-items	Link it/Go Math!:
NJDOE Digital Item Library	https://www-k6.thinkcentral.com/ePC/start.do
https://nj.digitalitemlibrary.com/home	GoMath Personal Math Trainer
NJSLA Mathematics Evidence Statements https://docs.google.com/spreadsheets/d/18M5r1jk4P729fTpAIWAzrw1gE6tke n233I-Yk0U712M/edit#gid=554025491	Fluency Support for Grades 6-8 <u>https://www.engageny.org/resource/mathematics-fluency-support-grades-6-8</u> Moby May:
	https://www.mohymax.com/signin
LinkIt! Form A, B, & C	https://www.https//www.https//https://www.https//
	6 <sup>th</sup> grade Flip Book: http://community.ksde.org/Default.aspx?tabid=5646
	North Carolina Dept of Ed. Wikispaces:
	http://maccss.ncdpi.wikispaces.net/Middle+School
	PARCC Math Resources http://www.parcc-assessment.org/assessments/test-design/mathematics/math-test-specifications-documents
	101 Math Discourse Questions:
	http://www.casamples.com/downloads/100MathDiscourseQuestions Printable.pdf
	Asking Effective Questions http://www.edu.gov.on.ca/eng/literacynumeracy/inspire/research/CBS_AskingEffectiveQ uestions.pdf

### Mathematics Curriculum – Grade 6

Instructional Best Practices and Exemplars		
1. Identifying similarities and differences	6. Cooperative learning	
2. Summarizing and note taking	7. Setting objectives and providing feedback	
3. Reinforcing effort and providing recognition	8. Generating and testing hypotheses	
4. Homework and practice	9. Cues, questions, and advance organizers	
5. Nonlinguistic representations	10. Manage response rates	
Vocabulary		
<ul> <li>6.NS.A.1</li> <li>Apply and extend previous understanding of multiplication and division to divide fractions by fractions.</li> <li>reciprocal, multiplicative inverses, visual fraction model</li> <li>6.NS.B,2</li> <li>Compute fluently with multi-digit numbers and find common factors and</li> </ul>	<ul> <li>6.NS.B. 3 &amp; 4</li> <li>Compute fluently with multi-digit numbers and find common factors and multiples. greatest common factor, least common multiple, prime numbers, composite numbers, relatively prime, factors, multiples, distributive property, prime factorization</li> <li>6.RP.A.1, 2, &amp; 3</li> <li>Understand ratio concepts and use ratio reasoning to solve problems.</li> </ul>	
multi-digit	ratio, equivalent ratios, tape diagram, unit rate, part-to-part, part-to-whole, percent	

#### Mathematics Curriculum – Grade 6

#### Unit 1

#### 9.1 Personal Financial Literacy, 9.2 Career Awareness, Exploration, Preparation and Training & 9.4 Life Literacies and Key Skills

9.1.8.CR.3: Relate the importance of consumer, business, and government responsibility to the economy and personal finance.

9.1.8.CDM.1: Compare and contrast the use of credit cards and debit cards for specific purchases and the advantages and disadvantages of using each.

9.1.8.CDM.2: Demonstrate an understanding of the terminology associated with different types of credit (e.g., credit cards, installment loans, mortgages, lines of credit) and compare and calculate the interest rates associated with each.

9.1.8.CDM.3: Compare and contrast loan management strategies, including interest charges and total principal repayment costs.

9.1.8.CP.2: Analyze how spending habits affect one's ability to save.

9.1.8.EG.4: Identify and explain the consequences of breaking federal and/or state employment or financial laws.

9.1.8.EG.7: Explain the effect of the economy (e.g., inflation, unemployment) on personal income, individual and family security, and consumer decisions.

9.1.8.FP.4: Analyze how familial and cultural values influence savings rates, spending, and other financial decisions.

9.1.8.PB.4: Construct a simple personal savings and spending plan based on various sources of income and different stages of life (e.g. teenager, young adult, family).

9.1.8.RM.2: Analyze the need for and value of different types of insurance and the impact of deductibles in protecting assets against loss.

9.1.8.RM.4: Explain the purpose of insurance products and the reasons for property product and liability insurance protection.

9.2.8.CAP.3: Explain how career choices, educational choices, skills, economic conditions, and personal behavior affect income.

9.2.8.CAP.6: Compare the costs of postsecondary education with the potential increase in income from a career of choice.

9.2.8.CAP.8: Compare education and training requirements, income potential, and primary duties of at least two jobs of interest.

### Mathematics Curriculum – Grade 6

#### Unit 1

9.2.8.CAP.11: Analyze potential career opportunities by considering different types of resources, includ8ing occupation databases, and state and national labor market statistics.

9.4.8.CT.1: Evaluate diverse solutions proposed by a variety of individuals, organizations, and/or agencies to a local or global problem, such as climate change, and use critical thinking skills to predict which one(s) are likely to be effective (e.g., MS-ETS1-2).

9.4.8.DC.8: Explain how communities use data and technology to develop measures to respond to effects of climate change (e.g., smart cities).

9.4.8.IML.3: Create a digital visualization that effectively communicates a data set using formatting techniques such as form, position, size, color, movement, and spatial grouping (e.g., 6.SP.B.4, 7.SP.B.8b).

9.4.8.IML.4: Ask insightful questions to organize different types of data and create meaningful visualizations.

9.4.8.IML.5: Analyze and interpret local or public data sets to summarize and effectively communicate the data.

The implementation of the 21st Century skills and standards for students of the Winslow Township District is infused in an interdisciplinary format in a variety of curriculum areas that include, English language Arts, Mathematics, School Guidance, Social Studies, Technology, Visual and Performing Arts, Science, Physical Education and Health, and World Language.: Additional opportunities to address 9.1, 9.2 & 9.4:

#### Philadelphia Mint

https://www.usmint.gov/learn/kids/resources/educational-standards

Different ways to teach Financial Literacy.

https://www.makeuseof.com/tag/10-interactive-financial-websites-teach-kids-money-management-skills/

#### Mathematics Curriculum – Grade 6

#### Unit 1

#### Suggested Modifications for Special Education/504

Students with special needs: The students' needs will be addressed on an individual and grade level using a variety of modalities. Accommodations will be made for those students who need extra time to complete assignments. Support staff will be available to aid students related to IEP specifications. 504 accommodations will also be attended to by all instructional leaders. Physical expectations and modifications, alternative assessments, and scaffolding strategies will be used to support this learning. The use of Universal Design for Learning (UDL) will be considered for all students as teaching strategies are considered.

 $\Box$  Provide the opportunity to re-take tests

□Modify activities/assignments/projects/assessments

 $\hfill\square$  Breakdown activities/assignments/projects/assessments into manageable units

 $\Box$ Additional time to complete activities/assignments/projects/assessments

 $\Box$  Provide an option for alternative

activities/assignments/projects/assessments

 $\Box$  Modify Content

 $\Box$  Modify Amount

 $\square$  Small Group Intervention/Remediation

- □ Individual Intervention/Remediation
- □ Additional Support Materials
- $\Box$  Guided Notes
- □ Graphic Organizers
- □ Adjust Pacing of Content
- $\Box$  Increase one on one time

□ Peer Support

- □ Other Modifications for Special Education:
  - Think Central Online Resources:
    - Reteach
    - Strategic Intervention
    - Intensive Intervention Skill Pack
    - Response to Intervention Activities

#### Mathematics Curriculum – Grade 6

#### Unit 1

#### Suggested Modifications for At-Risk Students

Formative and summative data will be used to monitor student success. At first signs of failure, student work will be reviewed to determine support. This may include parent consultation, basic skills review and differentiation strategies. With considerations to UDL, time may be a factor in overcoming developmental considerations

 $\Box$  Provide the opportunity to re-take tests

 $\Box$  Increase one on one time

 $\Box$  Oral prompts can be given

□ Using visual demonstrations, illustrations, and models

 $\Box$  Give directions/instructions verbally and in simple written format

□ Peer Support

□ Modify activities/assignments/projects/assessments

□ Additional time to complete activities/assignments/projects/assessments

 $\Box$  Provide an option for alternative

activities/assignments/projects/assessments

- □ Modify Content
- □ Modify Amount
- □ Adjust Pacing of Content
- $\square$  Small Group Intervention/Remediation
- $\Box$  Individual Intervention/Remediation
- □ Additional Support Materials
- $\Box$  Guided Notes
- $\Box$  Graphic Organizers
- $\Box$  Other Modifications for Students At-Risk:
  - Think Central Online Resources:
    - Reteach
    - Strategic Intervention
    - Intensive Intervention Skill Pack
    - Response to Intervention Activities

### Mathematics Curriculum – Grade 6

English Language Learners	Suggested Modifications for Gifted Students
All WIDA Can Do Descriptors can be found at this link: https://wida.wisc.edu/teach/can-do/descriptors Grades 6-8 WIDA Can Do Descriptors: Listening Speaking Reading Writing Oral Language Students will be provided with accommodations and modifications that may include: Relate to and identify commonalities in mathematics studies in student's home country Assist with organization Use of computer Emphasize/highlight key concepts Teacher Modeling Peer Modeling Label Classroom Materials - Word Walls	<ul> <li>Students excelling in mastery of standards will be challenged with complex, high level challenges related to the topic.</li> <li>Raise levels of intellectual demands</li> <li>Require higher order thinking, communication, and leadership skills</li> <li>Differentiate content, process, or product according to student's readiness, interests, and/or learning styles</li> <li>Provide higher level texts</li> <li>Expand use of open-ended, abstract questions</li> <li>Critical and creative thinking activities that provide an emphasis on research and in-depth study</li> <li>Enrichment Activities/Project-Based Learning/ Independent Study</li> <li>Additional Strategies may be located at the links:</li> <li>Gifted Programming Standards</li> <li>Webb's Depth of Knowledge Levels and/or Revised Bloom's Taxonomy</li> <li>REVISED Bloom's Taxonomy Action Verbs</li> </ul>
Sugg	ested Activities
<ul> <li>Do Now/Warm-Up</li> <li>Whole Group</li> <li>Small Groups</li> <li>Guided Practice</li> <li>Independent Practice</li> <li>Daily 5</li> </ul>	<ul> <li>CAFÉ</li> <li>Centers</li> <li>Intervention/Remediation</li> <li>Projects</li> <li>Academic Games</li> <li>Other Suggested Activities:</li> </ul>

#### Mathematics Curriculum – Grade 6

#### Unit 1

#### Interdisciplinary Connections

Go Math Grab and Go! Activities (Reading, Science, Math, Social Studies)

Go Math Real World Project: Big Idea, The Number System (Math, Reading, Writing, Science, Social Studies)

Go Math Cross-Curricular Science and Social Studies questions, experiments, and activities embedded throughout the chapter.

#### Integration of Computer Science and Design Thinking NJSLS 8

8.1.8.NI.2: Model the role of protocols in transmitting data across networks and the Internet and how they enable secure and errorless communication.8.1.8.NI.3: Explain how network security depends on a combination of hardware, software, and practices that control access to data and systems.8.1.8.DA.1: Organize and transform data collected using computational tools to make it usable for a specific purpose.