



The Liberty School Curriculum Scope & Sequence

Orton-Gillingham Language Instruction Scope & Sequence- Phonology (sounds)

(By Ronald Yoshimoto, Fellow, A.O.G.P.E.)

Phonemic Awareness	Letter Recognition, Handwriting, Sound/Symbol	Consonant Digraphs	Letter Combinations	Spelling	Syllable Type	Vowel Digraphs/ R-controlled (lower level)	Vowel/Consonant Digraphs, etc. (higher level)
Rhyming; phonemic counting; syllable counting; segmentation ; sound deletion; syllable deletion; matching sounds; blending; manipulation; alliteration	(a,t,b,l,f,h,p,s,u,m,r, c,g,l,n,d,o,j,v,w,e,x, k,z,qu) (No English words end with "i," "v," "j," or "qu") First sounds of vowels: a, e, l, o, u, y (short vowel sounds)	(sh*, th, ch, wh, ph, ck) *Can be introduced earlier	ng : ang, ing, ong, ung nk : ank, ink, onk, unk	-ck, -dge, -tch, -(ed) (floss rule) (Rule: soft/hard c/g) -Doubling Rule -Drop-e Rule -Change y Rule	Vowel-consonant-e (open/closed) Magic-e ("s"=/z/) (all)	Oi, oy, ar, ee, or, ai, ay, er, igh, oa, "y"=/i/, oo, ea, ou, ow, kn, ir, au, aw, oe, ew, eigh	-ture, ur, -tion, age, -sion, ie, ue, ph, -stle, ey, ough, wr, ui, or=/er/, augh, ei, gn, eu, ar=/er/, ch=/k/ or /sh/, ear, qua, y=/i/, our, -que, wor, gue, -mb, rh, -mn, a=/ə/

Orton-Gillingham Language Instruction

Scope & Sequence- Structural Analysis & Syllabication

(By Ronald Yoshimoto, Fellow, A.O.G.P.E.)

Closed syllable	(teach after short vowels)
vc/cv	(rabbit)
Vowel-consonant-e	(teach after Magic-e)
vc/cv-c-e	(reptile)
vc/cy	(penny:y=/long e/)
Open syllable	
v/cv, v/cv-c-e, v/cy	(tulip)
Consonant-le syllable	
vc/c-le, v/c-le	(candle, maple)
vc/v	(camel)
r-controlled syllable	(can cover earlier)
r-controlled division	(hornet)
vc/ccv	(ostrich, pilgrim)
-tion/-sion	(construction/mansion)
Diphthong/vowel team syllable	(can cover earlier)
Vowel team division	(band-aid)
Compound words	(cowboy)
Prefix/root/suffix	
v/v	(violin)
Crazy "i"	(continent)
Connectives	

Orton-Gillingham Language Instruction
Scope & Sequence- Morphology (Greek & Latin)

(By Ronald Yoshimoto, Fellow, A.O.G.P.E.)

Lower level suffixes	(-ed, -ing, -er, -s, -es, etc.) (teach 1-1-1, Silent-e, Y to i)
Closed prefixes	(un, in, mis, etc.) (after closed syllable/rabbit)
Open prefixes	(re, de, pro, etc.) (after open syllable/tulip)
Lower level roots	(port, form, ject)
Continue introducing prefixes/suffixes/roots	
Chameleon prefixes	(con, com, col, cor)
Similar sounding suffixes	(est/ist, us/ous, able/ible)
Continue introducing upper level Latin	(carn, dorm, etc.)
Greek combining forms	(tele, phobia, logy, arch, etc.)

Writing and Communicating Scope & Sequence

Grammar: Parts of Speech, Syntax, Usage, Mechanics	Parts of a Sentence (Subject and Predicate)
<p>Beginning: Nouns, proper nouns, pronouns Capitalization Punctuation Articles Verbs Adjectives Adverbs</p> <p>Intermediate: Intermediate Punctuation Helping and linking verbs - "to be" and "to have" Prepositions Possessives Contractions Conjunctions Noun/verb agreement Adjective/noun agreement Article/Noun agreement Plurals/Irregular plurals Abbreviations Adverb/verb agreement</p> <p>Advanced: Consistent Verb tense Quotations in Dialogue</p>	<p>Beginning: Simple Sentences: A complete thought with an actor (subject) and an action (predicate) Simple Sentence: May include adjectives and adverbs Four Types of Sentences: Declarative, Exclamatory, Interrogative, Imperative</p> <p>Intermediate: Basic Sentence combining: Compound subjects and predicates Prepositional phrases Phrases vs. Clauses Transition words and sentences Descriptive Details</p> <p>Advanced: Compound Sentences: Two independent clauses joined with a comma/coordinating conjunction (FANBOYS) or a semicolon</p> <p>Complex Sentences: One dependent (subordinate) clause and one independent clause joined together by a subordinating conjunction Appositives Parallel Structure Paraphrasing and Quoting</p>

Writing and Communicating Scope & Sequence

Paragraphs, Essays, Presentations:	Creative Writing:	Other Writing Elements:
<p>Beginning: Letter Writing Short Stories Stating Opinions 5-Sentence Colored Paragraphs Introduce Informational Text Structures (Description, compare/contrast, order and sequence, problem/solution, cause and effect)</p> <p>Intermediate: Expanded Colored Paragraphs Expanded Colored Essays Narrative Essays Short Research Reports Presentations (e.g., <i>Google Slides</i>, etc.)</p> <p>Advanced: Introductions and Conclusions Essays/Theme Papers (Expository: compare/contrast, problem/solution) Literary Analysis (e.g., character, theme) Persuasive/Argumentative) Research Reports, citations, references Speeches/Debates Formal MLA or APA style</p>	<p>Beginning: Character Development Story: Beg, Middle, End</p> <p>Intermediate: Plot Development (e.g., rising action, climax, falling action) Imagery (metaphor, simile) Setting Development</p> <p>Advanced Dialog Conflict Point of View Symbolism Foreshadowing Style</p>	<p>Beginning: Editing with and Adult Early Keyboarding</p> <p>Intermediate: Speech to text if needed Expanding Word Choice Self-Editing</p> <p>Advanced: Author's voice Active vs Passive Voice Poetry Recursive Writing Process (edit, update)</p> <p>Supplemental at all levels: Pre-writing (e.g., Mind maps) Portfolio and/or Rubric assessment Assistive Technology Motivational writing program -<i>Druidawn</i> Inspiring Ideas Expanding and Strengthening Conventions Vocabulary building and word lists Interdisciplinary Projects</p>

Literature Reading, Interpretation, and Analysis

Reading	Comprehension	Analysis and Related Projects
<p>Beginning: Students read and discuss books with their tutors, parents, and/or other adults.</p> <p>Intermediate and Advanced: Students collectively read a contemporary, classic, or award winning book of interest for literature class.</p> <p>Advanced: Students read poetry or classic plays together in literature class. Simultaneously, they read a novel or other approved book on their own.</p>	<p>Beginning: Students orally ask and answer questions about their current books.</p> <p>Intermediate: Students participate in literature circles with defined roles. Plots are discussed as a whole class. New vocabulary is introduced and defined.</p> <p>Advanced: Students summarize, make inferences, and discuss the text in class daily. They research and examine the life of the author and the times in which he/she lived and their impacts on the purposes and events of the story. Vocabulary is discussed and defined.</p>	<p>Intermediate: Beginning Literary Devices are introduced: (e.g., theme, symbol, motif)</p> <p>Students do associated research and reports in writing class.</p> <p>Advanced: Students are introduced to advanced literary and poetic terms and devices as they occur in the reading.</p> <p>Students do extensive research and prepare short presentations or papers on the author or poet, style, genre, historical location, and era associated with the author and/or historical context of the novel or poem.</p> <p>Students learn to annotate, do character analyses, analyze plots, draw inferences, connect to today's culture. They also apply critical thinking skills whenever possible and connect what they are reading to papers, projects, speeches, debates, character trials, reenactments, or their own poetry.</p>

Math Scope and Sequence

Mathematics Progression Overview

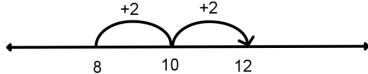
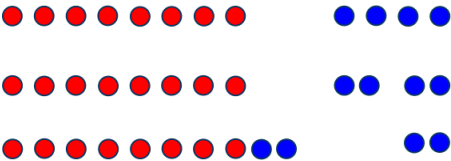
Grade	1	2	3	4	5	6	7	8
	Whole Numbers: Counting and Representation							
	Whole Numbers: Operations							
			Fractions and Decimals: Representation and Relationships					
					Fractions and Decimals: Operations			
						Algebra: Concepts		
	Algebra: Relationships and Functions							
					Algebra: Expressions			
	Algebra: Equations and Inequalities							
	Geometry: Shapes							
	Geometry: Measurement							
				Euclidean Geometry and Reasoning				
				Data Analysis				
						Probability		

	Number & Operation
	Algebra
	Geometry & Measurement
	Data Analysis & Probability

Math Scope and Sequence

1st Grade

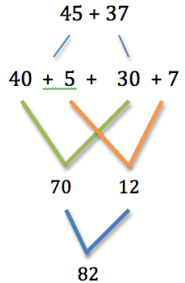
Basic	Average	Advanced
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Whole Number Counting and Representation	Example
<ul style="list-style-type: none"> Count, compare, and represent whole numbers up to 120, with an emphasis on groups of tens and ones. 	10 20 30 40 50 60 70 80 90 100 110 120
Whole Number Operations	Example
<ul style="list-style-type: none"> Use a variety of models and strategies to solve addition and subtraction problems in real-world and mathematical contexts. 	<p>$8+4= 12$</p>   <p>https://www.bigideasmath.com/protected/content/dcs_cc_v2/tools/interactive_number_line_at_1/interactive_number_line_at_1.html</p>
Algebra: Relationships and Functions	Example
<ul style="list-style-type: none"> Recognize and create patterns; use rules to describe patterns. 	<p>https://stemtc.scimathmn.org/frameworks/121-patterns</p>

Algebra: Equations and Inequalities	Example
<ul style="list-style-type: none"> Use number sentences involving addition and subtraction basic facts to represent and solve real-world and mathematical problems; create real-world situations corresponding to number sentences. 	<p>$5 + 3 = 8$ could be used to represent a situation in which 5 red balloons are combined with 3 blue balloons to make 8 total balloons.</p>
Geometry: Shapes	Example
<ul style="list-style-type: none"> Describe characteristics of basic shapes. Use basic shapes to compose and decompose other objects in various contexts. 	<p>https://stemtc.scimathmn.org/frameworks/131-shapes</p>
Geometry: Measurement	Example
<ul style="list-style-type: none"> Use basic concepts of measurement in real-world and mathematical situations involving length, time and money. 	<p>https://stemtc.scimathmn.org/frameworks/132a-length</p>

Math Scope and Sequence

2nd Grade

Basic	Average	Advanced
Whole Number Counting and Representation		Example
<ul style="list-style-type: none"> Compare and represent whole numbers up to 1000 with an emphasis on place value and equality. 		https://stemtc.scimathmn.org/frameworks/211a-numbers-representation-and-place-value
Whole Number Operations		Example
<ul style="list-style-type: none"> Demonstrate mastery of addition and subtraction basic facts; add and subtract one- and two-digit numbers in real-world and mathematical problems. 		 <p style="text-align: center;"> $45 + 37$ $40 + 5 + 30 + 7$ $70 \quad 12$ 82 </p> https://stemtc.scimathmn.org/frameworks/212b-addition-subtraction-real-world
Algebra: Relationships and Functions		Example
<ul style="list-style-type: none"> Recognize, create, describe, and use patterns and rules to solve real-world and mathematical problems. 		<p><i>Another example:</i> Collecting 7 empty milk cartons each day for 5 days will generate the pattern 7, 14, 21, 28, 35, resulting in a total of 35 milk cartons.</p> https://stemtc.scimathmn.org/frameworks/221-patterns

Algebra: Equations and Inequalities	Example
<ul style="list-style-type: none"> Use number sentences involving addition, subtraction, and unknowns to represent and solve real-world and mathematical problems; create real-world situations corresponding to number sentences. 	<p>How many more players are needed if a soccer team requires 11 players and so far, only 6 players have arrived? This situation can be represented by the number sentence $11 - 6 = p$ or by the number sentence $6 + p = 11$.</p> <p>https://stemtc.scimathmn.org/frameworks/222-number-sentences</p>
Geometry: Shapes	Example
<ul style="list-style-type: none"> Identify, describe, and compare basic shapes according to their geometric attributes. 	<p>Identify and name basic two- and three-dimensional shapes, such as squares, circles, triangles, rectangles, trapezoids, hexagons, cubes, rectangular prisms, cones, cylinders and spheres.</p> <p>https://stemtc.scimathmn.org/frameworks/231-shapes</p>
Geometry: Measurement	Example
<ul style="list-style-type: none"> Understand length as a measurable attribute; use tools to measure length. Use time and money in real-world and mathematical situations. 	<ul style="list-style-type: none"> It will take more paper clips than whiteboard markers to measure the length of a table. Draw a line segment that is 3 inches long Tell time to the quarter-hour and distinguish between a.m. and p.m. <p>https://stemtc.scimathmn.org/frameworks/search?grade%5B2%5D=2&strand%5BM3%5D=M3&keys=</p>


Math Scope and Sequence

3rd Grade

Basic	Average	Advanced
Whole Number Counting and Representation		Example
<ul style="list-style-type: none"> Read, write and represent whole numbers up to 100,000. Representations may include numerals, expressions with operations, words, pictures, number lines, and manipulatives such as bundles of sticks and base 10 blocks. Use place value to describe whole numbers between 1,000 and 100,000 in terms of ten thousands, thousands, hundreds, tens, and ones. 		<p>https://stemtc.scimathmn.org/frameworks/311a-number-representation-place-value</p> <p>Writing 54,873 is a shorter way of writing the following sums:</p> <p>5 ten thousands + 4 thousands + 8 hundreds + 7 tens + 3 ones</p> <p>54 thousands + 8 hundreds + 7 tens + 3 ones</p>
<ul style="list-style-type: none"> Find 10,000 more or 10,000 less than a given five-digit number. Find 1,000 more or 1,000 less than a given four- or five-digit. Find 100 more or 100 less than a given four- or five-digit number. Round numbers to the nearest 10,000, 1,000, 100 and 10. Round up and round down to estimate sums and differences. 		<p>Compare and order whole numbers up to 100,000</p> <p>8,726 rounded to the nearest 1,000 is 9,000, rounded to the nearest 100 is 8,700, and rounded to the nearest 10 is 8,730</p>

Whole Number Operations	Example
<ul style="list-style-type: none"> • Add and subtract multi-digit numbers, using efficient and generalizable procedures based on knowledge of place value, including standard algorithms. 	$124 + 3,421 =$
<ul style="list-style-type: none"> • Solve real-world and mathematical problems involving multiplication and division, including both "how many in each group" and "how many groups" division problems. 	<p>Repeated addition/subtraction Equal groups/sharing Forming equal groups Arrays Equal jumps on a number line, skip counting</p>
<ul style="list-style-type: none"> • Use addition and subtraction to solve real-world and mathematical problems involving whole numbers. Use various strategies, including the relationship between addition and subtraction, the use of technology, and the context of the problem to assess the reasonableness of results. • Represent multiplication facts by using a variety of approaches, such as repeated addition, equal-sized groups, arrays, area models, equal jumps on a number line and skip counting. Represent division facts by using a variety of approaches, such as repeated subtraction, equal sharing, and forming equal groups. Recognize the relationship between multiplication and division. 	<p>Jared has collected 1,286 baseball cards; Kyle has collected 1,527 baseball cards. Jared would like to have as many cards as Kyle. How many more baseball cards does Jared need to collect so that he will have the same amount as Kyle?</p> <p>https://stemtc.scimathmn.org/frameworks/312b-multiplication-division</p>

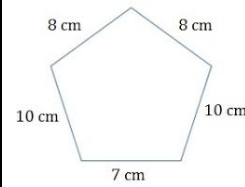
<ul style="list-style-type: none"> Use strategies and algorithms based on knowledge of place value, equality, and properties of addition and multiplication to multiply a two- or three-digit number by a one-digit number. Strategies may include mental strategies, partial products, the standard algorithm, and the commutative, associative, and distributive properties. 	$9 \times 26 = 9 \times (20 + 6) = 9 \times 20 + 9 \times 6 = 180 + 54 = 234$
Fractions and Decimals: Representation & Relationships	Example
<ul style="list-style-type: none"> Read and write fractions with words and symbols. Recognize that fractions can be used to represent parts of a whole, parts of a set, points on a number line, or distances on a number line. Understand that the size of a fractional part is relative to the size of the whole. Order and compare unit fractions and fractions with like denominators by using models and an understanding of the concept of numerator and denominator 	<p>Parts of a shape ($\frac{3}{4}$) of a pie, parts of a set (3 out of 4 people), measurements ($\frac{3}{4}$) of an inch).</p> <p>One-half of a small pizza is smaller than one-half of a large pizza, but both represent one-half.</p> <p><, >, or =</p>
Algebra: Relationships and Functions	Example
<ul style="list-style-type: none"> Use single-operation input-output rules to represent patterns, relationships, and to solve real-world mathematical problems. 	<p>Describe the relationship between number of chairs and number of legs by the rule that the number of legs is four times the number of chairs.</p>

Algebra: Equations and Inequalities	Example
<ul style="list-style-type: none"> • Understand how to interpret number sentences involving multiplication, division, and unknowns. Create real-world situations to represent number sentences. • Use multiplication and division basic facts to represent a given problem situation using a number sentence. • Use number sense, multiplication, and division to find values for the unknowns that make the number sentences true. 	<p>The number sentence $8 \times m = 24$ could be represented by the question "How much did each ticket to a play cost if 8 tickets totaled \$24?"</p> <p>Find values of the unknowns that make each number sentence true</p> $6 = p \div 9$ $24 = a \times b$ $5 \times 8 = 4 \times t$
Geometry: Shapes	Example
<ul style="list-style-type: none"> • Sketch polygons with a given number of sides or vertices (corners), such as pentagons, hexagons and octagons. 	
<ul style="list-style-type: none"> • Identify parallel and perpendicular lines in various contexts, and use them to describe and create geometric shapes, such as right triangles, rectangles, parallelograms and trapezoids. 	<p>https://stemtc.scimathmn.org/frameworks/331-parallelperpendicular-lines-polygons</p>

Geometry: Measurement

Example

- Find the perimeter of a polygon by adding the lengths of the sides.



- Find the perimeter of a polygon using half units when measuring distances.
- Tell time to the minute, using digital and analog clocks. Determine elapsed time to the minute.
- Know relationships among units of time.
- Make change up to a dollar in several different ways, including with as few coins as possible.

Measure the distance around a classroom, or measure a person's wrist size.

Your trip began at 9:50 a.m. and ended at 3:10 p.m. How long were you traveling?

Know the number of minutes in an hour, days in a week and months in a year.

A chocolate bar costs \$1.84. You pay for it with \$2.00. Give two possible ways to make change.

- Use an analog thermometer to determine temperature to the nearest degree in Fahrenheit and Celsius.



Read the temperature in a room with a thermometer that has both Fahrenheit and Celsius scales. Use the thermometer to compare Celsius and Fahrenheit readings.

Data Analysis	Example
<ul style="list-style-type: none">• Using a variety of graphs, collect, display, and interpret data.• Create graphs using appropriate titles, labels, and units.	https://stemtc.scimathmn.org/frameworks/341-data-analysis

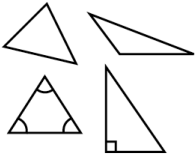
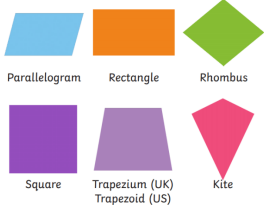
Math Scope and Sequence

4th Grade

Basic	Average	Advanced
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Whole Number Operations	Example
<ul style="list-style-type: none"> • Demonstrate fluency with multiplication and division facts. • Use an understanding of place value to multiply a number by 10, 100 and 1,000. • Multiply multi-digit numbers, using efficient and generalizable procedures, based on knowledge of place value, including standard algorithms. 	<p>Fourth graders use rounding, benchmark numbers, and place value to estimate and evaluate the reasonableness of results.</p> <p>300 20 5 because that is the same as 325</p> <p>$\begin{array}{r} 300 \\ \times 20 \\ \hline \end{array}$ 9 because that is the same as 29</p>
<ul style="list-style-type: none"> • Estimate products and quotients of multi-digit whole numbers by using rounding, benchmarks, and place value to assess the reasonableness of results. 	<p>53×38 is between 50×30 and 60×40, or between 1,500 and 2,400, and $411/73$ is between 5 and 6</p>
<ul style="list-style-type: none"> • Solve multi-step real-world and mathematical problems requiring the use of addition, subtraction, and multiplication of multi-digit whole numbers. • Use strategies and algorithms based on knowledge of place value, equality, and properties of operations to divide multi-digit whole number dividends by one- or two-digit divisors. 	<p>https://stemtc.scimathmn.org/frameworks/411b-multi-digit-multiplication</p> <p>https://stemtc.scimathmn.org/frameworks/411c-division</p>

Fractions and Decimals: Representation & Relationships	Example
<ul style="list-style-type: none"> • Use fraction models to add and subtract fractions with like denominators in real-world and mathematical situations. Develop a rule for addition and subtraction of fractions with like denominators. • Read and write decimals with words and symbols; use place value to describe decimals in terms of thousands, hundreds, tens, ones, tenths, hundredths and thousandths. • Compare and order decimals and whole numbers using place value, a number line and models such as grids and base 10 blocks. 	<p>https://stemtc.scimathmn.org/frameworks/412a-fractions</p>
<ul style="list-style-type: none"> • Represent equivalent fractions using fraction models such as parts of a set, fraction circles, fraction strips, number lines and other manipulatives. Use the models to determine equivalent fractions. • Locate fractions on a number line. Use models to order and compare whole numbers and fractions, including mixed numbers and improper fractions. • Read and write tenths and hundredths in decimal and fraction notations using words and symbols; know the fraction and decimal equivalents for halves and fourths. • Round decimals to the nearest tenth. 	<p>Locate $\frac{5}{3}$ and $1\frac{3}{4}$ on a number line and give a comparison statement about these two fractions, such as, $\frac{5}{3}$ is less than $1\frac{3}{4}$</p> <p>https://stemtc.scimathmn.org/frameworks/412a-fractions</p> <p>Writing 362.45 is a shorter way of writing the sum: 3 hundreds + 6 tens + 2 ones + 4 tenths + 5 hundredths which can also be written as: three hundred sixty-two and forty-five hundredths.</p> <p>$\frac{1}{2}=0.5=0.50$ and $\frac{7}{4}=1\frac{3}{4}$, which can also be written as one and three-fourths or one and seventy-five hundredths.</p> <p>The number 0.36 rounded to the nearest tenth is 0.4</p> <p>https://stemtc.scimathmn.org/frameworks/412b-decimals</p>

Algebra: Relationships and Functions	Example
<ul style="list-style-type: none"> • Create and use input-output rules involving addition, subtraction, multiplication, and division to solve problems in various contexts. 	<p>If the rule is "multiply by 3 and add 4," record the outputs for given inputs in a table.</p>
Algebra: Equations and Inequalities	Example
<ul style="list-style-type: none"> • Understand and use multiplication, division, and unknowns to represent a given problem situation using a number sentence. Use number sense, properties of multiplication, and the relationship between multiplication and division to find values for the unknowns that make the number sentences true. 	<p>The number sentence $a \times b = 60$ can be represented by the situation in which chairs are being arranged in equal rows and the total number of chairs is 60.</p> <p>If \$84 is to be shared equally among a group of children, the amount of money each child receives can be determined using the number sentence $84 \div n = d$.</p> <p>$12 \times m = 36$ or $s = 256 \div t$</p>
Geometry: Shapes	Example
<ul style="list-style-type: none"> • Describe, classify, and sketch triangles, including equilateral, right, obtuse and acute triangles. Recognize triangles in various contexts. 	
<ul style="list-style-type: none"> • Describe, classify and draw quadrilaterals, including squares, rectangles, trapezoids, rhombuses, parallelograms and kites. 	

Geometry: Measurement	Example
<ul style="list-style-type: none"> • Compare and classify angles as acute, right, or obtuse. • Understand that the area of a two-dimensional figure can be found by counting the total number of same size square units that cover a shape without gaps or overlaps. 	
<ul style="list-style-type: none"> • Measure angles in geometric figures and real-world objects with a protractor or angle ruler. 	Compare different hockey sticks according to the angle between the blade and the shaft.
<ul style="list-style-type: none"> • Find the areas of geometric figures and real-world objects that can be divided into rectangular shapes. Use square units to label area measurements. 	How many copies of a square sheet of paper are needed to cover the classroom door? Measure the length and width of the door to the nearest inch and compute the area of the door.
Data Analysis	Example
<ul style="list-style-type: none"> • Use tables, bar graphs, timelines, and Venn diagrams to display data sets. The data may include fractions or decimals. 	https://stemtc.scimathmn.org/frameworks/441-data-analysis
<ul style="list-style-type: none"> • Understand that spreadsheet tables and graphs can be used to display data. 	

Math Scope and Sequence

5th Grade

Basic	Average	Advanced
Whole Number Operations		Example
<ul style="list-style-type: none"> Divide multi-digit dividend by single-digit divisor showing quotient different ways. 		2417 ÷ 2 = 1208 R1 or 1208 ½ or 1208.5
<ul style="list-style-type: none"> Divide multi-digit dividend by multi-digit divisor showing quotient in different ways. 		2431 ÷ 10 = 243 R1 or 243 1/10 or 243.1
Read, write, and compare fractions and decimals.		Example
<ul style="list-style-type: none"> Related to place value Rounding 		https://stemtc.scimathmn.org/frameworks/512-decimals-fractions
<ul style="list-style-type: none"> Write fraction as a decimal Write a mixed number as a decimal Write an improper fraction as a decimal 		1/10 = .1 1 2/10 = 1.2 12/10 = 1.2
<ul style="list-style-type: none"> Order fractions and decimals least to greatest etc. 		.25, 1/3, .335, .48, 1/2, 3/4, 1.05
Fraction and Decimal Operations		Example
<ul style="list-style-type: none"> Add/subtract fractions with like denominators Add/subtract decimals 		3/4 + 3/4 = 6/4 or 1 1/2 Students understand to line up the decimal to add and subtract properly

- Add/subtract fractions with unlike denominators
- Simplify answer
- $\times \div$ decimals

Butterfly Method for Fractions (Addition & Subtraction)

$$\frac{3}{7} + \frac{5}{2} = 41$$

$$= 2 \frac{13}{14}$$

- Cross Canceling
- Real-world word problems with fractions and decimals
- $\times \div$ Fractions

$$\frac{2}{3} \times \frac{3}{7} = \frac{2 \times 1}{3 \times 7} = \frac{2}{21}$$

Algebra: Relationships and Functions

Example

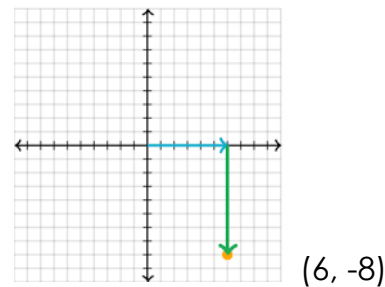
- Create and use tables, spreadsheets, and graphs to interpret patterns and solve problems.

<https://stemtc.scimathmn.org/frameworks/521-representing-change>

- Order of Algebraic expressions

PEMDAS [parenthesis, exponents, \times , \div , +, -]

- Plot ordered pairs in quadrant 1 on a coordinate grid.



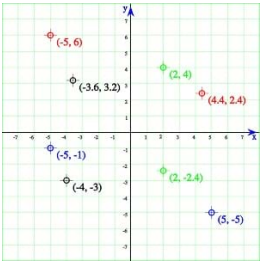
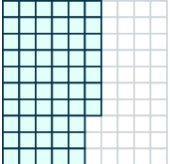
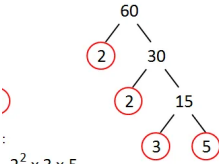
Algebra: Expressions	Example
<ul style="list-style-type: none"> Apply commutative, distributive, associative, identity, and the property of 0 and order of operations to generate and solve equations with whole numbers. 	<p>Purchase 5 pencils at 19 cents and 7 erasers at 19 cents. The numerical expression is $5 \times 19 + 7 \times 19$ which is the same as $(5 + 7) \times 19$.</p>
Algebra: Equations and Inequalities	Example
<ul style="list-style-type: none"> Given a value for a variable determine if an equation or inequality is true. Solve equations and evaluate expressions where the value of the variable is given 	<p>https://stemtc.scimathmn.org/frameworks/523-equations-inequalities</p>
<ul style="list-style-type: none"> Use equations and inequalities to create and solve real world problems. 	<p>$250 - 27 \times a = b$ can be used to represent the number of sheets of paper remaining from a packet of 250 sheets when each student in a class of 27 is given a certain number of sheets.</p>
Geometry: Shapes	Example
<ul style="list-style-type: none"> Describe and Classify three dimensional figures. 	<p>Cube prism pyramid etc.... by faces, edges, and vertices</p>
Geometry: Measurement	Example
<ul style="list-style-type: none"> Use formulas to determine the area of triangles, parallelograms and other figures. Measure volume and surface area of rectangular prisms. 	<p>https://stemtc.scimathmn.org/frameworks/532-area-surface-area-volume</p>

Data Analysis	Example
<ul style="list-style-type: none"> • Create and analyze different types of graphs, spreadsheets, and tables including fractions. 	<p>https://stemtc.scimathmn.org/frameworks/541-data-analysis</p>
<ul style="list-style-type: none"> • Know and use mean, median, and range for a set of data. 	<p>The set of numbers 1, 1, 4, 6 has mean 3. It can be leveled by taking one unit from the 4 and three units from the 6 and adding them to the 1s, making four 3's.</p> <p>https://www.newmanagement.com/tips/math_poems.html</p> <p>Mode, median, mean, and range</p> <p>(To the tune of <i>Row, Row, Row Your Boat</i>)</p> <p>“Mode, mode, mode the most, Average is the mean. Median, median, median, median, The number in between. Range is a tricky one, He likes to hide around. The difference between high and low, Is how he can be found.”</p>

Math Scope and Sequence

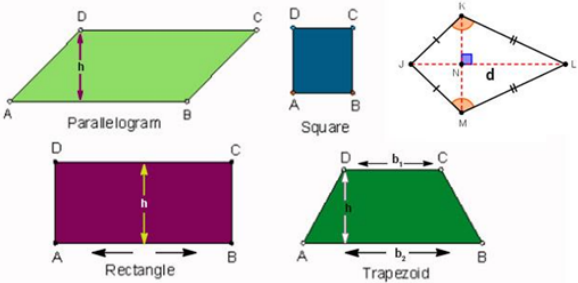
6th Grade

Basic	Average	Advanced
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Fractions and Decimals: Representation & Relationships	Example
<ul style="list-style-type: none"> Locate positive rational numbers on a number line and plot positive rational numbers on a coordinate grid Understand that percent represents parts out of 100 and ratios to 100 Determine equivalences between fractions, decimals, and percents 	 <p>$57/100 = 57\%$</p>  <p>$\frac{1}{2} = \frac{3}{6}$ $\frac{1}{4} = 0.25$ $0.65 = 65\%$</p>
<ul style="list-style-type: none"> Compare positive rational numbers using $<$, $>$, and $=$ Factor whole numbers; express a whole number as a product of prime factors with exponents 	<p>$7.6 < 7.9$ $\frac{1}{2} > \frac{1}{3}$, $0.75 = \frac{3}{4}$</p>  <p>$2^2 \times 3 \times 5$</p>

<ul style="list-style-type: none"> Determine greatest common factors and least common multiples. Use these in fraction operations and to find equivalent fractions 	<p>Prime factors of 18: $2 \times 3 \times 3$</p> <p>Prime factors of 24: $2 \times 2 \times 2 \times 3$</p> <p>There is one 2 and one 3 in common. The GCF is $2 \times 3 = 6$.</p> <p>Multiples of 3 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, ...</p> <p>Multiples of 5 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, ...</p> <p>Least Common Multiple (LCM) = 15</p>
<p>Fractions and Decimals: Operations</p>	<p>Example</p>
<ul style="list-style-type: none"> Multiply and divide fractions and decimals Calculate the percent of a number and determine what percent one number is of another number to solve problems Solve real-world math problems using operations with fractions, decimals, and mixed numbers 	$\frac{2}{5} \times \frac{6}{7} = \frac{2 \times 6}{5 \times 7} = \frac{12}{35}$ <p>30% of 90 = 27</p> <p>A recipe calls for $\frac{3}{4}$ cup of flour. How much will you need if you double the recipe?</p>
<p>Algebra Concepts: Ratios to Proportions to Functions</p>	<p>Example</p>
<ul style="list-style-type: none"> Apply the relationship between ratios, equivalent fractions, and percents to solve problems Use reasoning about multiplication and division to solve ratio and rate problems 	<p>https://stemtc.scimathmn.org/frameworks/612-ratios-rates</p>
<ul style="list-style-type: none"> Identify and use ratios to compare quantities 	<p>https://stemtc.scimathmn.org/frameworks/612-ratios-rates</p>
<p>Algebra: Relationships and Functions</p>	<p>Example</p>
<ul style="list-style-type: none"> Represent the relationship between two varying quantities with function rules, graphs and tables; translate between representations 	<p>https://stemtc.scimathmn.org/frameworks/621-variables-representations-relationship</p>

<ul style="list-style-type: none"> • Understand that a variable can be used to represent a quantity that can change • Use variables in various contexts 	https://stemtc.scimathmn.org/frameworks/621-variables-representations-relationships
Algebra: Expressions	Example
<ul style="list-style-type: none"> • Apply the associative, commutative, and distributive properties and order of operations to generate equivalent expressions and solve problems 	https://stemtc.scimathmn.org/frameworks/622-properties-equivalent-expressions
Algebra: Equations and Inequalities	Example
<ul style="list-style-type: none"> • Solve equations involving positive rational numbers 	https://www.youtube.com/watch?v=pFBiKzxe_5Y&list=RDCMUCRkeyHV2bANRrFjesu_wdLQ&start_radio=1&t=103 https://s3-us-west-2.amazonaws.com/oervm/chipmodel/ChipModelOps.html
<ul style="list-style-type: none"> • Represent real-world mathematical situations using equations and inequalities involving variables 	https://stemtc.scimathmn.org/frameworks/523-equations-inequalities

Geometry: Measurement	Example
<ul style="list-style-type: none"> Calculate area of quadrilaterals 	<p>https://stemtc.scimathmn.org/frameworks/631-measurement-polygons-prisms</p>  <p>The image contains four diagrams illustrating the measurement of quadrilaterals:</p> <ul style="list-style-type: none"> Parallelogram: A green parallelogram with vertices labeled A, B, C, and D. A vertical dashed line from vertex D to the base AB is labeled 'h', representing the height. Square: A blue square with vertices labeled A, B, C, and D. Rectangle: A purple rectangle with vertices labeled A, B, C, and D. A vertical dashed line from vertex D to the base AB is labeled 'h', representing the height. Trapezoid: A green trapezoid with vertices labeled A, B, C, and D. The top base is labeled b_1 and the bottom base is labeled b_2. A vertical dashed line from vertex D to the bottom base AB is labeled 'h', representing the height.
<ul style="list-style-type: none"> Calculate surface area and volume of prisms and use appropriate unit labels Estimate perimeter and area of irregular figures on a grid 	<p>Surface Area: https://www.khanacademy.org/math/cc-sixth-grade-math/cc-6th-geometry-topic/cc-6th-surface-area/v/finding-surface-area-using-net</p> <p>Volume: https://www.khanacademy.org/math/cc-sixth-grade-math/cc-6th-geometry-topic/cc-6th-surface-area/v/finding-surface-area-using-net</p> <p>Perimeter and area of irregular figures on a grid: https://www.youtube.com/watch?v=a7PZlhL_l8Q</p>
Geometry: Algebra in Geometry	Example
<p>Estimate weights, capacities, and geometric measurements using appropriate units</p>	<p>https://slideplayer.com/slide/17355407/</p>

- Solve problems involving conversion of weights, capacities, geometric measurements, and times using appropriate units

U.S. Customary Units

<p style="text-align: center;">Length</p> <p>1 foot = 12 inches 1 yard = 3 feet 1 mile = 5,280 feet 1 mile = 1,760 yards</p>	<p style="text-align: center;">Weight</p> <p>1 pound = 16 ounces 1 ton = 2,000 pounds</p>
<p style="text-align: center;">Capacity</p> <p>1 cup = 8 fluid ounces 1 pint = 2 cups 1 quart = 2 pints 1 gallon = 4 quarts</p>	<p style="text-align: center;">Time</p> <p>1 minute = 60 seconds 1 hour = 60 minutes 1 day = 24 hours 1 week = 7 days 1 year = 52 weeks 1 year = 12 months 1 year = 365 days</p>

Geometry: Euclidean Geometry and Reasoning

Example

- *Solve problems using the relationships between the angles formed by intersecting lines
 - *Determine missing angles in a triangle
- *Use formulas to determine the sum of interior angles of polygons

Angles formed by intersecting lines:
<https://www.youtube.com/watch?v=CVLpoRLS3Qc>

Missing angles in a triangle:
<https://www.youtube.com/watch?v=bp5UxYKPie8>

Sum of interior angles of polygons:
<https://www.khanacademy.org/math/geometry-home/geometry-shapes/angles-with-polygons/v/sum-of-interior-angles-of-a-polygon>

Probability

Example

- *Determine possible outcomes for a given experiment
- Determine probabilities of an event and represent answers using percents, fractions, and decimals

<https://virtualnerd.com/middle-math/probability-statistics/finding-outcomes/calculate-all-possible-outcomes-experiment>

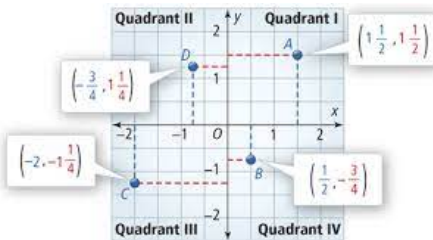
<https://www.ck12.org/book/ck-12-middle-school-math-concepts-grade-8/section/11.9/>

- * Calculate experimental probabilities and represent them as fractions, decimals, and percents. Use probabilities to make predictions

<https://www.khanacademy.org/math/cc-seventh-grade-math/cc-7th-probability-statistics/cc-7th-theoretical-and-experimental-probability/v/comparing-theoretical-to-experimental-probabilites>

Math Scope and Sequence
7th Grade

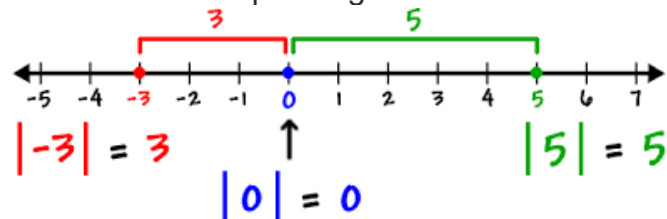
Basic	Average	Advanced
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Fractions and Decimals: Representation & Relationships	Example
<ul style="list-style-type: none"> Locate positive and negative rational numbers on a number line and plot on a coordinate grid 	
<ul style="list-style-type: none"> Compare positive and negative rational numbers in various forms using $<$, $>$, $=$, \leq, \geq 	$-0.175 > \left(-\frac{3}{8}\right)$
<ul style="list-style-type: none"> Recognize and generate equivalent representations of positive and negative rational numbers, including equivalent fractions 	$-\frac{25}{100} = -\frac{1}{4} = -0.25$
Fractions and Decimals: Operations	Example
<ul style="list-style-type: none"> Solve problems involving positive and negative rational numbers and exponents, including computing simple and compound interest 	<p>If you deposit \$5,000 into an account that generates 8% interest compounded annually, how much money will there be after 7 years?</p>

- Add, subtract, multiply, and divide positive and negative rational numbers
- Raise positive rational numbers to whole-number exponents
- Use proportional reasoning to solve problems involving ratios
- Demonstrate an understanding of absolute value on a number line

$$(-7)-18 = -15, \quad \frac{4}{5} \left(-\frac{2}{3}\right) = 1\frac{7}{15}$$

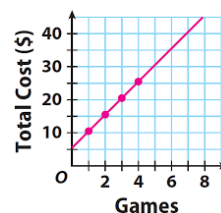
A recipe calls for milk, flour and sugar in a ratio of 4:6:3 (this is how recipes are often given in large institutions, such as hospitals). How much flour and milk would be needed with 1 cup of sugar?



Algebra Concepts: Ratios to Proportions to Functions

- Understand that the graph of a proportional relationship is a line through the origin whose slope is the unit rate


Example

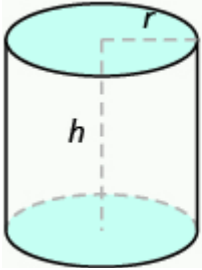
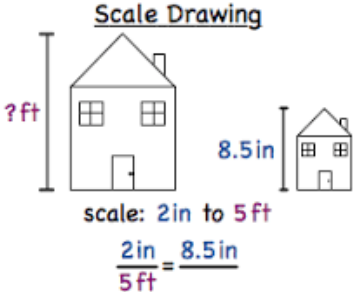
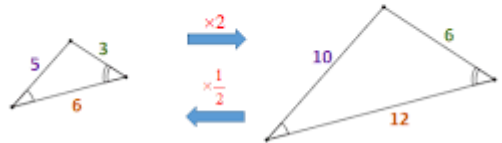


- Understand that a relationship between two variables, x and y , is proportional if it can be expressed in the form $y/x = k$ or $y = kx$

Examples of Direct Variation Equations ($y = kx$ or $y/x = k$)...

$y = 4x$	\rightarrow	$k = 4$
$y = x$	\rightarrow	$k = 1$
$y = 2x$	\rightarrow	$k = 2$
$y = 2.5x$	\rightarrow	$k = 2.5$
$y = \frac{5}{8}x$	\rightarrow	$k = \frac{5}{8}$
$y = 0.75x$	\rightarrow	$k = 0.75$

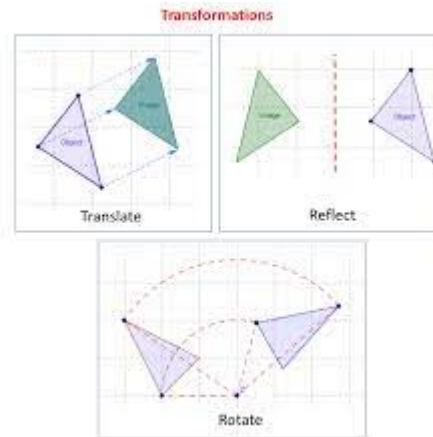
Algebra: Relationships and Functions	Example
<ul style="list-style-type: none"> • Represent proportional relationships with tables, verbal descriptions, symbols, equations, and graphs. Determine unit rate/slope based on these representations • Solve multi-step problems involving proportional relationships • Represent real-world or mathematical situations using equations and inequalities involving variables and positive and negative rational numbers 	<p>Core Lesson</p> <p>A pizza with 8 slices costs \$14.80. What equation can be used to represent the total cost, t, of n slices?</p>  <p>LEARN ZILLION</p> <p>x is at least -3 and less than 5" can be represented as $-3 \leq x < 5$, and also on a number line.</p>
Algebra: Expressions	Example
<ul style="list-style-type: none"> • Use associative, distributive, and commutative properties to generate equivalent numerical and algebraic expressions • Evaluate algebraic expressions when the variable is known • Demonstrate understanding of order of operations 	<p>$12+13(92-158)=12+13 \times 92-13 \times 158=12+32-58=2-58=13$ 8</p> <p>If $x=3$, evaluate $3x+4-5$ (ans: 8)</p> <p>$(3+4) \times 2-(8-6)^2+3 = 13$ PEMDAS</p>
Algebra: Equations and Inequalities	Example
<ul style="list-style-type: none"> • Represent relationships with equations involving variables and positive and negative rational numbers. Solve for the value of the variable. • Solve equations resulting from proportional relationships 	<p>Solve for w in the equation $P = 2w + 2\ell$ when $P = 3.5$ and $\ell = 0.4$</p> <p>Given that y varies proportionally with x, find the constant of proportionality if $y=24$ and $x=3$ ($y=kx$ answer: $k=8$)</p>

Geometry: Measurement:	Example
<ul style="list-style-type: none"> Calculate the circumference and area of circles 	<p>If a circle has a diameter of 12 meters, find its area/perimeter</p>
<ul style="list-style-type: none"> Calculate the volume and surface area of cylinders 	<div style="display: flex; align-items: center;">  <div> <p>Volume: $V = \pi r^2 h$ or $V = Bh$</p> <p>Surface Area: $S = 2\pi r^2 + 2\pi rh$</p> </div> </div>
Geometry: Algebra in Geometry	Example
<ul style="list-style-type: none"> Use proportions and ratios to solve problems involving scale drawings and conversions of measurement units 	<p style="text-align: center;">Scale Drawing</p> <div style="text-align: center;">  <p>scale: 2 in to 5 ft</p> $\frac{2 \text{ in}}{5 \text{ ft}} = \frac{8.5 \text{ in}}{\quad}$ </div>
<ul style="list-style-type: none"> Apply scale factors, length ratios, and area ratios to determine side lengths and areas of similar geometric figures Compare geometric figures for similarity and determine scale factors 	<p style="text-align: center;">Scale Factor</p> <p>A scale factor is the number by which all the components of an object are multiplied in order to create a proportional enlargement or reduction.</p> <div style="text-align: center;">  </div>

Geometry & Measurement- Euclidean Geometry and Reasoning

- Graph and describe translations and reflections of figures on a coordinate grid and determine the coordinates of the vertices after a transformation

Example



Data Analysis

- Determine mean, median, mode, and range from data and draw conclusions and make predictions
- Use reasoning with proportions to display and interpret data in pie charts, graphs, and histograms. Choose the appropriate data display and know how to create it using a spreadsheet or other graphing technology

Example

If Sue scores 98, 82, 90, 73, and 89, find the mean, median, mode, and range of her scores. What type of display would be best to show the changes in temperature over time? What display would be best to show the different preferences students have in movie genres?

- Describe the impact that inserting or deleting a data point has on the mean and the median of a data set. Know how to create data displays using a spreadsheet to examine this impact

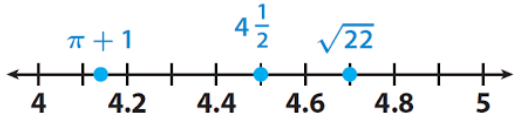
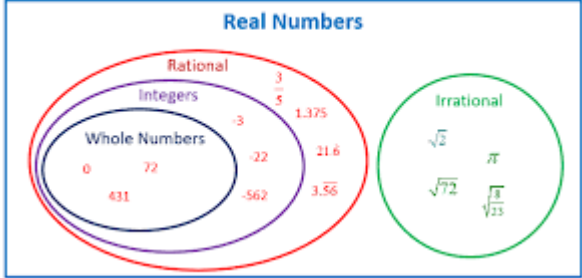
How does dropping a student's lowest test score affect the mean test score?

Probability	Example
<ul style="list-style-type: none">• Calculate probability as a fraction of sample space or as a fraction of area. Express probability as percents, decimals, and fractions.• Use probabilities to draw conclusions about and predict relative frequencies of outcomes	<p>What is the probability of rolling a "3" when tossing a die? Answer: 1:6, 0.1666, 17%, $\frac{1}{6}$</p> <p>When rolling a number cube 600 times, one would predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.</p>

Math Scope and Sequence

8th Grade

Basic	Average	Advanced
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Fractions and Decimals: Representation & Relationships	Example
<ul style="list-style-type: none"> Compare and locate real numbers on a number line. Express very large and very small numbers using scientific notation 	 <p>7.93 x 10⁹ = 7,930,000,000</p>
<ul style="list-style-type: none"> Know and apply the properties of positive and negative integer exponents to generate equivalent numerical expressions 	$x^{-n} = \frac{1}{x^n}$
<ul style="list-style-type: none"> Classify real numbers as rational or irrational Determine rational approximations for solutions to problems involving real numbers 	<p>Examples of rational numbers, integers, whole numbers, and irrational numbers</p> 

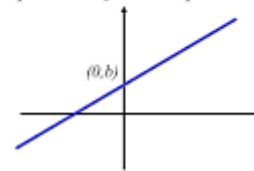
Algebra Concepts: Ratios to Proportions to Functions**Example**

- Understand that a function is linear if it can be expressed in the form $f(x)=mx+b$ or if its graph is a straight line
- Understand that an arithmetic sequence is a linear function that can be expressed in the form $f(x)=mx+b$, where $x= 0,1,2,3,\dots$

A **linear function** is a function of the form

$$f(x)=mx+b$$

The graph of a linear function is a line with a slope m and y -intercept b .

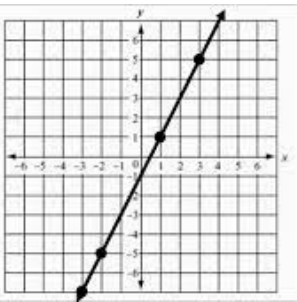


- Understand that a function is a relationship between an independent variable and a dependent variable in which the value of the independent variable determines the dependent variable. Use $f(x)$ to represent such relationships.
- Use linear functions to represent relationships in which changing the input variable leads to a change in the output variable that is a constant times that amount.
- Understand that an arithmetic sequence is a linear function that can be expressed in the form $f(x) = mx+b$, where $x = 0, 1, 2, 3,\dots$

The relationship between the area of a square and the side length can be expressed as $f(x)=x^2$. In this case, $f(5)=25$, which represents the fact that a square of side length 5 units has area 25 units squared.

Uncle Jim gave Emily 50 on the day she was born and 25 on each birthday after that. The function $f(x)=50+25x$ represents the amount of money Jim has given after x years. The rate of change is \$25 per year.

The arithmetic sequence 3, 7, 11, 15, ..., can be expressed as $f(x) = 4x + 3$.

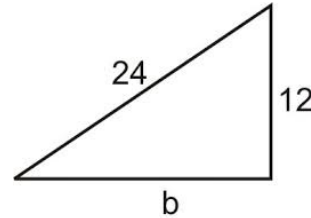
Algebra: Relationships and Functions	Example										
<ul style="list-style-type: none"> • Represent linear functions with tables, verbal descriptions, symbols, equations, and graphs; translate from one representation to another • Identify graphical properties of linear functions including slopes and intercepts. Know that slope equals the rate of change, and that the y-intercept is zero when the function represents a proportional relationship. • Represent geometric sequences using equations, tables, graphs, and verbal descriptions, and use them to solve problems 	<div data-bbox="1066 180 1596 479"> <p>Table to Graph</p> <table border="1"> <thead> <tr> <th>X</th> <th>Y</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>5</td> </tr> <tr> <td>1</td> <td>1</td> </tr> <tr> <td>-2</td> <td>-5</td> </tr> <tr> <td>-3</td> <td>-7</td> </tr> </tbody> </table> <p>Is this a LINEAR function? YES</p>  </div> <p>If a girl invests \$100 at 10% annual interest, she will have $100(1.1x)$ dollars after x years.</p>	X	Y	3	5	1	1	-2	-5	-3	-7
X	Y										
3	5										
1	1										
-2	-5										
-3	-7										
<ul style="list-style-type: none"> • Represent arithmetic sequences using equations, tables, graphs, and verbal descriptions, and use them to solve problems 	<p>If a girl starts with \$100 in savings and adds \$10 at the end of each month, she will have $100 + 10x$ dollars after x months.</p>										
<ul style="list-style-type: none"> • Identify how coefficient changes in the equation $f(x)=mx+b$ affect the graphs of linear functions. Know how to use technology to examine these effects. 	<p>https://www.youtube.com/watch?v=8sz1IPjBRS8&t=46s</p>										
Algebra: Expressions	Example										
<ul style="list-style-type: none"> • Evaluate algebraic expressions (including radicals and absolute values) when given the value for the variable 	<p>https://www.youtube.com/watch?v=9xnhLTXzi50</p>										
<ul style="list-style-type: none"> • Generate equivalent expressions using the associative, commutative, and distributive properties and the order of operations 	<p>$3215 \times 56 = 32 \times 515 \times 6 = 2 \times 16 \times 53 \times 5 \times 3 \times 2 = 169 \times 22 \times 55 = 169$</p>										

Algebra: Equations and Inequalities	Example
<ul style="list-style-type: none"> Use linear equations to represent situations involving a constant rate of change, including proportional and non-proportional relationships 	<p>For a cylinder with fixed radius of length 5, the surface area $A = 2\pi(5)h + 2\pi(5)^2 = 10\pi h + 50\pi$, is a linear function of the height h, but the surface area is not proportional to the height</p>
<ul style="list-style-type: none"> Express linear equations in slope-intercept, point-slope, and standard forms, and convert between them. Find equations of a line. Solve systems of linear equations 	<p>Determine an equation of the line through the points $(-1, 6)$ and $(\frac{2}{3}, -\frac{3}{4})$</p> <p>https://www.khanacademy.org/test-prep/sat/sat-math-practice/new-sat-heart-of-algebra/v/sat-math-h7-easier</p>
<ul style="list-style-type: none"> Solve multi-step equations in one variable. Solve for one variable in a multi-variable equation. Solve and graph equations and inequalities involving the absolute value of a linear expression 	<p>https://www.youtube.com/watch?v=Y98WBfp9N2Y</p> <p>https://www.khanacademy.org/math/algebra-home/alg-absolute-value/alg-absolute-value-equations/v/absolute-value-equations</p>
Geometry: Algebra in Geometry	Example
<ul style="list-style-type: none"> Solve problems involving parallel and perpendicular lines on a coordinate system 	<p>https://www.youtube.com/watch?v=9hryH94KFJA</p>
<ul style="list-style-type: none"> Analyze polygons on a coordinate system by determining the slopes of their sides 	<p>Given the coordinates of four points, determine whether the corresponding quadrilateral is a parallelogram.</p>

Geometry & Measurement- Euclidean Geometry and Reasoning

- Solve problems involving right triangles using the Pythagorean Theorem and its converse

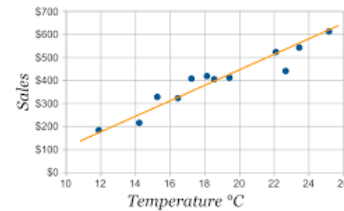
Example



Data Analysis

- Collect, display, and interpret data using scatterplots
- Use lines of best fit to draw conclusions about data and the approximate rate of change

Example



Given a scatterplot relating student heights to shoe sizes, predict the shoe size of a 5'4" student, even if the data does not contain information for a student of that height.

- Assess the reasonableness of predictions using scatterplots

A set of data may show that the number of women in the U.S. Senate is growing at a certain rate each election cycle. Is it reasonable to use this trend to predict the year in which the Senate will eventually include 1,000 female Senators?

Social Studies Concepts & Scope (Elementary)

Unit	Guiding concepts/questions
Native American Study	Understand and analyze indigenous people groups of North America.
Government	<ul style="list-style-type: none"> Examine the different Indigenous people groups of North America and their forms of government.
Geography	<ul style="list-style-type: none"> Why and how Indigenous peoples came to live in the regions they lived in.
History	<ul style="list-style-type: none"> Examine key people and events from different perspectives and their effect on the development of indigenous people groups in North America.
Economics	<ul style="list-style-type: none"> What resources did indigenous people groups barter/trade in the past and now?
South/Central America Study	Understand and analyze peoples, cultures, and governments of South/Central America.
Government	<ul style="list-style-type: none"> Examine the different Indigenous people groups of South and Central America and their forms of government.
Geography	<ul style="list-style-type: none"> What geographical features make up the South and Central American landscapes?
History	<ul style="list-style-type: none"> Examine key people and events from different perspectives and their effect on the development of South and Central American cultures.
Economics	<ul style="list-style-type: none"> What resources did indigenous people groups barter/trade in the past and now?
Colorado History	Understand and analyze how Colorado became a state and its unique features.
Government	<ul style="list-style-type: none"> What is the structure of the state government and how does it work?
Geography	<ul style="list-style-type: none"> What geographical features make up Colorado's landscape? How does the landscape explain why people settled where they did in the past and today?

History	<ul style="list-style-type: none"> ● What decisions shaped Colorado into a state? ● Examine key people and events from different perspectives and their effect on the development of Colorado's culture. ● Compare and contrast the choices/risks earlier settlers made.
Economics	<ul style="list-style-type: none"> ● Opportunity costs ● Positive and negative incentives ● Goods and services
Africa Study	Understand and analyze people, cultures, and governments of Africa.
Government	<ul style="list-style-type: none"> ● Examine the different Indigenous people groups of Africa and their forms of government.
Geography	<ul style="list-style-type: none"> ● What geographical features make up the African landscape and how did these landscapes help shape civilization?
History	<ul style="list-style-type: none"> ● Examine key people and events from different perspectives and their effect on the development of African cultures.
Economics	<ul style="list-style-type: none"> ● What resources did African countries barter/trade in the past and now?

Social Studies Concepts & Scope (Middle School)

Unit	Guiding concepts/questions
USA: 1491–The Constitution	Analyze and understand how the United States became a country.
Government	<ul style="list-style-type: none"> Analyze and understand ideas and documents that shaped our government.
Geography	<ul style="list-style-type: none"> Why did people settle in the locations they did as our country was developing? What geographical features make up the United States landscape during this time period?
History	<ul style="list-style-type: none"> What key factors lead to the Revolutionary War? Examine key people and events from different perspectives and their effect on the development of the United States.
Economics	<ul style="list-style-type: none"> What economic system was the United States founded on? Examine other forms of economic systems during the same time period around the world.
Civil War – Industrial Revolution	Understand and analyze the events of the Civil War and the Industrial Revolution.
Government	<ul style="list-style-type: none"> Analyze laws from different perspectives to learn their effect on the people living in the United States during the Civil War – the Industrial Revolution
Geography	<ul style="list-style-type: none"> How did a region's climate, geography, and resources have an impact on the Civil war – the Industrial Revolution? Explain the establishment of human settlements in relationship to physical attributes and important regional connections. Calculate and analyze population trends. Analyze how economic, political, cultural, and social processes interact to shape patterns of human population, interdependence, cooperation and conflict. Compare how differing geographic perspectives apply to a historic issue.

	<ul style="list-style-type: none"> ● Interpret from a geographic perspective the expansion of the United States by addressing issues of land, security, access, and sovereignty.
History	<ul style="list-style-type: none"> ● What impact if any did the American Revolution have on the Civil War? ● Examine key people and events from different perspectives and their effect on the United States during the Civil War – the Industrial Revolution.
Economics	<ul style="list-style-type: none"> ● What economic system was the United States founded on? ● Examine economic factors of the Civil War and the Industrial Revolution from different perspectives.
US Government	Understand types of governments and how the United States government developed and functioned over time.
Geography	<ul style="list-style-type: none"> ● Different States/regions have different issues and perspectives over space and resources. How does this affect government both at the state and national level? ● What geographical features make up the United States landscape? ● What are the different regions
Economics	<ul style="list-style-type: none"> ● What resources are produced and traded in each region of the United States? ● What type of economic system does the United States have currently? ● Identify and analyze different types of economic systems. ● Free trade ● Economic Freedom ● How does Government affect the economy?
History	<ul style="list-style-type: none"> ● How has the United States government changed over time?
Eastern Hemisphere	Explore cultures, economics, history, and governments of eastern countries.
Government	<ul style="list-style-type: none"> ● Examine the different people groups of the Eastern hemisphere and their forms of government. ● Compare/Contrast

Geography	<ul style="list-style-type: none"> • What geographical features make up the Eastern Hemisphere?
History	<ul style="list-style-type: none"> • Examine key people and events from different perspectives and their effect on the development of cultures in the Eastern hemisphere.
Economics	<ul style="list-style-type: none"> • What resources did/do countries in the Eastern hemisphere barter/trade in the past and now?
Ancient Civilizations	Understand and analyze how ancient civilizations developed and grew over time.
Government	<ul style="list-style-type: none"> • Examine the governments of different people groups of ancient civilizations around the world.
History	<ul style="list-style-type: none"> • How did various peoples and civilizations develop over time? • What were the causes and effects of change?
Geography	<ul style="list-style-type: none"> • What geographical features made up the ancient civilizations?
Economics	<ul style="list-style-type: none"> • What resources were produced and traded in each ancient civilization? • What type of economic systems did the ancient civilizations have? • Identify and analyze different types of economic systems. • How does Government affect the economy?
Civil Rights	Understand the events of a minority group as they establish their civil rights.
Government	<ul style="list-style-type: none"> • Analyze the changing definition of citizenship and give examples of the expansion of rights. • Describe examples of citizens and groups who have influenced change in United States government and politics. For example: Women, American Indians, African Americans, and people in the unsettled territories.
Geography	<ul style="list-style-type: none"> • Interpret maps and other geographic tools as a primary source to analyze a historic issue.

History	<ul style="list-style-type: none">● Describe instances in which major political, social, economic, or cultural changes occurred and the reasons for the changes.● Describe examples of citizens and groups who have influenced change in United States government and politics. For example: Women, American Indians, African Americans, and people in the unsettled territories.● How have various people from different eras in our nation's history promoted change in the face of opposition and what democratic principles were advanced?
Economics	<ul style="list-style-type: none">● Analyze the changes in the development of human capital for minority groups over time. For example: gaining knowledge and skill through education, apprenticeship, and work experience.

Science Scope & Sequence

1st Grade

Based on Colorado State Standards from the CDE

Physical Science	Life Science	Earth Science
GUIDING QUESTIONS		
<p>What are the characteristic properties and behaviors of waves?</p>	<p>How do the structures of organisms enable life's functions?</p> <p>How are the characteristics of one generation related to the previous generation?</p> <p>Why do individuals of the same species vary in how they look, function, and behave?</p>	<p>What is the universe, and what goes on in stars?</p> <p>What are the predictable patterns caused by Earth's movement in the solar system?</p>
MAIN CONCEPTS		
<ul style="list-style-type: none"> • Sound can make matter vibrate and vibrating matter can make sound. 	<ul style="list-style-type: none"> • All organisms have external parts that they use to perform daily functions. • Young organisms are very much, but not exactly, like their parents, and also resemble other organisms of the same kind 	<ul style="list-style-type: none"> • Patterns of movement of the sun, moon and stars as seen from Earth can be observed, described and predicted.

Science Scope & Sequence

2nd Grade

Based on Colorado State Standards from the CDE

Physical Science	Life Science	Earth Science
GUIDING QUESTIONS		
How do particles combine to form the variety of matter one observes?	How do organisms interact with the living and nonliving environments to obtain matter and energy? What evidence shows that different species are related?	How do people reconstruct and date events in the Earth's planetary history? How and why is Earth constantly changing?
MAIN CONCEPTS		
<ul style="list-style-type: none"> Matter exists as different substances that have observable different properties. 	<ul style="list-style-type: none"> Plants depend on water and light to grow and on animals for pollination or to move their seeds around. A range of different organisms lives in different places. 	<ul style="list-style-type: none"> Some events on Earth occur quickly; others can occur very slowly. Wind and water can change the shape of the land; models can show the shape and these changes to the land.

Science Scope & Sequence

3rd Grade

Based on Colorado State Standards from the CDE

Physical Science	Life Science	Earth Science
GUIDING QUESTIONS		
<p>How can one predict an object's continued motion, changes in motion or stability?</p> <p>What underlying forces explain the variety of interactions observed?</p> <p>Why are some physical systems more stable than others?</p>	<p>How do the structures of organisms enable life's functions?</p> <p>How do organisms interact with the living and nonliving environments to obtain matter and energy?</p> <p>How are the characteristics of one generation related to the previous generation?</p> <p>Why do individuals of the same species vary in how they look, function and behave?</p> <p>What evidence shows that different species are related?</p> <p>How does genetic variation among organisms affect survival and reproduction?</p> <p>How does the environment influence populations of organisms over multiple generations?</p> <p>What is biodiversity, how do humans affect it, and how does it affect humans?</p>	<p>What regulates weather and climate?</p> <p>How do natural hazards affect individuals and societies?</p>

MAIN CONCEPTS

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| <ul style="list-style-type: none">• Patterns of motion can be used to predict future motion.• Objects in contact exert forces on each other; electric and magnetic forces between a pair of objects do not require contact. | <ul style="list-style-type: none">• Organisms have unique and diverse life cycles.• Being part of a group helps animals obtain food, defend themselves and cope with changes.• Different organisms vary in how they look and function because they have different inherited information; the environment also affects the traits that an organism develops.• Some living organisms resemble organisms that once lived on Earth• Sometimes differences in characteristics between individuals of the same species provide advantages in survival and reproduction. | <ul style="list-style-type: none">• Climate describes patterns of typical weather conditions over different scales and variations; historical weather patterns can be analyzed.• A variety of weather hazards result from natural process; humans cannot eliminate weather-related hazards but can reduce their impacts. |
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Science Scope & Sequence

4th Grade

Based on Colorado State Standards from the CDE

Physical Science	Life Science	Earth Science
GUIDING QUESTIONS		
<p>What is energy?</p> <p>What is meant by conservation of energy?</p> <p>How is energy transferred between objects or systems?</p> <p>How are forces related to energy?</p> <p>How do food and fuel provide energy?</p> <p>What are the characteristic properties and behaviors of waves?</p> <p>What is light? How can one explain the varied effects that involve light?</p> <p>What other forms of electromagnetic radiation are there?</p> <p>How are instruments that transmit and detect waves used to extend human senses?</p>	<p>How do internal and external structures support the survival, growth, behavior and reproduction of plants and animals?</p>	<p>How can water, ice, wind and vegetation change the land?</p> <p>What patterns of Earth's features can be determined with the use of maps?</p> <p>How do living organisms alter Earth's processes and structures?</p> <p>Why do the continents move, and what causes earthquakes and volcanoes?</p> <p>How do humans depend on Earth's resources?</p> <p>How do natural hazards affect individuals and societies?</p>

MAIN CONCEPTS

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| <ul style="list-style-type: none">• The faster an object moves the more energy it has.• Energy can be moved from place to place• When objects collide, contact forces transfer so as to change objects' motion.• Energy can be produced, used or released by converting stored energy.• Waves are regular patterns of motion.• An object can be seen when light reflected from its surface enters the eyes.• Patterns can encode, send, receive and decode information. | <ul style="list-style-type: none">• Organisms have both internal and external structures that serve various functions. | <ul style="list-style-type: none">• Earth has changed over time.• Four major earth systems interact.• Earth's physical features occur in patterns.• Energy and fuels that humans use are derived from natural sources and their use affects the environment in multiple ways.• A variety of hazards result from natural process; humans cannot eliminate natural hazards but can reduce their impacts' effect |
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Science Scope & Sequence

5th Grade

Based on Colorado State Standards from the CDE

Physical Science	Life Science	Earth Science
GUIDING QUESTIONS		
<p>How do particles combine to form the variety of matter one observes?</p> <p>How do substances combine or change (react) to make new substances?</p> <p>How does one characterize and explain these reactions and make predictions about them?</p> <p>What underlying forces explain the variety of interactions observed?</p> <p>How do food and fuel provide energy?</p> <p>If energy is conserved, why do people say it is produced or used?</p>	<p>How do organisms obtain and use the matter and energy they need to live and grow?</p> <p>How do organisms interact with the living and nonliving environments to obtain matter and energy?</p> <p>How do matter and energy move through an ecosystem?</p>	<p>What is the universe, and what goes on in stars?</p> <p>What are the predictable patterns caused by Earth's movement in the solar system?</p> <p>How do Earth's major systems interact?</p> <p>How do the properties and movements of water shape the Earth's surface and affect its systems?</p> <p>How do humans change the planet?</p>
MAIN CONCEPTS		
<ul style="list-style-type: none"> • Matter exists as particles that are too small to be seen; measurements of a variety of observable properties can be used to identify particular materials. 	<ul style="list-style-type: none"> • Plants acquire their material from growth chiefly from air and water. 	<ul style="list-style-type: none"> • Stars range greatly in size and distance from Earth, and this can explain their relative brightness.

MAIN CONCEPTS (CONTINUED)

- Chemical Reactions that occur when substances are mixed can be identified by the emergence of substances with different properties; the total mass remains the same.
- The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center.
- The energy released from food was once energy from the sun.

- Matter cycles between air and soil and among plants, animals and microbes as these organisms live and die.

- Earth's orbit and rotation and the orbit of the moon around earth cause observable patterns.
- Earth's major systems interact in multiple ways to affect Earth's surface materials and processes.
- Earth's major systems interact in multiple ways to affect Earth's surface materials and processes.
- Most of Earth's water is in the ocean and much of Earth's freshwater in glaciers or underground.
- Societal activities have had major effects on land, ocean, atmosphere and even outer space

Middle School Science Scope & Sequence

Based on Colorado State Standards from the CDE

Physical Science	Life Science	Earth Science
GUIDING QUESTIONS		
<p>How do particles combine to form the variety of matter one observes?</p> <p>How do substances combine or change (react) to make new substances?</p> <p>How does one characterize and explain these reactions and make predictions about them?</p> <p>How can one predict an object's continued motion, changes in motion or stability?</p> <p>What underlying forces explain the variety of interactions observed?</p> <p>What is energy?</p> <p>What is meant by conservation of energy?</p> <p>How is energy transferred between objects or systems?</p> <p>How are forces related to energy?</p>	<p>How do the structures of organisms enable life's functions?</p> <p>How do organisms grow and develop?</p> <p>How do organisms detect, process, and use information about the environment?</p> <p>How do organisms interact with the living and nonliving environments to obtain matter and energy?</p> <p>How do matter and energy move through an ecosystem?</p> <p>What happens to ecosystems when the environment changes?</p> <p>How are the characteristics of one generation related to the previous generation?</p> <p>Why do individuals of the same species vary in how they look, function, and behave?</p> <p>What evidence shows that different species are related?</p>	<p>What is the universe, and what goes on in stars?</p> <p>What are the predictable patterns caused by Earth's movement in the solar system?</p> <p>How do people reconstruct and date events in Earth's planetary history?</p> <p>How do Earth's major systems interact?</p> <p>Why do the continents move, and what causes earthquakes and volcanoes?</p> <p>How do the properties and movements of water shape Earth's surface and affect its systems?</p> <p>What regulates weather and climate?</p> <p>How do humans depend on Earth's resources?</p>

GUIDING QUESTIONS (CONTINUED)

What are the characteristic properties and behaviors of waves?
How can one explain the varied effects that involve light?
How are instruments that transmit and detect waves used to extend human senses?

How does genetic variation among organisms affect survival and reproduction?
How does the environment influence populations of organisms over multiple generations?

How do natural hazards affect individuals and societies?
How do humans change the planet?
How do people model and predict the effects of human activities on Earth's climate?

MAIN CONCEPTS

- The fact that matter is composed of atoms and molecules can be used to explain the properties of substances, diversity of materials, states of matter and phases changes.
- Reacting substances rearrange to form different molecules, but the number of atoms is conserved. Some reactions release energy and others absorb energy.

- All living things are made up of cells, which is the smallest unit that can be said to be alive.
- Organisms reproduce, either sexually or asexually, and transfer their genetic information to their offspring.
- Sustaining life requires substantial energy and matter inputs.
- Each sense receptor responds to different inputs (electromagnetic, mechanical, chemical), transmitting them as signals that travel along nerve cells to the brain.
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- Motion is predictable in both solar systems and galaxies.
- The solar system contains many varied objects held together by gravity. Solar system models explain and predict eclipses, lunar phases, and seasons.
- Rock strata and the fossil record can be used as evidence to organize the relative occurrence of major historical events in Earth's history.

MAIN CONCEPTS (CONTINUED)

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| <ul style="list-style-type: none">• Motion is described relative to a reference frame that must be shared with others and is determined by the sum of the forces acting on it. The greater the mass of the object, the greater the force needed to achieve the same change in motion.• Forces that act at a distance (gravitational, electric, and magnetic) can be explained by force fields that extend through space and can be mapped by their effect on a test object.• Kinetic energy can be distinguished from the various forms of potential energy• Energy changes to and from each type can be tracked through physical or chemical interactions. The relationship between the temperature and the total energy of a system depends on the types, states and amounts of matter. | <ul style="list-style-type: none">• Organisms and populations of organisms are dependent on their environmental interactions both with other living things and with nonliving• Ecosystems are sustained by the continuous flow of energy, originating primarily from the sun, and the recycling of matter and nutrients within the system.• Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or biological component of an ecosystem• Heredity explains why offspring resemble, but are not identical to, their parents and is a unifying biological principle. Heredity refers to specific mechanisms by which characteristics or traits are passed from one generation to the next via genes. | <ul style="list-style-type: none">• Energy flows and matter cycles within and among Earth's systems, including the sun and Earth's interior as primary energy sources. Plate tectonics is one result of these processes.• Plate tectonics is the unifying theory that explains movements of rocks at Earth's surface and geological history.• Water cycles among land, ocean, and atmosphere, and is propelled by sunlight and gravity. Density variations of sea water drive interconnected ocean currents. Water movement causes weathering and erosion, changing landscape features• Humans depend on Earth's land, ocean, atmosphere, and biosphere for different resources, many of which are limited or not renewable. Resources are distributed unevenly around the planet as a result of past geologic processes |
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MAIN CONCEPTS (CONTINUED)

- When two objects interact, each one exerts a force on the other that can cause energy to be transferred to and from the object.
- A simple wave model has a repeating pattern with specific wavelength, frequency, and amplitude and mechanical waves need a medium through which they are transmitted. This model can explain many phenomena which include light and sound.
- A wave model of light is useful to explain how light interacts with objects through a variety of properties
- Designed technologies can transmit digital information as wave pulses.

- Fossils are mineral replacements, preserved remains, or traces of organisms that lived in the past.
- Genetic variations among individuals in a population give some individuals an advantage in surviving and reproducing in their environment.
- Adaptation by natural selection acting over generations is one important process by which species change over time in response to changes in environmental conditions.
- Biodiversity is the wide range of existing life forms that have adapted to the variety of conditions on Earth, from terrestrial to marine ecosystems.

- Mapping the history of natural hazards in a region and understanding related geological forces.
- Human activities have altered the biosphere, sometimes damaging it, although changes to environments can have different impacts for different living things.
- Human activities affect global warming. Decisions to reduce the impact of global warming depend on understanding climate science, engineering capabilities, and social dynamics.