Introduction to Robotics with Dash & Dot

Benchmarks for Science Literacy

- **1C/E1 (Grades: 3-5)**: Science is an adventure that people everywhere can take part in, as they have for many centuries.
- **1C/E3 (Grades: 3-5)**: Doing science involves many different kinds of work and engages men and women of all ages and backgrounds.
- **3A/E4 (Grades: 3-5)**: Technology extends the ability of people to change the world: to cut, shape, or put together materials; to move things from one place to another; and to reach farther with their hands, voices, senses, and minds. The changes may be for survival needs such as food, shelter, and defense; for communication and transportation; or to gain knowledge and express ideas.
- **3C/E6 (Grades: 3-5)**: Because of their ability to invent tools and processes, people have an enormous effect on the lives of other living things.

CSS Standards for Math

- **CCSS.MATH.CONTENT.1.NBT.C.4**: Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, 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 and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.
- **CCSS.MATH.CONTENT.1.NBT.C.5**: Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.

CSS Standards for History

- **4.8A.5 (Grades: K-4)**: Identify and describe technological inventions and developments that evolved during the 19th century and the influence of these changes on the lives of workers. [Demonstrate and explain the influence of ideas]

ISTE Standards (technology standards)

- Creativity and Innovation - Students demonstrate creative thinking, construct knowledge, and develop innovative products and process using technology.
- Critical thinking, problem solving and decision making - Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
  - Use multiple processes and diverse perspectives to explore alternative solutions
- Technology operations and concepts - Students demonstrate a sound understanding of technology concepts, systems and operations.
  - Understand and use technology systems
  - Select and use applications effectively and productively
  - Troubleshoot systems and applications
  - Transfer current knowledge to learning of new technologies
2 Wondering with Dash

ISTE Standards (technology standards)
1. Creativity and Innovation - Students demonstrate creative thinking, construct knowledge, and develop innovative products and process using technology.
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3 Dash Can Play the Xylophone

Science Literacy Standards
- SL.4.5
  Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes.
- SL.5.5/6.5
  Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.

MENC: The National Association for Music Education and the nine National Music Education Standards:
1. Singing, alone and with others, a varied repertoire of music.
2. Performing on instruments, alone and with others, a varied repertoire of music.
3. Improvising melodies, variations, and accompaniments.
4. Composing and arranging music within specified guidelines.
5. Reading and notating music.
6. Listening to, analyzing, and describing music.
7. Evaluating music and music performances.
8. Understanding relationships between music, the other arts, and disciplines outside the arts.
9. Understanding music in relation to history and culture.

4 Dash’s Adventures in History

Common Core ELA:
- RL.3.10, 4.10, 5.10: By the end of the year, read and comprehend literature, including stories, dramas, and poetry, at the appropriate grade levels.
- RI.3.3: 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.
• RI.3.7: Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).
• W.3.3, 4.3, 5.3: Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.
• SL.3.4, 4.4, 5.4: 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.
• SL.4.5, 5.5, 6.5: Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.

Common Core Mathematics:
• 3.NBT.A.2: Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationships between addition and subtraction.
• 4.NBT.B.4 Fluently add and subtract multi-digit whole numbers using the standard algorithm.
• 5.NBT.B.5 Fluently multiply multi-digit whole numbers using the standard algorithm.
• 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 (in extension).
• 4.NF.B.3.C Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction (in extension).
• 4.NF.B.4.C Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem (in extension).

National Standards for History
• 3.2B.3 (U.S. History Grades 5-12): Explain the dispute over the western lands and evaluate how it was resolved. [Draw upon data in historical maps]
• 4.1C.1 (U.S. History Grades 5-12): Explain the economic, political, racial, and religious roots of Manifest Destiny and analyze how the concept influenced the westward expansion of the nation. [Examine the influence of ideas]

Geography:
• Identify the major physical components of the world (e.g. oceans, equator, continents, and hemispheres).
• Find a specific location on a school or community map.
• Identify and use key geographical features on maps (e.g. mountains, rivers, plains, valleys, and forests).
• Identify the states of the US and the capitals of the states
• Use latitude and longitude to identify major North American cities on a map (e.g. Boston, Mexico City, New York, Toronto, Charleston, Savannah, Washington, DC, Philadelphia, Santa Fe, and Los Angeles).

5 Dash Explores Newton’s Laws

NGSS Elementary School
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-PS2-2. Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.*

PS2.A: Forces and Motion
Pushes and pulls can have different strengths and directions. (KPS2-1), (K-PS2-2)
Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it. (K-PS2-1),(K-PS2-2)

PS2.B: Types of Interactions
When objects touch or collide, they push on one another and can change motion. (K-PS2-1)

PS3.C: Relationship Between Energy and Forces
A bigger push or pull makes things go faster (secondary to K-PS2-1).

ETS1.A: Defining Engineering Problems
A situation that people want to change or create can be approached as a problem to be solved through engineering. Such problems may have many acceptable solutions. (secondary to KPS2-2)

Middle School
MS-PS2-1. Apply Newton’s Third Law to design a solution to a problem involving the motion of two colliding objects.*

MS-PS2-2. Plan an investigation to provide evidence that the change in an object’s motion depends on the sum of the forces on the object and the mass of the object.

PS2.A: Forces and Motion (MS-PS2-2)
For any pair of interacting objects, the force exerted by the first object on the second object is equal in strength to the force that the second object exerts on the first, but in the opposite direction (Newton’s third law). (MS-PS2-1)
The motion of an object is determined by the sum of the forces acting on it; if the total force on the object is not zero, its motion will change. The greater the mass of the object, the greater the force needed to achieve the same change in motion. For any given object, a larger force causes a larger change in motion.
All positions of objects and the directions of forces and motions must be described in an arbitrarily chosen reference frame and arbitrarily chosen units of size. In order to share information with other people, these choices must also be shared.

6 Introduction to Coding and Hour of Code with Dash and Dot

ISTE Standards (technology standards)
4. Creativity and Innovation - Students demonstrate creative thinking, construct knowledge, and develop innovative products and process using technology.
5. Critical thinking, problem solving and decision making - Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
   o Use multiple processes and diverse perspectives to explore alternative solutions
6. Technology operations and concepts - Students demonstrate a sound understanding of technology concepts, systems and operations.
   o Understand and use technology systems
   o Select and use applications effectively and productively
   o Troubleshoot systems and applications
   o Transfer current knowledge to learning of new technologies
7 Number Line Moves

Common Core Mathematics:
- CCSS.MATH.CONTENT.1.NBT.C.4 Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, 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 and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.
- CCSS.MATH.CONTENT.1.NBT.C.5 Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.
- CCSS.MATH.CONTENT.1.NBT.C.6 Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), 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 and explain the reasoning used.

ISTE Standard 4: Critical thinking, problem solving, and decision making
Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
- a. Identify and define authentic problems and significant questions for investigation
- b. Plan and manage activities to develop a solution or complete a project
- c. Collect and analyze data to identify solutions and/or make informed decisions
- d. Use multiple processes and diverse perspectives to explore alternative solutions

8 Step by Step (Obstacle Course)

Common Core ELA:
- RI.3.3. 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.

Common Core Mathematics:
- 4.NBT.B.4 Fluently add and subtract multi-digit whole numbers using the standard algorithm.
- 5.NBT.B.5 Fluently multiply multi-digit whole numbers using the standard algorithm.
- 3.MD.B.4 Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch.

NGSS: (Next Generation Science 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.
- 4-PS4-3. Generate and compare multiple solutions that use patterns to transfer information.

9 Dash Adventures in a Fractional World

Common Core Mathematics:
- 4.NF.4: Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.
- 4.NF.4a. Understand a fraction a/b as a multiple of 1/b. For example, use a visual fraction model to represent 5/4 as the product 5 × (1/4), recording the conclusion by the equation 5/4 = 5 × (1/4).
Standards in Exploring Robotics with Dash Curriculum Lessons

- 4.NF.4b. Understand a multiple of a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number. For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.)
- 4.NF.4c. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. For example, if each person at a party will eat 3/8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?

Common Core ELA:
- W.4.3: Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.
- W.4.4: Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience.
- SL.4.4: 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.
- SL.4.1: 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.

10 A Series of Unfortunate Events

Common Core ELA:
- W.4.3: Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.
- SL.4.4: 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.
- SL.4.1: Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on appropriate level topics and texts, building on others' ideas and expressing their own clearly.

NGSS:
- 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.

11 Dance the Loopedy Loop

ISTE Standards (technology standards)
1. Creativity and Innovation - Students demonstrate creative thinking, construct knowledge, and develop innovative products and process using technology.
2. Critical thinking, problem solving and decision making - Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
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Standards in Exploring Robotics with Dash Curriculum Lessons

- Troubleshoot systems and applications
- Transfer current knowledge to learning of new technologies

12 Geometry with Dash

Common Core Mathematics:

- CCSS.MATH.CONTENT.3.MD.D.8 Geometric measurement: recognize perimeter.
- 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.

- 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.

ISTE

- Standard 4: Critical thinking, problem solving, and decision making
- Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
- Identify and define authentic problems and significant questions for investigation
- Plan and manage activities to develop a solution or complete a project
- Collect and analyze data to identify solutions and/or make informed decisions
- Use multiple processes and diverse perspectives to explore alternative solutions

13 Forces of Attraction

Common Core ELA:

- W.3.2: Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
- W.3.8: Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories.

NGSS:

- 3-PS2-3: Ask questions to determine cause and affect relationships of electric or magnetic interactions between two objects not in contact with each other.
- 5-PS1-3: Make observations and measurements to identify materials based on their properties.

14 Introduction to Variables in Programming

Common Core Math

- 4.OA.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. 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.
- 4.NBT.B.4: Fluently add and subtract multi-digit whole numbers using the standard algorithm.
Standards in Exploring Robotics with Dash Curriculum Lessons

- **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.

**15 Balancing Act**

- **NGSS 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.
- **CCSS W.3.2**: Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

**16 Dash Long Jump**

**Common Core Mathematics:**

- **3.NF.3**: Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.
- **3.NF.3a**: Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.
- **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.
- **3.NF.3d**: Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer 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.
- **4.NF.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.

**17 Zooming With Dash**

**Common Core Mathematics:**

- **CCSS.MATH.PRACTICE.MP1**: Make sense of problems and persevere in solving them.
- **CCSS.MATH.PRACTICE.MP2**: Reason abstractly and quantitatively.
- **CCSS.MATH.PRACTICE.MP3**: Construct viable arguments and critique the reasoning of others.
- **CCSS.MATH.PRACTICE.MP5**: Use appropriate tools strategically.
- **CCSS.MATH.CONTENT.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.
- **CCSS.MATH.CONTENT.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.
- **CCSS.MATH.CONTENT.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.
- **CCSS.MATH.CONTENT.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.
- **CCSS.MATH.CONTENT.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.

- CCSS.MATH.CONTENT.5.OA.A.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.
- 5.NBT.B.7. Add, subtract, multiply, and divide decimals to hundredths, 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 and explain the reasoning used.

NGSS:
- NGSS-4-PS3-1. Use evidence to construct an explanation relating the speed of an object to the energy of that object.

ISTE:
- ISTE Standard 4: Critical thinking, problem solving, and decision making:
  - Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
  - Identify and define authentic problems and significant questions for investigation
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  - Collect and analyze data to identify solutions and/or make informed decisions
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18 Dash and Dot are So Random

Common Core Mathematics:
- CCSS.Math.Content.6.SP.B.5 Summarize numerical data sets in relation to their context, such as by:
  - CCSS.Math.Content.6.SP.B.5.a Reporting the number of observations.
  - CCSS.Math.Content.6.SP.B.5.b Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
  - CCSS.Math.Content.6.SP.B.5.c Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.
  - CCSS.Math.Content.6.SP.B.5.d Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.

19 Wave Hello, Wave GoodBye

NGSS
- PS-1 Develop a model of waves to describe patterns in terms of amplitude and wavelength.
- ETS1.C Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints.

20 Call Me Obtuse

- CCSS.MATH.CONTENT.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:
- CCSS.MATH.CONTENT.4.MD.C.5.A: An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a "one-degree angle," and can be used to measure angles.
Standards included in Exploring Robotics with Dash Curriculum Lessons

- CCSS.MATH.CONTENT.4.MD.C.5.B: An angle that turns through $n$ one-degree angles is said to have an angle measure of $n$ degrees.
- CCSS.MATH.CONTENT.4.MD.C.6: Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.
- CCSS.MATH.CONTENT.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.

21 Very Variable Game Day

- **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.
- **L.3.6** Acquire and use accurately grade-appropriate conversational, general academic and domain-specific words and phrases, including those that signal spatial and temporal relationships (e.g., After dinner that night we went looking for them).

22 All Rover The Universe (Mars Rover)

- **SL.4.4/5.4:** 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.
- **SL 5.5/6.5** Include multimedia components (e.g., graphics, images, music, sound) and visual displays in presentations to clarify information
- **RI.4.1:** Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.
- **W.4.8/5.8:** 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.
- **W.4.9/5.9:** Draw evidence from literary or informational texts to support analysis, reflection, and research.
- **RST.6-8.3** Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

23 Place Value Game

**Grade 4:**
- 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.

**Grade 5:**
- Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., 347.392 = $3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$.
- Compare two decimals to thousandths based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons.
Standards in Exploring Robotics with Dash Curriculum Lessons

24 Robot Petting Zoo

Science:

- 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. [Clarification Statement: Emphasis is on systems of information transfer.] [Assessment Boundary: Assessment does not include the mechanisms by which the brain stores and recalls information or the mechanisms of how sensory receptors function.]

- SL.3.4/4.45.4: 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.

- W.3.8/4.8/5.8: 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.

25 The Robot Games

Grade 1:

- 1.NBT.B.3 - Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.
- 1.NBT.B.2 - Understand that the two digits of a two-digit number represent amounts of tens and ones.
- 1.MD.A.2 - Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps.
- 1.OA.C.6 - 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).
- 1.G.A.1 - Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.

Grade 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.A.1 - Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones.
- 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.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
- 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.

Grade 3:
Standards in Exploring Robotics with Dash Curriculum Lessons

- 3.NF.A.3.D - Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer 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.
- 3.NF.A.3 - Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.
- 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.NF.A.3 - Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.
- 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 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.

Grade 4:

- 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.
- 4.NBT.B.4/5 - Fluently add and subtract multi-digit whole numbers using the standard algorithm.
- 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.

Grade 5:

- 5.NBT.A.3 - Read, write, and compare decimals to thousandths.
- 5.MD.B.2 - Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots.
- 5.NBT.B.7 - Add, subtract, multiply, and divide decimals to hundredths, 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 and explain the reasoning used.
- 5.G.B.3 - 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.