

COMMON CORE Standards Plus[®]



Mathematics

GRADE 8

Teacher Edition



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Common Core Standards Plus® - Mathematics Grade 8

What is Common Core Standards Plus?

Research Behind Standards Plus:

Common Core Standards Plus is produced by Learning Plus Associates, a Nonprofit Public Benefit Corporation dedicated to creating and providing solutions that increase student achievement and support teacher delivery of high-quality, effective instruction on a daily basis. The lessons are based upon the research of Effective Schools Correlates, Edward Deming's Total Quality Management (TQM), and models of effective instruction. A team of content and grade level experts wrote the Common Core Standards Plus lessons to meet the skills, concepts, depth, and rigor of the Common Core Standards.

What is Standards Plus?

Standards Plus is a set of research-based, supplemental K-8 language arts and math materials written to the Common Core Standards. These explicit direct instruction lessons were designed to teach discrete elements of the Common Core Standards.

Benefits:

- Ready-to-teach lessons and projects with very little teacher prep
- Grade level content vocabulary is taught within the context of the lessons.
- Increases student and teacher understanding of the standards
- A year's worth of daily lessons, performance lessons, and integrated projects ensure that all students have equal access to standards at every level of rigor (DOK 1-4)
- Prepares students for the state assessment

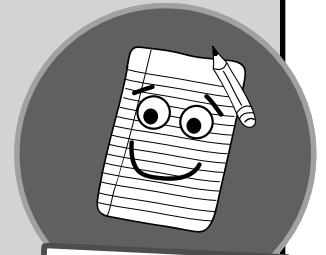
Three Types of Lessons:

Daily Lessons and Weekly Assessments (Evaluations):

(15-20 minutes daily)

There are 34 weeks of daily lessons and assessments (evaluations) written directly to the standards.

A week of instruction is comprised of **four lessons** and a **corresponding assessment**. The daily lessons are written to DOK Levels 1 and 2.



Daily Lessons & Weekly Assessments

Performance Lessons:

(3-5 days 30 minutes each day)

After one or more weeks of daily lessons written to a particular standard or topic, you will find a Performance Lesson. Performance Lessons are written to DOK Level 3.

These lessons require that students apply what they have learned and use reasoning, planning, evidence, and a higher level of thinking than the daily lessons. Many standards are assessed at this level of rigor on state assessments.



Performance Lessons

Integrated Projects:

(Multiple class sessions over several days or weeks)

Three Integrated Projects are located immediately after the supporting daily lessons, assessments, and performance lessons. Integrated Projects require that students plan, synthesize information, produce high-quality products, and present their findings. Integrated Projects are written to DOK level 4.



Integrated Projects

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Delivering the Daily Lessons



Prepare to Teach/Plan Instruction

Select the week of instruction you will be teaching. View the sample pacing on pages 8-9 or create your own pacing to match the content and standards of Standards Plus lessons to classroom instruction, district pacing guides, or benchmark information.

Helpful Hint

A **week of instruction** is a set of four daily lessons and a weekly assessment.



Preview the Week of Instruction (5 minutes)

Look at the teacher lesson plans for all four lessons paying particular attention to the standard(s), lesson objective, and introduction. Those three pieces of information will identify what students will learn and be able to do. Quickly scan the student page to gain an understanding of what students will be expected to do in independent practice. Repeat this process for the next three lessons and the assessment. This will give you a clear picture of how the week unfolds and will help you keep the daily lessons focused and concise.



Prepare to Teach a Daily Lesson (5 minutes)

- Read the entire teacher lesson plan.
- Identify academic vocabulary.
- Determine your instructional focus, “What do I want students to know and do by the end of today’s lesson?”
- Consider any relevant prior knowledge connections you can share with students, so they can connect the new learning to previous learning.



Teach a Daily Lesson (15-20 minutes)

Every Day

1. **Project the student lesson**
2. **Read the standard(s)** aloud with students, highlighting the part of the standard being taught in today’s lesson.
3. **Read the Introduction** provided in the Teacher Edition or provide your own.
4. **Read the Instruction aloud to students.**
Focus on new academic vocabulary, teaching the concept directly, and modeling the concept for students.
5. **Read the Guided Practice** and work through the examples together with students, sharing your thoughts aloud as you work through the item(s) step-by-step.
 - Monitor the class – If students are struggling, DO NOT MOVE onto Independent Practice, continue with Guided Practice.
6. **Read the Independent Practice and/or the Directions.**
 - Continue to monitor the class to catch common errors or misconceptions and correct immediately.
 - Differentiate instruction for struggling students by assigning fewer items.
 - Prompt and praise students for making attempts.
7. **Complete the Review**
 - Review answers when all students have completed Independent Practice or when your timeframe has expired.
 - Have students correct their mistakes or improve their answers.
8. **Read the Closure**
 - Read or paraphrase the closure or have students summarize the important concepts or skills learned in the lesson.

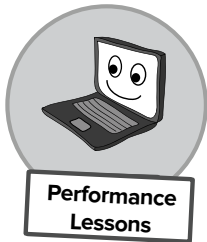
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Delivering the Lessons



Weekly Formative Assessments (Evaluations)

- Formative assessments that include items that match the week's instruction.
- Use these assessments to identify students' understanding of the concept taught and identify students for intervention.



Prepare to Teach a Performance Lesson

Allocate 30 minutes a day for 3-5 days to complete a performance lesson.

Periodically



Preview the Entire Performance Lesson (5-10 Minutes)

- Read the teacher lesson plan (1-2 pages) and student pages
- Focus on the standards listed at the top of the teacher page, the Lesson Objective, and the Overview. This information will provide a broad overview of the performance lessons.

NOTE: Performance lessons are more complex and more difficult for students than the daily lessons. **Performance lessons must be taught, not assigned.** Each performance lesson *has a large guided practice section*. This is so that the teacher can model and guide students through each component of the lesson. These lessons teach students how to successfully complete a performance task.



Prepare to Teach an Integrated Project

Multiple class sessions over several days or weeks.

3 Times a Year



Preview the Entire Integrated Project (10-15 Minutes)

- Previewing the project will provide an overview of the standards and components of the project.
- This allows the teacher to gain an understanding of how several different standards can be taught and evaluated.

NOTE: Even if you are not planning to teach a Standards Plus Integrated Project, it is helpful to view the components of the project listed in the Teacher Edition. It provides a broad look at how to integrate many topics and standards. It is a good reminder for teachers to include standards and expectations often overlooked, whether it is planning and delivering an opinion speech, or using technology to produce and publish writing as well as to interact and collaborate with others. Each project component may take up to a week or two of instruction.

Helpful Hint

To ensure all heavily-weighted standards are taught prior to state testing, you may need to teach a Performance Lesson and/or a component of an Integrated Project **in addition to** a week of Daily Lessons. **See PBL sample pacing on page 10-11 for an example.**

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Suggested Pacing



Standards Plus is supplemental and **does not** have to be taught in the printed order.

The pacing guide below provides instruction of the **most heavily-weighted standards in the 26 weeks prior to state testing.**

Suggested Pacing Guide

WEEK	DOMAIN/TOPIC, LESSON (L), EVALUATIONS (E)	STANDARD(S)	TE PG#	DOK
1	Expressions & Equations L1-4, E1	8.EE.2	68-77	DOK 1-2
2	Expressions & Equations L5-8, E2	8.EE.1	78-89	DOK 1-2
Performance Lesson 2 – Square Roots, Cube Roots, & Exponents		8.EE.1, 8.EE.2	90	DOK 3
3	Expressions & Equations L9-12, E3	8.EE.3	94-105	DOK 1-2
4	Expressions & Equations L13-16, E4	8.EE.4	106-115	DOK 1-2
Performance Lesson 3 – Using Scientific Notation		8.EE.3, 8.EE.4	116	DOK 3
5	Expressions & Equations L17-20, E5	8.EE.5	120-139	DOK 1-2
6	Expressions & Equations L21-24, E6	8.EE.6	140-151	DOK 1-2
Performance Lesson 4 – What is Slope?		8.EE.5, 8.EE.6	152	DOK 3
7	Expressions & Equations L25-28, E7	8.EE.7a, 8.EE.7b	156-165	DOK 1-2
8	Expressions & Equations L29-32, E8	8.EE.7b	166-175	DOK 1-2
9	Expressions & Equations L33-36, E9	8.EE.7a, 8.EE.7b	176-185	DOK 1-2
10	Expressions & Equations L37-40, E10	8.EE.8a	186-203	DOK 1-2
11	Expressions & Equations L41-44, E11	8.EE.8b	204-219	DOK 1-2
12	Expressions & Equations L45-48, E12	8.EE.8c	220-237	DOK 1-2
Performance Lesson 5 – Systems of Equations		8.EE.7a-b, 8.EE.8a-c	238	DOK 3
13	Functions L1-4, E1	8.F.1	260-271	DOK 1-2
14	Functions L5-8, E2	8.F.2, 8.F.3	274-291	DOK 1-2
15	Functions L9-12, E3	8.F.3, 8.F.4	292-305	DOK 1-2
16	Functions L13-16, E4	8.F.2	306-315	DOK 1-2
Performance Lesson 6 – Linear Functions & Relationships		8.F.1, 8.F.2, 8.F.3, 8.F.4	316	DOK 3
17	Functions L17-20, E5	8.F.2, 8.F.4	320-331	DOK 1-2
18	Geometry L1-4, E1	8.G.1, 8.G.2	428-439	DOK 1-2
19	Geometry L5-8, E2	8.G.3, 8.G.4	440-453	DOK 1-2
20	Geometry L9-12, E3	8.G.4, 8.G.5	454-463	DOK 1-2
21	Geometry L13-16, E4	8.G.5	464-473	DOK 1-2
22	Geometry L17-20, E5	8.G.5	474-483	DOK 1-2
Performance Lesson 10 – 2-D Figures & Transformations		8.G.1, 8.G.2, 8.G.3, 8.G.4, 8.G.5	484	DOK 3
23	Geometry L21-24, E6	8.G.6	488-505	DOK 1-2
24	Geometry L25-28, E7	8.G.7	506-515	DOK 1-2
25	Geometry L29-32, E8	8.G.7	516-525	DOK 1-2
26	Geometry L33-36, E9	8.G.8	526-539	DOK 1-2
Performance Lesson 11 – Pythagorean Theorem		8.G.6, 8.G.7, 8.G.8	540	DOK 3
STATE TESTING BEGINS				



Daily Lessons & Weekly Assessments

Each white row represents a week of instruction.

A week of instruction includes four daily lessons (L) and a weekly formative assessment /evaluation (E).



Performance Lessons

Each shaded row represents a performance lesson.

Performance lessons may take up to three 30-minute sessions to complete.

→ Suggested pacing continues at the top of the next page.

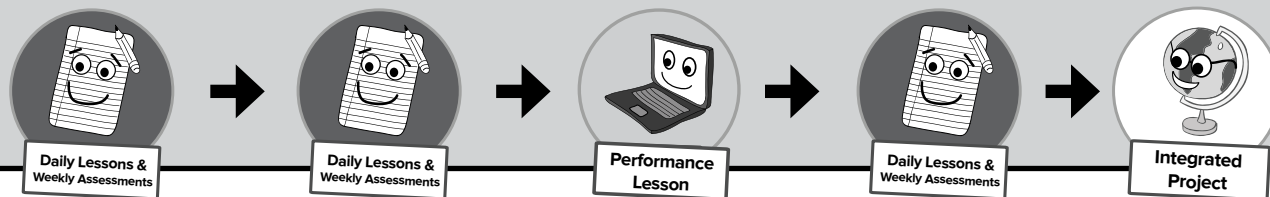
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Suggested Pacing Continued

Suggested Pacing Guide Continued

↓ These lessons are scheduled to be taught after state testing begins or they may be taught as needed throughout the year to support instruction. ↓				
WEEK	DOMAIN/TOPIC, LESSON (L), EVALUATIONS (E)	STANDARD(S)	TE PG#	DOK
27	The Number System L1-4, E1	8.NS.1	30-43	DOK 1-2
28	The Number System L5-8, E2	8.NS.2	44-55	DOK 1-2
Performance Lesson 1 – Rational and Irrational Numbers		8.NS.1, 8.NS.2	56	DOK 3
29	Functions L21-24, E6	8.F.5	332-345	DOK 1-2
Performance Lesson 7 – Functional Relationships		8.F.2, 8.F.4, 8.F.5	346	DOK 3
30	Statistics & Probability L1-4, E1	8.SP.1, 8.SP.2	356-371	DOK 1-2
31	Statistics & Probability L5-8, E2	8.SP.2, 8.SP.3	372-385	DOK 1-2
Performance Lesson 8 – Scatter Plots		8.SP.1, 8.SP.2, 8.SP.3	386	DOK 3
32	Statistics & Probability L9-12, E3	8.SP.4	390-403	DOK 1-2
Performance Lesson 9 – Two-Way Tables		8.SP.4	404	DOK 3
33	Geometry L37-40, E10	8.G.9	542-551	DOK 1-2
34	Geometry L41-44, E11	8.G.9	552-561	DOK 1-2
Performance Lesson 12 – Volume		8.G.9	562	DOK 3

Developing Your Own Standards Plus Pacing is Easy



The Common Core Standards Plus lessons can be easily paced to match:

- Core publisher textbooks
- District or site pacing
- District benchmarks

Here's How:

The Lesson Index found on pages **12-18** lists the Domain, Lesson Focus, and Standard(s) taught in each lesson. Every week of instruction (four Daily Lessons & a Weekly Assessment), Performance Lesson, and an Integrated Project is included in the lesson index. Use the Strand, Lesson Focus, or Standard listed on the Lesson Index to match the Standards Plus content to your own textbooks, units, or pacing. Schedule the Daily Lessons that lead up to each Performance Lesson to ensure students can apply the skills and concepts taught in the Daily Lessons.

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Project-Based Learning Pacing

Pacing Explanation:

Standards Plus materials are Common Core by design. They offer instruction at all four levels of Webb’s Depth of Knowledge (DOK 1-4), and they include three instructional components (Daily Lessons, Performance Lessons, and Integrated projects) that can be scheduled to support Project-Based Learning. Each grade level and subject may be organized into three distinct sets of instruction that include several weeks of Daily Lessons and Weekly Assessments (evaluations), multiple Performance Lessons, and an Integrated Project.

If you are using Common Core Standards Plus to support Project-Based Learning, here’s an example of how you might schedule the instruction to fit your instructional day:

Week	Monday	Tuesday	Wednesday	Thursday	Friday
18	<i>Functions Lesson 13</i>	<i>Functions Lesson 14</i>	<i>Functions Lesson 15</i>	<i>Functions Lesson 16</i>	<i>Functions Evaluation 4</i>
	<i>Performance Lesson 6: Character Study and Comic Strip</i>				
	<i>Project Component: Analyzing Room Dimensions / Calculating Area</i>				



This is an example of a week of PBL instruction that includes instruction at **every level of rigor**. In this example, you teach the Daily Lessons, a Performance Lesson, and a component of an Integrated Project in one week.

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Project-Based Learning Pacing

14-Week PBL Plan

WEEK	STRAND, LESSONS, EVALUATIONS (E)	INTEGRATED PROJECT COMPONENTS
1	The Number System 1-4, E1	Integrated Project #1 <i>It's Your Future</i>
2	The Number System 5-8, E2 / <i>*Performance Lesson #1</i>	
3	Expressions and Equations 1-4, E1	Making Career Choices
4	Expressions & Equations 5-8, E2 / <i>*Performance Lesson #2</i>	
5	Expressions and Equations 9-12, E3	Research Education Requirements and Costs
6	Expressions & Equations 13-16, E4 / <i>*Performance Lesson #3</i>	Research Education Requirements and Costs
7	Expressions and Equations 17-20, E5	Research Education Requirements and Costs
8	Expressions & Equations 21-24, E6 / <i>*Performance Lesson #4</i>	
9	Expressions and Equations 25-28, E7	Expected Salary and Growth Expectations
10	Expressions and Equations 29-32, E8	
11	Expressions and Equations 33-36, E9	Saving for Retirement
12	Expressions and Equations 37-40, E10	
13	Expressions and Equations 41-44, E11	Group Share-out
14	Express. & Equations 45-48, E12 / <i>*Performance Lesson #5</i>	Reflecting on the Future


9-Week PBL Plan

15	Functions 1-4, E1	Integrated Project #2 <i>Home Improvement Plans</i>
16	Functions 5-8, E2	
17	Functions 9-12, E3	Establishing Groups & Reading the Challenge
18	Functions 13-16, E4 / <i>*Performance Lesson #6</i>	Analyze Room Dimensions / Calculate Area
19	Functions 17-20, E5	Calculating Paint Costs / Time to Paint
20	Functions 21-24, E6 / <i>*Performance Lesson #7</i>	Graphing the Data
21	Statistics and Probability 1-4, E1	Sketching the Floor Plan
22	Statistics and Probability 5-8, E2 / <i>*Performance Lesson #8</i>	Writing the Report
23	Statistics & Probability 9-12, E3 / <i>*Performance Lesson #9</i>	Presenting as a Group



11-Week PBL Plan

24	Geometry 1-4, E1	Integrated Project #3 <i>Pythagoras Who?</i>
25	Geometry 5-8, E2	
26	Geometry 9-12, E3	What Is the Pythagorean Theorem? Why Is It Important?
27	Geometry 13-16, E4	Researching Proofs
28	Geometry 17-20, E5 / <i>*Performance Lesson #10</i>	Researching Proofs
29	Geometry 21-24, E6	Developing a Rubric
30	Geometry 25-28, E7	Developing a Rubric
31	Geometry 29-32, E8	Making a Visual Display
32	Geometry 33-36, E9 / <i>*Performance Lesson #11</i>	Preparing the Oral Presentation
33	Geometry 37-40, E10	Presenting the Proof
34	Geometry 41-44, E11 / <i>*Performance Lesson #12</i>	Final Reflection



Integrated Project

Each project component may take up to two weeks of instruction.

* Use the Performance Lessons to reinforce content and build application skills.

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Lesson Index

Domain	Lesson	Focus	Standard(s)	TE Page	St. Ed. Page	DOK Level
The Number System (The Number System Standards: 8.NS.1-2)	1	Types of Numbers	8.NS.1: Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.	30	3	1-2
	2	Decimal Expansion		32	4-5	
	3	Converting Repeating Decimals to Fractions		36	6-7	
	4	Converting Repeating Decimals to Fractions		40	8	
	E1	Evaluation – Irrational Numbers		42	9	
	5	Approximating Square Roots	8.NS.2: Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., $\sqrt{2}$). For example, by truncating the decimal expansion of $\sqrt{2}$, show that $\sqrt{2}$ is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.	44-45	11-12	1-2
	6	Compare Real Numbers		48	13	
	7	Order Real Numbers		50	14	
	8	Locate Real Numbers on the Real Number Line		52	15	
	E2	Evaluation – Real Numbers		54	16	
P1	Performance Lesson #1 – Rational and Irrational Numbers (8.NS.1, 8.NS.2)			56	17	3
Expressions and Equations (Expressions and Equations Standards: 8.EE.1-7, 8.EE.7a-b, 8.EE.8, 8.EE.8a-c)	1	Square Numbers and Roots	8.EE.2: Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.	68	18	1-2
	2	Using Square Roots		70	19	
	3	Evaluate Cube Roots		72	20	
	4	Using Cube Roots		74	21	
	E1	Square and Cube Roots		76	22	
	5	Properties of Exponents	8.EE.1: Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$.	78	23	1-2
	6	Properties of Exponents		80	24	
	7	Properties of Exponents		82-83	25	
	8	Properties of Exponents		86	26	
	E2	Evaluation – Properties of Exponents		88	27	
P2	Performance Lesson #2 – Square Roots, Cube Roots, and Exponents (8.EE.1, 8.EE.2)			90	29-31	3
Expressions and Equations (Expressions and Equations Standards: 8.EE.3, 8.EE.4)	9	Scientific Notation	8.EE.3: Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. 8.EE.4: Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities.	94	32	1-2
	10	Scientific Notation		96	33	
	11	Scientific Notation		98	34	
	12	Scientific Notation		100-101	35	
	E3	Evaluation – Scientific Notation		104	36	
	13	Operations Using Scientific Notation	8.EE.4	106	37	1-2
	14	Operations Using Scientific Notation		108	38	
	15	Operations Using Scientific Notation		110	39	
	16	Using Technology w/ Scientific Notation		112	40	
	E4	Evaluation – Scientific Notation		114	41	
P3	Performance Lesson #3 – Using Scientific Notation (8.EE.3, 8.EE.4)			116	43-45	3

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Lesson Index

Domain	Lesson	Focus	Standard(s)	TE Page	St. Ed. Page	DOK Level	
Expressions and Equations (Expressions and Equations Standards: 8.EE.1-7, 8.EE.7a-b, 8.EE.8, 8.EE.8a-c)	17	Graph Proportional Relationships & Determine Unit Rate	8.EE.5: Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.	120-121	46-47	1-2	
	18	Graph Proportional Relationships & Determine Unit Rate		124-125	48-49		
	19	Comparing Proportional Relationships		128	50-51		
	20	Comparing Proportional Relationships		132	52-53		
	E5	Evaluation – Graphing and Comparing Proportional Relationships		136	54-55		
	21	Simple Triangles and Slope	8.EE.6: Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b .	140	57	1-2	
	22	Simple Triangles and Slope		142	58		
	23	Derive the Equation $y = mx$		144	59		
	24	Derive the Equation $y = mx$		146	60		
	E6	Evaluation – Proportional Relationships, Lines, and Linear Equations		148	61,63		
	P4	Performance Lesson #4 – What is Slope? (8.EE.5, 8.EE.6)			152	65-66	3
	25	Types of Solutions to a Linear Equation	8.EE.7a: Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers).	156	67	1-2	
	26	Linear Equations		158	68		
	27	Solving 1-Step and 2-Step Equations	8.EE.7a, 8.EE.7b: Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.	160	69		
	28	Solving 1-Step and 2-Step Equations		162	70		
	E7	Evaluation – Finding Solutions to 1- and 2-Step Linear Equations		164	71		
	29	Distributive Property	8.EE.7b	166	73	1-2	
	30	Simplifying Expressions		168	74		
	31	Multi-Step Linear Equations		170	75		
	32	Multi-Step Linear Equations		172	76		
	E8	Solving Multi-Step Linear Equations		174	77		
	33	Multi-Step Linear Equations	8.EE.7a	176	79	1-2	
	34	Multi-Step Linear Equations		178	80		
	35	Multi-Step Linear Equations	8.EE.7b	180	81		
	36	Multi-Step Linear Equations		182	82		
	E9	Solve Multi-Step Linear Equations	8.EE.7a, 8.EE.7b	184	83		
	37	Systems of Equations	8.EE.8a: Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.	186	85	1-2	
	38	Systems of Equations		188	86		
	39	System of Equations		190-191	87		
	40	Systems of Equations		194-195	88-90		
E10	Evaluation – Systems of Equations	200		91, 93			

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Domain	Lesson	Focus	Standard(s)	TE Page	St. Ed. Page	DOK Level
Expressions and Equations <small>(Expressions and Equations Standards: 8.EE.1-7a-b, 8.EE.8a-c)</small>	41	Systems of Equations	8.EE.8b: Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. <i>For example, $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because $3x + 2y$ cannot simultaneously be 5 and 6.</i>	204	95	1-2
	42	Systems of Equations		206	96	
	43	Systems of Equations		208	97-98	
	44	Systems of Equations		212	99-100	
	E11	Evaluation – Solving Systems of Equations Algebraically		216	101, 103	
	45	Systems of Equations	8.EE.8c: Solve real-world and mathematical problems leading to two linear equations in two variables. <i>For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.</i>	220	105-106	1-2
	46	Systems of Equations		224	107	
	47	Solving Systems of Equations		226	108-109	
	48	Systems of Equations		230	110-111	
	E12	Evaluation – Systems of Equations		234	112-113	
	P5	Performance Lesson #5 – Systems of Equations (8.EE.7a, 8.EE.7b, 8.EE.8a, 8.EE.8b, 8.EE.8c)			238	115
Integrated Project #1 – It’s Your Future <small>(8.NS.1, 8.NS.2, 8.EE.1, 8.EE.2, 8.EE.3, 8.EE.4, 8.EE.5, 8.EE.6, 8.EE.7, 8.EE.7a, 8.EE.7b, 8.EE.8, 8.EE.8a, 8.EE.8b, 8.EE.8c)</small>				243-247	116-117	4
Prerequisite Common Core Standards Plus Domains: <i>The Number System</i> and <i>Expressions and Equations</i>						
Product: The students will research two possible careers and show the earning potential from the first year of employment to the 30 th year.						
Overview: In this project, the students will research two career choices that they each find appealing. They will discover the education requirements for the careers and the expected education costs to prepare to enter the career. They will determine the expected starting salary and annual growth expectations for each of the two careers. They will calculate and graph the annual salary for thirty years for each of the two careers. Then they will estimate possible savings for retirement based on multiple contingencies and analyze the results. They will share their findings in peer groups and provide a written self-reflection of the process and how it may impact their futures. Since this is a learning activity, all components will be completed in class.						

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Domain	Lesson	Focus	Standard(s)	TE Page	St. Ed. Page	DOK Level	
Functions (Functions Standards: 8.F.1-5)	1	Defining Functions	8.F.1: Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.	260	118	1-2	
	2	Defining Functions		262	119		
	3	Defining Functions		264	120		
	4	Defining Functions		266	121-122		
	E1	Evaluation – Defining Functions		270	123, 125		
	5	Identifying Linear and Non-Linear Functions	8.F.3: Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.	274-275	127-128	1-2	
	6	Identifying Linear and Non-Linear Functions		278	129-130		
	7	Identifying Linear and Non-Linear Functions		282-283	131-132		
	8	Linear Parent Function	8.F.3, 8.F.2: Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).	286-287	133-134		
	E2	Evaluation – Comparing Functions		290	135		
	9	Linear Functions in $y = k$ Form	8.F.2, 8.F.3	292	137	1-2	
	10	Rate of Change	8.F.4: Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.	294	138		
	11	Rate of Change		296	139		
	12	Rate of Change		298	140-141		
	E3	Evaluation – Comparing Functions	8.F.3, 8.F.4	302	142-143		
	13	Rewrite Linear Equation into Slope-Intercept Form	8.F.2	306	145	1-2	
	14	Comparing Properties of Two Functions		308	146		
	15	Comparing Properties of Two Functions		310	147		
	16	Comparing Properties of Two Functions		312	148		
	E4	Evaluation – Comparing Functions		314	149		
	P6	Performance Lesson #6 – Linear Functions and Relationships (8.F.1, 8.F.2, 8.F.3, 8.F.4)			316	151-152	3
	17	Comparing the Properties of Two Functions	8.F.2	320	153	1-2	
	18	Construct/Interpret a Function to Model a Linear Relationship	8.F.4	322	154		
	19	Construct/Interpret a Function to Model a Linear Relationship		324	155		
	20	Construct/Interpret a Function to Solve Problems		326	156-157		
	E5	Evaluation – Constructing and Interpreting Functions	8.F.2, 8.F.4	330	158		
	21	Sketch a Function Graph	8.F.5: Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.	332	159	1-2	
	22	Describe Functional Relationships		334	160		
	23	Describe Functional Relationships	8.F.5	336	161-162		
	24	Describe Functional Relationships		340	163-164		
E6	Evaluation – Use Functions to Model Relationships	344		165			
P7	Performance Lesson #7 – Functional Relationships (8.F.2, 8.F.4, 8.F.5)			346	167	3	

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Domain	Lesson	Focus	Standard(s)	TE Page	St. Ed. Page	DOK Level	
Statistics and Probability (Statistics and Probability Standards: 8.SP.1-4)	1	Associations of Bivariate Data	8.SP.1: Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. 8.SP.1, 8.SP.2: Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.	356	168-169	1-2	
	2	Construct Scatter Plots		360	170		
	3	Create and Interpret Scatter Plots		362-363	171-172		
	4	Line of Best Fit		366	173-174		
	E1	Evaluation – Scatter Plots and Line of Best Fit		370	175		
	5	Evaluate and Write Linear Models	8.SP.2, 8.SP.3: Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.	372-373	177	1-2	
	6	Find and Use Linear Models to Solve Problems	8.SP.3	376-377	178-179		
	7	Evaluate Goodness of Fit		380	180		
	8	Find and Use a Linear Model to Solve Problems		382	181		
	E2	Evaluation – Linear Models of Scatter Plots		8.SP.2, 8.SP.3	384		182
	P8	Performance Lesson #8 – Scatter Plots (8.SP.1, 8.SP.2, 8.SP.3)			386	183-184	3
	9	Construct Two-Way Frequency Tables	8.SP.4: Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables.	390	185	1-2	
	10	Construct Two-Way Frequency Tables		392	186		
	11	Construct Two-Way Relative Frequency Tables		394-395	187-188		
	12	Two-Way Relative Frequency Tables		398	189		
	E3	Evaluation – Scatter Plots and Two-Way Tables		400	190-191		
P9	Performance Lesson #9 – Two-Way Tables (8.SP.4)			404	193	3	
Integrated Project #2 – Home Improvement Plans (8.F.1, 8.F.2, 8.F.3, 8.F.4, 8.F.5, 8.SP.1, 8.SP.2, 8.SP.3, 8.SP.4)				409-413	194-196	4	
Prerequisite Standards Plus Domains: <u>Functions</u> and <u>Statistics & Probability</u>							
Project Objective: The students will work in teams of three or four to make plans to paint a house. They will analyze time and cost to do the work using a variety of tools. Each group will present their findings to the class.							
Overview: In this project, the students will work in groups to create a plan to paint given interior walls of a house. They will analyze the challenge, the room dimensions, the cost of paint, the coverage of paint, and the time to paint using different tools. They will work as a team to write a report that includes accurate calculations, graphs of related functions, a sketch of the floor plan of the house based on the dimensions, and expected outcomes. They will present the plan to the class. Since this is a learning activity, all components will be completed in class.							

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Domain	Lesson	Focus	Standard(s)	TE Page	St. Ed. Page	DOK Level	
Geometry (Geometry Standards: 8.G.1-8.G.9)	1	Verifying Properties	8.G.1: Verify experimentally the properties of rotations, reflections, and translations. 8.G.2: See Below	428	197-198	1-2	
	2	Showing Congruency	8.G.2: Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.	432	199		
	3	Mapping Figures		434	200		
	4	Mapping Figures		436	201		
	E1	Evaluation – Using Rotations, Reflections, and Translations		8.G.1, 8.G.2	438		202
	5	Dilating Figures	8.G.3: Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.	440-441	203	1-2	
	6	Transforming Figures		444-445	204-205		
	7	Transforming Figures	8.G.4: Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.	448	206		
	8	Transforming Figures		450	207		
	E2	Transforming Figures		452	208		
	9	Describe a Sequence of Transformations		8.G.4	454	209	
	10	Angle Sum and Exterior Angle Theorems	8.G.5: Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.	456	210	1-2	
	11	Applying the Angle Sum of a Triangle		458	211		
	12	Apply the Angle Sum and Exterior Angle of Triangles		460	212		
	E3	Evaluation – The Angle Sum and Exterior Angle of Triangles		8.G.4, 8.G.5	462		213
	13	Defining Angles Made by a Transversal	8.G.5	464	215		1-2
	14	Measuring the Angles Formed by a Transversal		466	216		
	15	Measuring Angles Formed by a Transversal		468	217		
	16	Measuring Angles Formed by a Transversal		470	218		
	E4	Evaluation – Parallel Lines Cut by a Transversal		472	219		
	17	Parallel Lines Cut by a Transversal	8.G.5	474	221	1-2	
	18	Use Transversals to Find the Angle Sum of a Triangle		476	222		
	19	Properties and Criteria for Similar Triangles		478	223		
	20	Criteria for Similar Triangles		480	224		
	E5	Evaluation – Transformations, Triangles, and Parallel Lines Cut by Transversals		482	225		
	P10	Performance Lesson #10 – 2-D Figures & Transformations (8.G.1, 8.G.2, 8.G.3, 8.G.4, 8.G.5)			484	227-228	3
	21	Proof of the Pythagorean Theorem	8.G.6: Explain a proof of the Pythagorean Theorem and its converse.	488	229-230	1-2	
	22	Proof of the Pythagorean Theorem		492	231-232		
	23	Proof of the Pythagorean Theorem		496	233-234		
	24	Converse of the Pythagorean Theorem		500	235-236		
E6	Evaluation – Proofs of the Pythagorean Theorem and It's Converse	504		237			
25	Applying the Pythagorean Theorem	8.G.7: Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.	506	239	1-2		
26	Applying the Pythagorean Theorem		508	240			
27	Applying the Pythagorean Theorem		510	241			
28	Applying the Pythagorean Theorem		512	242			
E7	Evaluation – Apply the Pythagorean Theorem		514	243			

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Domain	Lesson Focus	Standard(s)	TE Page	St. Ed. Page	DOK Level	
Geometry (Geometry Standards: 8.G.1-8.G.9)	29	Applying the Pythagorean Theorem and Its Converse	8.G.7	516	245	1-2
	30	Applying the Pythagorean Theorem		518	246	
	31	Pythagorean Theorem and Special Right Triangles		520	247	
	32	Applying the Pythagorean Theorem to 3-Dimensional Problems		522	248	
	E8	Evaluation – Applying the Pythagorean Theorem		524	249	
	33	Finding the Distance Between Points on a Coordinate Plane	8.G.8: Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.	526	251	1-2
	34	Distance Formula		528	252-253	
	35	Applying the Distance Formula		532	254	
	36	Distance Formula and the Converse of the Pythagorean Theorem		534	255	
	E9	Evaluation – Pythagorean Theorem		536	256-257	
	P11	Performance Lesson #11 – Pythagorean Theorem (8.G.6, 8.G.7, 8.G.8)		540	259	3
	37	Use the Volume Formula of Cylinders to Solve Problems	8.G.9: Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.	542	260	1-2
	38	Use the Volume Formula of Cylinders to Solve Problems		544	261	
	39	Use the Volume Formula of Cylinders to Solve Problems		546	262	
	40	Use the Volume Formula of Cylinders to Solve Problems		548	263	
	E10	Evaluation – Volume of Cylinders and Cones		550	264	
	41	Use the Volume Formula of Spheres to Solve Problems	8.G.9	552	265	1-2
	42	Use the Volume Formula of Spheres and Cylinders to Solve Problems		554	266	
	43	Use the Volume Formula of Three-Dimensional Shapes to Solve Problems		556	267	
	44	Use the Volume Formula of Three-Dimensional Shapes to Solve Problems		558	268	
E11	Evaluation 11 – Use the Volume Formula	560		269		
P12	Performance Lesson #12 – Volume (8.G.9)		562	271-272	3	
Integrated Project #3 – Pythagoras Who? (8.G.1, 8.G.2, 8.G.3, 8.G.4, 8.G.5, 8.G.6, 8.G.7, 8.G.8)			567-570	273	4	
Prerequisite Standards Plus Domain: <i>Geometry</i>						
Project Objective: The students will research and report on one proof of the Pythagorean Theorem and create a visual display that exhibits the proof. They will provide an oral presentation of the proof and the visual display.						
Overview: In this project, the students will explore proofs of the Pythagorean Theorem from throughout history. They will discuss the meaning and importance of the Pythagorean Theorem. The class will develop a rubric to use for creating the visual displays and for reporting aloud. Each student will select one proof, create a visual display that exhibits the proof, and provide an oral presentation of the proof and the visual display. Since this is a learning activity, all components will be completed in class.						

