



---

# Content and Timeline for Mathematics

***Grade 6***



West Virginia DEPARTMENT OF  
EDUCATION



**West Virginia Board of Education  
2018-2019**

**David G. Perry**, President  
**Miller L. Hall**, Vice President  
**Thomas W. Campbell, CPA**, Financial Officer

**F. Scott Rotruck**, Member  
**Debra K. Sullivan**, Member  
**Frank S. Vitale**, Member  
**Joseph A. Wallace, J.D.**, Member  
**Nancy J. White**, Member  
**James S. Wilson, D.D.S.**, Member

**Carolyn Long**, Ex Officio  
Interim Chancellor  
West Virginia Higher Education Policy Commission

**Sarah Armstrong Tucker, Ed.D.**, Ex Officio  
Chancellor  
West Virginia Council for Community and Technical College Education

**Steven L. Paine, Ed.D.**, Ex Officio  
State Superintendent of Schools  
West Virginia Department of Education

## Grade 6

The West Virginia College- and Career-Readiness Standards for mathematics emphasize key content, skills, and mathematical habits of mind at each grade level. The focus of instruction is placed on grade-level standards. Instruction should be attentive to learning across all early and elementary learning grades and link major topics within grades. Instruction should develop conceptual understanding, procedural skill and fluency, and application.

Students in the sixth grade will focus on four critical areas: (1) connecting ratio and rate to whole number multiplication and division and using concepts of ratio and rate to solve problems; (2) completing understanding of division of fractions and extending the notion of number to the system of rational numbers, which includes negative numbers; (3) writing, interpreting and using expressions and equations; and (4) developing understanding of statistical thinking.

The following table highlights the content at the cluster level for sixth grade standards. The bulk of instructional time should be given to the clusters and the standards within them. Standards should not be neglected; to do so would result in gaps in students' learning, including skills and understandings they may need in later grades. Instruction should reinforce standards within the clusters by including problems and activities that support natural connections between clusters. **Teachers and administrators alike should note that the standards are not topics to be checked off after being covered in isolated units of instruction;** rather, they provide content to be developed throughout the school year through rich instructional experiences presented in a coherent manner.

### Connections to the Next Grade

In grades six through eight, multiplication and division develop into powerful forms of ratio and proportional reasoning. The properties of operations take on prominence as students move from arithmetic to algebra. The theme of quantitative relationships also becomes explicit in grades six through eight, developing into the formal notion of a function by grade eight. In addition, the foundations of deductive geometry are laid. The gradual development of data representations in kindergarten through grade five leads to the study of statistics in grades six through eight: evaluation of shape, center, and spread of data distributions; possible associations between two variables; and the use of sampling in making statistical decisions.

To be prepared for grade-seven mathematics, students should be able to demonstrate mastery of particular mathematical concepts and procedural skills by the end of grade six and that they have met the fluency expectations for grade six. The expected fluencies for sixth-grade students are multi-digit whole-number division (M.6.5) and multi-digit decimal operations (M.6.6). These fluencies and the conceptual understandings that support them are foundational for work with fractions and decimals in grade seven.

Of particular importance at grade six are skills and understandings of division of fractions by fractions (M.6.4); an understanding of the system of rational numbers (M.6.8-M.6.11); the ability to use ratio concepts and reasoning to solve problems (M.6.1-M.6.3); the extension of arithmetic to algebraic expressions (M.6.13-15), including how to reason about and solve one-variable equations and inequalities (M.6.16-19); and the ability to represent and analyze quantitative relationships between dependent and independent variables (M.6.16-M.6.20).



Grade 6	West Virginia College- and Career-Readiness Standards
<b>Ratios and Proportional Relationships</b>	
<b>Clusters</b>	
<ul style="list-style-type: none"> <li>Understand ratio concepts and use ratio reasoning to solve problems.</li> </ul>	M.6.1-M.6.3
<b>The Number System</b>	
<b>Clusters</b>	
<ul style="list-style-type: none"> <li>Apply and extend previous understandings of multiplication and division to divide fractions by fractions.</li> </ul>	M.6.4
<ul style="list-style-type: none"> <li>Compute fluently with multi-digit numbers and find common factors and multiples.</li> </ul>	M.6.5 – M.6.7
<ul style="list-style-type: none"> <li>Apply and extend previous understandings of numbers to the system of rational numbers.</li> </ul>	M.6.8 - M.6.11
<b>Expressions and Equations</b>	
<b>Clusters</b>	
<ul style="list-style-type: none"> <li>Apply and extend previous understandings of arithmetic to algebraic expressions.</li> </ul>	M.6.12 – M.6.15
<ul style="list-style-type: none"> <li>Reason about and solve one-variable equations and inequalities.</li> </ul>	M.6.16 – M.6.19
<ul style="list-style-type: none"> <li>Represent and analyze quantitative relationships between dependent and independent variables.</li> </ul>	M.6.20
<b>Geometry</b>	
<b>Clusters</b>	
<ul style="list-style-type: none"> <li>Solve real-world and mathematical problems involving area, surface area, and volume.</li> </ul>	M.6.21 – M.6.24
<b>Statistics and Probability</b>	
<b>Clusters</b>	
<ul style="list-style-type: none"> <li>Develop understanding of statistical variability.</li> </ul>	M.6.25 – M.6.27
<ul style="list-style-type: none"> <li>Summarize and describe distributions.</li> </ul>	M.6.28 – M.6.29

### Explanations

- Domains are broad components that make up a content area. Domains in mathematics vary by grade-level and by course. For example, the five domains for mathematics of Grade 6 are Ratios and Proportional Relationships; The Number System; Expressions and Equations; Geometry; and Statistics and Probability.
- Clusters** are groups of standards that define the expectations students must demonstrate to be college- and career-ready.
- Standards** are expectations for what students should know, understand and be able to do; standards represent educational goals.

*Note of caution: Neglecting material will leave gaps in students' skills and understandings and will leave students unprepared for the challenges they face in later grades.*



## Grade 6 Content Plan

Teachers must provide students the opportunity to master each of the grade-level content standards. It is important to understand that neglecting grade-level content standards will leave gaps in students' skills and understandings and will leave students unprepared for the challenges they face in later grades. Any content plan must demonstrate a means by which students can be provided the opportunity to address all grade-level content standards and to revisit and practice skills and strengthen understandings throughout the school year. The information below is an example of how to address all Grade 6 standards in a school year.

<b>DOMAIN TOPIC</b>	<b>Geometry</b>	<b>Ratios and Proportional Relationships</b>	<b>Ratios and Proportional Relationships</b>	<b>The Number System</b>	<b>The Number System</b>	<b>Expressions and Equations</b>	<b>Number System</b>	<b>Statistics and Probability</b>
	<i>Area and Surface Area</i>	<i>Introduction to Ratios</i>	<i>Unit Rates and Percentages</i>	<i>Dividing Fractions</i>	<i>Operations in Base 10</i>	<i>Expressions and Equations</i>	<i>Rational Numbers</i>	<i>Data Sets and Distributions</i>
<b>SAMPLE TIMELINE</b>	August/September	October/November	November/December	January	February	March	April	May/June
<b>CONTENT STANDARDS</b>	M.6.12 M.6.13 M.6.21 M.6.22 M.6.24	M.6.1 M.6.2 M.6.3	M.6.2 M.6.3	M.6.4 M.6.21 M.6.22	M.6.5 M.6.6 M.6.15	M.6.3 M.6.6 M.6.12 M.6.13 M.6.14 M.6.15 M.6.16 M.6.17 M.6.18 M.6.20	M.6.7 M.6.8 M.6.9 M.6.10 M.6.11 M.6.13 M.6.16 M.6.17 M.6.18 M.6.19 M.6.23	M.6.6 M.6.25 M.6.26 M.6.27 M.6.28 M.6.29
<b>RATIONALE</b>	In the sample above, Grade 6 mathematics begins with students reasoning about area and understanding and applying concepts of surface area. This format starts with a mathematical concept that is new to students and incorporates opportunities to practice arithmetic concepts and skills developed in prior years. In the plan, students can be provided opportunities to strengthen their ability in procedural fluency, conceptual understanding, and applications. As an example, skills and understandings related to area can be revisited and can support students as they are introduced to operations in base 10 and to compute fluently with multi-digit numbers.							





Steven L. Paine, Ed.D.  
West Virginia Superintendent of Schools