

# Enduring Understandings and Essential Questions

## Mathematics K-12

### Wallingford Public Schools

*Organization is based on the current State Frameworks in Mathematics. The parentheses indicate the proposed structure for the revision of the Math Frameworks.*

Enduring Understandings	Essential Questions
<b>Number Sense-</b> (Numeric Reasoning, Rational Numbers and Proportional Reasoning)	
<ul style="list-style-type: none"> <li>• There are many ways to represent a number.</li> <li>• The problem in front of you is a member of a larger class of problems.</li> <li>• Number sense develops through experience.</li> </ul>	<ul style="list-style-type: none"> <li>• How do I determine the best numerical representation (pictorial, symbolic, objects) for a given situation?</li> <li>• How does finding the common characteristics among similar problems help me to be a more efficient problem solver?</li> <li>• What kinds of experiences help develop number sense?</li> </ul>
<b>Operations-</b> (Numeric Reasoning, Rational Numbers and Proportional Reasoning)	
<ul style="list-style-type: none"> <li>• Operations create relationships between numbers.</li> <li>• The relationships among the operations and their properties promote computational fluency.</li> </ul>	<ul style="list-style-type: none"> <li>• Why do I need mathematical operations?</li> <li>• How do mathematical operations relate to each other?</li> <li>• How do I know which mathematical operation (+, -, x, ÷, exponents, etc.) to use?</li> <li>• How do I know which computational method (mental math, estimation, paper and pencil, and calculator) to use?</li> </ul>
<b>Estimation and Approximation-</b> (Numeric Reasoning, Rational Numbers and Proportional Reasoning, Spatial Relationships)	
<ul style="list-style-type: none"> <li>• In certain situations, an estimate is as useful as an exact answer.</li> </ul>	<ul style="list-style-type: none"> <li>• When is it appropriate to use estimation and/or approximation?</li> <li>• How important are estimations in real life situations?</li> <li>• How do I make a reasonable estimate?</li> </ul>
<b>Ratios, Proportions, and Percents-</b> (Rational Numbers and Proportional Reasoning and Spatial Relationships)	
<ul style="list-style-type: none"> <li>• Proportional relationships express how quantities change in relationship to each other.</li> </ul>	<ul style="list-style-type: none"> <li>• When and why do I use proportional comparisons?</li> <li>• How does comparing quantities describe the relationship between them?</li> </ul>
<b>Measurement-</b> (Spatial Relationships)	
<ul style="list-style-type: none"> <li>• Measurement describes the attributes of objects and events.</li> <li>• Standard units of measure enable people to interpret results or data.</li> <li>• All measurements have some degree of</li> </ul>	<ul style="list-style-type: none"> <li>• Why do I measure?</li> <li>• Why do I need standardized units of measurement?</li> <li>• How does what I measure influence how we measure?</li> </ul>

uncertainty.	<ul style="list-style-type: none"> <li>• How exact does a measurement have to be?</li> </ul>
<b>Spatial Relationships and Geometry-</b> (Spatial Relationships)	
<ul style="list-style-type: none"> <li>• Geometry and spatial sense offer ways to interpret and reflect on our physical environment.</li> <li>• Analyzing geometric relationships develops reasoning and justification skills.</li> </ul>	<ul style="list-style-type: none"> <li>• How do geometric models describe spatial relationships?</li> <li>• How are geometric shapes and objects classified?</li> </ul>
<b>Probability and Statistics-</b> (Working with Data)	
<ul style="list-style-type: none"> <li>• The way that data is collected, organized and displayed influences interpretation.</li> <li>• The probability of an event's occurrence can be predicted with varying degrees of confidence.</li> </ul>	<ul style="list-style-type: none"> <li>• Why is data collected and analyzed?</li> <li>• How do people use data to influence others?</li> <li>• How can predictions be made based on data?</li> </ul>
<b>Patterns-</b> (Working with Data, Algebraic Thinking)	
<ul style="list-style-type: none"> <li>• Patterns and relationships can be represented numerically, graphically, symbolically, and verbally.</li> <li>• Patterns provide insights into potential relationships.</li> </ul>	<ul style="list-style-type: none"> <li>• What is a pattern?</li> <li>• How do I describe a pattern?</li> <li>• How do I express a pattern to show a relationship?</li> <li>• How can patterns be used to make predictions?</li> </ul>
<b>Algebra and Functions-</b> (Algebraic Thinking)	
<ul style="list-style-type: none"> <li>• Real world situations can be represented symbolically and graphically.</li> <li>• Algebraic expressions and equations generalize relationships from specific cases.</li> </ul>	<ul style="list-style-type: none"> <li>• How is thinking algebraically different from thinking arithmetically?</li> <li>• How do I use algebraic expressions to analyze or solve problems?</li> <li>• How do the properties contribute to algebraic understanding?</li> <li>• What is meant by equality?</li> </ul>
<b>Problem Solving-</b> (Process Standard)	
<ul style="list-style-type: none"> <li>• A problem solver understands what has been done, knows why the process was appropriate, and can support it with reasons and evidence.</li> <li>• There can be different strategies to solve a problem, but some are more effective and efficient than others are.</li> <li>• The context of a problem determines the reasonableness of a solution.</li> <li>• The ability to solve problems is the heart of mathematics.</li> </ul>	<ul style="list-style-type: none"> <li>• How do I know where to begin when solving a problem?</li> <li>• How does explaining my process help me to understand a problem's solution better?</li> <li>• How do I decide what strategy will work best in a given problem situation?</li> <li>• What do I do when I get stuck?</li> <li>• How do I know when a result is reasonable?</li> <li>• What is the relationship between solving problems and computation?</li> <li>• Why is the ability to solve problems the heart of mathematics?</li> </ul>