Orange Public Schools

Office of Curriculum & Instruction

2019-2020 Mathematics Curriculum Guide

7th Grade Mathematics

Illustrative Mathematics - Unit 2: Introducing Proportional Relationships

October 2, 2019 – October 30, 2019

Board Approved: 1.14.2020

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From the New Jersey Student Learning Standards:

In **Grade 7**, instructional time should focus on four critical areas: (1) developing understanding of and applying proportional relationships; (2) developing understanding of operations with rational numbers and working with expressions and linear equations; (3) solving problems involving scale drawings and informal geometric constructions, and working with two- and three-dimensional shapes to solve problems involving area, surface area, and volume; and (4) drawing inferences about populations based on samples.

1. Students extend their understanding of ratios and develop understanding of proportionality to solve single- and multi-step problems. Students use their understanding of ratios and proportionality to solve a wide variety of percent problems, including those involving discounts, interest, taxes, tips, and percent increase or decrease. Students solve problems about scale drawings by relating corresponding lengths between the objects or by using the fact that relationships of lengths within an object are preserved in similar objects. Students graph proportional relationships and understand the unit rate informally as a measure of the steepness of the related line, called the slope. They distinguish proportional relationships from other relationships.

2. 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.

3. 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 in Grade 8 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.

4. 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.

Yearlong Pacing Guide
Grade 7

Grade	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
5	Unit 1 5.NBT	Unit 2 5.NBT		Unit 3 5.NF	Unit 4 5.NF		Unit 5 5.MD		Unit 6 5.OA & 5.G	
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	
7	**Unit 1 7.G**	**Unit 2 7.RP**	**Unit 3 7.G**	**Unit 4 7.RP**	**Unit 5 7.NS**	**Unit 6 7.EE**	**Unit 7 7.G**		**Unit 8 7.SP**	
8	Unit 1 8.G	Unit 2 8.G	Unit 3 8.EE	Unit 4 8.EE		Unit 5 8.F	Unit 6 8.SP	Unit 7 8.EE	Unit 8 8.G	

Unit 1 — **Geometry:** Scale Drawings

Unit 2 — **Ratios & Proportional Relationships:** Introducing Proportional Relationships

Unit 3 — **Geometry:** Measuring Circles

Unit 4 — **Ratios & Proportional Relationships:** Proportional Relationships & Percentages

Unit 5 — **Number System:** Rational Number Arithmetic

Unit 6 — **Expressions & Equations:** Expressions, Equations &

Unit 7 — **Geometry:** Angles, Triangles, and Prisms

Unit 8 — **Statistics & Probability:** Probability and Sampling

2019-2020 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
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)	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)
15 Days	17 Days	13 Days	19 Days	19 Days	25 Days	19 Days	22 Days
Oct. 1	Oct. 30	Nov. 22	Jan. 8	Feb. 7	Mar. 27	May 5	Jun. 9

Major Work Supporting Content Additional Content

Table of Contents

References

"Illustrative Mathematics" *Open Up Resources.* 2018 <https://auth.openupresources.org/register/complete>

I. Unit Overview

In this unit, students develop the idea of a proportional relationship out of the grade 6 idea of equivalent ratios. Proportional relationships prepare the way for the study of linear functions in grade 8.

Students learn that any proportional relationship can be represented by an equation of the form y=kx where k is the constant of proportionality, that its graph lies on a line through the origin that passes through Quadrant I, and that the constant of proportionality indicates the steepness of the line. By the end of the unit, students should be able to easily work with common contexts associated with proportional relationships (such as constant speed, unit pricing, and measurement conversions) and be able to determine whether a relationship is proportional or not.

Because this unit focuses on understanding what a proportional relationship is, how it is represented, and what types of contexts give rise to proportional relationships, the contexts have been carefully chosen. The first tasks in the unit employ contexts such as servings of food, recipes, constant speed, and measurement conversion, that should be familiar to students from the grade 6 course. These contexts are revisited throughout the unit as new aspects of proportional relationships are introduced.

Associated with the contexts from the grade 6 course are derived units: miles per hour; meters per second; dollars per pound; or cents per minute. In this unit, students build on their grade 6 experiences in working with a wider variety of derived units, such as cups of flour per tablespoon of honey, hot dogs eaten per minute, and centimeters per millimeter. The tasks in this unit avoid discussion of measurement error and statistical variability, which will be addressed in later units.

Essential Questions
• What is a ratio? • What is a unit rate? • What is the constant of proportionality? • How are unit rates used in the real world? • How can we compute unit rates for ratios and rates specified by rational numbers? • How do you determine a proportional relationship? What about non-proportional relationships? • How can we represent proportionality using a table, graph, equation, and or verbal description? • How can the constant of proportionality be found in various representations of linear data?

Enduring Understanding

- Understand a proportional relationship when graphed is a straight line through the origin.
- Realize that a specific point (x,y) on a linear graph represents a rate.
- Understand that the point (1,r) on a linear graph represents the unit rate.
- Proportional relationships are made up of equivalent ratios.
- Recognize that relationships may be represented using tables, graphs, equations, and verbal descriptions.

II. Pacing Guide

Activity	New Jersey State Learning Standards (NJSLS)	Estimated Time (Blocks)
Unit 2 Pre-Unit Assessment (IM) *Optional*	6.RP.A.1, 6.RP.A.3.a, 6.RP.A.2, 6.RP.A.3.b, 6.RP.A.3	½
Lesson 1: One of These Things Is Not Like the Others	7.G.A.1	1
Lesson 2: Introducing Proportional Relationships with Tables	7.RP.A.2, 7.RP.A.2.a, 7.RP.A.2.b	1
Lesson 3: More about Constant of Proportionality	7.RP.A.2, 7.RP.A.2.a, 7.RP.A.2.b	1
Lesson 4: Proportional Relationships and Equations	7.RP.A.2, 7.RP.A.2.c	1
Lesson 5: Two Equations for Each Relationship	7.RP.A, 7.RP.A.2, 7.RP.A.2.b, 7.RP.A.2.c	1
Lesson 6: Using Equations to Solve Problems	7.RP.A.2, 7.RP.A.2.c	1
Lesson 7: Comparing Relationships with Tables	7.RP.A.2	1
Lesson 8: Comparing Relationships with Equations	7.RP.A.1	1
Lesson 9: Solving Problems about Proportional Relationships	7.RP.A, 7.RP.A.2	1
Lesson 10: Introducing Graphs of Proportional Relationships	7.RP.A.2, 7.RP.A.2.a	1
Lesson 11: Interpreting Graphs of Proportional Relationships	7.RP.A	1
Lesson 12: Using Graphs to Compare Relationships	7.RP.A.2	1
Lesson 13: Two Graphs for Each Relationship	7.RP.A.2	1
Lesson 14: Four Representations	7.RP.A, 7.RP.A.2	1
Lesson 15: Using Water Efficiently ***(Project Based Learning)***	7.RP.A.2	1
Performance Task 1	7.RP.A.1, 7.RP.A.2b	½
Unit 2 End of Unit Assessment (IM) *Optional*	7.RP.A.2.a, 7.RP.A.2.d, 7.RP.A.2.c, 7.RP.A.2.b, 7.RP.A.2.a	**1**
Total Time		**17 Blocks**
Grade 7 Interim Assessment 1	7.G.A.1,7.RP.A.2.a, 7.RP.A.2.b, 7.RP.A.2.c, 7.RP.A.2.d	**1**

Major Work Supporting Content Additional Content

III. Pacing Calendar

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		

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

NOVEMBER

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

IV. NJSLA Assessment Evidence Statements

Type I Type II Type III

NJSLS	Evidence Statement	Clarification	Math Practices	Calculator ?
7.RP.1	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. For example, if a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction 1/2/1/4 miles per hour, equivalently 2 miles per hour.	i) Tasks have a real-world context. ii) Tasks do not assess unit conversions.	MP. 2 MP. 4 MP. 5	Yes
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 may or may not have context	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 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.RP.2c	Recognize and represent proportional relationships between quantities: c. Represent proportional relationships by equations. For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as t = pn.	i) Tasks have a context. ii) Tasks use only coordinates in Quadrant 1 and use only a positive constant of proportionality.	MP. 2 MP. 8	No
7.RP.2d	Recognize and represent proportional relationships between quantities. d. Explain what a point (x, y) on the graph of a proportional relationships means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate.	i) Tasks require students to interpret a point (x, y) on the graph of a proportional relationship in terms of the situation. For the explain aspect of 7.RP.2d, see 7.C.6.1. ii) Tasks use only coordinates in Quadrant 1 and use only a positive constant of proportionality	MP. 2 MP. 4	No

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.

Equivalent Ratios: Two ratios ***a:b*** and ***c:d*** are equivalent ratios if there is a number ***s*** that you can multiply both a and b by to get c and d (respectively). In other words, $a \cdot s = c$ and $b \cdot s = d$.

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 2 Assessment Framework				
Assessment	**NJSLS**	**Estimated Time**	**Format**	**Graded ?**
Pre-Unit 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 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.2a	1 Block	Individual	Yes
Grade 7 Interim Assessment 1 (Early November) *iReady Standards Mastery*	7.G.A.1,7.RP.A.2a, 7.RP.A.2b,7.RP.A.2c, 7.RP.A.2d	1 Block	Individual	Yes

Unit 2 Performance Assessment Framework				
Assessment	**NJSLS**	**Estimated Time**	**Format**	**Graded ?**
Unit 2 Performance Task 1 (Early November) *Cider Versus Juice*	7.RP.A.1, 7.RP.A.2b	½ Block	Individual	Yes; Rubric
Unit 2 Performance Task Option 1 (Optional) *Buying Coffee*	7.RP.A.2	Teacher Discretion	Teacher Discretion	Yes, if administered
Extended Constructed Response (ECR)* (click here for access)	Dependent on unit of study & month of administration	Up to 30 minutes	Individual	Yes; Rubric

* Use the following links to access ECR protocol and district assessment scoring documents:

- *Assessment & Data in Mathematics Bulletin*
- *Extended Constructed Response Protocol*

Name _____ Block _____ Date _____

Cider Versus Juice (7.RP.A.1, 7.RP.A.2b)

The price of a gallon of apple cider is $7.00. The price of eight 4.23-ounce juice boxes is $2.39.

a. Suppose the juice was instead packaged like the cider. Approximately what is the cost per gallon of the juice?

b. Suppose the cider was instead packaged like the juice. Approximately what is the cost per eight 4.23-ounce boxes of cider?

c. Peter wants to have at least a gallon of either only cider or only juice. Which product is the better deal?

d. State the unit rate(s) you used to compare the cost of cider versus juice in your answer to Question c.

e. List two or more additional unit rates that could be used to make this comparison.

7th Grade Cider Versus Juice – Rubric Name: _____ Date: _____

NJSLS: 7.RP.A.1, 7.RP.A.2b 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				
Command Level Description	***Level 5:*** ***Distinguished Command*** Perform the task items accurately or with minor computation errors.	***Level 4:*** ***Strong Command*** Perform the task items with some non-conceptual errors.	***Level 3:*** ***Moderate Command*** Perform the task items with minor conceptual errors and some computation errors.	***Level 2:*** ***Partial Command*** Perform the task items with some errors on both math concept and computation.	***Level 1:*** ***No Command*** Perform the task items with serious errors on both math concept and computation.
Score range	*12-14 pts*	*9-11 pts*	*6-8 pts*	*3-5 pts*	*0-2 pt*
Task Score & PLD Assigned					

7th Grade Cider Versus Juice – Scoring Guide **NAME: _____**

#	Answer	Scoring
Part A	$\frac{2.39 \text{ dollars}}{33.84 \text{ ounces}} = \frac{x \text{ dollars}}{1 \text{ gallon}}$ $\frac{2.39 \text{ dollars}}{33.84 \text{ ounces}} \cdot \frac{128 \text{ ounces}}{1 \text{ gallon}} \approx \frac{9.04 \text{ dollars}}{1 \text{ gallon}}$, so $x \approx 9.04$, and the price of the juice is about \$9.04 per gallon.	1 point for correctly setting up the proportion 2 points for the correct unit rate and showing the work 1 point for the correct statement including the correct units **4 TOTAL POINTS**
Part B	$\frac{7 \text{ dollars}}{128 \text{ ounces}} = \frac{x \text{ dollars}}{1 \text{package of boxes}}$ $\frac{7 \text{ dollars}}{128 \text{ ounces}} \cdot \frac{33.84 \text{ ounces}}{1 \text{ package of boxes}} \approx \frac{1.85 \text{ dollars}}{1 \text{ package of boxes}}$, and $x \approx 1.85$ and the price of the cider is about \$1.85 per eight 4.23-ounce boxes.	1 point for correctly setting up the proportion 2 points for the correct unit rate and showing the work 1 point for the correct statement including the correct units **4 TOTAL POINTS**
Part C	c. Utilizing our previous answers to part a and b, we see that the cider is the more cost-effective choice. (In fact, Peter would have to buy four 8-packs of juice to get at least a gallon, for a cost of \$9.56, much more than the \$7 it would take to get a gallon of cider.)	1 point for the correct statement 1 point for justifying **2 TOTAL POINTS**

Part D	d. The unit rates we used in parts a and b are dollars per gallon and dollars per pack of eight 4.23-ounce boxes.	1 point for the correct units for the cider 1 point for the correct units for the juice **2 TOTAL POINTS**
Part E	e. Additional unit rates could be dollars per ounce, cents per ounce, ounces per dollar, dollars per 4.23-ounce box, etc.	1 point for each additional unit rate **2 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. Modifications

Special Education/ 504:	English Language Learners:
-Adhere to all modifications and health concerns stated in each IEP. -Give students a MENU options, allowing students to pick assignments from different levels based on difficulty. -Accommodate Instructional Strategies: reading aloud text, graphic organizers, one-on-one instruction, class website (Google Classroom), handouts, definition list with visuals, extended time -Allow students to demonstrate understanding of a problem by drawing the picture of the answer and then explaining the reasoning orally and/or writing , such as Read-Draw-Write -Provide breaks between tasks, use positive reinforcement, use proximity -Assure students have experiences that are on the Concrete- Pictorial- Abstract spectrum by using manipulatives -Implement supports for students with disabilities (click here) - Make use of strategies imbedded within lessons -Common Core Approach to Differentiate Instruction: Students with Disabilities (pg 17-18) - Strategies for students with 504 plans	- Use manipulatives to promote conceptual understanding and enhance vocabulary usage - Provide graphic representations, gestures, drawings, equations, realia, and pictures during all segments of instruction - During i-Ready lessons, click on “Español” to hear specific words in Spanish - Utilize graphic organizers which are concrete, pictorial ways of constructing knowledge and organizing information - Use sentence frames and questioning strategies so that students will explain their thinking/ process of how to solve word problems - Utilize program translations (if available) for L1/ L2 students - Reword questions in simpler language - Make use of the ELL Mathematical Language Routines (click here for additional information) -Scaffolding instruction for ELL Learners -Common Core Approach to Differentiate Instruction: Students with Disabilities (pg 16-17)
Gifted and Talented:	**Students at Risk for Failure:**
- Elevated contextual complexity - Inquiry based or open ended assignments and projects - More time to study concepts with greater depth - Promote the synthesis of concepts and making real world connections - Provide students with enrichment practice that are imbedded in the curriculum such as: ● Application / Conceptual Development ● Are you ready for more? - Provide opportunities for math competitions - Alternative instruction pathways available - Common Core Approach to Differentiate Instruction: Students with Disabilities (pg. 20)	- Assure students have experiences that are on the Concrete- Pictorial- Abstract spectrum - Modify Instructional Strategies, reading aloud text, graphic organizers, one-on-one instruction, class website (Google Classroom), inclusion of more visuals and manipulatives, Peer Support - Constant parental/ guardian contact - Provide academic contracts to students & guardians - Create an interactive notebook with samples, key vocabulary words, student goals/ objectives. - Plan to address students at risk in your learning tasks, instructions, and directions. Anticipate where the needs will be, then address them prior to lessons. -Common Core Approach to Differentiate Instruction: Students with Disabilities (pg 19)

21st Century Life and Career Skills:

Career Ready Practices describe the career-ready skills that all educators in all content areas should seek to develop in their students. They are practices that have been linked to increase college, career, and life success. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

https://www.state.nj.us/education/cccs/2014/career/9.pdf

- **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.

Students are given an opportunity to communicate with peers effectively, clearly, and with the use of technical language. They are encouraged to reason through experiences that promote critical thinking and emphasize the importance of perseverance. Students are exposed to various mediums of technology, such as digital learning, calculators, and educational websites.

Technology Standards:

All students will be prepared to meet the challenge of a dynamic global society in which they participate, contribute, achieve, and flourish through universal access to people, information, and ideas.
https://www.state.nj.us/education/cccs/2014/tech/

8.1 Educational Technology:

All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.

A. **Technology Operations and Concepts:** Students demonstrate a sound understanding of technology concepts, systems and operations.
B. **Creativity and Innovation:** Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.
C. **Communication and Collaboration:** Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
D. **Digital Citizenship:** Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
E. **Research and Information Fluency:** Students apply digital tools to gather, evaluate, and use of information.
F. **Critical thinking, problem solving, and decision making:** Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

8.2 Technology Education, Engineering, Design, and Computational Thinking - Programming:

All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.

A. **The Nature of Technology: Creativity and Innovation-** Technology systems impact every aspect of the world in which we live.
B. **Technology and Society:** Knowledge and understanding of human, cultural, and societal values are fundamental when designing technological systems and products in the global society.
C. **Design:** The design process is a systematic approach to solving problems.
D. **Abilities in a Technological World:** The designed world in a product of a design process that provides the means to convert resources into products and systems.
E. **Computational Thinking: Programming-** Computational thinking builds and enhances problem solving, allowing students to move beyond using knowledge to creating knowledge.

Interdisciplinary Connections:	
English Language Arts:	
L.7.3	Use knowledge of language and its conventions when writing, speaking, reading, or listening.
SL.7.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 7 topics, texts, and issues, building on others' ideas and expressing their own clearly.
W.7.1	Write arguments to support claims with clear reasons and relevant evidence.

X. Core Instruction & Supplemental Resources

Core Instruction

ILLUSTRATIVE MATHEMATICS V. 2019
(OPEN UP RESOURCES)

GRADE	TEACHER RESOURCES	STUDENT RESOURCES
6	• **Teacher Edition: Unit 1-9** • Online Course Guide	• Student Workbook Set: Unit 1-9 • Online Student Access (Digital Applets)
7	• **Teacher Edition: Unit 1-9** • Online Course Guide	• Student Workbook Set: Unit 1-9 • Online Student Access (Digital Applets)
8	• **Teacher Edition: Unit 1-9** • Online Course Guide	• Student Workbook Set: Unit 1-9 • Online Student Access (Digital Applets)

5 Practices for Orchestrating Productive Mathematics Discussions

Anticipate

Consider how students might mathematically interpret a problem, the array of strategies—both correct and incorrect—that they might use to tackle it, and how those strategies and interpretations might relate to the mathematical concepts, representations, procedures, and practices that you would like the students to learn.

- Solve the problem yourself first. If possible work with colleagues.
- Ask yourself the following questions:
  - What strategies have students used in the past?
  - What representations are students most likely to use?
  - What incorrect or unproductive strategies are students likely to try?
  - What things might get in the way of students being able to engage with the problem? How can you remove those barriers?
  - What questions will you ask those who struggle?

Monitor

Pay close attention to students' mathematical thinking and solution strategies as they work on the task.

- Create a list of strategies the students may produce.
- Circulate the room. Watch and listen to students as they work.
- If any students use strategies you anticipated, write their name or group number on your list.
- Ask questions that will help students make their thinking visible.
- Ask questions that will help students clarify their thinking.
- Press students to consider aspects of the task to which they need to attend.

Select

Select particular students to share their work with the rest of the class to get specific mathematics into the open for discussion. The selection of particular students and their solutions is guided by the previously anticipated strategies and your assessment of how each approach will contribute to that goal.

- Based on the previously anticipated strategies and the mathematical goal of the activity, decide which student strategies to highlight.
- Select students who will share their work with the class.

Sequence

Make purposeful choices about the order in which students' work is shared to maximize the chances of achieving the mathematical goals for the discussion.

- Based on the mathematical goal, decide on the purpose for the sequence of work. For example: least efficient to most efficient, concrete to abstract, misconceptions to conceptions, or building representations.
- Decide in which order students will present their work.

Connect

Help students draw connections between their solutions and other students' solutions as well as the key mathematical ideas in the lesson. Help students to make judgments about the consequences of different approaches for the range of problems that can be solved, one's likely accuracy and efficiency in solving them, and the kinds of mathematical patterns that can be most easily discerned. Know where you want the discussion to "land" and make choices that are likely to get you there. If necessary, you may have to demonstrate an approach that students didn't come up with themselves.

- As students share, ask questions to elicit and clarify student thinking.
- After each student shares, ask questions to connect it to previously shared work or ask a student to summarize what another student said in their own words.
- Ask students to compare and contrast strategies or representations during the discussion.
- If students did not come up with an approach that you need them to see in order for the discussion to "land," demonstrate this approach and connect it to the work that students did.

IDEAL MATH BLOCK

Whole Group Instruction	55min	INSTRUCTION (Grades 3 – 8) Daily Routine: Mathematical Content or Language Routine (7 – 10 min) Anchor Task: Anticipate, Monitor, Select, Sequence, Connect Tech Integration: Digital applets embedded within lessons designed to enhance student learning Collaborative Work* Guided Learning/Guided Practice Independent Work (Demonstration of Student Thinking) Additional Activities / Let's Practice		
Rotation Stations (Student Notebooks & Chromebooks Needed)	1-2X 30 min	STATION 1: Focus on current Grade Level Content STUDENT EXPLORATION* Independent or groups of 2-3 Emphasis on MP's 3, 6 (Reasoning and Precision) And MP's 1 & 4 (Problem Solving and Application) TOOLS/RESOURCES Practice Problems Extra Practice/Enrichment Are you ready for more? Put Your Thinking Cap On	STATION 2: Focus on Student Needs TECH STATION Independent TECH INTEGRATION iReady - *i-Ready* delivers online lessons driven by student data to provide tailored instruction that meets students where they are in their learning trajectory. Dreambox (ELL) – Adaptive online learning platform.	TEACHER STATION: Focus on Grade Level Content; heavily scaffolded to connect deficiencies TARGETED INSTRUCTION 4 – 5 Students TOOLS/ RESOURCES Homework Manipulatives Reteach Workbook Transition Guide *all students seen in 2 weeks
Closure	5 min	INSTRUCTION Exit Ticket (Demonstration of Student Thinking) TOOLS/RESOURCES Notebooks or Exit Ticket Slips		

* Promotes discourse and collaboration

Supplemental Resources

Achieve the Core

Tasks - https://achievethecore.org/category/416/mathematics-tasks

Coherence Map - https://achievethecore.org/page/1118/coherence-map

Embarc

https://embarc.online/

Engage NY

https://www.engageny.org/ccss-library/?f%5B0%5D=field_subject%253Aparents_all%3A13601

iReady Digital Platform

https://login.i-ready.com/

Illustrative Mathematics

Content Standard Tasks - https://tasks.illustrativemathematics.org/content-standards

Practice Standard Tasks - https://tasks.illustrativemathematics.org/practice-standards

Open Up Resources - https://access.openupresources.org/sign_in

iM Additional Resources - https://bit.ly/imshare

Khan Academy

https://www.khanacademy.org/math/illustrative-math

NJDOE Digital Item Library

https://nj.digitalitemlibrary.com/home?subject=Math

Ready Teacher Toolbox

https://teacher-toolbox.com/