Littlebits

Next Generation Science Standards

PE number	Performance Expectation	Disciplinary Core Ideas	Topic	Identified Science and Engineering Practice	Identified Cross Cutting Concept	Correlated ELA Standards	Correlated Math Standards
3-5-ETS1-1	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.	3-5-ETS1-1 Engineering Design	ALL	Asking questions and defining problems		W.5.7 W.5.8 W.5.9	MP.2 MP.4 MP.5 3-5.OA
3-5-ETS1-2	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.	3-5-ETS1-2 Engineering Design	ALL	Constructing explanations and designing solutions		RI.5.1 RI.5.9	MP.2 MP.4 MP.5 3-5.OA
3-5-ETS1-3	Plan and carry out fair tests in which variable are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.	3-5-ETS1-3 Engineering Design	ALL	Planning and carrying out investigations		W.5.7 W.5.8 W.5.9	MP.2 MP.4 MP.5
3-PS2-2	Make observations and/or measurements of an object's motion to provide evidence that pattern can be used to predict future motion.	3-PS2 Motion and Stability: Forces and Interactions	Forces and Interactions	Planning and carrying out investigations	Patterns	W.3.7 W.3.8	
3-PS2-4	Define a simple design problem that can be solved by applying scientific ideas about magnets.*	3-PS2 Motion and Stability: Forces and Interactions	Forces and Interactions	Asking questions and defining problems	Interdependence of Science, Engineering, and Technology		
4-PS3-1	Use evidence to construct an explanation relating the speed of an object to the energy of that object.	4-PS3 Energy	Energy	Constructing explanations and designing solutions	Energy and matter	RI.4.1 RI.4.3 RI.4.9 W.4.2 W.4.8 W.4.9	
4-PS3-2	Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.	4-PS3 Energy	Energy	Planning and carrying out investigations	Energy and matter	W.4.7 W.4.8	
4-PS3-3	Ask questions and predict outcomes about the changes in energy that occur when objects collide.	4-PS3 Energy	Energy	Asking questions and defining problems	Energy and matter	W.4.7 W.4.8	
5-PS2-1	Support an argument that the gravitational force exerted by Earth on objects is directed down.	5-PS2 Motion and Stability: Forces and Interactions	Space systems: Stars and Solar System	Engaging in argument from science	Cause and effect	RI.5.1 RI.5.9 W.5.1	

Common Core ELA Standards

CC.3.R.L.5 Craft and Structure: Refer to parts of stories, dramas, and poems when writing or speaking about a text, using terms such as chapter, scene, and stanza; describe how each successive part builds on earlier sections.
CC.3.R.L.7 Integration of Knowledge and Ideas: Explain how specific aspects of a text's illustrations contribute to what is conveyed by the words in a story (e.g., create mood, emphasize aspects of a character or setting).
CC.3.W.3 Text Types and Purposes: Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.
CC.3.W.3.a Text Types and Purposes: Establish a situation and introduce a narrator and/or characters; organize an event sequence that unfolds naturally.
CC.4.W.3 Text Types and Purposes: Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.
CC.4.W.3.a Text Types and Purposes: Orient the reader by establishing a situation and introducing a narrator and/or characters; organize an event sequence that unfolds naturally.
CC.5.W.3 Text Types and Purposes: Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.
CC.5.W.3.a Text Types and Purposes: Orient the reader by establishing a situation and introducing a narrator and/or characters; organize an event sequence that unfolds naturally.

Tinkering Labs

Next Generation Science Standards

PE number	Performance Expectation	Disciplinary Core Ideas	Topic	Identified Science and Engineering Practice	Identified Cross Cutting Concept	Correlated ELA Standards	Correlated Math Standards
3-5-ETS1-1	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.	3-5-ETS1-1 Engineering Design	ALL	Asking questions and defining problems		W.5.7 W.5.8 W.5.9	MP.2 MP.4 MP.5 3-5.OA
3-5-ETS1-2	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.	3-5-ETS1-2 Engineering Design	ALL	Constructing explanations and designing solutions		RI.5.1 RI.5.9	MP.2 MP.4 MP.5 3-5.OA
3-5-ETS1-3	Plan and carry out fair tests in which variable are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.	3-5-ETS1-3 Engineering Design	ALL	Planning and carrying out investigations		W.5.7 W.5.8 W.5.9	MP.2 MP.4 MP.5
3-PS2-2	Make observations and/or measurements of an object's motion to provide evidence that pattern can be used to predict future motion.	3-PS2 Motion and Stability: Forces and Interactions	Forces and Interactions	Planning and carrying out investigations	Patterns	W.3.7 W.3.8	
3-PS2-1	Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.	3-PS2 Motion and Stability: Forces and Interactions	Forces and Interactions	Planning and carrying out investigations	Cause and effect	RI.3.1 W.3.7 W.3.8	MP.2 MP.5 2.MD.A.2
4-PS3-1	Use evidence to construct an explanation relating the speed of an object to the energy of that object.	4-PS3 Energy	Energy	Constructing explanations and designing solutions	Energy and matter	RI.4.1 RI.4.3 RI.4.9 W.4.2 W.4.8 W.4.9	
4-PS3-3	Ask questions and predict outcomes about the changes in energy that occur when objects collide.	4-PS3 Energy	Energy	Asking questions and defining problems	Energy and matter	W.4.7 W.4.8	
4-PS3-4	Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.*	4-PS3 Energy	Energy	Constructing explanations and designing solutions	Energy and matter	W.4.7 W.4.8	
4-PS4-3	Generate and compare multiple solutions that use patterns to transfer information.*	4-PS4 Waves and their Applications in Technologies for Information Transfer	Waves and Information	Constructing explanations and designing solutions	Patterns		RI.4.1 RI.4.9
5-PS2-1	Support an argument that the gravitational force exerted by Earth on objects is directed down.	5-PS2 Motion and Stability: Forces and Interactions	Space systems: Stars and Solar System	Engaging in argument from science	Cause and effect	RI.5.1 RI.5.9 W.5.1	

Ozobots

Next Generation Science Standards

PE number	Performance Expectation	Disciplinary Core Ideas	Topic	Identified Science and Engineering Practice	Identified Cross Cutting Concept	Correlated ELA Standards	Correlated Math Standards
3-5-ETS1-1	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.	3-5-ETS1-1 Engineering Design	ALL	Asking questions and defining problems		W.5.7 W.5.8 W.5.9	MP.2 MP.4 MP.5 3-5.OA
3-5-ETS1-2	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.	3-5-ETS1 Engineering Design	ALL	Constructing explanations and designing solutions	Influence of science, engineering, and technology	RI.5.1 RI.5.7 RI.5.9	MP.2 MP.4 MP.5 3-5.OA
3-5-ETS1-3	Plan and carry out fair tests in which variable are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.	3-5-ETS1 Engineering Design	ALL	Planning and carrying out investigations		W.5.7 W.5.8 W.5.9	MP.2 MP.4 MP.5

Common Core Math Standards

CC.2.G.2 Reason with shapes and their attributes. Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.
CC.3.NF.1 Develop understanding of fractions as numbers. Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a parts of size 1/b. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)
CC.3.NF.2 Develop understanding of fractions as numbers. Understand a fraction as a number on the number line; represent fractions on a number line diagram. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)
CC.3.NF.3 Develop understanding of fractions as numbers. Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)
CC.3.NF.3a Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)
CC.3.NF.3b Recognize and generate simple equivalent fractions (e.g., 1/2 = 2/4, 4/6 = 2/3), Explain why the fractions are equivalent, e.g., by using a visual fraction model. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)
CC.3.NF.3d Compare two fractions with the same numerator or the same denominator, by reasoning about their size, Recognize that valid comparisons rely on the two fractions referring to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)
CC.3.MD.8 Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures. Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different area or with the same area and different perimeter.
CC.3.G.2 Reason with shapes and their attributes. Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part is 1/4 of the area of the shape.
CC.4.OA.1 Use the four operations with whole numbers to solve problems. Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 x 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.
CC.4.OA.3 Use the four operations with whole numbers to solve problems. Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
CC.4.G.1 Draw and identify lines and angles, and classify shapes by properties of their lines and angles. Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.
CC.5.NF.1 Use equivalent fractions as a strategy to add and subtract fractions. Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)
CC.5.NF.7c Solve real-world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. For example, how much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?
CC.K-12.MP.1 Make sense of problems and persevere in solving them. Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, “Does this make sense?” They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.
CC.K-12.MP.2 Reason abstractly and quantitatively. Mathematically proficient students make sense of the quantities and their relationships in problem situations. Students bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.
CC.K-12.MP.4 Model with mathematics. Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.
CC.K-12.MP.5 Use appropriate tools strategically. Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.
CC.K-12.MP.6 Attend to precision. Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions.

Lego Wall

Next Generation Science Standards

Common Core Math Standards

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CC.K-12.MP.4 Model with mathematics. Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.
CC.K-12.MP.5 Use appropriate tools strategically. Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.
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CC.1.OA.1 Represent and solve problems involving addition and subtraction. Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.
CC.1.OA.2 Represent and solve problems involving addition and subtraction. Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.
CC.1.OA.3 Understand and apply properties of operations and the relationship between addition and subtraction. Apply properties of operations as strategies to add and subtract. Examples: If 8 + 3 = 11 is known, then 3 + 8 = 11 is also known. (Commutative property of addition.) To add 2 + 6 + 4, the second two numbers can be added to make a ten, so 2 + 6 + 4 = 2 + 10 = 12. (Associative property of addition.) (Students need not use formal terms for these properties.)
CC.1.OA.5 Add and subtract within 20. Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).
CC.1.OA.6 Add and subtract within 20. Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten (e.g., 8 + 6 = 8 + 2 + 4 = 10 + 4 = 14); decomposing a number leading to a ten (e.g., 13 – 4 = 13 – 3 – 1 = 10 – 1 = 9); using the relationship between addition and subtraction (e.g., knowing that 8 + 4 = 12, one knows 12 – 8 = 4); and creating equivalent but easier or known sums (e.g., adding 6 + 7 by creating the known equivalent 6 + 6 + 1 = 12 + 1 = 13).
CC.1.OA.7 Work with addition and subtraction equations. Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. For example, which of the following equations are true and which are false? 6 = 6, 7 = 8 – 1, 5 + 2 = 2 + 5, 4 + 1 = 5 + 2.
CC.1.OA.8 Work with addition and subtraction equations. Determine the unknown whole number in an addition or subtraction equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations 8 + ? = 11, 5 = __ – 3, 6 + 6 = __.
CC.1.NBT.1 Extend the counting sequence. Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.

PE number	Performance Expectation	Disciplinary Core Ideas	Topic	Identified Science and Engineering Practice	Identified Cross Cutting Concept	Correlated ELA Standards	Correlated Math Standards
K-PS2-2	Analyze data to determine if a design solution work as intended to change the speed or direction of an object with a push or a pull.*	K-PS2 Motion and Stability	Pushes and Pulls	Analyzing and interrupting data	Cause and Effect	RI.K.1 SL.K.3	
K-PS3-2	Use tools and materials to design and build a structure that will reduce the warming effects of sunlight on an area.*	K-PS3 Energy	Weather and Climate	Constructing Explanations and Designing Solutions	Cause and Effect		K.MD.A.2
3-PS2-2	Make observations and/or measurements of an object's motion to provide evidence that pattern can be used to predict future motion.	3-PS2 Motion and Stability: Forces and Interactions	Forces and Interactions	Planning and carrying out investigations	Patterns	W.3.7 W.3.8	
3-PS2-4	Define a simple design problem that can be solved by applying scientific ideas about magnets.*	3-PS2 Motion and Stability: Forces and Interactions	Forces and Interactions	Asking questions and defining problems	Interdependence of Science, Engineering, and Technology		
3-PS2-1	Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.	3-PS2 Motion and Stability: Forces and Interactions	Forces and Interactions	Planning and carrying out investigations	Cause and effect	RI.3.1 W.3.7 W.3.8	MP.2 MP.5 2.MD.A.2
3-PS2-3	Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.	3-PS2 Motion and Stability: Forces and Interactions	Forces and Interactions	Asking questions and defining problems	Cause and effect	RI.3.1 RI.3.3 RI.3.8 SL.3.3	
4-PS3-1	Use evidence to construct an explanation relating the speed of an object to the energy of that object.	4-PS3 Energy	Energy	Constructing explanations and designing solutions	Energy and matter	RI.4.1 RI.4.3 RI.4.9 W.4.2 W.4.8 W.4.9	
4-PS3-3	Ask questions and predict outcomes about the changes in energy that occur when objects collide.	4-PS3 Energy	Energy	Asking questions and defining problems	Energy and matter	W.4.7 W.4.8	
4-PS3-4	Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.*	4-PS3 Energy	Energy	Constructing explanations and designing solutions	Energy and matter	W.4.7 W.4.8	4.OA.A.3
4-PS3-2	Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.	4-PS3 Energy	Energy	Planning and carrying out investigations	Energy and matter	W.4.7 W.4.8	
5-PS2-1	Support an argument that the gravitational force exerted by Earth on objects is directed down.	5-PS2 Motion and Stability: Forces and Interactions	Space systems: Stars and Solar System	Engaging in argument from science	Cause and effect	RI.5.1 RI.5.9 W.5.1	

Sphero

Next Generation Science Standards

PE number	Performance Expectation	Disciplinary Core Ides	Topic	Identified Science and Engineering Practice	Identified Cross Cutting Concept	Correlated ELA Standards	Correlated Math Standards
K-PS2-2	Analyze data to determine if a design solution work as intended to change the speed or direction of an object with a push or a pull.*	K-PS2 Motion and Stability	Pushes and Pulls	Analyzing and interrupting data	Cause and Effect	RI.K.1 SL.K.3	
K-PS2-1	Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object	K-PS2 Motion and Stability	Pushes and Pulls	Planning and carrying out investigations	Cause and Effect	W.K.7	MP.2 K.MD.A.1 K.MD.A.2
3-PS2-2	Make observations and/or measurements of an object's motion to provide evidence that pattern can be used to predict future motion.	3-PS2 Motion and Stability: Forces and Interactions	Forces and Interactions	Planning and carrying out investigations	Patterns	W.3.7 W.3.8	
3-PS2-1	Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.	3-PS2 Motion and Stability: Forces and Interactions	Forces and Interactions	Planning and carrying out investigations	Cause and effect	RI.3.1 W.3.7 W.3.8	MP.2 MP.5 2.MD.A.2
3-5-ETS1-1	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.	3-5-ETS1-1 Engineering Design	ALL	Asking questions and defining problems		W.5.7 W.5.8 W.5.9	MP.2 MP.4 MP.5 3-5.OA
3-5-ETS1-2	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.	3-5-ETS1-2 Engineering Design	ALL	Constructing explanations and designing solutions		RI.5.1 RI.5.9	MP.2 MP.4 MP.5 3-5.OA
3-5-ETS1-3	Plan and carry out fair tests in which variable are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.	3-5-ETS1-3 Engineering Design	ALL	Planning and carrying out investigations		W.5.7 W.5.8 W.5.9	MP.2 MP.4 MP.5

Common Core Math Standards

CC.4.OA.1 Use the four operations with whole numbers to solve problems. Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 x 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.
CC.4.OA.3 Use the four operations with whole numbers to solve problems. Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
CC.4.G.1 Draw and identify lines and angles, and classify shapes by properties of their lines and angles. Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.
CC.4.OA.2 Use the four operations with whole numbers to solve problems. Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.
CC.4.G.2 Draw and identify lines and angles, and classify shapes by properties of their lines and angles. Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.
CC.4.G.3 Draw and identify lines and angles, and classify shapes by properties of their lines and angles. Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.

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Next Generation Science Standards

PE number	Performance Expectation	Disciplinary Core Ideas	Topic	Indentified Science and Engineering Practice	Identified Cross Cutting Concept	Correlated ELA Standards	Correlated Math Standards
3-PS2-3	Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.	3-PS2 Motion and Stability: Forces and Interactions	Forces and Interactions	Asking questions and defining problems	Cause and effect	RI.3.1 RI.3.3 RI.3.8 SL.3.3	
4-PS3-1	Use evidence to construct an explanation relating the speed of an object to the energy of that object.	4-PS3 Energy	Energy	Constructing explanations and designing solutions	Energy and matter	RI.4.1 RI.4.3 RI.4.9 W.4.2 W.4.8 W.4.9	
4-PS3-4	Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.*	4-PS3 Energy	Energy	Constructing explanations and designing solutions	Energy and matter	W.4.7 W.4.8	4.OA.A.3
4-PS3-2	Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.	4-PS3 Energy	Energy	Planning and carrying out investigations	Energy and matter	W.4.7 W.4.8	

Common Core Math Standards

CC.4.OA.1 Use the four operations with whole numbers to solve problems. Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 x 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.
CC.4.OA.3 Use the four operations with whole numbers to solve problems. Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
CC.4.G.1 Draw and identify lines and angles, and classify shapes by properties of their lines and angles. Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.
CC.4.OA.2 Use the four operations with whole numbers to solve problems. Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.
CC.4.G.2 Draw and identify lines and angles, and classify shapes by properties of their lines and angles. Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.
CC.4.G.3 Draw and identify lines and angles, and classify shapes by properties of their lines and angles. Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.

Common Core ELA Standards

CC.2.R.L.4 Craft and Structure: Describe how words and phrases (e.g., regular beats, alliteration, rhymes, repeated lines) supply rhythm and meaning in a story, poem, or song.
CC.4.W.2 Text Types and Purposes: Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
CC.4.W.8 Research to Build and Present Knowledge: Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.

Makey Makey

Next Generation Science Standards

PE number	Performance Expectation	Disciplinary Core Ideas	Topic	Identified Science and Engineering Practice	Identified Cross Cutting Concept	Correlated ELA Standards	Correlated Math Standards
K-2-ETS1-1	Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.	K-2-ETS1 Engineering Design	ALL	Asking Questions and defining problems		RI.2.1 W.2.6 W.2.8	2.MD.D.10
K-2-ETS1-2	Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.	K-2-ETS1 Engineering Design	ALL	Developing and using models	Structure and Function	SL.2.5	
K-2-ETS1-3	Analyze data from test of two objects design to solve the same problem to compare the strengths and weaknesses of how each performs.	K-2-ETS1 Engineering Design	ALL	Analyzing and interrupting data		W.2.6 W.2.8	2.MD.D.10
K-LS1-1	Use observations to describe patterns of what plants and animals (including humans) need to survive.	K-LS1 From Molecules to Organisms: Structures and Processes	Interdependent Realtionships: Animals, Plants, and their Environment	Analyzing and interrupting data	Patterns	W.K.7	K.MD.A.2
1-LS1-1	Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.*	1-LS1 From Molecules to Organisms: Structures and Processes	Structure, Function, and Information Processing	Constructing Explanations and Designing Solutions	Structure and Function	W.1.7	
2-PS1-1	Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.	2-PS1 Matter and its Interactions	Structure and Properties of Matter	Constructing explanations and designing solutions	Energy and Matter	W.2.7 W.2.8 RI.2.8 W.2.1	
3-5-ETS1-1	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.	3-5-ETS1-1 Engineering Design	ALL	Asking questions and defining problems		W.5.7 W.5.8 W.5.9	MP.2 MP.4 MP.5 3-5.OA
3-5-ETS1-2	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.	3-5-ETS1-2 Engineering Design	ALL	Constructing explanations and designing solutions		RI.5.1 RI.5.9	MP.2 MP.4 MP.5 3-5.OA
3-5-ETS1-3	Plan and carry out fair tests in which variable are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.	3-5-ETS1-3 Engineering Design	ALL	Planning and carrying out investigations		W.5.7 W.5.8 W.5.9	MP.2 MP.4 MP.5

Magnatiles

Common Core Math Standards

CC.4.G.2 Draw and identify lines and angles, and classify shapes by properties of their lines and angles. Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.
CC.4.G.3 Draw and identify lines and angles, and classify shapes by properties of their lines and angles. Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.
CC.2.G.2 Reason with shapes and their attributes. Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.
CC.1.G.1 Reason with shapes and their attributes. Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); for a wide variety of shapes; build and draw shapes to possess defining attributes.
CC.1.G.2 Reason with shapes and their attributes. Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape. (Students do not need to learn formal names such as “right rectangular prism.”)
CC.1.G.3 Reason with shapes and their attributes. Partition circles and rectangles into two and four equal shares, describe the shares using the words halves, fourths, and quarters, and use the phrases half of, fourth of, and quarter of. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.
CC.2.G.3 Reason with shapes and their attributes. Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words halves, thirds, half of, a third of, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.
CC.3.G.2 Reason with shapes and their attributes. Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part is 1/4 of the area of the shape.
CC.K.G.1 Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres). Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as above, below, beside, in front of, behind, and next to.
CC.K.G.2 Identify and describe shapes (such as squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres). Correctly name shapes regardless of their orientations or overall size.
CC.K.G.3 Identify and describe shapes (such as squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres). Identify shapes as two-dimensional (lying in a plane, “flat”) or three-dimensional (“solid”).
CC.K.G.4 Analyze, compare, create, and compose shapes. Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g., number of sides and vertices/“corners”) and other attributes (e.g., having sides of equal length).
CC.K.G.5 Analyze, compare, create, and compose shapes. Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.
CC.K.G.6 Analyze, compare, create, and compose shapes. Compose simple shapes to form larger shapes. For example, "can you join these two triangles with full sides touching to make a rectangle?”
CC.2.G.1 Reason with shapes and their attributes. Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes. (Sizes are compared directly or visually, not compared by measuring.)
CC.3.G.1 Reason with shapes and their attributes. Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.
CC.5.G.3 Classify two-dimensional figures into categories based on their properties. Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.
CC.5.G.4 Classify two-dimensional figures into categories based on their properties. Classify two-dimensional figures in a hierarchy based on properties.

Duct Tape Creation Station

Common Core Math Standards

CC.3.MD.2 Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects. Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). (Excludes compound units such as cm^3 and finding the geometric volume of a container.) Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. (Excludes multiplicative comparison problems (problems involving notions of “times as much.”)
CC.3.MD.5 Geometric measurement: understand concepts of area and relate area to multiplication and to addition. Recognize area as an attribute of plane figures and understand concepts of area measurement. -- a. A square with side length 1 unit, called “a unit square,” is said to have “one square unit” of area, and can be used to measure area. -- b. A plane figure which can be covered without gaps or overlaps by n unit squares is said to have an area of n square units.
CC.3.MD.6 Geometric measurement: understand concepts of area and relate area to multiplication and to addition. Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).
CC.3.MD.7 Geometric measurement: understand concepts of area and relate area to multiplication and to addition. Relate area to the operations of multiplication and addition.
CC.5.MD.3 Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition. Recognize volume as an attribute of solid figures and understand concepts of volume measurement. -- a. A cube with side length 1 unit, called a “unit cube,” is said to have “one cubic unit” of volume, and can be used to measure volume. -- b. A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.
CC.5.MD.4 Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition. Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.
CC.5.MD.5 Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition. Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.
CC.5.MD.5a Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent three-fold whole-number products as volumes, e.g., to represent the associative property of multiplication.
CC.5.MD.5b Apply the formulas V =(l)(w)(h) and V = (b)(h) for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems.
CC.5.MD.5c Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.

Green Screen Video Creation

Common Core ELA Standards

CC.1.SL.4 Presentation of Knowledge and Ideas: Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.
CC.1.SL.5 Presentation of Knowledge and Ideas: Add drawings or other visual displays to descriptions when appropriate to clarify ideas, thoughts, and feelings.
CC.2.SL.4 Presentation of Knowledge and Ideas: Tell a story or recount an experience with appropriate facts and relevant, descriptive details, speaking audibly in coherent sentences.
CC.2.SL.5 Presentation of Knowledge and Ideas: Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings.
CC.3.SL.4 Presentation of Knowledge and Ideas: Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.
CC.3.SL.5 Presentation of Knowledge and Ideas: Create engaging audio recordings of stories or poems that demonstrate fluid reading at an understandable pace; add visual displays when appropriate to emphasize or enhance certain facts or details.
CC.4.SL.4 Presentation of Knowledge and Ideas: Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.
CC.4.SL.5 Presentation of Knowledge and Ideas: Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes.
CC.5.SL.5 Presentation of Knowledge and Ideas: Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.
CC.5.SL.4 Presentation of Knowledge and Ideas: Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.
CC.K.SL.5 Presentation of Knowledge and Ideas: Add drawings or other visual displays to descriptions as desired to provide additional detail.
CC.K.SL.6 Presentation of Knowledge and Ideas: Speak audibly and express thoughts, feelings, and ideas clearly.
CC.K-12.W.R.4 Production and Distribution of Writing: Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
CC.K-12.W.R.5 Production and Distribution of Writing: Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.
CC.K-12.W.R.6 Production and Distribution of Writing: Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.
CC.K-12.SL.4 Presentation of Knowledge and Ideas: Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.
CC.K-12.SL.5 Presentation of Knowledge and Ideas: Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.

Stop-Motion Animation

Common Core ELA Standards

CC.1.SL.4 Presentation of Knowledge and Ideas: Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.
CC.1.SL.5 Presentation of Knowledge and Ideas: Add drawings or other visual displays to descriptions when appropriate to clarify ideas, thoughts, and feelings.
CC.2.SL.4 Presentation of Knowledge and Ideas: Tell a story or recount an experience with appropriate facts and relevant, descriptive details, speaking audibly in coherent sentences.
CC.2.SL.5 Presentation of Knowledge and Ideas: Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings.
CC.3.SL.4 Presentation of Knowledge and Ideas: Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.
CC.3.SL.5 Presentation of Knowledge and Ideas: Create engaging audio recordings of stories or poems that demonstrate fluid reading at an understandable pace; add visual displays when appropriate to emphasize or enhance certain facts or details.
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CC.4.SL.5 Presentation of Knowledge and Ideas: Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes.
CC.5.SL.5 Presentation of Knowledge and Ideas: Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.
CC.5.SL.4 Presentation of Knowledge and Ideas: Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.
CC.K.SL.5 Presentation of Knowledge and Ideas: Add drawings or other visual displays to descriptions as desired to provide additional detail.
CC.K.SL.6 Presentation of Knowledge and Ideas: Speak audibly and express thoughts, feelings, and ideas clearly.
CC.K-12.W.R.4 Production and Distribution of Writing: Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
CC.K-12.W.R.5 Production and Distribution of Writing: Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.
CC.K-12.W.R.6 Production and Distribution of Writing: Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.
CC.K-12.SL.4 Presentation of Knowledge and Ideas: Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.
CC.K-12.SL.5 Presentation of Knowledge and Ideas: Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.

3-D Printing & Design

Common Core Math Standards

CC.K-12.MP.1 Make sense of problems and persevere in solving them. Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, “Does this make sense?” They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.
CC.K-12.MP.2 Reason abstractly and quantitatively. Mathematically proficient students make sense of the quantities and their relationships in problem situations. Students bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.
CC.K-12.MP.4 Model with mathematics. Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.
CC.K-12.MP.5 Use appropriate tools strategically. Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.
CC.K-12.MP.6 Attend to precision. Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions.
CC.K-12.MP.3 Construct viable arguments and critique the reasoning of others. Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.
CC.K-12.MP.7 Look for and make use of structure. Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see 7 × 8 equals the well remembered 7 × 5 + 7 × 3, in preparation for learning about the distributive property. In the expression x^2 + 9x + 14, older students can see the 14 as 2 × 7 and the 9 as 2 + 7. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see 5 – 3(x – y)^2 as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers x and y.
CC.K-12.MP.8 Look for and express regularity in repeated reasoning. Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts. Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again, and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through (1, 2) with slope 3, middle school students might abstract the equation (y – 2)/(x –1) = 3. Noticing the regularity in the way terms cancel when expanding (x – 1)(x + 1), (x – 1)(x^2 + x + 1), and (x – 1)(x^3 + x^2 + x + 1) might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results.

Common Core ELA Standards

CC.K-12.W.R.5 Production and Distribution of Writing: Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.
CC.K-12.SL.4 Presentation of Knowledge and Ideas: Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.
CC.K-12.R.R.7 Integration of Knowledge and Ideas: Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.
CC.5.R.L.3 Key Ideas and Details: Compare and contrast two or more characters, settings, or events in a story or drama, drawing on specific details in the text (e.g., how characters interact).
CC.K-12.R.R.2 Key Ideas and Details: Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
CC.K-12.W.R.2 Text Types and Purposes: Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
CC.K-12.W.R.7 Research to Build and Present Knowledge: Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.
CC.K-12.W.R.8 Research to Build and Present Knowledge: Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
CC.K-12.W.R.10 Range of Writing: Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.