

Iowa Core Standards Alignment

Literacy



Legend

•	The standard is clearly addressed by program activities.
-	This standard potentially could be addressed as part of <i>FIRST</i> ® LEGO® League Explore either by actions that the coach or teacher takes when working with the students or by conditions established by the program.

	Grade 2	Grade 3	Grade 4	Addressed
Reading Standards for Literature	1. Ask and answer such questions as who, what where, when, why, and how to demonstrate understanding of key details in a text.	1. Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.	1. Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.	-
	2. Recount stories, including fables and folktales from diverse cultures, and determine their central message, lesson, or moral.	2. Recount stories, including fables, folktales, and myths from diverse cultures, determine the central message, lesson, or moral and explain how it is conveyed through key details in the text.	2. Determine a theme of a story, drama, or poem from details in the text; summarize the text.	
	3. Describe how characters in a story respond to major events and Challenges.	3. Describe characters in a story (e.g., their traits, motivations, or feelings) and explain how their actions contribute to the sequence of events.	3. Describe in depth a character, setting, or event in a story or drama, drawing on specific details in the text (e.g., a character’s thoughts, words, or actions).	-
	4. Describe how words and phrases (e.g., regular beats, alliteration, rhymes, repeated lines) supply rhythm and meaning in a story, poem, or song.	4. Determine the meaning of words and phrases as they are used in a text, distinguishing literal from nonliteral language.	4. Determine the meaning of words and phrases as they are used in a text, including those that allude to significant characters found in mythology (e.g., Herculean).	
	5. Describe the overall structure of a story, including describing how the beginning introduces the story and the ending concludes the action.	5. 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.	5. Explain major differences between poems, drama, and prose, and refer to the structural elements of poems (e.g., verse, rhythm, meter) and drama (e.g., casts of characters, settings, descriptions, dialogue, stage directions) when writing or speaking about a text.	
	6. Acknowledge differences in the points of view of characters, including by speaking in a different voice for each character when reading dialogue aloud.	6. Distinguish their own point of view from that of the narrator or those of the characters.	6. Compare and contrast the point of view from which different stories are narrated, including the difference between first- and third-person narrations.	

	7. Use information gained from the illustrations and words in a print or digital text to demonstrate understanding of its characters, setting, or plot.	7. 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).	7. Make connections between the text of a story or drama and a visual or oral presentation of the text, identifying where each version reflects specific descriptions and directions in the text.	-
	8. RL.2.8 (not applicable to literature)	8. (not applicable to literature)	8. (not applicable to literature)	
	9. Compare and contrast two or more versions of the same story (e.g. Cinderella stories) by different authors or from different cultures.	9. Compare and contrast the themes, settings, and plots of stories written by the same author about the same or similar characters (e.g., in books forma series).	9. Compare and contrast the treatment of similar themes and topics (e.g., opposition of good and evil) and patterns of events (e.g., the quest) in stories, myths, and traditional literature from different cultures.	
	10. By the end of the year, read and comprehend literature, including stories and poetry, in the grades 2-3 text complexity band proficiently, with scaffolding as needed at the high end of the range.	10. By the end of the year, read and comprehend literature, including stories and poetry, in the grades 2-3 text complexity band proficiently, with scaffolding as needed at the high end of the range.	10. By the end of the year, read and comprehend literature, including stories, dramas, and poetry, in the grades 4-5 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
Reading Standards for Informational Text	1. Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text.	1. Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as basis for the answers.	1. Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.	•
	2. Identify the main topic of a multiparagraph text as well as the focus of specific paragraphs within the text.	2. Determine the main idea of a text, recount the key details and explain how they support the main idea.	2. Determine the main idea of a text and explain how it is supported by key details; summarize the text.	-
	3. Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text.	3. Describe the relationship between a series of historical events, scientific ideas, or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.	3. Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.	-
	4. Determine the meaning of words and phrases in a text relevant to a grade 2 topic or subject area.	4. Determine the meaning of general academic and domain specific words and phrases in a text relevant to a grade 3 topic or subject area.	4. Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area.	-
	5. Know and use various text features (e.g., captions, bold print, subheadings, glossaries, indexes, electronic menus, icons) to locate key facts or	5. Use text features and search tools (e.g., key words, sidebars, hyperlinks) to locate information relevant to a given topic efficiently.	5. Describe the overall structure (e.g., chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in a text or part of a text.	•

	information in a text efficiently.			
	6. Identify the main purpose of a text, including what the author wants to answer, explain, or describe.	6. Distinguish their own point of view from that of the author of a text.	6. Compare and contrast a firsthand and secondhand account of the same event or topic; describe the differences in focus and the information provided.	•
	7. Explain how specific images (e.g., a diagram showing how a machine works) contribute to clarify a text.	7. Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understandings of the text (e.g., where when, why, and how key events occur).	7. Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.	-
	8. Describe how reasons support specific points the author makes in a text.	8. Describe the logical connection between particular sentences and paragraphs in a text (e.g., comparison, cause/effect, first/second/third in a sequence).	8. Explain how an author uses reasons and evidence to support particular points in a text.	
	9. Compare and contrast the most important points presented by two texts on the same topic.	9. Compare and contrast the most important points and key details presented in two texts on the same topic.	9. Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably.	•
	10. By the end of the year, read and comprehend informational texts, including history/social studies, science, and technical texts, in the grades 2-3 text complexity band proficiently, with scaffolding as needed at the high end of the range.	10. By the end of the year, read and comprehend informational texts, including history/social studies, science, and technical texts, in the grades 2-3 text complexity band proficiently, with scaffolding as needed at the high end of the range.	10. By the end of year, read and comprehend informational texts, including history/social studies, science, and technical texts, in the grades 4-5 text complexity band proficiently, with scaffolding as needed at the high end of the range.	-
Reading Standards	1. Know and apply grade-level phonics and word analysis skills in decoding words.	1. Know and apply grade-level phonics and word analysis skills in decoding words.	1. Know and apply grade-level phonics and word analysis skills in decoding words.	-
	2. Read with sufficient accuracy and fluency to support comprehension.	2. Read with sufficient accuracy and fluency to support comprehension.	2. Read with sufficient accuracy and fluency to support comprehension.	-
Writing Standards	1. Write opinion pieces in which they introduce the topic or book they are writing about, state an opinion, supply reasons that support the opinion, use linking words (e.g., because, and also) to connect opinion and	1. Write opinion pieces on topics or texts supporting a point of view with reasons.	1. Write opinion pieces on topics or texts, supporting a point of view with reasons and information.	•

	reasons, and provide a concluding statement or section.			
	2. Write informative/ explanatory texts in which they introduce a topic, use facts and definitions to develop points, and provide a concluding statement or section.	2. Write informative/ explanatory texts to examine a topic and convey ideas and information clearly.	2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly.	-
	3. Write narratives in which they recount a well-elaborated event or short sequence of events, include details to describe actions, thoughts, and feelings, use temporal words to signal event order, and provide a sense of closure.	3. Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.	3. Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.	-
	4. (begins in grade 3)	4. With guidance and support from adults, produce writing in which the development and organization are appropriate to task and purpose. (Grade-specific expectations for writing types are defined in standards 1-3 for 3rd Grade).	4. Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)	•
	5. With guidance and support from adults and peers, focus on a topic and strengthen writing as needed by revising and editing.	5. With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing.	5. With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grade 4 on page 29.)	•
	6. With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers.	6. With guidance and support from adults, use technology to produce and publish writing (using key boarding skills) as well as to interact and collaborate with others.	6. With some guidance and support from adults, use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of one page in a single sitting.	-
	7. Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a	7. Conduct short research projects that build knowledge about a topic.	7. Conduct short research projects that build knowledge through investigation of different aspects of a topic.	•

	report; record science observations).			
	8. Recall information from experiences or gather information from provided sources to answer a question.	8. Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provide categories.	8. 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.	•
	9. (begins in grade 4)	9. (begins in grade 4)	9. Draw evidence from literary or informational texts to support analysis, reflection, and research.	
	10. (begins in grade 3)	10. 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 discipline-specific tasks, purposes, and audiences.	10. 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 discipline-specific tasks, purposes, and audiences.	
Speaking & Listening Standards	1. Participate in collaborative conversations with diverse partners about Grade 2 topics and texts with peers and adults in small and larger groups.	1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.	1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.	•
	2. Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.	2. Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.	2. Paraphrase portions of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.	•
	3. Ask and answer questions about what a speaker says in order to clarify comprehension, gather additional information, or deepen understanding of a topic or issue.	3. Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.	3. Identify the reasons and evidence a speaker provides to support particular points.	•
	4. Tell a story or recount an experience with appropriate facts and relevant, descriptive details, speaking audibly in coherent sentences.	4. 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.	4. 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.	•
	5. Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify	5. 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.	5. Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes.	•

	ideas, thoughts, and feelings.			
	6. Produce complete sentences when appropriate to task and situation in order to provide requested detail or clarification.	6. Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification.	6. Differentiate between contexts that call for formal English (e.g., presenting ideas) and situations where informal discourse is appropriate (e.g., small-group discussion); use formal English when appropriate to task and situation. (See grade 4 Language standards 1 on page 28 for specific expectations.)	•
Language Standards	1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.	1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.	1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.	-
	2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.	2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.	2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.	-
	3. Use knowledge of language and its conventions when writing, speaking, reading, or listening.	3. Use knowledge of language and its conventions when writing, speaking, reading, or listening.	3. Use knowledge of language and its conventions when writing, speaking, reading, or listening.	-
	4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 2 reading and content, choosing flexibly from an array of strategies.	4. Determine or clarify the meaning of unknown and multiple-meaning word and phrases based on grade 3 reading and content; choosing flexibly from a range of strategies.	4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 4 reading and content, choosing flexibly from a range of strategies.	-
	5. Demonstrate understanding of figurative language, word relationships and nuances in word meanings.	5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.	5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.	-
	6. Use words and phrases acquired through conversations, reading and being read to, and responding to texts, including using adjectives and adverbs to describe (e.g., When other kids are happy that makes me happy).	6. Acquire and use accurately a range of general academic and domain-specific words and phrases, including those that signal spatial and temporal relationships (e.g., <i>After dinner that night we went looking for them</i>).	6. Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases, including those that signal precise actions, emotions, or states of being (e.g., quizzed, whined, stammered) and that are basic to a particular topic (e.g., wildlife, conservation, and endangered when discussing animal preservation).	-

Iowa Core Standards Alignment

Mathematics



EXPLORE

Legend

•	The standard is clearly addressed by program activities.
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All Grades

	Indicator	Indicator Statement	Addressed
Mathematical Practice	MP1	Make sense of problems and persevere in solving them.	-
	MP2	Reason abstractly and quantitatively.	•
	MP3	Construct viable arguments and critique the reasoning of others.	•
	MP4	Model with mathematics.	-
	MP5	Use appropriate tools strategically.	-
	MP6	Attend to precision.	-
	MP7	Look for and make use of structure.	•
	MP8	Look for and express regularity in repeated reasoning.	-

Grade 2

	Indicator	Indicator Statement	Addressed
Operations and Algebraic Thinking	2.OA.A.1	Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.	-
	2.OA.B.2	Fluently add and subtract within 20 using mental strategies. By the end of Grade 2, know from memory all sums of two one-digit numbers.	-
	2.OA.C.3	Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.	-
	2.OA.C.4	Use addition to find the total number objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.	-
Number and Operations in Base Ten	2.NBT.A.1	Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases:	-
	2.NBT.A.2	Count within 1000; skip-count by 5s, 10s, and 100s.	-
	2.NBT.A.3	Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.	-
	2.NBT.A.4	Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using $>$, $=$, and $<$ symbols to record the results of comparisons	-
	2.NBT.B.5	Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or relationship between addition and subtraction.	-
	2.NBT.B.6	Add up to four two-digit numbers using strategies based on place value and properties of operations.	-
	2.NBT.B.7	Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and	-

		tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.	
	2.NBT.B.8	Mentally add 10 or 100 to a given number 100-900, and mentally subtract 10 or 100 from a given number 100-900.	-
	2.NBT.B.9	Explain why addition and subtraction strategies work, using place value and the properties of operations.	-
Measurement and Data	2.MD.A.1	Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.	-
	2.MD.A.2	Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.	-
	2.MD.A.3	Estimate lengths using units of inches, feet, centimeters, and meters.	-
	2.MD.A.4	Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.	-
	2.MD.B.5	Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.	-
	2.MD.B.6	Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, ..., and represent whole-number sums and differences within 100 on a number line diagram.	-
	2.MD.C.7	Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.	-
	2.MD.C.8	Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using \$ and ¢ symbols appropriately.	-
	2.MD.D.9	Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.	-
	2.MD.D.10	Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph.	-
Geometry	2.G.A.1	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.	-
	2.G.A.2	Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.	-
	2.G.A.3	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.	-

Grade 3

	Indicator	Indicator Statement	Addressed
Operations and Algebraic Thinking	3.OA.A.1	Interpret products of whole numbers, e.g., interpret 5×7 as the total number of objects in 5 groups of 7 objects each.	-
	3.OA.A.2	Interpret whole-number quotients of whole numbers, e.g., interpret $56/8$ as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each.	-
	3.OA.A.3	Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurements quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.	-
	3.OA.A.4	Determine the unknown whole number in a multiplication or division equation relating three whole numbers.	-
	3.OA.B.5	Apply properties of operations as strategies to multiply and divide.	-

	3.OA.B.6	Understand division as an unknown-factor problem.	
	3.OA.C.7	Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40/5 = 8$) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.	
	3.OA.D.8	Solve two-step word problems using the four operations. 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.	
	3.OA.D.A.9	Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations.	
Number and Operations in Base Ten	3.NBT.A.1	Use place value understanding to round whole numbers to the nearest 10 or 100.	-
	3.NBT.A.2	Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.	
	3.NBT.A.3	Multiply one-digit whole numbers by multiples of 10 in the range 10-90 (e.g., 9×80 , 5×60) using strategies based on place value and properties of operations.	-
Number and Operations - Fractions	3.NF.A.1	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 by a parts of the size $1/b$.	-
	3.NF.A.2	Understand a fraction as a number on the number line; represent fractions on a number line diagram.	-
	3.NF.A.3	Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.	-
Measurement and Data	3.MD.A.1	Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.	
	3.MD.A.2	Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). 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 beaker with a measurement scale) to represent the problem.	
	3.MD.B.3	Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs.	-
	3.MD.B.4	Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units - whole numbers, halves, or quarters.	-
	3.MD.C.5	Recognize area as an attribute of plane figures and understand the concepts of area measurement.	-
	3.MD.C.6	Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).	-
	3.MD.C.7	Relate area to the operations of multiplication and addition.	-
	3.MD.C.7	Relate area to the operations of multiplication and addition.	-
	3.MD.D.8	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 areas or with the same area and different perimeters.	-
Geometry	3.G.A.1	Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that 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.	-
	3.G.A.2	Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole.	-

Grade 4

	Indicator	Indicator Statement	Addressed
Operations and Algebraic Thinking	4.OA.A.1	Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ 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.	-
	4.OA.A.2	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.	-
	4.OA.A.3	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.	-
	4.OA.B.4	Find all factor pairs for a whole number in the range 1-100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1-100 is prime or composite.	-
	4.OA.C.5	Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. <i>For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.</i>	-
Number and Operations in Base Ten	4.NBT.A.1	Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. <i>For example, recognize that $700 \div 70 = 10$ by applying concepts of place value and division.</i>	-
	4.NBT.A.2	Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons.	-
	4.NBT.A.3	Use place value understanding to round multi-digit whole numbers to any place.	-
	4.NBT.B.4	Fluently add and subtract multi-digit whole numbers using the standard algorithm.	-
	4.NBT.B.5	Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	-
	4.NBT.B.6	Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	-
Number and Operations - Fractions	4.NF.A.1	Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.	-
	4.NF.A.2	Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as $1/2$. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual fraction model.	-
	4.NF.B.3	Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$.	-
	4.NF.B.4	Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.	-

	4.NF.C.5	Express a fraction with denominator 10 as an equivalent fraction with denominator 100 and use this technique to add two fractions with respective denominators 10 and 100.4 For example, express $\frac{3}{10}$ as $\frac{30}{100}$, and add $\frac{3}{10} + \frac{4}{100} = \frac{34}{100}$.	
	4.NF.C.6	Use decimal notation for fractions with denominators 10 or 100. For example, rewrite 0.62 as $\frac{62}{100}$; describe a length as 0.62 meters; locate 0.62 on a number line diagram.	
	4.NF.C.7	Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual model.	
Measurement and Data	4.MD.A.1	Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two column table. For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36)	-
	4.MD.A.2	Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.	-
	4.MD.A.3	Apply the area and perimeter formulas for rectangles in real world and mathematical problems. For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.	-
	4.MD.B.4	Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Solve problems involving addition and subtraction of fractions by using information presented in line plots. For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.	-
	4.MD.C.5	Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:	-
	4.MD.C.6	Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.	-
	4.MD.C.7	Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.	-
Geometry	4.G.A.1	Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.	-
	4.G.A.2	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.	-
	4.G.A.3	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.	-

Iowa Core Standards Alignment

Science



EXPLORE

Legend

•	The standard is clearly addressed by program activities.
-	This standard potentially could be addressed as part of FIRST® LEGO® League Explore either by actions that the coach or teacher takes when working with the students or by conditions established by the program.

Grade 2

Cluster	Indicator	Indicator Statement	Addressed
Matter and its Interactions	2-PS1-1	Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.	
	2-PS1-2	Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.	•
	2-PS1-3	Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object.	•
	2-PS1-4	Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.	
Ecosystems: Interactions, Energy, and Dynamics	2-LS2-1	Plan and conduct an investigation to determine if plants need sunlight and water to grow.	
	2-LS2-2	Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.	
Biological Evolution: Unity and Diversity	2-LS4-1	Make observations of plants and animals to compare the diversity of life in different habitats.	
Earth's Place in the Universe	2-ESS1-1	Use information from several sources to provide evidence that Earth events can occur quickly or slowly.	
Earth's Systems	2-ESS2-1	Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.	
	2-ESS2-2	Develop a model to represent the shapes and kinds of land and bodies of water in an area.	
	2-ESS2-3	Obtain information to identify where water is found on Earth and that it can be solid or liquid.	

Grades K-2

Cluster	Indicator	Indicator Statement	Addressed
Engineering Design	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-ETS1-2	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-ETS1-3	Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.	

Grade 3

Cluster	Indicator	Indicator Statement	Addressed
Motion and Stability: Forces and Interactions	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-PS2-2	Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.	-
	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-PS2-4	Define a simple design problem that can be solved by applying scientific ideas about magnets.	
From Molecules to Organisms: Structures and Processes	3-LS1-1	Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.	
Ecosystems: Interactions, Energy, and Dynamics	3-LS2-1	Construct an argument that some animals form groups that help members survive.	
Heredity: Inheritance and Variation of Traits	3-LS3-1	Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.	
	3-LS3-2	Use evidence to support the explanation that traits can be influenced by the environment.	
Biological Evolution: Unity and Diversity	3-LS4-1	Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.	
	3-LS4-2	Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.	
	3-LS4-3	Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.	
	3-LS4-4	Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.	
Earth's Systems	3-ESS2-1	Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.	
	3-ESS2-2	Obtain and combine information to describe climates in different regions of the world	
Earth and Human Activity	3-ESS3-1	Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.	

Grade 4

Cluster	Indicator	Indicator Statement	Addressed
Energy	4-PS3-1	Use evidence to construct an explanation relating the speed of an object to the energy of that object.	-
	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-PS3-3	Ask questions and predict outcomes about the changes in energy that occur when objects collide.	-
	4-PS3-4	Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.	-

Waves and Their Applications in Technologies for Information Transfer	4-PS4-1	Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.	
	4-PS4-2	Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.	
	4-PS4-3	Generate and compare multiple solutions that use patterns to transfer information.	
From Molecules to Organisms: Structures and Processes	4-LS1-1	Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.	
	4-LS1-2	Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.	
Earth's Place in the Universe	4-ESS1-1	Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.	
Earth's Systems	4-ESS2-1	Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.	
	4-ESS2-2	Analyze and interpret data from maps to describe patterns of Earth's features.	
Earth and Human Activity	4-ESS3-1	Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.	
	4-ESS3-2	Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.	

Grades 3-5

Cluster	Indicator	Indicator Statement	Addressed
Engineering Design	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 ETS1-2	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-ETS1-3	Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.	-

Iowa Core Standards Alignment

Universal Constructs



Legend

•	The standard is clearly addressed by program activities.
-	This standard potentially could be addressed as part of FIRST® LEGO® League Explore either by actions that the coach or teacher takes when working with the students or by conditions established by the program.

	Indicator Statement	Addressed
CRITICAL THINKING	Critical thinking is the ability to access and analyze key information to develop solutions to complex problems that may have no clear answer. It incorporates reflective and visionary processes. Critical thinking utilizes abstractions and non-rules based strategies to guide decisions, behaviors and actions. Twenty-first century critical thinking reflects:	•
	thoughtful questioning that challenges assumptions, promotes higher order thinking, leads to new insights and validates perceptions.	•
	metacognition that supports reflective practice.	•
	processes that analyze, select, use and evaluate various approaches to develop solutions.	•
	critical issues that develop innovative responses.	•
	analysis and synthesis of multiple sources and points of information.	•
	intentional use of disciplinary frameworks to analyze complex issues and information.	•
	suspension of judgment while collecting evidence to make determinations.	-
COMPLEX COMMUNICATION	Complex communication is based on the successful sharing of information through multiple means that include visual, digital, verbal and nonverbal interactions. The message is purposeful, clear and concise and leads to an accurate exchange of information and ideas. Complex communication in the 21st Century reflects:	•
	negotiation processes that generate mutually satisfactory solutions.	•
	managing and resolving conflicts.	•
	interacting effectively with people of different cultures.	•
	selection and integration of various communication processes.	-
	integration of appropriate forms of informative communication technology.	-
	understanding the interactions among modes of communication.	-
	meaningful and engaging interactions.	•
	focus, energy and passion around the key message.	•
navigation through nuances of effective communication.	•	
CREATIVITY	Creativity incorporates curiosity and innovation to generate new or original thoughts, interpretations, products, works or techniques. Creativity is nurtured, advanced and modeled through numerous approaches that include inquiry-based learning, abstract thinking and student-focused learning. Twenty-first century creativity reflects:	•
	a disciplined process that includes skill, knowledge, imagination, inspiration and evaluation.	•
	capturing or collecting new ideas for current or future use.	•
	a combination of seemingly unrelated ideas into something new.	-
	a respectful exchange of ideas.	•
	engagement in formal and informal learning experiences.	•
	divergent thinking.	•
	entrepreneurial thinking that encourages unique thoughts and applications.	-
	a comfort level with open-ended challenges that reflect multiple approaches and results.	•
	reconfiguration of current thought within a new context.	•
pattern recognition across disciplines that results in an innovative outcome.	-	

COLLABORATION	Collaboration is working among and across personal and global networks to achieve common goals. It requires cultural competence and personal and civic responsibility in all environments. Collaboration also requires open and flexible approaches to leadership. Twenty-first century collaboration reflects:	●
	non-hierarchical leadership based on individual skill sets.	●
	respect for a complex process that requires individuals to contribute and participate in meaningful interactions.	●
	the belief that group synergy enhances productivity.	●
	understanding and application of effective group processes to solve problems.	●
	productive group interactions.	●
	respectful disagreement.	●
FLEXIBILITY AND ADAPTABILITY	Flexibility and adaptability include responding and adjusting to situational needs, and changing to meet the challenges of new roles, paradigms and environments. Flexibility and adaptability include the thoughtful balance between an individual’s core beliefs and appropriate reaction to change. These dispositions are nurtured through lifelong learning and continuous improvement. Twenty-first century flexibility and adaptability reflect:	●
	engagement in innovation and creativity.	●
	intellectual agility.	●
	embracing change.	●
	expecting and accepting the emotions inherent in change while supporting those who are involved.	●
	respect for unique qualities of others and self.	●
	purposeful and thoughtful response to disruptions.	●
	acknowledging and responding to dissonance in productive ways.	●
	the potential for positive and negative outcomes in risk-taking.	●
	proactive and reactive approaches to change.	●
acknowledging ambiguity is inherent in a changing environment.	-	
PRODUCTIVITY AND ACCOUNTABILITY	Productivity is prioritizing, planning and applying knowledge and skills to make decisions that create quality results in an ever-changing environment. Individuals and teams demonstrate initiative, self-direction and personal responsibility to add value to the world around them. Individuals demonstrate accountability through efficient time management, appropriate resource allocation, personal integrity and self-monitoring to meet the demands of productivity. Individuals and teams recognize interconnectedness of their actions at all levels. Twenty-first century productivity and accountability reflect:	●
	the ability to acquire new learning on one’s own.	●
	application of appropriate processes and tools to facilitate task completion.	●
	self-sufficiency as required in a complex environment.	●
	identification of available opportunities.	-
	motivation and commitment to achieve.	●
	assuming leadership roles.	●
	building on prior learning and experience to apply knowledge and skills in a variety of contexts.	●
self-confidence and self-respect	●	

Iowa Core Standards Alignment

Social Studies



Legend

•	The standard is clearly addressed by program activities.
-	This standard potentially could be addressed as part of FIRST® LEGO® League Explore either by actions that the coach or teacher takes when working with the students or by conditions established by the program.

	Indicator Statement	Addressed
Grade 2	SS.2.1. Explain why a compelling question is important.	-
	SS.2.2. Generate supporting questions across the social studies disciplines related to compelling questions.	-
	SS.2.3. Determine if a source is primary or secondary and distinguish whether it is mostly fact or opinion.	-
	SS.2.4. Construct responses to compelling questions using reasoning, examples, and relevant details	•
	SS.2.5. Take group or individual action to help address local, regional, and/or global problems.	•
	SS.2.6. Use deliberative and democratic procedures to make decisions about and act on civic problems in their classrooms.	-
	SS.2.7. Explain how people from different groups work through conflict when solving a community problem.	•
	SS.2.9. Develop an opinion on a decision about a local issue.	-
	SS.2.10. Determine effective strategies for solving particular community problems.	•
Grade 3	SS.2.14. Explain how different careers take different levels of education.	-
	SS.3.1. Identify disciplinary ideas associated with a compelling question.	-
	SS.3.2. Use supporting questions to help answer the compelling question in an inquiry.	-
	SS.3.3. Determine the credibility of one source.	-
	SS.3.4. Cite evidence that supports a response to supporting or compelling questions.	-
	SS.3.5. Construct responses to compelling questions using reasoning, examples, and relevant details.	•
	SS.3.6. Identify challenges and opportunities when taking action to address problems, including predicting possible results.	•
	SS.3.7. Use a range of deliberative and democratic procedures to make decisions about and act on civic problems in their classrooms.	-
Grade 4	SS.3.16. Describe how people take risks to improve their family income through education, career changes and moving to new places.	-
	SS.4.1. Explain how a compelling question represents key ideas in the field.	-
	SS.4.2. Use supporting questions to help answer the compelling question in an inquiry.	-
	SS.4.3. Cite evidence that supports a response to supporting or compelling questions.	-
	SS.4.4. Construct responses to compelling questions using reasoning, examples, and relevant details.	•
	SS.4.5. Identify challenges and opportunities when taking action to address problems, including predicting possible results.	•
	SS.4.6. Use a range of deliberative and democratic procedures to make decisions about and act on civic problems in their classrooms.	-
SS.4.7. Explain causes of conflict or collaboration among different social groups.	•	