Grade 2 • Module 1
Sums and Differences to 20

OVERVIEW

Module 1 sets the foundation for students to master the sums and differences to 20 (2.OA.2) and to subsequently apply these skills to fluently add one-digit to two-digit numbers at least through 100 using place value understandings, properties of operations and the relationship between addition and subtraction (2.NBT.5). In Grade 1, students worked extensively with numbers to 10 and they developed Level 2 and Level 3 mental strategies to add and subtract within 20 (1.OA.1) and 100 (1.NBT.4-6).

For example, to solve 12 + 3 students might make an equivalent but easier problem by decomposing 12 as 10 + 2 and composing 2 with 3 to make 5. Students can use this knowledge to solve related problems such as 92 + 3. They also apply their skill using smaller numbers to subtract problems with larger numbers: 12 – 8 = 10 – 8 + 2 = 2 + 2, just as 72 – 8 = 70 – 8 + 2 = 62 + 2.

Daily fluency activities provide sustained practice to help students attain fluency within 20. This fluency is essential to the work of later modules and future grade levels, where students must fluently recompose place value units to work adeptly with the four operations. Activities such as Say Ten counting and Take from 10, and the use of ten-frame cards and Hide Zero cards, solidify student fluency. Because the amount of practice required by each student to achieve mastery will vary, a motivating, differentiated fluency program needs to be established in these first weeks to set the tone for the rest of the year.

Throughout the module, students will represent and solve one-step word problems through the daily Application Problem (2.OA.1). Application problems can precede a lesson to act as the lead-in to a concept, allowing students to discover through problem-solving the logic and usefulness of a strategy before that strategy is reviewed. Or, they can follow the concept development so that students connect and apply their learning to real-world situations. This latter structure can also serve as a bridge between teacher-directed
work and students solving problems independently on activity worksheets and at home. In either case, problem-solving begins as a guided activity, with the goal being to move students to independent problem-solving, wherein they reason through the relationships of the problem and choose an appropriate strategy to solve. In Module 1, application problems follow concept development.

Topic A reactivates students’ Kindergarten and Grade 1 learning, as they practice prerequisite skills for Level 3 decomposition and composition methods: partners to 10 and decompositions for all numbers within 101. Students move briskly from concrete to pictorial to abstract as they remember their “make ten” facts. They use ten-frame cards to visualize 10, and they write the number bonds of 10 from memory. They use those facts to see relationships in larger numbers (e.g., 28 needs how many to make 30.) The number bond is also used to represent related facts within 10.

Topic B also moves from concrete to pictorial to abstract, as students use decomposing strategies to add and subtract within 20. By the end of Grade 1, Module 2, students learned to form ten as a unit. Hence, the phrase make ten now transitions to make a ten. Students use the ten-structure to reason about making a ten to add to the teens, and they use this pattern and math drawings to solve related problem sets (e.g., 9 + 4, 9 + 5, 9 + 6). Students reason about the relationship between problems such as 19 + 5 and 20 + 4 to 9 + 5 and 10 + 4. They use place value understanding to add and subtract within 20 by adding to and subtracting from the ones. The topic ends with a lesson in which students subtract from 10. The goal in making a 10 and taking from 10 is for students to master mental math.

Topic C calls on students to review strategies to add and subtract within 100 (1.NBT.4–6) to set the foundation for Grade 2’s work towards mastery of fluency with the same set of problems (2.NBT.5). They use basic facts and place value understanding to add and subtract within multiples of 10 without crossing the multiple (e.g., 7 – 5 = 2, so 47 - 5 = 42.) This segues into the use of basic facts and properties of addition to cross multiples of 10 (e.g., 26 + 9 = 20 + 6 + 4 + 5). In the final lesson, students decompose to make a ten, and then to subtract from numbers that have both tens and ones.

1 K.OA.4 and K.OA.3
Focus Grade Level Standards

Represent and solve problems involving addition and subtraction. ²

2.OA.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. ³

Add and subtract within 20. ⁴

2.OA.2 Fluently add and subtract within 20 using mental strategies. ⁵ By end of Grade 2, know from memory all sums of two one-digit numbers.

Use place value understanding and properties of operations to add and subtract. ⁶

2.NBT.5 Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

² In this module, word problems focus primarily on result unknown and change unknown situations.
³ See CCLS Glossary, Table 1.
⁴ From this point forward, fluency practice with addition and subtraction to 20 is part of the students’ ongoing experience.
⁵ See standard 1.OA.6 for a list of mental strategies.
⁶ The balance of this cluster is addressed in Modules 4 and 5.
Foundational Standards

Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.

**K.OA.3** Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., 5 = 2 + 3 and 5 = 4 + 1).

**K.OA.4** For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation.

Work with numbers 11–19 to gain foundations for place value.

**K.NBT.1** Compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and record each composition or decomposition by a drawing or equation (e.g., 18 = 10 + 8); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.

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 = 12 + 1 = 13).

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

**1.NBT.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.

**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.

**1.NBT.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.
Focus Standards for Mathematical Practice

MP.1  **Make sense of problems and persevere in solving them.** Students make math drawings and use recomposing strategies to reason through the relationships in word problems. They write equations and word sentences to explain their solutions.

MP.2  **Reason abstractly and quantitatively.** Students decompose numbers and use the associative property to create equivalent but easier problems, e.g., $25 + 6 = 20 + 5 + 5 + 1$. They reason abstractly when they relate subtraction to addition and change $13 - 8 = ____$ into an unknown addend, $8 + ____ = 13$, to solve.

MP.3  **Construct viable arguments and critique the reasoning of others.** Students explain their reasoning to prove that $9 + 5 = 10 + 4$. They communicate how simpler problems embedded within more complex problems enable them to solve mentally, e.g., $8 + 3 = 11$, so $68 + 3 = 71$.

MP.7  **Look for and make use of structure.** Students use the structure of ten to add and subtract within 20, and later, within 100. E.g., $12 - 8 = 10 - 8 + 2 = 2 + 2$, and $92 + 3 = 90 + 2 + 3 = 90 + 5$. 
# Overview of Module Topics and Lesson Objectives

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Terminology

Familiar Terms and Symbols

- Make ten and subtract from ten (e.g., \(8 + 3 = 8 + 2 + 1\) and \(15 - 7 = 10 - 7 + 5 = 3 + 5\))
- Ten plus (e.g., \(10 + 3 = 13\), \(30 + 5 = 35\), \(70 + 8 = 78\))
- Number bond (e.g., \(5 + 1 = 6\), \(1 + 5 = 6\), \(6 - 1 = 5\), \(6 - 5 = 1\))
- Say Ten counting (e.g., \(11\) is “1 ten 1,” \(12\) is “1 ten 2,” twenty is “2 tens,” \(27\) is “2 tens 7,” \(35\) is “3 tens 5,” \(100\) is “1 hundred,” \(146\) is “1 hundred 4 tens 6”)

Suggested Tools and Representations

- One set of ten-frame cards per student
  - One each of 1–4 and 6–9
  - Two fives
  - Ten tens
  - Blank frame
- Large set of ten-frame cards for teacher
- A bag of counters for each student (e.g., large white beans spray painted red on one side)
- Ten-strips
- Rekenrek
- Personal boards
- Hide Zero cards
- Linking cubes
- Dice

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**Suggested Methods of Instructional Delivery**

**Directions for Administration of Sprints**

Sprints are designed to develop fluency. They should be fun, adrenaline-rich activities that intentionally build energy and excitement. A fast pace is essential. During Sprint administration, teachers assume the role of athletic coaches. A rousing routine fuels students’ motivation to do their personal best. Student recognition of increasing success is critical, and so every improvement is celebrated.

One Sprint has two parts with closely related problems on each. Students complete the two parts of the Sprint in quick succession with the goal of improving on the second part, even if only by one more.

With practice the following routine takes about 8 minutes.

**Sprint A**

Pass *Sprint A* out quickly, face down on student desks with instructions to not look at the problems until the signal is given. (Some Sprints include words. If necessary, prior to starting the Sprint quickly review the words so that reading difficulty does not slow students down.)

- **T:** You will have 60 seconds to do as many problems as you can.
- **T:** I do not expect you to finish all of them. Just do as many as you can, your personal best. (If some students are likely to finish before time is up, assign a number to count by on the back.)
- **T:** Take your mark! Get set! THINK! (When you say THINK, students turn their papers over and work furiously to finish as many problems as they can in 60 seconds. Time precisely.)

After 60 seconds:

- **T:** Stop! Circle the last problem you did. I will read just the answers. If you got it right, call out “Yes!” and give a fist pump. If you made a mistake, circle it. Ready?
- **T:** (Energetically, rapid-fire call the first answer.)
- **S:** Yes!
- **T:** (Energetically, rapid-fire call the second answer.)
- **S:** Yes!

Repeat to the end of *Sprint A*, or until no one has any more correct. If need be, read the count by answers in the same way you read Sprint answers. Each number counted by on the back is considered a correct answer.

- **T:** Fantastic! Now write the number you got correct at the top of your page. This is your personal goal for *Sprint B*.
- **T:** How many of you got 1 right? (All hands should go up.)
- **T:** Keep your hand up until I say the number that is 1 more than the number you got right. So, if you got 14 correct, when I say 15 your hand goes down. Ready?
- **T:** (Quickly.) How many got 2 correct? 3? 4? 5? (Continue until all hands are down.)
Optional routine, depending on whether or not your class needs more practice with Sprint A:

T: I’ll give you one minute to do more problems on this half of the Sprint. If you finish, stand behind your chair. (As students work you might have the person who scored highest on Sprint A pass out Sprint B.)

T: Stop! I will read just the answers. If you got it right, call out “Yes!” and give a fist pump. If you made a mistake, circle it. Ready? (Read the answers to the first half again as students stand.)

Movement

To keep the energy and fun going, always do a stretch or a movement game in between Sprint A and B. For example, the class might do jumping jacks while skip counting by 5 for about 1 minute. Feeling invigorated, students take their seats for Sprint B, ready to make every effort to complete more problems this time.

Sprint B

Pass Sprint B out quickly, face down on student desks with instructions to not look at the problems until the signal is given. (Repeat the procedure for Sprint A up through the show of hands for how many right.)

T: Stand up if you got more correct on the second Sprint than on the first.

S: (Students stand.)

T: Keep standing until I say the number that tells how many more you got right on Sprint B. So if you got 3 more right on Sprint B than you did on Sprint A, when I say 3 you sit down. Ready? (Call out numbers starting with 1. Students sit as the number by which they improved is called. Celebrate the students who improved most with a cheer.)

T: Well done! Now take a moment to go back and correct your mistakes. Think about what patterns you noticed in today’s Sprint.

T: How did the patterns help you get better at solving the problems?

T: Rally Robin your thinking with your partner for 1 minute. Go!

Rally Robin is a style of sharing in which partners trade information back and forth, one statement at a time per person, for about 1 minute. This is an especially valuable part of the routine for students who benefit from their friends’ support to identify patterns and try new strategies.

Students may take Sprints home.
Personal Boards

Materials Needed for Personal Boards

- 1 High Quality Clear Sheet Protector
- 1 piece of stiff red tag board 11” x 8 ¼”
- 1 piece of stiff white tag board 11” x 8 ¼”
- 1 3”x 3” piece of dark synthetic cloth for an eraser
- 1 Low Odor Blue Dry Erase Marker: Fine Point

Directions for Creating Personal Boards

Cut your white and red tag to specifications. Slide into the sheet protector. Store your eraser on the red side. Store markers in a separate container to avoid stretching the sheet protector.

Frequently Asked Questions About Personal Boards

Why is one side red and one white?

The white side of the board is the “paper.” Students generally write on it and if working individually then turn the board over to signal to the teacher they have completed their work. The teacher then says, “Show me your boards,” when most of the class is ready.

What are some of the benefits of a personal board?

- The teacher can respond quickly to a hole in student understandings and skills. “Let’s do some of these on our personal boards until we have more mastery.”
- Student can erase quickly so that they do not have to suffer the evidence of their mistake.
- They are motivating. Students love both the drill and thrill capability and the chance to do story problems with an engaging medium.
- Checking work gives the teacher instant feedback about student understanding.

What is the benefit of this personal board over a commercially purchased dry erase board?

- It is much less expensive.
- Templates such as place value charts, number bond mats, hundreds boards, and number lines can be stored between the two pieces of tag for easy access and reuse.
- Worksheets, story problems, and other problem sets can be done without marking the paper so that students can work on the problems independently at another time.
- Strips with story problems, number lines, and arrays can be inserted and still have a full piece of paper to write on.
- The red versus white side distinction clarifies your expectations. When working collaboratively, there is no need to use the red. When working independently, the students know how to keep their work private.
- The sheet protector can be removed so that student work can be projected on an overhead.
Scaffolds

The scaffolds integrated into *A Story of Units* give alternatives for how students access information as well as express and demonstrate their learning. Strategically placed margin notes are provided within each lesson elaborating on the use of specific scaffolds at applicable times. They address many needs presented by English language learners, students with disabilities, students performing above grade level, and students performing below grade level. Many of the suggestions are organized by Universal Design for Learning (UDL) principles and are applicable to more than one population. To read more about the approach to differentiated instruction in *A Story of Units*, please refer to “How to Implement *A Story of Units*.”

Assessment Summary

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7 Students with disabilities may require Braille, large print, audio, or special digital files. Please visit the website, www.p12.nysed.gov/specialed/aim, for specific information on how to obtain student materials that satisfy the National Instructional Materials Accessibility Standard (NIMAS) format.
In this first module of Grade 2, students make significant progress towards fluency with sums and differences within 20 (2.OA.2). Fluency, coupled with a fundamental grasp of place value, rests on three essential skills: 1) knowing number bonds of ten, 2) adding ten and some ones, and 3) the number bonds (pairs) of numbers through ten. Topic A energetically revisits this familiar ground from kindergarten (K.OA.3) and Grade 1 (1.OA.6) at a new pace; we move quickly from concrete to pictorial to abstract. All the material included herein can be included in daily fluency work, and should be if students lack fluency with mental strategies.

In Lesson 1, students use ten-frames to model number bonds of ten as they generate addition and subtraction number sentences and solve for the missing part by bonding, counting on, or subtracting. Students record and share number bonds of 10 to regain their Grade 1 fluency and understanding. Lesson 2 continues with students revisiting number pairs through 10 and each pair’s related facts. Again, students work with ten-frame cards to create number bonds and to determine a corresponding subtraction number sentence. As students play a part–whole game, they practice finding the missing part and decomposing a given quantity in a variety of ways.

The application problems in these earlier lessons follow the concept development to provide students with the opportunity to discover the connection between the one-step story problems (2.OA.1) and the models (i.e., ten-frames, number bonds) and to articulate their observations with classmates.
**A Teaching Sequence Towards Mastery of Foundations for Addition and Subtraction Within 20**

| Objective 1: Make number bonds of ten. | (Lesson 1) |
| Objective 2: Make number bonds through ten with a subtraction focus and apply to one-step word problems. | (Lesson 2) |
Lesson 1

Objective: Make number bonds of ten.

Suggested Lesson Structure

- Fluency Practice (19 minutes)
- Concept Development (16 minutes)
- Application Problems (15 minutes)
- Student Debrief (10 minutes)

Total Time (60 minutes)

Fluency Practice (19 minutes)

- Happy Counting 1–10 2.NBT.2 (2 minutes)
- Break 10 in 2 Parts 2.OA.2 (5 minutes)
- Add Tens and Some Ones 2.OA.2 (12 minutes)

Happy Counting 1–10 (2 minutes)

Note: On the first day, counting up and down to 10 simply alerts students to the fun and challenge of changing direction and establishing a protocol that will quickly advance to larger numbers as the module unfolds.

Make your hand motions emphatic so the students’ counting is sharp and crisp. Once students get the hang of it, make the counting more challenging by skip-counting or starting at higher numbers. Also, it’s Happy Counting, not Happy Mouth, so resist the urge to mouth the answers. Students need to do the work, so they have to watch your fingers!

T: We’re going to play a game called Happy Counting!

T: Watch my hand to know whether to count up or down. A closed hand means stop. (Show signals as you explain.)

T: Let’s count by ones, starting at zero. Ready? (Teacher rhythmically points up until a change is desired. Show a closed hand then point down. Continue, mixing it up.)

S: 0, 1, 2, 3, (stop), 2, 1, 0, (stop), 1, 2, 3, 4, 5, (stop), 4, 3, 2, 1, 0, (stop), 1, 2, 3, 4, 5, 6, 7, (stop), 6, 5, 4, (stop), 5, 6, 7, 8, 9, 10, (stop), 9, 8, 7, 6.

T: Excellent! Try it for 30 seconds with your partner. Partner A, you are the teacher today.
Break 10 in 2 Parts (5 minutes)

Materials: (S) One stick of ten linking cubes with a color change after the fifth cube

Note: There is almost no foundational skill more important than fluency with the bonds of numbers within 10. By starting at the concrete level, students quickly re-engage with their hopefully hard-wired knowledge of their bonds of 10. The color change also orients them to the five.

T: Now let’s play Break 10 in 2 Parts
T: Show me your 10 stick. (Students show.) Hide it behind your back.
T: I will say the size of one part. Break that part off in one piece. Then without peeking, see if you know how many are in the other part.
T: Ready?
S: Yes!
T: Break off 2. No peeking. At the signal, tell how many are in the other part. (Give signal.)
S: 8!
T: Show your parts and see if you are correct.
S: It’s 8!
T: What parts are you holding?
S: 2 and 8.
T: What’s the whole?
S: 10.

Continue with the following possible sequences: 3 and 7, 1 and 9, 4 and 6, 5 and 5. Show the bond (as pictured to the right) and continue with the remaining bonds at an ever-quickening pace.

T: Turn and talk to your partner about how this game is the same or different than one you played in first grade.
T: How did knowing that help you play today?
T: Tell your partner which pattern or strategy helped you to find the missing part when you couldn’t peek at how many were left.

Sprint: Add Tens and Some Ones (12 minutes)

Materials: (S) Add Tens and Some Ones Sprint

Note: This particular choice brings automaticity back with the Ten Plus sums, foundational for the make a ten strategy and expanded form.
Directions for Administration of Sprints

One sprint has two parts with closely related problems on each. The problems on each part move from simple to complex, creating a challenge for every learner. Before the lesson, cut the sprint sheet in half to create Sprint A and Sprint B. Students complete the two parts of the sprint in quick succession with the goal of improving on the second part, even if only by one more. With practice the following routine takes about 8 minutes.

**Sprint A**
(Put Sprint A face down on desks with instructions to not look at problems until the signal is given.)

T: You will have 60 seconds to do as many problems as you can.
T: I do not expect you to finish all of them. Just do as many as you can, your personal best.
T: Take your mark! Get set! THINK! (When you say THINK, students turn papers over and work furiously to finish as many problems as they can in 60 seconds. Time precisely.)

(After 60 seconds:)
T: Stop! Circle the last problem you did. I will read just the answers. If you got it right, call out “Yes!” and give a fist pump. If you made a mistake, circle it. Ready?

(Repeat to the end of Sprint A or until no one has any more correct.)

T: Now write your correct number at the top of the page. This is your personal goal for Sprint B.
T: How many of you got 1 right? (All hands should go up.)
T: Keep your hand up until I say a number that is 1 more than the number you got right. So, if you got 14 right, when I say 15 your hand goes down. Ready?
T: (Quickly.) How many got 2 right? And 3, 4, 5, etc. (Continue until all hands are down.)

(Optional routine, depending on whether or not the class needs more practice with Sprint A.)

T: Take one minute to do more problems on this half of the sprint.

(As students work, you might have the person who scored highest on Sprint A pass out Sprint B.)

T: Stop! I will read just answers. If you got it right, call out “Yes!” and give a fist pump. If you made a mistake, circle it. Ready? (Read the answers to the first half again.)

Note: To keep the energy and fun going, do a stretch or a movement game in between sprints.

**Sprint B**
(Put Sprint B face down on desks with instructions to not look at the problems until the signal is given. Repeat the procedure for Sprint A up through the show of hands for how many right.)

T: Stand up if you got more correct on the second sprint than on the first.

S: (Students stand.)
T: Keep standing until I say the number that tells how many more you got right on Sprint B. If you got 3 more right on Sprint B than on Sprint A, when I say 3 you sit down. Ready?

(Call out numbers starting with 1. Students sit as the number by which they improved is called.)

An alternate method is to choose three students to tell how many they got correct on Sprint A and Sprint B.
For each set of scores, on your signal, the class chorally says the difference. This provides frequent practice with counting on and other mental strategies, and it reinforces the relationship between addition and subtraction.

T: Miguel, how many did you get correct on Sprint A and Sprint B?
S: On Sprint A, I got 12, and on Sprint B I got 17.
T: How many more did Miguel do on Sprint B than on Sprint A? (Pause.)
S: (Students respond chorally.) 5!

Students may take sprints home.

**Concept Development (16 minutes)**

**Materials:** (T) Large set of ten-frame cards in the following suggested order: 5, 9, 1, 8, 2, 7, 3, 6, 4, 5, 10
(S) Personal white boards, deck of eleven ten-frame cards that show the numbers 1–10, with an extra card that shows 5 (see image below)

**Note:** This activity provides visual support as it invites students to remember the number bonds of 10.

T: Place your ten-frame cards in order from largest to smallest.
T: Move your ten-frames that have 5 or fewer dots to make ten (see model).
S: (Students move cards, placing the 1 on the 9, etc.)
T: Now go through your bonds of 10 out loud: (10 and 0, 9 and 1, 8 and 2, 7 and 3, etc.)
T: Close your eyes and see if you can remember them without looking.
T: Open your eyes and do it again. Who got better at their number bonds of 10?

![Image of ten-frame cards]

**Note:** This next activity requires students to visualize (for those who still need support) or recall from memory (for those who achieved mastery of partners to 10) the missing addend. It also refreshes their subitizing skills, as students only have a few seconds to recognize the set of 5 and the set of 2 on the image below as 7, in order to complete the number sentence.

T: Here is a ten-frame card. Tell me the addition sentence to make ten. Wait for the signal. (Flash a ten-frame dot card for about two seconds.)
S: 7 + 3 = 10, 5 + 5 = 10, 9 + 1 = 10, 8 + 2 = 10, etc.
T: This time, tell me the subtraction sentence to get to the number of dots shown.
Wait for the signal. (Flash a ten-frame dot card for about two seconds.)

**S:** 10 – 7 = 3, 10 – 5 = 5, 10 – 9 = 1, 10 – 1 = 9, etc.

**T:** Partner A: Turn over your ten-frame cards to hide the dots.
1. Show the top card for two seconds.
2. Wait for your partner to tell you the addition sentence and subtraction sentence.
3. Flash the next card.
4. Keep going until the buzzer sounds after one minute.

**T:** (Set the timer for one minute.) Partner B, do the same.

**T:** Let’s try the class set again. (Repeat the class set. Give verbal praise specific to observed improvement, “Students, you really improved at making 10 from 2, 3, and 4, which have always been a greater challenge.”)

**T:** Partners, talk about how 6 + 4 helps you solve 10 – 6.

Call out one number for students to show with their fingers. They show the missing part and say the number sentence.

**T:** Four.

**S:** (Students show 4 fingers. Then they show 6.) 4 + 6 = 10.

**T:** (Continue quickly through the remaining partners to 10.)

For three minutes, students write number bonds of 10 on personal boards or blank paper without pictures or manipulatives. If they get stuck, invite them to visualize ten-frame cards rather than use them. Close by having partners share their work and look for commonalities. (Template included.)

Once having generated the pairs independently in writing, briefly continue forward into teen numbers with addition, numbers to 40, and numbers to 100 as students are able. This adds excitement as students see their sums applying to bigger numbers. Keep a lively pace.

**T:** 5 + 5 is?

**S:** 10.

**T:** 15 + 5 is?

**S:** 20!

**T:** 25 + 5 is?

**T:** 30!

**T:** 65 + 5 is?

**S:** 70.

Repeat the process as time allows, possibly using the following sequence: 7 + 3, 17 + 3, 27 + 3, 57 + 3; 8 + 2, 28 + 2, and 48 + 2.
**Application Problems (15 minutes)**

**Problem 1**
Mrs. Potter paints her fingernails one at a time from left to right. If she paints 1 fingernail, how many fingernails will she have unpainted? How many other combinations of painted and unpainted nails can she have?

**Problem 2**
The cashier puts exactly 10 bills inside each envelope. How many more bills does he need to put in each of the following envelopes?

a. An envelope with 9 bills. (1)
b. An envelope with 5 bills. (5)
c. An envelope with 1 bill. (9)
d. Find other numbers of bills that might be in an envelope and tell how many more bills the cashier needs to put to make 10 bills.

A different cashier puts exactly 30 bills in each envelope. How many more bills does he need to put in each of the following envelopes?

a. An envelope with 28 bills. (2)
b. An envelope with 22 bills. (8)
c. An envelope with 24 bills. (6)

Note: Choose one or both problems based on the needs of your students and the time constraint of 15 minutes. These problems are designed to elicit connections between the fingernails, envelopes, and ten-frames, which can be explored during the Debrief. 15 minutes have been allotted in order for you to review the Read, Draw, Write (RDW) Process for problem-solving.

Directions on the RDW Process: Read the problem, draw and label, write a number sentence, and write a word sentence. The more students participate in reasoning through problems with a systematic approach, the more they internalize those behaviors and thought processes.

(Excerpted from “How to Implement A Story of Units.”)

**Problem Set**
Students should do their personal best to complete the Problem Set within the allotted 10 minutes. Some problems do not specify a method for solving. This is an intentional reduction of scaffolding that invokes MP.5, Use Appropriate Tools Strategically. Students should solve these problems using the RDW approach used for Application Problems.
Lesson 1: Make number bonds of ten.

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For some classes, it may be appropriate to modify the assignment by specifying which problems students should work on first. With this option, let the careful sequencing of the problem set guide your selections so that problems continue to scaffold. Balance word problems with other problem types to ensure a range of practice. Assign incomplete problems for homework or at another time during the day.

Student Debrief (10 minutes)

Lesson Objective: Make number bonds of ten.

The Student Debrief is intended to invite reflection and active processing of the total lesson experience.

Invite students to review their solutions for the Problem Set. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation to debrief the Problem Set and process the lesson. You may choose to use any combination of the questions below to lead the discussion.

- Compare the envelope problem to the fingernail problem. What is different about the problems? What is the same about them?
- (Hold up a ten-frame card). Why do you think I chose to use the ten-frame cards today?
- (Hold up the ten-stick of linking cubes with the color change after the fifth cube.) How does the color change at the five help us with learning our bonds of ten?
- Instead of a color change, how does the ten-frame show the five?
- How did the first envelope problem help you solve the second one? How does 6 + 4 help you to solve 26 + 4?

Exit Ticket (3 minutes)

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help you assess the students’ understanding of the concepts that were presented in the lesson today and plan more effectively for future lessons. You may read the questions aloud to the students.
Lesson 1: Make number bonds of ten.

Date: 5/8/13

<table>
<thead>
<tr>
<th>10 and 0 make</th>
<th>27</th>
<th>10 and 10 is</th>
<th>17</th>
<th>10 and 2 make</th>
<th>29</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 more than 10 is</td>
<td>23</td>
<td>10 and 10 is</td>
<td>16</td>
<td>10 and 2 make</td>
<td>28</td>
</tr>
<tr>
<td>5 more than 10 is</td>
<td>31</td>
<td>10 + 2 =</td>
<td>15</td>
<td>10 + 1 =</td>
<td>14</td>
</tr>
<tr>
<td>3 more than 10 is</td>
<td>25</td>
<td>10 and 10 is</td>
<td>13</td>
<td>10 and 2 make</td>
<td>27</td>
</tr>
<tr>
<td>2 more than 10 is</td>
<td>30</td>
<td>10 + 3 =</td>
<td>12</td>
<td>10 + 4 =</td>
<td>11</td>
</tr>
</tbody>
</table>

Do as many as you can in 60 seconds.
1. Add or subtract. Complete the number bond for each set.

3 + 7 = ____  9 + 1 = ____
7 + 3 = ____  1 + 9 = ____
10 - 7 = ____  10 - 1 = ____
10 - 3 = ____  10 - 9 = ____

2. Circle all the number sentences that are true.

0 + 10 = 10  6 + 3 = 10
5 + 5 = 10  9 + 1 = 10
2 + 9 = 10  6 + 4 = 10
3 + 7 = 10  1 + 10 = 10

3. Fill in the missing numbers.

4 + ____ = 10
10 - 6 = ___
10 = ____ + 6
___ = 10 - 4
4. Complete the number bonds.

5. Jim had $6 in the bank. He found some money on a park bench and put it the bank. He now has $10 in the bank. How much money did he find?

6. Natasha was given some money for her birthday. She spent $7 on a bow and $3 on a hair clip. If she used all of her money, how much money was Natasha given? Solve using words, math drawings, or numbers.
Lesson 1 Exit Ticket

Complete each number bond to make 10. Write at least one addition and one subtraction sentence to accompany each bond.

____ + ____ = ____
____ - ____ = ____

____ + ____ = ____
____ - ____ = ____

____ + ____ = ____
____ - ____ = ____

____ + ____ = ____
____ - ____ = ____
1. Circle all number sentences that are true.
   - 6 + 4 = 10
   - 10 = 3 + 7
   - 10 - 7 = 4
   - 5 + 5 = 1 + 9
   - 2 + 8 = 7 + 3
   - 8 - 2 = 10

2. Add or Subtract.
   - 10 - 7 = _____
   - 8 + 2 = _____
   - 10 - 5 = _____
   - 3 + 7 = _____
   - 10 - 0 = _____

3. Solve the problems.
   - 1 + 9 = 59 + 1 =
   - 15 + 5 = 65 + 5 =
   - 28 + 2 = 72 + 8 =
   - 33 + 7 = 87 + 3 =
   - 46 + 4 = 94 + 6 =
4. Complete the number bonds.

5. Your little brother has $4 and wants to spend the money on an action figure that costs $10. How much money does he still need to buy the action figure?

6. Daniel found $14. His father gave him some more. Then he had $20. How much money was he given? Write a number sentence to show your thinking.

7. Amy read 24 books. Peter read 30 books. Amy wants to read as many books as Peter. Amy thinks she needs to read 7 more books to reach her goal. Is she right? Explain using words, math drawings, or numbers.
Draw all the number bonds of 10. The first one is done for you.

10

0 10

10

10 0
Lesson 2

Objective: Make number bonds through ten with a subtraction focus and apply to one-step word problems.

Suggested Lesson Structure

- Fluency Practice (15 minutes)
- Concept Development (20 minutes)
- Application Problems (15 minutes)
- Student Debrief (10 minutes)
- Total Time (60 minutes)

Fluency Practice (15 minutes)

- Happy Counting 9–25 2.NBT.2 (2 minutes)
- Say Ten Counting from 5 to 25 2.NBT.1 (6 minutes)
- Ten Plus Number Sentences 2.OA.2 (3 minutes)
- Make Ten by Identifying the Missing Part 2.OA.2 (4 minutes)

Happy Counting 9–25 (2 minutes)

Note: Students practice fluently crossing the ten on day 2, meaning they work up and down especially focusing on 8, 9, 10, 11, 12, 11, 10, 9, 8 and 18, 19, 20, 21, 22, 21, 20, 19, 18.

T: We’re going to play a game called Happy Counting!

T: Watch my hand to know whether to count up or down. A closed hand means stop. (Show signals as you explain.)

T: Let’s count by ones, starting at zero. Ready? (Rhythmically point up until a change is desired. Show a closed hand then point down. Continue, mixing it up.)

S: 9, 10, 11, 12, 13, 14 (stop) 13, 12, 11 (stop) 12, 13, 14, 15, 16, 17, 18 (stop) 17, 16, 15, 14 (stop) 15, 16, 17, 18, 19, 20 (stop) 19, 18, 17 (stop) 18, 19, 20, 21, 22, 23 (stop) 22, 21, 20, 19 (stop) 20, 21, 22, 23, 24, 25.

T: Excellent! Try it for 30 seconds with your partner. Partner B, you are the teacher today.

Say Ten Counting from 5 to 25 (6 minutes)

Note: Research substantiates that unit form counting, or counting the Say Ten way, supports number sense in that the naming of the numbers reveals the base ten to students. Students have been counting this way since kindergarten.
Hide Zero cards and the Rekenrek (both pictured below) beautifully parallel Say Ten counting.

T: The Say Ten way to say 11 is 1 ten 1. (Pull the cards apart to show the 10 and the 1.) In Say Ten counting, we first state the number of tens and then state the number of ones.

T: (Show 12 with place value cards.) 2 more than 10, not in Say Ten way?
S: 12
T: (Pull cards apart.) The Say Ten way is to say 12?
S: 1 ten 2
T: (Show 13.) What is the Say Ten way for 13?
S: 1 ten 3
T: (Pull cards apart.) Yes!
T: Let’s count the Say Ten way, starting from 5 on the Rekenrek. As I move the beads, count aloud.

Beads on the Rekenrek start out pushed to the right. To show 5, a row of 5 are pulled to the left. To show 1 ten 1, a row of ten and a second row of one are pulled to the left, etc.

S: 5, 6, 7, 8, 9, 10, 1 ten 1, 1 ten 2, 1 ten 3, 1 ten 4, 1 ten 5, 1 ten 6, 1 ten 7, 1 ten 8, 1 ten 9.
T: 2 tens (show two rows of ten beads pulled to the left), and the pattern begins again.
S: 2 tens 1, 2 tens 2, 2 tens 3, 2 tens 4, 2 tens 5.
T: Partner B, tell your partner what patterns you noticed as you counted numbers 11–19.
T: Talk with your partner about how Say Ten counting numbers 11–19 relates to counting numbers 20–29.

Ten Plus Number Sentences (3 minutes)

Materials: (T) Ten-frame cards, Hide Zero cards

Note: Students should be able to claim proficiency with their ten plus facts. “My ten-plus facts are easy! I just know them. 10 + 9 is 19. See I didn’t have to count.” Clearly this then extends into knowing 20 + 9 and later understanding expanded form without difficulty.

T: I will flash two ten-frame cards, ten and another card. Wait for the signal. Then tell me the addition sentence that combines the numbers. Let’s say numbers the regular way.

T: (Flash 10 and 5.)
S: 10 + 5 = 15.

Continue with the following possible sequence: 10 and 9, 10 and 1, 10 and 3.

T: Let’s use Hide Zero cards for larger numbers. (Flash 30 and 5.)

Continue with the following possible sequence: 30 and 8, 70 and 8, 70 and 7
Lesson 2:

Make number bonds through ten with a subtraction focus and apply to one-step word problems.

Date: 5/8/13

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Lesson 2  2.1

T: Talk to your partner about 10 + 8 = 18, 30 + 8 = 38 and 70 + 8 = 78. (Write these facts on the board.) What is the same about these facts? What is different?

T: Partner A, explain how one problem helps you solve the other.

T: Partner B, explain how Say Ten counting is like ten plus number sentences.

Make Ten by Identifying the Missing Part (4 minutes)

Materials: (S) Personal white boards

Note: Students need this skill as they add 8 and 6 using the ten and subsequently add 18 and 6 or 80 and 60.

T: If I say 9, you say 1 because 9 needs 1 to be 10.

T: Wait for the signal, 5.

S: 5.

Continue with the following possible sequence: 8, 2, 9, 1.

T: This time I’ll say a number and you write the addition sentence to make ten on your personal white board.

T: 0. Get ready. Show me your board.

S: $0 + 10 = 10$.

T: 10. Get ready. Show me your board.

S: $10 + 0 = 10$.

Continue with the following possible sequence: 3, 7, 6, 4.

T: Turn and explain to your partner what pattern you noticed that helped you solve the problems.

S: First you said 0 and the answer was $0 + 10 = 10$; next you said 10 and the answer was $10 + 0 = 10$. The numbers switched places!

Concept Development (20 minutes)

Materials: (T) Set of ten-frame cards (S) Per pair of students: set of ten-frame cards, ten two-sided counters, a blank ten-frame, a die, a hiding paper, personal white boards

Note: This lesson builds on the previous lesson as students reestablish their Grade 1 mastery of sums and differences to 10. The focus is on subtraction facts since, in general, students are proficient in addition but often mistakenly write $2 – 7 = 5$, for example, rather than $7 – 2 = 5$.

T: Look at the card I’m holding up. (Hold up a ten-frame with 6 dots.)

T: How many dots do you see?

S: 6.

T: In your mind, subtract 1. At the signal tell me the subtraction sentence. Wait for my signal.
Lesson 2:

Make number bonds through ten with a subtraction focus and apply to one-step word problems.

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NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

Choose one or both application problems based on the needs of your students and the time constraint of 15 minutes.

Take care that the connection between the concept development and the application problems is not made too explicit; the goal is for students to discover these connections: “Oh! This is just ten plus number sentences!” “I can use what I practiced in make 10 to do the apples problem!” Ask questions to probe what students mean and encourage them to articulate their observations, especially during the Debrief when you want the lesson’s objective to become eminently clear to the students.

S: 6 – 1 = 5.
T: Good. Let’s keep going. As you look at the 6 card, subtract the number I tell you. Wait for the signal. 5. (Signal.)
S: 6 – 5 = 1.
T: Nice work! (Keep going, subtracting 2, 4, 3, and 0 before advancing to the 7 card with a similar sequence.)
T: (Hold up a ten-frame with 7 dots.) Now how many dots do you see?
S: 7.
T: (Continue through the bonds of 7.)
T: Now, you practice in pairs using the 8 and 9 cards to quiz each other. Partner A, you start with the 8 card. When I say to switch, Partner B will start quizzing partner A with the 9 card.
T: (Pass out materials for the following activity: ten two-sided counters, a blank ten-frame, a die, a blank piece of paper to hide the counters.)
T: I will tell you the whole amount. Partner B shows the whole using counters on the ten-frame.
T: If I say that the whole is 7, Partner B shows one color of 7 counters on the ten-frame.
T: Now Partner A, roll the die to determine the part to change color. What part did you roll?
S: 4.
T: Hiding all the counters from Partner A, Partner B flips 4 counters to the other color.
T: Partner A, say the subtraction sentence to find the part that didn’t change color.
S: 7 – 4 = 3. The part that didn’t change color is 3!
T: Partner B, show the counters to prove whether Partner A is correct or incorrect.
T: Continue playing for 30 seconds. I will then say switch. Exchange materials. As I watch and listen to you work and improve, I will pass you on to the next larger number when you are ready. (Move students on to wholes of 8, 9, 10 and beyond.)

Note: Conduct a short debriefing to give students time to reflect and share insights.

T: There are some problems that you may do more slowly than others. Which ones slow you down?
S: Subtracting 6 from 9 is hard for me.
T: Who can share a way they subtract 6 from 9 with the class?
Lesson 2: Make number bonds through ten with a subtraction focus and apply to one-step word problems.

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NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:
As you circulate during this Application lesson segment, identify a student who uses an efficient representation or strategy. Ask the student to share her work with the class during the Student Debrief. Select work that advances efficient ways of counting and grouping rather than work that shows scattered representations.

S: My fives are easy for me. 9 – 5 is 4 so 9 – 6 is one less, 3. I think, 6 plus what is 9? I know that is 3. I know my tens. 10 – 6 is 4 so 9 – 6 is one less. I know my number pairs. 6 and 3 is 9 so 9 – 6 is 3.

T: Partner B, turn and talk to your partner about one strategy you just heard and understood that is different from the one you used. (Pause.) Partner A, take a turn.

Application Problems (15 minutes)

Problem 1
There are both red and green apples in a bag. (Select a total number of apples as appropriate for your students. Be sure your students are proficient with 7, 8, and 9 before choosing a larger number.) How many red and how many green apples might there be in the bag?

Problem 2
Sherry already has 10 stickers. Now her goal is to collect 20 in all. She got 4 more on Monday and 4 again on Tuesday.

- How many does she have in all?
- How many more does she need to make her goal?
- How many does she need if her goal is to collect 30 stickers?

Note: Problem 1 relates to the fingernail problem from the previous day’s lesson. Instruct students to use the RDW procedure (introduced in Lesson 1) and their personal white boards to complete Problem 1. Problem 2 is more challenging, and the goal is for students to do their best within the allotted time (time-frame), not to complete all tasks (task-frame). The two problems create a differentiation opportunity. Those students who grasp the concept can move on, while those who need more practice can work on Problem 1.

Guide students through the problem by rereading it and then drawing and labeling each piece of information as it is given. (Be sure students write the equation and the statement of the answer for each part as it is solved on their personal white boards.) This systematic approach will support students as they work independently on the Problem Set and at home.

T: Let’s read Problem 2 together through Part (a).
S: (Students read chorally.)
T: Tell your partner what you see when you hear the story.
S: (Students share with partners.)
T: What can you draw to show Part (a)?
S: A page with 10 stickers, and then another page that’s getting fuller because she got stickers on Monday and stickers on Tuesday. → 10 stickers and 8 more.

T: I’ll give you two minutes to make your drawing of the story.

T: Explain to your partner what your drawing shows.

T: (Wait until a brief exchange is complete.) How many stickers does Sherry have now?

S: 18.

T: 18 what? It’s important to always state the unit.

S: 18 stickers.

T: Turn and tell your partner what number sentence you can write to show your drawing.

At this point continue through the process of having the students write the equation and the statement of the answer.

Problem Set (10 minutes)

Students should do their personal best to complete the Problem Set within the allotted 10 minutes. For some classes, it may be appropriate to modify the assignment by specifying which problems they work on first. Some problems do not specify a method for solving. Students solve these problems using the RDW approach used for Application Problems.

Student Debrief (10 minutes)

Lesson Objective: Make number bonds through ten with a subtraction focus and apply to one-step word problems.

The Student Debrief is intended to invite reflection and active processing of the total lesson experience.

Invite students to review their solutions for the Problem Set. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation to debrief the Problem Set and process the lesson. You may choose to use any combination of the questions below to lead the discussion.
Lesson 2: Make number bonds through ten with a subtraction focus and apply to one-step word problems.

You’ve worked hard to solve the sticker problem so now let’s look at our work together.

What did you see?

Do you agree? Turn and talk to your partner about why you agree or disagree?

Look at the first and second columns of Problem 2. What connections do you see between the problems in each row?

In Problem 6, which numbers did you add first? Why?

Exit Ticket (3 minutes)

After the Student Debrief, instruct students to complete the Exit Ticket. A quick review of their work will help you assess the students’ understanding of the concepts that were presented in the lesson today. Students have three minutes to complete the Exit Ticket. You may read the questions aloud to the students.

NOTES ON USING MP.3 IN A STUDENT DEBRIEF:

In transitioning from the Application Problems to the Student Debrief, anticipate your students needing one minute to organize their materials and find their pre-assigned math partner to come to the rug.

As students organize themselves, quickly project or redraw the student sample you selected, as well as your own solution on the board.

Once students have gathered, wait for 100% attention before beginning. Signal the beginning of the Debrief with a welcoming statement as modeled to the left.

The simple question, “What do you see?” is non-threatening and remarkably effective for eliciting a range of observations and insights that get the conversation started by meeting students where they are. These insights then lead to the opportunity to construct viable arguments and critique the reasoning of others.
1. Complete the number bonds

2. Find the unknown numbers that make the number sentences true.

   \[ 9 - 5 = \_ \_ \] \[ 8 - 5 = \_ \_ \] 
   \[ 3 + \_ \_ = 8 \] \[ 3 + \_ \_ = 7 \] 
   \[ 8 - \_ \_ = 4 \] \[ 6 - \_ \_ = 3 \] 
   \[ 18 = \_ \_ + 10 \] \[ 17 = 7 + \_ \_ \] 
   \[ \_ \_ - 5 = 4 \] \[ \_ \_ - 6 = 3 \]

3. Maria put some cups on the table. Jesse put 7 more. There were 17 cups in all. How many cups did Maria put on the table? Show your thinking using words, math drawings, or numbers.
4. Fill in the missing numbers:
   11 is _____ and 1
   13 is _____ and 3
   15 is 10 and _____
   10 and _____ is 19
   10 and 8 is _____
   12 is 10 and _____

5. Your older sister says, “3 + 10 is easy”. You can hear the answer when you count the Say Ten way. Use the ten-frame cards to show why this strategy works for 10 + 7 = 17.

   [Ten-frame representation]

6. Maggie had a bag of marbles. There were 5 yellow marbles, 6 white marbles and 4 blue marbles. How many marbles were there in all? Show your thinking using words, math drawings, or a number sentence.
Name _______________________________ Date ________________

1.  7 - 4 = ____

2.  2 + _____ = 8

3.  6 = 9 - _____

4. Mr. Gardener has a box with 12 tomatoes. He gives 2 tomatoes to his sister and another 7 tomatoes to his neighbor. How many tomatoes does he have left? Show your work with a picture and number sentence.

   Mr. Gardener has _____ tomatoes.
Lesson 2 Homework
NYS COMMON CORE MATHEMATICS CURRICULUM

1. Complete the number bonds

2. Find the unknown numbers that make the number sentences true.

   7 - 5 = _____  
   9 - 5 = _____

   4 + _____ = 8  
   10 = 7 + _____

   8 - _____ = 3  
   7 - _____ = 3

   17 = _____ + 10  
   6 = 5 + _____

   _____ - 5 = 3  
   _____ - 6 = 3

3. Fill in the missing numbers

   _____ = 8 + 10  
   _____ = 7 - 2

   _____ = 10 - 5  
   _____ = 10 + 4

   _____ = 10 + 9  
   _____ = 3 + 6
4. Fill in the missing numbers.
   16 is _____ and 6.
   11 is 10 and _____
   18 is _____ and 10
   10 and 7 is _____
   15 is _____ ten _____ ones.
   10 and _____ is 19

5. Mr. Avakian put a stack of 10 paper plates on the table for a party. He also put 8 big plates of food. How many plates were there in all on the table? Show your thinking using words, math drawings, or a number sentence.

6. Mr. Passerini handed out 10 vanilla, 2 chocolate, and 8 strawberry ice cream cones. How many ice cream cones did she hand out in all? Show your thinking using words, math drawings, or a number sentence.