7th Grade Mathematics (Accelerated)

Scale Drawings and Proportional Relationships
Unit 1 Pacing Calendar - Illustrative Mathematics

ORANGE PUBLIC SCHOOLS

OFFICE OF CURRICULUM AND INSTRUCTION

OFFICE OF MATHEMATICS

From the New Jersey State Learning Standards:

Traditional Pathway Accelerated 7th Grade

In **Accelerated 7th Grade,** instructional time should focus on four critical areas: (1) Rational Numbers and Exponents; (2) Proportionality and Linear Relationships; (3) Introduction to Sampling Inference; (4) Creating, Comparing, and Analyzing Geometric Figures

1. Students develop a unified understanding of number, recognizing fractions, decimals (that have a finite or a repeating decimal representation), and percents as different representations of rational numbers. Students extend addition, subtraction, multiplication, and division to all rational numbers, maintaining the properties of operations and the relationships between addition and subtraction, and multiplication and division. By applying these properties, and by viewing negative numbers in terms of everyday contexts (e.g., amounts owed or temperatures below zero), students explain and interpret the rules for adding, subtracting, multiplying, and dividing with negative numbers. They use the arithmetic of rational numbers as they formulate expressions and equations in one variable and use these equations to solve problems. They extend their mastery of the properties of operations to develop an understanding of integer exponents, and to work with numbers written in scientific notation.

2. Students use linear equations and systems of linear equations to represent, analyze, and solve a variety of problems. Students recognize equations for proportions ($y/x = m$ or $y = mx$) as special linear equations ($y = mx + b$), understanding that the constant of proportionality (m) is the slope, and the graphs are lines through the origin. They understand that the slope (m) of a line is a constant rate of change, so that if the input or x-coordinate changes by an amount A, the output or y-coordinate changes by the amount m×A. Students strategically choose and efficiently implement procedures to solve linear equations in one variable, understanding that when they use the properties of equality and the concept of logical equivalence, they maintain the solutions of the original equation.

3. Students build on their previous work with single data distributions to compare two data distributions and address questions about differences between populations. They begin informal work with random sampling to generate data sets and learn about the importance of representative samples for drawing inferences

4. Students continue their work with area from Grade 6, solving problems involving the area and circumference of a circle and surface area of three-dimensional objects. In preparation for work on congruence and similarity, they reason about relationships among two-dimensional figures using scale drawings and informal geometric constructions, and they gain familiarity with the relationships between angles formed by intersecting lines. Students work with three-dimensional figures, relating them to two-dimensional figures by examining cross sections. They solve real- world and mathematical problems involving area, surface area, and volume of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes and right prisms. Students use ideas about distance and angles, how they behave under translations, rotations, reflections, and dilations, and ideas about congruence and similarity to describe and analyze two-dimensional figures and to solve problems. Students show that the sum of the angles in a triangle is the angle formed by a straight line, and that various configurations of lines give rise to similar triangles because of the angles created when a transversal cuts parallel lines. Students complete their work on volume by solving problems involving cones, cylinders, and spheres.

Yearlong Pacing Guide
Accelerated 7

Grade	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
6	Unit 1 6.G	Unit 2 6.RP	Unit 3 6.RP	Unit 4 6.NS		Unit 5 6.NS	Unit 6 6.EE	Unit 7 6.NS	Unit 8 6.SP	
Acc 7	Unit 1 7.RP	Unit 2 7.G / Unit 3 7.RP	Unit 4 7.NS	Unit 5 7.EE	Unit 6 7.G	Unit 7 8.G	Unit 8 8.G / Unit 9 8.EE	Unit 10 8.EE	Unit 11 7.SP	

Unit 1	Unit 2	Unit 3	Unit 4	Unit 5
7.RP: Scale Drawings & Proportional Relationships	**7.G:** Measuring Circles	**7.RP:** Proportional Relationships & Percentages	**7.NS:** Rational Number Arithmetic	**7.EE:** Expressions, Equations, & Inequalities

Unit 6	Unit 7	Unit 8	Unit 9	Unit 10	Unit 11
7.G: Angles, Triangles and Prisms	**8.G:** Rigid Transformations & Congruence	**8.G.** Dilations, Similarity, and Introducing Slope	**8.EE:** Linear Relationships	**8.EE:** Exponents and Scientific Notation	**7.SP:** Probability & Sampling

2019-2020 Accelerated Grade 7 (iM)

	Quarter 1			Quarter 2			Quarter 3			Quarter 4	
	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7	Unit 8	Unit 9	Unit 10	Unit 11
	iM 7.1 iM 7.2	iM 7.3	iM 7.4	iM 7.5	iM 7.6	iM 7.7	iM 8.1	iM 8.2	iM 8.3	iM 8.7	iM 7.8
	7.G.1(A) 7.RP.2a(M) 7.RP.2b(M) 7.RP.2c(M) 7.RP.2d(M)	7.G.4(A)	7.RP.1(M) 7.RP.3(M)	7.NS.1(M) 7.NS.2(M) 7.NS.3(M)	7.EE.3(M) 7.EE.4(M) 7.EE.2(M) 7.EE.1(M)	7.G.5(A) 7.G.2(A) 7.G.3(A) 7.G.6(A)	8.G.1(M) 8.G.2(M) 8.G.5(M)	8.G.4(M) 8.G.3(M) 8.EE.6(M)	8.EE.5(M) 8.F.4(S) 8.EE.8(M)	8.EE.1(M) 8.EE.3(M) 8.EE.4(M)	7.SP.6(S) 7.SP.5(S) 7.SP.7(S) 7.SP.8(S) 7.SP.1(S) 7.SP.2(S) 7.SP.3(S) 7.SP.4(S)
	20 Days	8 Days	11 Days	14 Days	18 Days	12 Days	13 Days	12 Days	12 Days	11 Days	15 Days
	Oct. 9	Oct. 24	Nov. 15	Dec. 12	Jan. 22	Feb. 12	Mar. 11	Apr. 1	Apr. 29	May. 18	June 11

Major Work Supporting Content Additional Content

Table of Contents

I. Unit Overview

In this unit, students learn to understand and use the terms "scaled copy," "to scale," "scale factor," "scale drawing," and "scale," and recognize when two pictures or plane figures are or are not scaled copies of each other. They use tables to reason about measurements in scaled copies, and recognize that angle measures are preserved in scaled copies, but lengths are scaled by a scale factor and areas by the square of the scale factor. They make, interpret, and reason about scale drawings. These include maps and floor plans that have scales with and without units.

Additionally, students learn to understand and use the terms "proportional," "constant of proportionality," and "proportional relationship," and recognize when a relationship is or is not proportional. They represent proportional relationships with tables, equations, and graphs. Students use these terms and representations in reasoning about situations that involve constant speed, unit pricing, and measurement conversions.

II. Pacing Guide

Activity	New Jersey State Learning Standards (NJSLS)	Estimated Time (Blocks)
Lesson 1: What are Scaled Copies?	7.G.A.1	1
Lesson 2: Making Scaled Copies	7.G.A.1	1
Lesson 3: The Size of the Scale Factor	7.G.A.1	1
Lesson 4: Scaling and Area	7.G.A.1, 7.G.B.6	1
Lesson 5: Scale Drawings and Maps	7.G.A.1	1
Lesson 6: Changing Scales	7.G.A.1	1
Lesson 7: Scales without Units	7.G.A.1	1
Lesson 8: Units in Scale Drawings	7.G.A.1	1
Lesson 9: Introducing Proportional Relationships with Tables	7.RP.A.2.a, 7.RP.A.2.b, 7.RP.A.2	1
Lesson 10: More About Constant of Proportionality	7.RP.A.2.a, 7.RP.A.2.b, 7.RP.A.2	1
Lesson 11: Proportional Relationships and Equations	7.RP.A.2.b, 7.RP.A.2.c, 7.RP.A.2	1
Lesson 12: Using Equations to Solve Problems	7.RP.A.2.c, 7.RP.A.2	1
Lesson 13: Comparing Relationships with Tables	7.RP.A.2	1
Lesson 14: Comparing Relationships with Equations	7.G.B.6, 7.RP.A.1, 7.RP.A.2	1
Lesson 15: Solving Problems about Proportional Relationships	7.RP.A.2	1
Lesson 16: Interpreting Graphs of Proportional Relationships	7.RP.A.2.a, 7.RP.A.2.d, 7.RP.A.2	1
Lesson 17: Using Graphs to Compare Relationships	7.RP.A.2	1
Lesson 18: Two Graphs for Each Relationship	7.RP.A.2	1
Performance Task 1	7.G.A.1	**½**
Total Time		**18 ½ Blocks**

Major Work Supporting Content Additional Content

III. Scope & Sequence

Accelerated Unit Lesson	Accelerated Lesson Name	Original Unit Lesson	Activity Name
1.1	What are Scaled Copies?	7.1.1	Printing Portraits
		7.1.1	Scaling F
		7.1.1	Pairs of Scaled Polygons
		7.1.2	Corresponding Parts
		7.1.2	Scaled Triangles
		7.1.2	Comparing Polygons ABCD and PQRS
1.2	Making Scaled Copies	7.1.3	More or Less?
		7.1.3	Which Operations? (Part 1)
		7.1.3	Which Operations? (Part 2)
		7.1.3	More Scaled Copies
		7.1.4	Three Quadrilaterals (Part 1)
		7.1.4	Three Quadrilaterals (Part 2)
		7.1.4	Scaled or Not Scaled?
		7.1.4	Comparing Pictures of Birds
1.3	The Size of the Scale Factor	7.1.5	Number Talk: Missing Factor
		7.1.5	Scaled Copies Card Sort
		7.1.5	Missing Figure, Factor, or Copy
		7.1.5	Scaling a Rectangle
1.4	Scaling and Area	7.1.6	Scaling a Pattern Block
		7.1.6	Scaling More Pattern Blocks
		7.1.6	Area of Scaled Parallelograms and Triangles
		7.1.6	Enlarged Areas
1.5	Scale Drawings and Maps	7.1.7	What is a Scale Drawing?
		7.1.7	Sizing Up a Basketball Court
		7.1.7	Tall Structures
		7.1.7	Length of a Bus and Width of a Lake
		7.1.8	Driving on I-90
		7.1.8	Biking Through Kansas
1.6	Changing Scales	7.1.9	Two Maps of Utah
		7.1.10	Appropriate Measurements
		7.1.10	Same Plot, Different Drawings
		7.1.10	A New Drawing of the Playground
1.7	Scales Without Units	7.1.11	One to One Hundred
		7.1.11	Apollo Lunar Module
		7.1.11	Same Drawing, Different Scales
		7.1.11	Scaled Courtyard Drawings
1.8	Units in Scale Drawings	7.1.12	Centimeters in a Mile
		7.1.12	Scales Card Sort
		7.1.12	The World's Largest Flag (optional)
		7.1.12	Pondering Pools (optional)
		7.1.12	Drawing the Backyard
1.9	Introducing Proportional Relationships with Tables	7.2.2	Notice & Wonder: Paper Towels by the Case
		7.2.2	Feeding a Crowd
		7.2.2	Making Bread Dough
		7.2.2	Quarters and Dimes
		7.2.2	Green Paint

1.10	More About Constant of Proportionality	7.2.3	Equal Measures
		7.2.3	Centimeters and Millimeters
		7.2.3	Pittsburgh to Phoenix
		7.2.3	Fish Tank
1.11	Proportional Relationships and Equations	7.2.4	Feeding a Crowd, Revisited
		7.2.4	Denver to Chicago
		7.2.5	Meters and Centimeters
		7.2.5	Filling a Water Cooler
1.12	Using Equations to Solve Problems	7.2.6	Number Talk: Quotients with Decimal Points
		7.2.6	Concert Ticket Sales
		7.2.6	Recycling
		7.2.6	Granola
1.13	Comparing Relationships with Tables	7.2.7	Adjusting a Recipe
		7.2.7	Visiting the State Park
		7.2.7	Running Laps
		7.2.7	Apples and Pizza
1.14	Comparing Relationships with Equations	7.2.8	Notice & Wonder: Patterns with Rectangles
		7.2.8	More Conversions
		7.2.8	Total Edge Length, Surface Area, & Volume
		7.2.8	All Kinds of Equations
		7.2.8	Tables and Chairs
1.15	Solving Problems about Proportional Relationships	7.2.9	What Do You Want to Know?
		7.2.9	Info Gap: Biking and Rain
		7.2.9	Moderating Comments
		7.2.9	Steel Beams
1.16	Interpreting Graphs of Proportional Relationships	7.2.10	Notice These Points
		7.2.10	T-shirts for Sale
		7.2.10	Matching Tables and Graphs
		7.2.11	What Could the Graph Represent?
		7.2.11	Seagulls Eat What?
1.17	Using Graphs to Compare Relationships	7.2.12	Number Talk: Fraction Multiplication & Division
		7.2.12	Race to the Bumper Cars
		7.2.12	Space Rocks and the Price of Rope
		7.2.12	Revisiting the Amusement Park
1.18	Two Graphs for Each Relationship	7.2.13	True or False? Fractions and Decimals
		7.2.13	Tables, Graphs, and Equations
		7.2.13	Hot Dog Eating Contest
		7.2.13	Spicy Popcorn

III. Pacing Calendar

Please complete the pacing calendar based on the suggested pacing (*see Pacing Guide on page 2*).

SEPTEMBER

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

Please complete the pacing calendar based on the suggested pacing (*see Pacing Guide on page 2).*

OCTOBER

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

IV. PARCC Assessment Evidence Statements

Type I   Type II   Type III

NJSLS	Evidence Statement	Clarification	Math Practices	Calculator ?
7.G.1	Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.	i) Tasks may or may not have context	MP.2 MP.5	No
7.G.6	Solve real-world and mathematical problems involving area, volume, and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.	i) Tasks may or may not have context	MP.2 MP.5	No
7.RP.2a	Recognize and represent proportional relationships between quantities: a. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.	i) Tasks have "thin context"2 or no context. ii) Tasks are not limited to ratios of whole numbers. iii) Tasks use only coordinates in Quadrant 1 and use only a positive constant of proportionality.	MP.2 MP.5	Yes
7.RP.2b	Recognize and represent proportional relationships between quantities: b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.	i) Tasks may or may not have a context. ii) Tasks sample equally across the listed representations (graphs, equations, diagrams, and verbal descriptions). iii) Tasks use only coordinates in Quadrant 1 and use only a positive constant of proportionality.	MP.2 MP.5 MP.8	No
7.D.2	Solve multi-step contextual problems with degree of difficulty appropriate to grade 7, requiring application of knowledge and skills articulated in 6.RP.A, 6.EE.C, 6.G.	i) Tasks may have scaffolding, if necessary, in order to yield a degree of difficulty appropriate to grade 7.	MP.1 MP.2 MP.4 MP.5 MP.7	Yes
7.C.6.1	Construct, autonomously, chains of reasoning that will justify or refute propositions or conjectures. Content Scope: Knowledge and skills articulated in 7.RP.2	i) Tasks use only coordinates in Quadrant 1 and use only a positive constant of proportionality.	MP.2 MP.3 MP.6	Yes

V. Differentiated Instruction

Supporting English Language Learners

The purpose of this document is to nudge the field forward by offering support to the next generation of mathematics learners and by challenging persistent assumptions about how to support and develop students' disciplinary language. The goal is to provide guidance to mathematics teachers for recognizing and supporting students' language development processes in the context of mathematical sense making. UL/SCALE provides a framework for organizing strategies and special considerations to support students in learning mathematics practices, content, and language. The framework is intended to help teachers address the specialized academic language demands in math when planning and delivering lessons, including the demands of reading, writing, speaking, listening, conversing, and representing in math (Aguirre & Bunch, 2012). Therefore, while the framework can and should be used to support all students learning mathematics, it is particularly well-suited to meet the needs of linguistically and culturally diverse students who are simultaneously learning mathematics while acquiring English.

For more information, click the link below:

[Supporting ELL Learners](#)

Supporting Students with Disabilities

The philosophical stance that guided the creation of these materials is the belief that with proper structures, accommodations, and supports, all children can learn mathematics. Lessons are designed to maximize access for all students and include additional suggested supports to meet the varying needs of individual students. While the suggested supports are designed for students with disabilities, they are also appropriate for many children who struggle to access rigorous, grade-level content. Teachers should use their professional judgment about which supports to use and when, based on their knowledge of the individual needs of students in their classroom.

For more information, click the link below:

[Supporting Students with Disabilities](#)

VI. Vocabulary

Corresponding: If a part of the original figure matches up with a part of the copy, we call them corresponding parts. The part could be an angle, point, or side, and you can have corresponding angles, corresponding points, or corresponding sides.
If you have a distance between two points in the original figure, then the distance between the corresponding points in the copy is called the corresponding distance.

Constant of Proportionality   See proportional relationship.

Origin   In the coordinate plane, the origin is the point (0,0).

Proportional Relationship   If there is a positive constant k so that the quantities x and y are related by the equation $y=kx$, then we say that y and x are in a proportional relationship, and that y is proportional to x. The constant k is called the constant of proportionality.

Scaled Copy: Scaled copy of a figure is a figure in which every length in the original figure is increased or decreased by the same scale factor.

Scale Drawing: A scale drawing of an object is a drawing in which all lengths in the drawing correspond to lengths in the object by the same scale. The scale tells you how the lengths correspond; for example, a scale of "1 inch to 2 feet" means that 1 inch in the drawing represents 2 feet in the object.

Scale Factor: Scale factor is the factor by which every length in an original figure is increased or decreased when you make a scaled copy. For example, if you draw a copy of a figure in which every length is magnified by 2, then you have a scaled copy with a scale factor of 2.

VII. Assessment Framework

Unit 1 Assessment Framework				
Assessment	**NJSLS**	**Estimated Time**	**Format**	**Graded?**
Pre-Unit 1 Diagnostic Assessment (Beginning of Unit – Optional) *Illustrative Mathematics*	4.MD.A.1, 5.MD.A.1, 5.NF.B.5.a, 6.G.A.1, 6.EE.A.2.c, 6.RP.A.3.a, 7.G.A.1	½ Block	Individual	Yes (No Weight)
End-of-Unit 1 Assessment (End of Unit – Optional) *Illustrative Mathematics*	7.G.A.1, 7.RP.A.2.a	1 Block	Individual	Yes
Pre-Unit 2 Diagnostic Assessment (Beginning of Unit – Optional) *Illustrative Mathematics*	6.RP.A.1,6.RP.A.3.a, 6.RP.A.2,6.RP.A.3.b, 6.RP.A.3,	½ Block	Individual	Yes (No Weight)
End-of-Unit 2 Assessment (End of Unit – Optional) *Illustrative Mathematics*	7.RP.A.2a, 7.RP.A.2d,7.RP.A.2c, 7.RP.A.2b, 7.RP.A.2	1 Block	Individual	Yes

Unit 1 Performance Assessment Framework				
Assessment	**NJSLS**	**Estimated Time**	**Format**	**Graded?**
Unit 1 Performance Task 1 (Early October) *Map Distance*	7.G.A.1	½ Block	Individual	Yes; Rubric
Unit 1 Performance Task Option 1 (Optional) *Buy Coffee*	7.RP.A.2	Teacher Discretion	Teacher Discretion	Yes, if administered

Name _____   Block _____   Date _____

Map Distance (7.G.A.1)

On the map below, ¼ inch represents one mile. Candler, Candor, and Oteen are three cities on the map.

a. If the distance between the real towns of Candler and Canton is 9 miles, how far apart are Canton and Candler on the map?

b. If Candler and Oteen are 3½ inches apart on the map, what is the actual distance between Candler and Oteen in miles?

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7th Grade Map Distance – Rubric

Name: _____   Date: _____

NJSLS: 7.G.A.1

Type: _____   Teacher: _____

Task Description	• Clearly constructs and communicates a complete response based on concrete referents provided in the prompt or constructed by the student such as diagrams that are connected to a written (symbolic) method, number line diagrams or coordinate plane diagrams.
	• Clearly constructs and communicates a complete response by
	   ➢using a logical approach based on a conjecture and/or stated assumptions
	   ➢providing an efficient and logical progression of steps
	   ➢using grade-level vocabulary, symbols, and labels
	   ➢providing a justification of a conclusion with minor computational error
	   ➢evaluating, interpreting and critiquing the validity and efficiency of others' responses

	Level 5: ***Distinguished Command***	*Level 4:* ***Strong Command***	*Level 3:* ***Moderate Command***	*Level 2:* ***Partial Command***	*Level 1:*
Command Level Description	Perform the task items accurately or with minor computation errors.	Perform the task items with some non-conceptual errors	Perform the task items with minor conceptual errors and some computation errors.	Perform the task items with some errors on both math concept and computation.	Perform the task items with serious errors on both math concept and computation.
Score range	*5 pts*	*4 pts*	*3 pts*	*2 pts*	*0-1 pt*
Task Score & PLD Assigned					

7th Grade Map Distance – Scoring Guide   NAME: _____

#	Answer	Scoring
Part A	**** Solutions may vary *** A distance of nine miles means 9 quarter inches on the map. This is $9 \times ¼ = 9/4$ Or 2¼ inches between Candler and Canton on the map. 9 miles 1 mile 1 mile 1 mile 1 mile 1 mile 1 mile 1 mile 1 mile 1 mile ¼ inch ¼ inch ¼ inch ¼ inch ¼ inch ¼ inch ¼ inch ¼ inch ¼ inch	2 points: 1 point for the correct strategy and 1 point for an accurate explanation **2 TOTAL POINTS**
Part B	To find this, we divide: $3 ½ ÷ ¼ = 7/2 \times 4/1 = 14$ So, there are 14 miles between Chandler and Oteen.	2 points: for correctly dividing the fractions. OR 1 point: for identifying the necessary expression with minor mistakes. 1 point for correct explanation. **3 TOTAL POINTS**

Name _____   Block _____   Date _____

Buying Coffee (7.RP.A.2)

Coffee costs $18.96 for 3 pounds.

1. What is the cost for one pound of coffee?

2. At this store, the price for a pound of coffee is the same no matter how many pounds you buy. Let x be the number of pounds of coffee and y be the total cost of x pounds. Draw a graph of the relationship between the number of pounds of coffee and the total cost.

3. Where can you see the cost per pound of coffee in the graph? What is it?

IX. 21st Century Career Ready Practices

CRP1. Act as a responsible and contributing citizen and employee.
CRP2. Apply appropriate academic and technical skills.
CRP3. Attend to personal health and financial well-being.
CRP4. Communicate clearly and effectively and with reason.
CRP5. Consider the environmental, social and economic impacts of decisions.
CRP6. Demonstrate creativity and innovation.
CRP7. Employ valid and reliable research strategies.
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9. Model integrity, ethical leadership and effective management.
CRP10. Plan education and career paths aligned to personal goals.
CRP11. Use technology to enhance productivity.
CRP12. Work productively in teams while using cultural global competence.

For additional details see **21st Century Career Ready Practices** .

References

"Illustrative Mathematics" *Open Up Resources.* 2018

      <https://auth.openupresources.org/register/complete>