Grade 1 Mathematics, Quarter 1, Unit 1.1

Telling Time to the Hour

Overview

Number of instructional days: 3 (1 day = 45–60 minutes)

Content to be learned

- Correctly tell time in hours using analog and digital clocks.
- Correctly write time in hours using analog and digital clocks.

Mathematical practices to be integrated

Use appropriate tools strategically.

- Use individual, student-made or teacher-provided analog clocks to accurately model the passage of time.
- Use clocks with the understanding that the hands move in only one direction.
- Write time to the hour using appropriate format (example: _ _:_ _).

Attend to precision.

- Use appropriate vocabulary to explain their thinking using analog and digital clocks.
- Use precision and attention to detail when telling and writing time.

Essential questions

- What happens to the hour hand when the minute hand starts at 12 and moves all the way around to 12 again?
- What happens to the number in the hour position on a digital clock when one hour has passed?
- What is the purpose of the colon on a digital clock?
- What does it mean when the minute hand is on the twelve?

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.

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.

Clarifying the Standards

Prior Learning

In kindergarten, students have learned to count and write numbers sequentially up to 20. They have had no formal experience with telling and writing time.

Current Learning

Although the standard identifies time to the half hour, the focus of this unit is to tell time to the hour using analog as well as digital clocks. Students tell time on an analog clock by distinguishing between the hour and minute hands. Students tell time on digital clocks by understanding the hour and minute placing on either side of the colon. Students use analog and digital clocks to measure the passage of time in hours. Students are introduced to telling and writing time to the hour, therefore the instructional level is developmental.

Future Learning

In second grade, students will learn to tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m. In third grade, students will tell and write time to the nearest minute and measure time intervals in minutes. They will solve word problems involving addition and subtraction of time intervals in minutes.

Additional Findings

According to *Principles and Standards for School Mathematics*, emphasis should be placed on developing concepts of time and the way it is measured. Throughout the school day, opportunities arise for teachers to focus on time through short conversations with their students. Students will learn to tell time as attention is called to the clock by the teacher (p. 104).

Grade 1 Mathematics, Quarter 1, Unit 1.2

Counting and Representing Numbers Within 40

Overview

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

Content to be learned

- Count orally to 40 starting at any number less than 40.
- Read and write numerals to 40.
- Represent up to 40 objects with a numeral.

Mathematical practices to be integrated

Reason abstractly and quantitatively.

- Make sense of quantities up to 40 and represent it symbolically.
- Attend to the meaning of quantities.

Essential questions

- What tools can you use to count to 40?
- How do you know which number comes next when you are counting to 40?
- When given a sequence of numbers, how do you know if the sequence is correct or incorrect?
- What strategies can you use to count a quantity of objects up to 40?

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

2 Reason abstractly and quantitatively.

Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to *decontextualize*—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to *contextualize*, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

Clarifying the Standards

Prior Learning

In kindergarten, students rote counted sequentially to 100 by ones and tens. They wrote numbers up to 20. Students represented a number of objects (0–20) with a written numeral.

Current Learning

Students count to 40 starting at any number less than 40. They are writing and representing a number of up to 40 objects with a written numeral. This is a major cluster, which means greater emphasis should be placed on this skill, because it sets a foundation for future learning. Building on the prior knowledge obtained in kindergarten, the instructional level of this unit is developmental.

Future Learning

In second grade, students will count within 1,000 as well as skip-count by 5s, 10s, and 100s. They will read and write numbers to 1,000.

Additional Findings

As stated in *Adding It Up*, a student's ability to count does not demonstrate a student's comprehension of number value. (p. 161)

In *Principles and Standards for School Mathematics*, research finds that "During the early years, teachers must help students strengthen their sense of number, moving from the initial development of basic counting techniques to more-sophisticated understandings of the size of numbers, number relationships, patterns, operations, and place value." (p. 79)

Grade 1 Mathematics, Quarter 1, Unit 1.3

Introducing Place Value to 10

Overview

Number of instructional days: 15 (1 day = 45–60 minutes)

Content to be learned

- Understand that amounts of tens and ones are represented by two digits.
- Understand that 10 ones can be called a "ten."
- Develop understanding of the relative position of whole numbers.
- Understand numbers 11 to 19 are composed of a "ten" and one, two, three, four, five, six, seven, eight, or nine "ones."
- Understand that the two digits in the numbers 10, 20, 30, and 40 are one, two, three, or four "tens" and zero "ones."

Mathematical practices to be integrated

Attend to precision.

- Attend to the meaning of quantities.
- Clearly define that a bundle of ten ones is a "ten."
- Use their own reasoning to explain the use of a group of some "tens" and zero "ones" to compose the amounts of 10–40.

Look for and express regularity in repeated reasoning.

- Notice that if one "ten" is added, the numeral in the tens digit increases by one, but adds a quantity of 10.

Essential questions

- How can you represent the tens and ones in a two-digit number?
- How do you know the number of "tens" in a given number?
- When is the appropriate time to use the term "ten"?
- When looking at a number from 11 to 19, why does the first number stay the same, while the second number changes?
- How does the quantity change when the number changes from 10 to 20, 20 to 30, and 30 to 40?

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."

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

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).

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.

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 composed and decomposed numbers from 11–19 into ten ones and some further ones. They grasped the understanding that these numbers are composed of 10 ones and one, two, three, four, five, six, seven, eight, or nine ones. Students were not exposed to the term "a ten" for a bundle of ten ones; instead they simply called it "ten ones."

Current Learning

Students identify a bundle of 10 ones as a "ten." Students understand that the numbers from 11–19 are composed of a "ten" and one, two, three, four, five, six, seven, eight, or nine ones. Students recognize that the numbers 10, 20, 30, 40, etc. refer to one, two, three, and four tens and zero ones. Place value is considered a major cluster, therefore greater emphasis should be placed on this content. Due to the prior knowledge built in kindergarten, the instructional level of this unit is developmental.

Future Learning

In second grade, students will understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones. The will think of 100 as a bundle of ten tens and call it a "hundred." They will understand that the numbers 100, 200, 300, etc. refer to one, two, or three hundreds and zero tens and zero ones.

Additional Findings

As stated in *Adding It Up*, "The base ten place value system is very efficient. It allows one to write very large numbers using only ten symbols, the digits 0–9. The same digit has a different meaning depending on its place in the numeral." (p. 199)

As stated in *Principles and Standards for School Mathematics*, "During the early years, teachers must help students strengthen their sense of number, moving from the initial development of basic counting techniques to more sophisticated understanding of the size of numbers, number relationships, patterns, operations, and place value." (p. 79)

Grade 1 Mathematics, Quarter 1, Unit 1.4

Adding Within 10

Overview

Number of instructional days: 15 (1 day = 45–60 minutes)

Content to be learned

- Demonstrate fluency for addition facts within 10.
- Use the strategy of counting on when adding.
- Understand the meaning of the equal sign.
- Determine if addition equations within 10 are true or false.

Mathematical practices to be integrated

Make sense of problems and persevere in solving them.

- Plan how to solve the problem by counting on.
- Use concrete objects (manipulatives) or pictures to help conceptualize and solve a problem.

Reason abstractly and quantitatively.

- Use symbolic representations to move from a concrete idea to a written equation.
- Stop and self-check throughout the process to determine accuracy of the outcome.

Model with mathematics.

- Identify important quantities when counting on.
- Analyze addition equations to draw conclusions as to the accuracy of the solution of an equation.

Essential questions

- What does it mean to add?
- How can you use the strategy of "counting on" when adding?
- What does the equal sign mean?
- How can you tell if an equation is true or false?
- How can you solve the problem quickly?

Written Curriculum

Common Core State Standards for Mathematical Content

Operations and Algebraic Thinking	1.OA

Add and subtract within 20.

1.OA.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).~~

Work with addition and subtraction equations.

1.OA.7 Understand the meaning of the equal sign, and determine if equations involving addition ~~and subtraction~~ are true or false. *For example, which of the following equations are true and which are false? 6 = 6, 7 = 8 – 1, 5 + 2 = 2 + 5, 4 + 1 = 5 + 2.*

Common Core Standards for Mathematical Practice

1 Make sense of problems and persevere in solving them.

Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, “Does this make sense?” They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.

2 Reason abstractly and quantitatively.

Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to *decontextualize*—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to *contextualize*, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

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 represented addition with objects, fingers, mental images, drawings, sounds, acting out situations, verbal explanations, expressions, or equations. Students were encouraged to write equations, but it was not required. They added within 10 by using objects, drawing, or equations to represent the problem. They found the number that makes 10 when added to any given number from 1–9. Fluency was gained for adding within 5.

Current Learning

Students add within 10 by counting on from a given number. They recognize and correctly use the addition sign and the equal sign. Students determine if addition equations are true or false. Fluency in addition within 10 is expected by the end of first grade. The instructional level for this unit is developmental. This is a major cluster, which requires that greater emphasis be placed on this skill.

Future Learning

In second grade students, will be expected to use addition and subtraction within 100 to solve one- and two-step word problems. They will fluently add within 20 using mental strategies and know from memory all sums of two one-digit numbers.

Additional Findings

As stated in *Adding It Up*, "They notice that they do not have to count the objects for the first addend but can start with a number in the first or the larger addend and count on the objects in the other addend (count on)." (p. 187)

As stated in *Curriculum Focal Points*, students create strategies for solving problems based on their understanding of the meanings of numbers. (p. 11)