Orange Unified School District
Office of Curriculum and Instruction
Course Description - Middle School

Course Title	Middle School Honors Math I	**Course Code**	N248

Content Area:	Math	**Grade Range:**	7-8
Prerequisites:	Math 7/Math 7 Accelerated or AMC	**Length of Course:**	1 year
Course Sequence:	Y	**Next course in sequence:**	Honors Math II

Course Description: (from California CCSS-M)

The fundamental purpose of 8th Grade Mathematics I is to formalize and extend the mathematics that students learned through the end of seventh grade. Content in this course is grouped into six critical areas, or units. The units of study deepen and extend understanding of linear and exponential relationships by contrasting them with each other and by applying linear models to data that exhibit a linear trend. 8th Grade Mathematics 1 includes an exploration of the role of rigid motions in congruence and similarity. The Pythagorean theorem is introduced, and students examine volume relationships of cones, cylinders, and spheres. 8th Grade Mathematics 1 uses properties and theorems involving congruent figures to deepen and extend understanding of geometric knowledge from prior grades. The final unit in the course ties together the algebraic and geometric ideas studied. The Mathematical Practice Standards apply throughout each course and, together with the content standards, prescribe that students experience mathematics as a coherent, useful, and logical subject that makes use of their ability to make sense of problem situations. This course differs from Mathematics I in that it contains content from 8th grade. While coherence is retained, in that it logically builds from Accelerated 7th Grade, the additional content when compared to the high school course demands a faster pace for instruction and learning.

Student Outcomes:

1. **Critical Area 1:** Work with quantities and rates, including simple linear expressions and equations forms the foundation for this unit. Students use units to represent problems algebraically and graphically, and to guide the solution of problems. Student experience with quantity provides a foundation for the study of expressions, equations, and functions.

2. **Critical Area 2:** Building on earlier work with linear relationships, students learn function notation and language for describing characteristics of functions, including the concepts of domain and range. They explore many examples of functions, including sequences; they interpret functions given graphically, numerically, symbolically, and verbally, translate between representations, and understand the limitations of various representations. They work with functions given by graphs and tables, keeping in mind that depending upon the context, these representations are likely to be approximate and incomplete. Their work includes functions that can be described or approximated by formulas as well as those that cannot. When functions describe relationships between quantities arising from a context, students reason with the units in which those quantities are measured. Students build on and informally extend their understanding of integral exponents to consider exponential functions. They compare and contrast linear and exponential functions, distinguishing between additive and multiplicative change. They interpret arithmetic sequences as linear functions and geometric sequences as exponential functions.

3. **Critical Area 3:** This unit builds on earlier experiences by asking students to analyze and explain the process of solving an equation and to justify the process used in solving a system of equations. Students develop fluency writing, interpreting, and translating between various forms of linear equations and inequalities, and using them to solve problems. They master the solution of linear equations and apply related solution techniques and the laws of exponents to the creation and solution of simple exponential equations. Students explore systems of equations and inequalities, and they find and interpret their solutions.

4. **Critical Area 4:** This unit builds upon prior students' prior experiences with data, providing students with more formal means of assessing how a model fits data. Students use regression techniques to describe approximately linear relationships between quantities. They use graphical representations and knowledge of the context to make judgments about the appropriateness of linear models. With linear models, they look at residuals to analyze the goodness of fit.

5. **Critical Area 5:** In previous grades, students were asked to draw triangles based on given measurements. They also have prior experience with rigid motions (translations, reflections, and rotations) and have used these experiences to develop notions about what it means for two objects to be congruent. Students establish triangle congruence criteria, based on analyses of rigid motions and formal constructions. They solve problems about triangles, quadrilaterals, and other polygons. They apply reasoning to complete geometric constructions and explain why they work.

6. **Critical Area 6:** Building on their work with the Pythagorean Theorem to find distances, students use a rectangular coordinate system to verify geometric relationships, including properties of special triangles and quadrilaterals and slopes of parallel and perpendicular lines.

California Content Standards:

Number and Quantity

Quantities (N-Q)

- Reason quantitatively and use units to solve problems. [Foundation for work with expressions, equations, and functions]

Algebra

Seeing Structure in Expressions (A-SSE)

- Interpret the structure of expressions. [Linear expressions and exponential expressions with integer exponents]

Creating Equations (A-CED)

- Create equations that describe numbers or relationships. [Linear and exponential (integer inputs only); for A.CED.3, linear only]

Reasoning with Equations and Inequalities (A-REI and 8.EE)

- Understand solving equations as a process of reasoning and explain the reasoning. [Master linear; learn as general principle.]
- Solve equations and inequalities in one variable.
- Solve systems of equations. [Linear systems]
- Represent and solve equations and inequalities graphically. [Linear and exponential; learn as general principle.]

Functions

Interpreting Functions (F-IF and 8.F)

- Understand the concept of a function and use function notation. [Learn as general principle. Focus on linear and exponential (integer domains) and on arithmetic and geometric sequences.]
- Interpret functions that arise in applications in terms of the context. [Linear and exponential (linear domain)]
- Analyze functions using different representations. [Linear and exponential]

Building Functions (F-BF and 8.F)

- Build a function that models a relationship between two quantities. [For F.BF.1, 2, linear and exponential (integer inputs)]
- Build new functions from existing functions. [Linear and exponential; focus on vertical translations for exponential.]

Linear, Quadratic, and Exponential Models (F-LE)

- Construct and compare linear, quadratic, and exponential models and solve problems. [Linear and exponential]
- Interpret expressions for functions in terms of the situation they model. [Linear and exponential of form $f(x) = b^x + k$]

Geometry

Congruence (G-CO)

- Experiment with transformations in the plane.
- Understand congruence in terms of rigid motions. [Build on rigid motions as a familiar starting point for development of concept of geometric proof.]
- Make geometric constructions. [Formalize and explain processes.]

Understand and apply Pythagorean Theorem (8.G)

- Explain proof, apply Pythagorean Theorem to solve problems, find distance between two points on the coordinate plane.

Expressing Geometric Properties with Equations (G-GPE)

- Use coordinates to prove simple geometric theorems algebraically. [Include distance formula; relate to Pythagorean Theorem.]

Statistics and Probability

Investigate Patterns of Association in Bivariate Data (8.SP)

- Construct and interpret scatter plots, create trend lines.

Interpreting Categorical and Quantitative Data (S-ID)

- Summarize, represent, and interpret data on a single count or measurement variable.
- Summarize, represent, and interpret data on two categorical and quantitative variables. [Linear focus; discuss general principle.]
- Interpret linear models.

Standards for Mathematical Practice:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

District Adopted Curriculum Map for Pearson Integrated High School Mathematics I (with 8th grade standards additions):

Topic and Title	Number of Days
Chapter 1: Solving Equations and Inequalities	**19-21**
Core lessons with Activity/Technology/Lesson Lab(s)	16
Review, remediation, fluency practice, differentiation, and assessment	3-5
Chapter 2: An Introduction to Functions	**18-20**
Core lessons with Activity/Technology/Lesson Lab(s) *(Include 8th grade standards)*	15
Review, remediation, fluency practice, differentiation, and assessment	3-5
Chapter 3: Linear Functions	**17-19**
Core lessons with Activity/Technology/Lesson Lab(s)	14
Review, remediation, fluency practice, differentiation, and assessment	3-5
Chapter 4: Systems of Equations and Inequalities	**15-17**
Core lessons with Activity/Technology/Lesson Lab(s) *(Include 8th grade standards)*	12
Review, remediation, fluency practice, differentiation, and assessment	3-5
Chapter 5: Exponents and Exponential Functions	**17-19**
Core lessons with Activity/Technology/Lesson Lab(s)	14
Review, remediation, fluency practice, differentiation, and assessment	3-5
Topic 7: Pythagorean Theorem (enVision 2.0)	**7-9**
Core lessons with 3-Act Mathematical Modeling Lesson/STEM Project	4
Review, remediation, fluency practice, differentiation, and assessment	3-5

Topic and Title	Number of Days
Chapter 6: Data Analysis	**11-13**
Core lessons with Activity/Technology/Lesson Lab(s) *(Covers 8th grade standards)*	8
Review, remediation, fluency practice, differentiation, and assessment	3-5
Chapter 7: Tools of Geometry	**12-14**
Core lessons with Activity/Technology/Lesson Lab(s)	9
Review, remediation, fluency practice, differentiation, and assessment	3-5
Chapter 8: Transformations	**13-15**
Core lessons with Activity/Technology/Lesson Lab(s) *(Add lessons on Dilations and Similarity)*	10
Review, remediation, fluency practice, differentiation, and assessment	3-5
Chapter 9: Connecting Algebra and Geometry	**11-13**
Core lessons with Activity/Technology/Lesson Lab(s)	8
Review, remediation, fluency practice, differentiation, and assessment	3-5
Chapter 10: Reasoning and Proof	**17-19**
Core lessons with Activity/Technology/Lesson Lab(s)	14
Review, remediation, fluency practice, differentiation, and assessment	3-5
Textbook Resources to Use:	
Each section: Think About a Plan, Activity, Games and Puzzles, Additional Vocabulary Support Enrichment, Reteaching, Find the Errors!	

California Summative Assessment Blueprint (SBAC):

Note: These assessment blueprints are for the summative SBAC at the end of Grade 8

Target Sampling Mathematics Grade 8						
Claim	Content Category	Assessment Targets	DOK	Items		Total Items
				CAT	PT	
1. Concepts and Procedures	Priority Cluster	C. Understand the connections between proportional relationships, lines, and linear equations.	1, 2	5-6	0	17-20
		D. Analyze and solve linear equations and pairs of simultaneous linear equations.	1, 2			
		B. Work with radicals and integer exponents.	1, 2	5-6		
		E. Define, evaluate, and compare functions.	1, 2			
		G. Understand congruence and similarity using physical models, transparencies, or geometry software.	1, 2			
		F. Use functions to model relationships between quantities.	1, 2	2-3		
		H. Understand and apply the Pythagorean Theorem.	1, 2			
	Supporting Cluster	A. Know that there are numbers that are not rational, and approximate them by rational numbers.	1, 2	4-5		
		I. Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.	1, 2			
		J. Investigate patterns of association in bivariate data.	1, 2			

Target Sampling Mathematics Grade 8						
Claim	Content Category	Assessment Targets	DOK	Items		Total Items
				CAT	PT	
2. Problem Solving 4. Modeling and Data Analysis	Problem Solving (drawn across content domains)	A. Apply mathematics to solve well-posed problems arising in everyday life, society, and the workplace.	2, 3	2	1–2	8-10
		B. Select and use appropriate tools strategically. C. Interpret results in the context of a situation. D. Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flow charts, or formulas).	1, 2, 3	1		
	Modeling and Data Analysis (drawn across content domains)	A. Apply mathematics to solve problems arising in everyday life, society, and the workplace. D. Interpret results in the context of a situation.	2, 3	1	1–3	
		B. Construct, autonomously, chains of reasoning to justify mathematical models used, interpretations made, and solutions proposed for a complex problem. E. Analyze the adequacy of and make improvements to an existing model or develop a mathematical model of a real phenomenon.	2, 3, 4	1		
		C. State logical assumptions being used. F. Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flow charts, or formulas).	1, 2, 3	1		
		G. Identify, analyze, and synthesize relevant external resources to pose or solve problems.	3, 4	0		
3. Communicating Reasoning	Communicating Reasoning (drawn across content domains)	A. Test propositions or conjectures with specific examples. D. Use the technique of breaking an argument into cases.	2, 3	3	0-2	8-10
		B. Construct, autonomously, chains of reasoning that will justify or refute propositions or conjectures. E. Distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in the argument—explain what it is.	2, 3, 4	3		
		C. State logical assumptions being used. F. Base arguments on concrete referents such as objects, drawings, diagrams, and actions. G. At later grades, determine conditions under which an argument does and does not apply. (For example, area increases with perimeter for squares, but not for all plane figures.)	2, 3	2		