Grade 1 Mathematics, Quarter 1, Unit 1.1

Exploring Number Fluency

Overview

Number of instructional days: 5 (1 day = 45–60 minutes)

Content to be learned

- Use the structure/pattern of numbers to count from any number up to 120.
- Explore regularity within numbers from 0 to 120.
- Write numerals to 120.
- Represent a number using objects and a written numeral.

Mathematical practices to be integrated

Look for and make use of structure.

- Look for patterns in numbers.

Look for and express regularity in repeated reasoning.

- Notice repeated patterns and general methods for shortcuts.

Essential questions

- What are the patterns for counting up to 120?
- How do you know what number comes after _____?
- How can you record the number of objects in a set?
- How do you know that your number of objects matches the written numeral?

Written Curriculum

Common Core State Standards for Mathematical Content

Number and Operations in Base Ten 1.NBT

Extend the counting sequence.

1.NBT.1 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.~~

Common Core Standards for Mathematical Practice

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 $7 \times 5 + 7 \times 3$, 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.

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.

Clarifying the Standards

Prior Learning

In kindergarten, students learned to count to 100 by ones and tens. They also learned to count forward from any given number within a known sequence.

Current Learning

In grade 1, students learn to count to 120. Students should be able to start at any number less than 120 and count forward. Students are counting to, reading, and writing numbers up to 120 and are able to represent a number of objects with a written numeral.

Counting and "counting on" become part of daily routines such as taking attendance or counting days in a school year. Later counting is used to verify the outcomes of problems involving addition, subtraction, and comparing numbers.

Future Learning

In grade 2, students' learning will be reinforced as they continue to build on their knowledge of place value by having to count to, read, and write numbers up to 1,000. Students will use the skills of skip counting to count on. These skills should be at the drill-and-practice level in grade 3. In grade 4, students will use place value to read and write multi-digit whole numbers using base ten numerals, number names, and expanded form.

Additional Findings

According to *Principles and Standards for School Mathematics*, understanding of number develops in prekindergarten through grade 2 as children count and learn to recognize "how many' in sets of objects. Additionally, as students gain an understanding of numbers and learn how to represent them, they develop the foundation for understanding relationships among numbers.

The book also states that elementary math programs should enable students to understand numbers and ways of representing numbers. Relationships among numbers should be a major part of mathematical instruction (p. 33).

Grade 1 Mathematics, Quarter 1, Unit 1.2

Developing the Concept of Time to the Hour as it Relates to Number

Overview

Number of instructional days: 5 (1 day = 45–60 minutes)

Content to be learned

- Tell what time it is to the hour on an analog clock.
- Read time to the hour on a digital clock.
- Write time to the hour.

Mathematical practices to be integrated

Use appropriate tools strategically.

- Use a digital clock appropriately.
- Use an analog clock appropriately.

Look for and make use of structure.

- Make connections or relationships—patterns.
- Analog clock.
- Digital clock.

Essential questions

- How do we measure how much time has passed?
- How are the analog clock and the digital clock used to measure time?
- How is time shown on a digital clock similar to and different from the way time is shown on an analog clock?
- How are minutes related to the hour?
- How do we record the hour?

Written Curriculum

Common Core State Standards for Mathematical Content

Measurement and Data 1.MD

Tell and write time.

1.MD.3. Tell and write time in hours ~~and half-hours~~ using analog and digital clocks.

Common Core Standards for Mathematical Practice

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.

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 $7 \times 5 + 7 \times 3$, 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.

Clarifying the Standards

Prior Learning

Prior to first grade, children had experience using numbers to quantify objects. This concept is extended in quantifying time. Younger children have experience talking about the size of objects. This concept may play into comparing periods of elapsed time. Young children may have exposure to other tools that measure time, such as calendars. Young children have had a great deal of experience with time intervals as they wait for events in their life to occur i.e., TV shows, meals, birthdays, etc.

Current Learning

Students work with the concept of equality. This concept is extended as children explore the relationship of minutes to hours. First-graders accurately record values in terms of numeral representations. This is incorporated into interpreting time on a digital and analog clock as well as recording time. Students in grade 1, tell time as part of their daily routine. They relate the skill of telling time to their daily schedule: when it is time to go to lunch, itinerant teachers, recess, and to go home.

Future Learning

In grade 2, students will begin to read and write time to the nearest five-minute interval. They will relate time to morning and evening. In grade 3, students will solve problems involving time. They will add and subtract time intervals to the minute and will begin to represent these results in data format.

Additional Findings

Principles and Standards for School Mathematics states, "Teachers should guide students' experiences by making the resources available. When students use calendars and sequence stories they are using measures of time in a real way. Opportunities arise throughout the school day for teachers to focus on time and its measurement through short conversations. For example, 'Look at the clock. It's one o'clock—time for gym!' The process of measurement, in principle, for measuring any attribute: choose a unit, compare that unit to the object, and report the number of units" (pp. 104–105).

Grade 1 Mathematics, Quarter 1, Unit 1.3

Representing and Interpreting Data

Overview

Number of instructional days: 7 (1 day = 45–60 minutes)

Content to be learned

- Organize and represent data using up to three different categories.
- Interpret data by asking and responding to questions about the given data.
- Compare and contrast data from each category.

Mathematical practices to be integrated

Construct viable arguments and critique the reasoning of others.

- Construct arguments using objects, drawings, diagrams, and actions.
- Listen to the arguments of others and decide if they make sense, asking questions to clarify and improve arguments.

Model with mathematics.

- Identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts, and formulas.
- Analyze mathematical relationships to draw conclusions.

Essential questions

- How can you demonstrate the differences and similarities between x and y?
- What is the relationship between the set of data?
- How did you decide to organize your information this way?
- What other models could be used to show the same information?

Written Curriculum

Common Core State Standards for Mathematical Content

Measurement and Data 1.MD

Represent and interpret data.

1.MD.4. Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.

Common Core Standards for Mathematical Practice

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.

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.

Clarifying the Standards

Prior Learning

In kindergarten, students used the relationship with numbers to count and order things. They compared sets of objects and numbers. They were able to use the terms *more* and *less* to describe the relationship between numbers. Kindergartners categorized objects in many areas of the curriculum. They determined the attributes to use to categorize objects.

Current Learning

In grade 1, students begin to organize and represent categorized data. Students may use different ways to represent and record this data. They understand and accept the variations of other students' representations. They may ask questions to clarify how and why a student chose to show their data in a way different from their own. This skill is integrated into other subjects such as Science and Social Studies.

Future Learning

In grade 2, students will draw picture graphs and bar graphs to show data with up to four categories. They will make decisions about how the layout and design of their graphs may affect the interpretation of the data. By the end of grade 5, students will use data in statistics and probability.

Additional Findings

According to the *Progressions for the Common Core State Standards in Mathematics* (draft) commoncoretools.wordpress.com, states that the K–5 data standards run along two paths. One path deals with categorical data and focuses on bar graphs as a way to represent data. Categorical data comes from sorting objects into categories. Students work with categorical data in the early grades to support their later work with bivariate categorical data and two-way tables in 8th grade.

Grade 1 Mathematics, Quarter 1, Unit 1.4

Reading and Writing Numerals

Overview

Number of instructional days: 5 (1 day = 45–60 minutes)

Content to be learned

- Use the structure/pattern of numbers to count from any number up to 120.
- Explore regularity within numbers from 0 to 120.
- Count from any number to 120.
- Write numerals to 120.
- Read numerals to 120.

Mathematical practices to be integrated

Look for and make use of structure.

- Look for patterns in numbers.

Look for and express regularity in repeated reasoning.

- Look for and express regularity in repeated reasoning.
- Notice repeated patterns and general methods for shortcuts.

Essential questions

- What number comes after _____?
- What are the patterns for counting up to 120?
- Given a set of objects, write the numeral that represents the set.
- Given a number written in words, represent the number in a set and write the numeral that represents the number.

Written Curriculum

Common Core State Standards for Mathematical Content

Number and Operations in Base Ten **1.NBT**

Extend the counting sequence.

1.NBT.1 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.

Common Core Standards for Mathematical Practice

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 $7 \times 5 + 7 \times 3$, 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.

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.

Clarifying the Standards

Prior Learning

In kindergarten, students learned to count to 100 by ones and tens. They have also learned to count forward from any given number within a known sequence.

Current Learning

In grade 1, students are learning to count to 120. Students should be able to start at any number less than 120 and count forward. In future units during first grade, students are counting to, reading and writing numbers up to 120 and will be able to represent a number of objects with a written numeral. Routines: Students should continue to count daily in real world situations.

Routines: Students become fluent in writing numbers as they record the outcome of situations on a daily basis (taking attendance, counting objects, and counting the number of days in a school).

Future Learning

In grade 2, students' learning is being reinforced as they continue to build on their knowledge of place value by now having to count to, read and write numbers up to 1,000. Students are also using the skills of skip counting to count on. These skills should be at the drill and practice level in grade 3. In grade 4, students are using place value to read and write multi-digit whole numbers using base ten numerals, number names and expanded form.

Additional Findings

According to *Principles and Standards for School Mathematics*, understanding of number develops in prekindergarten through grade 2 as children count and learn to recognize "how many' in sets of objects. Additionally, as students gain an understanding of numbers and learn how to represent them, they develop the foundation for understanding relationships among numbers.

The book also states that elementary math programs should enable students to understand numbers and ways of representing numbers. Relationships among numbers should be a major part of mathematical instruction (p. 33).

Grade 1 Mathematics, Quarter 1, Unit 1.5

Understanding the Tens Place

Overview

Number of instructional days: 10 (1 day = 45–60 minutes)

Content to be learned

- Rename numbers to 100 in terms of "tens" and "ones." For example, 52 can be renamed as 5 tens and 2 ones.
- A bundle of 10 ones is called a ten.
- Mentally find 10 more or 10 less without having to count.

Mathematical practices to be integrated

Look for and make use of structure.

- Look for patterns.
- Use models to accurately represent numerical values.

Look for and express regularity in repeated reasoning.

- Attend to detail.
- Look for regularity.

Essential questions

- Given a set of objects, how many bundles of 10 can be made?
- How can you rename a number in terms of tens?
- What is the numeric pattern in counting by tens?
- What other tools would you use to represent the number *x*?
- What is 10 more than ___?
- What is 10 less than ___?

Written Curriculum

Common Core State Standards for Mathematical Content

Number and Operations in Base Ten 1.NBT

Understand place value.

1.NBT.2 Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:

a. 10 can be thought of as a bundle of ten ones — called a "ten."

c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).

Use place value understanding and properties of operations to add and subtract.

1.NBT.5 Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.

Common Core Standards for Mathematical Practice

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 $7 \times 5 + 7 \times 3$, 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.

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.

Clarifying the Standards

Prior Learning

In kindergarten, students understand the base ten system. The number 10 is composed and decomposed and they explore the result of adding 10 to numbers 0 through 9. Kindergarteners use manipulatives, drawings, and equations to explore numbers 11-19 in terms of place value

Current Learning

In grade 1, students begin to refer to10 as a counting unit. Their understanding of place value leads to an efficient method for addition and subtraction based on base 10. First-grade students understand that the number in the tens place is significant in determining the relationship between numbers and number sequence.

Future Learning

In future grades, the concept of base ten as a unit is expanded to 100s and 1,000s. Students continue to use these units to add and subtract efficiently. Students become proficient in determining the value of a number and its place in a counting sequence based on the position of numerals 0–9 within the number (946 is greater than 496).

Additional Findings

According the Progressions, common core tools.wordpress.com, students work in the base ten system is integrated into counting and computation.

Grade 1 Mathematics, Quarter 1, Unit 1.6

Developing the Power of 10 as it Relates to Digit Placement in a Teen Number

Overview

Number of instructional days: 8 (1 day = 45–60 minutes)

Content to be learned

- Teen numbers (11 to 19) are special numbers that refer to a bundle of ten and a given number of ones.

Mathematical practices to be integrated

Attend to precision

- Accurately explain reasoning.

Look for and make use of structure

- Use models to accurately represent numerical values.

Essential questions

- How can you represent *x* (any teen number) in tens and ones? For example, 14 is ___ tens and ___ ones or a rod and 4 ones.
- Given a ten and a number of ones, write the numeral that the tens and ones represent. For example: 1 ten and 3 ones is _____.

Written Curriculum

Common Core State Standards for Mathematical Content

Number and Operations in Base Ten 1.NBT

Extend the counting sequence.

1.NBT.2 Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:

b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.

Common Core Standards for Mathematical Practice

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.

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 $7 \times 5 + 7 \times 3$, 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.

Clarifying the Standards

Prior Learning

In kindergarten, students learned to count to 100 by ones and tens. They have also learned to count forward from any given number within a known sequence.

Current Learning

In grade 1, students are learning to count to 120. Students should be able to start at any number less than 120 and count forward. In future units during first grade, students are counting to, reading and writing numbers up to 120 and will be able to represent a number of objects with a written numeral.

Future Learning

In grade 2, students' learning is being reinforced as they continue to build on their knowledge of place value by now having to count to, read and write numbers up to 1,000. Students are also using the skills of skip counting to count on. These skills should be at the drill and practice level in grade 3. In grade 4, students are using place value to read and write multi-digit whole numbers using base ten numerals, number names and expanded form.

Additional Findings

According the Progressions, common core tools.wordpress.com, students work in the base ten system is integrated into counting and computation.