Second Grade Unit 1: Adding and subtraction within 100

Overview
Students start the year by working with addition and subtraction situations involving numbers they are already familiar with. They build on the strategies they used in Grade 1 to begin refining their addition strategies and develop strategies for subtraction within 100. Students expand their understanding of mentally adding and subtracting ten to include mental strategies for adding and subtracting other quantities within 20. These concepts are introduced at the beginning of the year because addition and subtraction is a major focus of Grade 2; therefore, students need time to practice to reach fluency by the end of the year.
Contents

Standards ................................................................................................................................................ 3
Mathematical Practices .......................................................................................................................... 3
Critical Area ............................................................................................................................................. 3
Vocabulary .............................................................................................................................................. 4
Resources ............................................................................................................................................... 4
Assessment ............................................................................................................................................. 5
Lesson Learning Targets ........................................................................................................................ 5
Lesson 1 ..................................................................................................................................................... 5
Lesson ..................................................................................................................................................... 12
Lesson ................................................................................................................................................... 14
Lesson ................................................................................................................................................... 18
Lesson ................................................................................................................................................... 20
Lesson ................................................................................................................................................... 27
Lesson ................................................................................................................................................... 31
Lesson ................................................................................................................................................... 34
Lesson ................................................................................................................................................... 41
Lesson ................................................................................................................................................... 44
Grade 2 Unit 1: Adding and subtraction within 100

Grade 2 Unit 1 13 Days

Standards
Common Core State Content Standards

Operations and Algebraic Thinking — 2.OA
B. Add and subtract within 20

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

NOTE: See standard 1.OA.C.6 for a list of mental strategies:

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 $6 + 6 + 1 = 12 + 1 = 13$).

Number and Operations in Base Ten — 2.NBT
B. Use place value understanding and properties of operations to add and subtract.

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

Mathematical Practices
1. Make sense of problems and persevere in solving them.
   In second grade, students realize that doing mathematics involves solving problems and discussing how they solved them. Students explain to themselves the meaning of a problem and look for ways to solve it. They may use concrete objects or pictures to help them conceptualize and solve problems. They may check their thinking by asking themselves, —Does this make sense?” They make conjectures about the solution and plan out a problem-solving approach.
   • Interpret and make meaning of the problem to find a starting point. Analyze what is given in order to explain to themselves the meaning of the problem.

 Comments: 2.OA.B.2 will be finalized in unit 15, allowing students time to work towards fluency.

2.NBT.B.5 calls for students to develop subtraction strategies with all numbers within 100—whereas in Grade 1, students only subtracted multiples of 10. This standard will be finalized in unit 15, allowing students time to work towards fluency.

Students apply their understanding of the structure in the number system to refine addition strategies and develop subtraction strategies (MP.7). This involves using and analyzing multiple approaches to problem solving (MP.1)
• Plan a solution pathway instead of jumping to a solution.
• Monitor their progress and change the approach if necessary.
• See relationships between various representations.
• Relate current situations to concepts or skills previously learned and connect mathematical ideas to one another.
• Continually ask themselves, “Does this make sense?” Can understand various approaches to solutions.

2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
   Second graders look for patterns. For instance, they adopt mental math strategies based on patterns (making ten, fact families, doubles).
   • Apply general mathematical rules to specific situations.
   • Look for the overall structure and patterns in mathematics.
   • See complicated things as single objects or as being composed of several objects.
8. Look for and express regularity in repeated reasoning.

**Critical Area**

#2 Build Fluency with Addition and Subtraction

Students use their understanding of addition to develop fluency with addition and subtraction within 100. They solve problems within 1000 by applying their understanding of models for addition and subtraction, and they develop, discuss, and use efficient, accurate, and generalizable methods to compute sums and differences of whole numbers in base-ten notation, using their understanding of place value and the properties of operations. They select and accurately apply methods that are appropriate for the context and the numbers involved to mentally calculate sums and differences for numbers with only tens or only hundreds.

**Vocabulary**

**Resources**

02 Unit 1- Adding and Subtracting within 100 REV 2014-15.00.00
MANIPULATIVES AND MATERIALS TO PREPARE FOR UNIT 1

ASSESSMENT

- To pinpoint assessments to use for students who are struggling, see page 23 in any of the KR Assessment Books.
- Do further assessment 1:1 of students who are not fluent to five on the Number Bond 5 Sprint the first week of school to make sure the centers are geared to their assessed needs and progress is monitored from beginning of the year.
- Sprint: Number Bonds for 10
- Assessment at end of lessons.
- Math Concepts Concept 7: Ten Frames addition and subtraction, p.36, 42; Assessing at Work, p. 57

Additional Resources:
Flip Book pg. 7-8 and 18-19

LESSON LEARNING TARGETS

Learning Target 1: Make connections between addition and subtraction and the different representations of the parts of ten.
Learning Target 2: Connect representations of parts of ten to subtraction.
Learning Target 3: Describe patterns in multiple representations when adding any one-digit number to 9 or 8.
Learning Target 4: Use basic facts to add or subtract a 1-digit number and a 2-digit number.
Learning Target 5: Represent addition and subtraction problems that can be solved using basic facts.
Learning Target 6: Determine when using basic facts to subtract can be used to solve problems and when problems need to be solved by subtracting from 10.
Learning Target 7: Describe patterns when decomposing to make ten to add within 20.
Learning Target 8: Use basic facts that make 10 as tools to subtract.
Learning Target 9: Make a ten to add within 100.
Learning Target 10: Make a ten to add within 100.
Learning Target 11: Find patterns in problems when you need to subtract from a ten.
Learning Target 12: Apply the pattern used to subtract by subtracting ones from tens to subtracting ones from number composed of tens and ones.
Learning Target 13: Apply different strategies to add and subtract 2-digit numbers within 100 to solve word problems (optional).
LESSON 1

Target 1: Make connections between addition and subtraction and the different representations of the parts of ten.

Success Criteria:

- Match ten frames that make ten.
- Use complete sentences to describe addition and subtraction of parts of ten.
- Make number bonds that represent addition and subtraction with ten-frames.
- Use words and equations to describe addition and subtraction with ten-frames and number bonds.
- Explain how the different representations are the same and how they are different.

Materials: number bonds sheet, some with circles and some with rectangles, in sheet protector; large teacher ten frames; student set of ten frames with 0-10 and two 5’s; Bead String Cards and Directions (after lesson); two dice for each pair. Exit ticket sheet Engage NY Module 1. A. 14

Teaching Actions

LAUNCH: (20 MINUTES)

Ten Frames:

- Ask students to place ten-frame cards in order from largest to smallest with the two 5’s next to each other.
- Hold up the 9: “How many to ten?”
- Model taking teacher 10-frame with 1 circle and placing it so that it fills the empty spot on the nine.
- Have students move each of the 0-5 ten frames with its 10-5 ten frame that makes 10 (0 with 10. 1 with 9, 5 with 5…..)
- Give partners about 1 minute to take turns pointing to a pair of their partner’s ten frames. The other partner says: “9 and 1 make 10; 7 and 3 make 10, etc.”

Use number bonds to represent addition and subtraction:

- Make different number bonds on chart paper, some with total on the top and others with total on the side, some with rectangles and some with circles.

Establish norm that students explain and answer in complete sentences except for fluency work or choral response asking for a number.

This lesson reviews concepts from first grade, but is foundational for the unit and connecting addition and subtraction.
Ask students how they can tell which is the whole (the lines from the two parts go into the whole no matter which way the number bond faces).

- **Model representing a ten frame with the number bond.**
  - Fill in the whole with 10.
  - Hold up the 7 ten-frame for 2 seconds and ask students: “**How many did you see and how did you see it?**”
  - Fill out the first part of the number bond with 7.
  - Hold it up again and ask: “**How many more to make 10?**”
  - Fill out second part with 3.
  - Point to each part and the whole in the number bond as students rhythmically say: “**7 and 3 make 10.**”
  - Teacher records addition equation under the bond.
- Hold up a full ten-frame and then the 7 ten-frame. “**If the 10-frame started full. How many were taken?**”
- **Model:** Point to the ten frame and say, “**10 minus 3 makes 7.**”

- Repeat with number bond, covering under addition equation.
  - the 7.
  - **Record 10 – 3 = 7**
- Hold up ten-frame for 2 seconds and have students describe the frame as subtraction to partner.
- **Model** “**Ten-Frame Addition Subtraction Game**” (Partners):
  - Students write total, 10, in the whole of their number bonds (In plastic shields).
  - Tell students you are Partner A and they will take turns acting as your Partner B.
    - Put away one set of ten frame cards, remove the extra ten-frame with 5 from one set and mix ten frames face down.
    - Partner A picks up a ten frame and shows it to partner for short time (for example 3).
    - Partner B says, “3 and 7 make 10.”
    - Partner A then fills out the number bond and writes 3 + 7 = 10.
    - Switch and this time Partner B picks up a ten frame and shows it to A for 2 seconds. A says “**4 and 6 make 10**” and B fills out number bond and addition equation on his/her sheet.
    - Students continue playing.

When one pair has used all of the ten-frames, stop and model Part 2, subtraction.
- Students mix frames face down again and turn one over.
- The student who has the matching number bond on their sheet, writes the subtraction equation under the addition equation and keeps the ten frame.

Frames for Addition:
- ____ and ____ make 10.
- ____ + ____ = 10

Frames for Subtraction:
- 10 minus ____ = ____
- 10 - ____ = ____

It is important that all games with winner/loser have element of chance so either student can be winner.
(for example, if 8 is turned over the subtraction would be \(10 - 2 = 8\) and the person with 10, 8, 2 number bond keeps the frame).

- First one to have both addition and subtraction equations on their number bond sheet is the winner (or the one with the most ten frames/number bonds with both equations when time is called).

**EXPLORE: (10 MINUTES)**

Students continue to play the game (it can be Center on Day 2)

**CENTERS:**

**Introduce LT and SC for Center Time (8 minutes)**

**Example of possible Learning Target and Success Criteria:**

**LT:** *I can take responsibility for my learning without the teacher and help others.*

**Success Criteria:**

- Use math tools to learn not to play.
- Use a quiet voice.
- Clean up.
- Follow directions and ask other students when I don’t understand.
- Listen, explain in complete sentences, and ask questions when I work with my partner.
- Explain what I learn and what helps me learn.

**Introduce bead string center:**

“How Did You Find It? What Do You Notice?”

See directions and cards following lesson.

**SUMMARY:**

- Self-Assess Center Learning Target: Students assess themselves using Success Criteria and select SC to work on for next day. Teacher gives specific positive feedback and relates it to what he/she was able to do to help students learn.
- Number Bond flash to assess:
- Ask students to visualize the ten frame when you show them the number bond and describe with the sentence frame when you point to it.
  - “I see ______ filled in and _______ that are empty.”
- Exit Ticket Sheet (Make sure students know the whole is ten on all the bonds. Model the first one with both equations)
Grade 2 Unit 1: Adding and subtraction within 100

1.A. Name__________________________ Date ________________

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

0 + ___ = ___
0 - ___ = ___

1 + ___ = ___
1 - ___ = ___

2 + ___ = ___
2 - ___ = ___

3 + ___ = ___
3 - ___ = ___

4 + ___ = ___
4 - ___ = ___

5 + ___ = ___
5 - ___ = ___

02 Unit 1- Adding and Subtracting within 100 REV 2014-15.00.00
<table>
<thead>
<tr>
<th>2 tens 8 ones</th>
<th>4 tens 11 ones minus 2</th>
<th>2 tens 18 ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 tens 23 ones</td>
<td>7 tens 14 ones</td>
<td>5 tens 24 ones</td>
</tr>
<tr>
<td>1 ten 8 ones</td>
<td>18 ones 7 tens</td>
<td>3 tens 10 ones</td>
</tr>
<tr>
<td>1 ten 8 ones plus 3 more ones</td>
<td>1 ten 9 ones plus 4</td>
<td>8 tens 9 ones plus 5</td>
</tr>
<tr>
<td>2 tens 8 ones plus 4</td>
<td>5 tens 8 ones plus 8</td>
<td>7 tens 8 ones minus 4</td>
</tr>
</tbody>
</table>
Teacher Directions for Bead String Center:
“How Did You Find It? What Do You Notice?”

Game 1 (Use Cards)

1. Partners each turn over 1 card and locate the number on the bead string. Use this frame to describe the number of beads: I see ____ tens ______ ones.

2. Students:
   a. Students explain their strategies for finding the number;
   b. Write an addition equation and find the sum of the numbers:
   c. Explain strategy for finding the sum (they can use the beads or any other strategy);
   d. Write a subtraction equation to represent finding the difference between the two numbers.
   e. Use the two bead strings and a second strategy to find the difference between the two numbers.

3. The player with the larger number counts out the difference in beans and places them 5 to a row like ten frames so they will be easy to add up at the end of the game.

4. Person with the most beans at the end of the game wins.
**LESSON 2**

**Target 2:** Connect representations of parts of ten to subtraction.

**Success Criteria:**
- Visualize subtracting numbers on a 10 frame.
- Describe mental strategy using the ten frame model.
- Connect the action of subtracting to the subtraction number sentence.
- Verify answers using 10-frames.

**Materials:**
- Teacher: Set of ten-frame cards
- For each pair: two-sided beans or counters; ten frame set; blank ten frame; a die, a hiding paper; white board for each student

**Teaching Actions**

**LAUNCH: (8 MIN)**
- Hold up ten frame with 6 (5 and 1). *How many dots do you see?* (signal).
- "Subtract one in your mind and at signal turn and tell your subtraction sentence."
- Continue to ask students to look at 6 card and subtract different number sentence at signal.
- Repeat with 7 ten-frame.
- Have partners practice with 8 card. First Partner A tells Partner B the number to subtract and B gives the subtraction sentence.
- At your signal, partners switch roles.

**EXPLORE: (15 MIN)**

Model and play "**Flip to Subtract**" (*this can become a center activity to number that students are working on including numbers greater than ten frame*)
- Partners use one blank ten frame with 7 two sided counters on it showing).
- Partner A rolls the die (ask one student to model by rolling the die).
- Partner B hides the ten-frame behind a paper and flips the same counters shown on the die to the opposite color (for example, if 4 student flips 4 to red).
- Partner A visualizes the ten frame with the four flipped beans and number sentence to find the part that didn’t change color: "**7 minus 4 = 3. The part that didn’t change color is 3.**"
- Verify by uncovering the ten-frame to check the number without color change.
- Have partners switch roles and continue to play.

Often students write subtraction equation 2-7 = 5 rather than 7-2 = 5. Saying the number sentence aloud to represent the action can prevent that confusion.

Listen for students who struggle with the number sentence or who improve after struggling at first.

Use with any 10 using double (same color number of was rolled, tells Partner B the
SUMMARY: (AFTER CENTERS/10MIN)
Which numbers were harder to subtract?
What strategies did you use when you didn't know?

During the game select students to share strategies.
LESSON 3

Target 3: Describe patterns in multiple representations when adding any one-digit number to 9 or 8.

Success Criteria:
- Build 9 or 8 and a 1-digit number on a double ten frame.
- Combine the counters on the ten frames.
- Make a quick sketch of actions with the ten frames.
- Record equivalent expressions and equations that match the actions.
- Represent decomposing the number with a number bond.
- Describe patterns you notice when adding any 1-digit number to 9 and to 8.
- Visualize and describe adding numbers to 9 and to 8.

Materials:
- White boards; teacher large double ten frame and 2 sided counters; Partners: student double ten frame; two sided counters
- 1.A.11 Sprint (left side of page)

Teaching Actions
Lesson is about 45 minutes

LAUNCH:
Quick Sketch the ten-frame way (4 min):
- Remind students that sketching is a tool mathematicians use to solve and represent problems.
- Hold up a filled ten-frame vertically and make a quick sketch of 5 dots without the frame.
- Ask students to make the sketch on their boards.
- Turn horizontally to make ten in two rows of 5.
- Tell students they can put dots on both sides of ten frame they can never have more than five in row or column. The horizontal (arm movement) or vertical (arm movement).

Students sketch and hold up boards:
“Sketch 6…” Teacher will make a chart of the different ways a represented from student boards e.g. (4, 2; 5,1; 3,3)
“Sketch 4…”
“Sketch 9…..”
“Sketch 8…..”

Ask students to watch carefully and see if they can connect the actions with the ten frames to the sketches, expressions, equations and number bond.
- Fill one frame in a double ten frame with 9 beads or counters
- Put 6 on the other ten frame, red side up.
- Make a quick sketch on chart. (e.g. Use open circles for the for the 9 to represent two colors)
- Record 9 + 6

Number bond sketch for
9 + 6 = 10 + 5

Adding numbers to 10 is like counting the ten way (10 + 5 is “one ten 5” counting ten way)
• Move one red counter to fill the ten-frame.
• Cross off one circle on the quick sketch and draw an arrow to the same open circle you moved to make a ten.
• Under 9 +6 record: 10 + 5

\[9 + 6 = 10 + 5\]

Use A/B Partner talk to have students explain how the sketches, expressions and equations match the action with the ten frames to find the sum.

• Have a student put the counter back to show 9 + 6, and then discuss how the one red with the 9 white represents the move to make 9 a ten by subtracting one from the 6.

The total number of counters remained the same so both arrangements of the counters are equivalent \((9+6 = 10 + 5)\).

“Why would I want to break apart the six to make a ten?”

Ask students to make sense of the number bond you use to represent the same situation:

\[
\begin{align*}
9 + 6 & \\
1 & + 5 \\
10 + 5 & 
\end{align*}
\]

Have partners fill 9 on a ten-frame and fill 4 on the second ten frame, sketch and write the expression 9 + 4. Have students refer to the chart to tell the class the next steps.

Partners continue adding different numbers to 9 and writing the representations.
• Chart representations for more of the numbers and discuss the patterns they notice in the equations with bonds and in the actions shown on the sketches?

• Private Think Time (PTT): “What if we added 6 to 8 instead of 9? How do you think your actions and sketches of the ten frames will be the same and different if you add numbers to 8 instead of 9?”

• After PTT, give time for partner talk. Students take turns going back and forth explaining one thing they think will be the same or different in each representation. Have them use ten frames sketches and expressions/equations to explain to each other.

• Tell students they will go to tables and test their conjectures (what they think will happen) when adding numbers to 8.

**EXPLORE: (15 MIN)**

• Partners move to seats and add different numbers to 8, recording in their math journals/notebooks.
• If they have time they will pick a new number and add it to 7 after making conjectures.

**SUMMARY:**
02 Unit 1- Adding and Subtracting within 100 REV 2014-15.00.00
• Chart the representations for adding numbers to 8 representations for adding to 9.
• Chart the first expressions and ask students to write to show how they decomposed the number to get ten.
• Repeat for 8. Ask students to record.

9 + 7 = 10 + ___  
9 + 6 = ___ + 5  
9 + 5 = ____ + ___

8 + 7 = 10 + ___  
8 + 6 = ___ + 4  
8 + 5  = ___ + ___

Centers: Use the center activities from pg 13. Addition and Subtraction of 10

*Students bring notebook/journal to carpet to record the equations on following page.
LESSON 4

Target 4: Use basic facts to add or subtract a 1-digit number and a 2-digit number.

Success Criteria:
- Build 10-frame models with beans.

Materials:
- Full ten frame cards, two colored beans; 1.B.22 and 1.B.24 (run back to back)
- 1.A.11 Sprint (right side of page)

Teaching Actions

LAUNCH:
Place 3 beans in column and 2 more beans to the right.
What addition sentence combines these two sets? Tell your partner. (3 + 2 = 5)

Place a full ten-frame card to the left of the 3 and separated from the 2 to the right.
What addition sentence combines these two sets? Tell your partner. 13 + 2 = 15
Have students read the equation the Say Ten way and the Regular way.
Co-create the number bond under the 13, breaking apart the 13 into 10 and 3
Underneath record 10 + 5 = 15

Where did I get the 10 and where did I get the 5?”

Students record on white board and don’t erase.

Move the ten-frame to the left of the 2 and separated from the 3 on the far left.
What addition sentence combines these two sets? Tell your partner. (3 + 12 = 15).

Ask students to work with partner to make number bond and the next equation.

“10 + 3 + 2 = 15 and 3 + 10 + 2 = 15 because they are both 15.

“Discuss with partner why these addition sentences have the same answer. Use the model to help you explain.”

“10 + 3 + 2 = 3 + 10 + 2

Ask students to make a quick ten-frame sketch of 16 and check with partner.

Record 16 – 4 and ask students to show the action of subtraction on their sketch without erasing.
Write the equation.
Write the basic fact you can use to solve 16 - 4? (6 - 4 = 2)

“What happened to the ten when you subtracted?”

“Can you think of a 1-digit number that cannot be subtracted from 16 unless you break up the ten?” (7,8,9)

“What other numbers can be subtracted from 16 by using a basic fact without breaking up a ten? 16 – 0, 16 – 1,2,3,4,5,6.

Ask students to make a quick sketch of 14: “What numbers can be subtracted from 14 using a basic fact without breaking up the ten?”

EXPLORE: (NOT NECESSARY THAT STUDENTS FINISH)
1.B.22 with partner:

Modified directions:

Write the basic fact used to solve the problem under the equation.

Use quick sketches when it helps or if you disagree.

Complete #’s 1 and 8 with the class so students have a model.

1. 13 + 2 = ___ 8. 15 -3 = ___
   3 + 2 = 5 5-3 = 2

SUMMARY:
Assessment: Exit Ticket 1.B.24

FLUENCY:

Sprint 1.A.11 (Use right half of sheet)

Students record improvement from first time
Use basic facts to help you solve with mental math.

1. $13 + 2 = \underline{\hspace{2cm}}$  
2. $11 + 4 = \underline{\hspace{2cm}}$
3. $14 + \underline{\hspace{2cm}} = 16$
4. $13 + 6 = \underline{\hspace{2cm}}$
5. $\underline{\hspace{2cm}} = 12 + 4$
6. $\underline{\hspace{2cm}} + 3 = 17$
7. $19 = \underline{\hspace{2cm}} + 13$
8. $15 - 3 = \underline{\hspace{2cm}}$
9. $15 - 4 = \underline{\hspace{2cm}}$
10. $15 - \underline{\hspace{2cm}} = 13$
11. $17 - 5 = \underline{\hspace{2cm}}$
12. $\underline{\hspace{2cm}} = 18 - 2$
13. $\underline{\hspace{2cm}} - 2 = 17$
14. $14 = \underline{\hspace{2cm}} - 5$
Lesson 4 Exit Ticket: 2+1

Name ____________________________  Date __________________

Solve the problems. Write the basic fact that helps you solve each one. The first one is done for you.

1. 14 - 1 = 13
   Basic Fact: 4 - 1 = 3

2. 14 + 1 = __________
   Basic Fact: __________________

3. 15 + 3 = __________
   Basic Fact: __________________

4. 18 + 2 = __________
   Basic Fact: __________________

5. 17 - 6 = __________
   Basic Fact: __________________

6. 19 + 7 = __________
   Basic Fact: __________________

7. 16 + 4 = __________
   Basic Fact: __________________

8. 12 + 8 = __________
   Basic Fact: __________________
LESSON 5

Target 5: Represent addition and subtraction problems that can be solved using basic facts.

Success Criteria:
- Read and visualize the problem.
- Represent the information in the problem with a sketch.
- Label the number bond.
- Place the ? and the numbers you will use to solve the problem into the labeled number bond.
- Decide if this is a subtraction or an addition problem.
- Show your solution with quick sketches, words, and numbers.
- Write the equation.

Materials:
student white boards; Task 5-A for partners; math notebooks/journals ; 1.B.25 (optional for homework or routines or extra practice)

Teaching Actions

LAUNCH: (20 MIN)

- Display the word problem and ask students to read it silently.

A. Sheila had $5 and then her mother gave her $14 more for Saturday and Sunday. How much money did Sheila have paid for babysitting?

Read the problem orally together and ask students to tell their important information in the problem.

Uncover the question that has been restated:

Question: How much money did Sheila have after she was babysitting?

Restated question: Sheila had _____ dollars after she was babysitting.

Co-create a labeled number bond to represent the problem.

Sketch the number bond, and label the first part $’s Sheila had, the part.
Ask students what to name the total and the other part of the bond.

“Is the question asking us to find a part or the whole? How do you know?”

Ask students to represent the problem with a quick sketch, and show their solution path in pictures, words or numbers on their white boards (even if they solved it mentally).

- Students solve the first problem in Private Think Time (PTT) and move to B if they finish ahead of the group (it is not necessary for everyone to finish the problem as long as they have time to engage in it: Extension B. After Sheila spent $7, how much money did she have?

- Use A/B partner protocol for partners to share their sketches and solution plan for solution (3 min).

- Have students hold up their boards. If they aren’t seated in a have them stand and form semi-circle so every one can see the sketches (1 min). Then sit down.

- Select one student to share sketch and solution path on his/her board.

- Establish protocol that the student who explains always asks there any questions?”

- Emphasize importance of asking questions if students aren’t sure of what the person sharing was thinking or if they don’t understand or they don’t agree.

- After students have opportunity to ask questions ask:

  **How did you know to add or subtract?**

  **What strategy did you use to find the sum?**

One at a time, display 4 representations of strategies (shown in parentheses below).

Ask students to look at the strategies carefully to see if they can explain the strategy.

- **Counting on 5 from 14 mentally (record: 14, 15, 16, 17, 18, 19)**

- **Counting on using five objects in the sketch (write numbers under/next to the objects);**

- **Breaking apart 14 into 10 and 4 and using basic fact of 5 +4 (number bond under 14 and writing 5 + 4 under number bond) ;**

- **Breaking apart 5 (number bond for 2 and 3) and adding 14 and 2 to get 16 and then adding 3 to 26 (24 + 2 = 26 and 26 + 3 = 29), using sketch of ten frames.**
After discussing each strategy, ask how many students who shared that strategy.

**Which strategies can you use if you do not know the basic fact of 3 + 5?**

Which strategy uses a basic fact to find the sum?

Model writing and labeling the equation to match the number bond and the situation.

**EXPLORE: (15 MIN)**

**Task 5-A**

- Partners read the first problem together and then use PTT to sketch the information before working on the rest of the problem (if a student completes his/her sketch before his/her partner he reads a challenge problem and sketches the information instead of completing the problem).

- Together, students fill out the number bond, describe their solution paths and write the equation.

- Students read the next problem together and work on it in PTT. If one person finishes before the other person is ready to discuss, the partner works on challenge problem.

- Students share solutions with partner and then move to # 2.

- If one partner is not making progress, have him/her stop PTT, ask question and work through the problem with a partner.

- Examples of possible teacher assessing/advancing questions during Explore.

- **How do you decide if the number is a part or the whole?**
- **Is the question asking you to find a part or the whole?**
- **Is there a basic fact you already know that you can use to help solve the problem?**
- **Can you represent what you just explained with a sketch or with equations?**
- **What labels could you include to make your solution more clear?**
- **How is the sketch of the information in the problem similar to your partner's? How is it different?**
- **If you didn’t just know the basic fact, what strategy did/could you use?**
- **How can you tell if your equation matches your number bond?**

**SUMMARY: (15 MIN)**

- Select 2 students to share representations and solutions under doc camera.

Even though using basic facts is target, emphasize recognizing the basic fact and using counting on strategy until students know the basic fact.
• Ask students if they can tell what strategy was used to add or subtract by looking at the student’s representation.
• Have the student who is sharing call on other students before explaining his/her strategy.
• Ask students the basic fact they see in the problem.
  Display all the number bonds and equations with the questions marks.

*How can you tell from the number bond when to subtract and when to add?*

**CENTER TIME:**

Guided Group for part of Center Time.

Self-Assessment of responsibility for learning (save 3 minutes)
Task 5-A

Record in math journal/notebook
- Model each problem with a sketch and a labeled number bond before solving.
- Put a ? in the part of the model that represents what you want to find out.
- Record the basic fact and
- Write the equation.

1. Tracy had $13, her mom gave her 5 dollars more. How much money did she have after her mom gave her the $5?
   Sketch Labeled Number Bond (numbers and ?) Basic Fact Equation
   Challenge: Tracy spent $7 at the movies. How much did she have left?

2. Serena ran a total of 14 miles on Tuesday and Wednesday. She ran for an 2 hours on Tuesday. On Wednesday she only ran 3 miles. How many miles did she run on Tuesday?
   Sketch Labeled Number Bond (numbers and ?) Basic Fact Equation
   Challenge: On Thursday, if she runs double the number of miles she ran on Wednesday how many total miles will she have run over the three days?

3. Amber had $18. After she spent some money on snacks, she only had $12 left. How much money did Amber spend?
   Sketch Labeled Number Bond (numbers and ?) Basic Fact Equation

4. Ellie made some cookies. She ate four of them and had 15 left. How many cookies did she make?
   Sketch Labeled Number Bond (numbers and ?) Basic Fact Equation

5. Andy caught 13 baseballs during the first game of the day. He caught some more during the second game. If he caught 17 balls during both games, how many did he catch during the second game?
   Sketch Labeled Number Bond (numbers and ?) Basic Fact Equation
1.B.25

Use basic facts to help you solve with mental math.
Record the equation and basic fact in your notebook/journal or on the task sheet.

1. \( 16 + 3 = \) Basic fact: \( 6 + 3 = 9 \)  
2. \( 18 – 6 = \) Basic fact: \( 8 – 6 = 2 \)

3. \( 4 + 15 = \) Basic fact: \( __ + __ \)
4. \( 14 + 5 = \) Basic fact:

5. \( 7 + 11 = \) Basic fact:
6. \( 17 + 1 = \) Basic fact:

7. \( 17 + 2 = \) Basic fact:
8. \( 16 + 2 = \) Basic fact:

9. \( 14 – 4 = \) Basic fact:
10. \( 18 – 8 = \) Basic fact:

11. \( 19 – 3 = \) Basic fact:
12. \( 18 – 4 = \) Basic fact:

13. \( 16 – 3 = \) Basic fact:
14. \( 17 – 5 = \) Basic fact:

15. Circle the number sentences that are true.
   \( 17 = 12 + 5 \)
   \( 14 + 4 = 13 + 3 \)
   \( 11 – 7 = 17 + 1 \)
   \( 12 + 5 = 15 + 2 \)
LESSON 6

Target 6: Determine when using basic facts to subtract can be used to solve problems and when problems need to be solved by subtracting from 10.

Success Criteria:
- Predict when I can solve a problem with basic facts and when I will need to break apart a ten to solve it.
- Verify (prove something is true; check prediction) using the beads and a quick 10-frame sketch.
- Circle problems that can be solved with basic facts, and write the basic fact
- Solve the other problems using a strategy of my choice.

Materials:
- bead strings; 1-B-34, modified from engage ny;

Teaching Actions

LAUNCH:
Display the following problems: 17-5, 14 – 5, 18 – 7

T: Which of these problems are you able to solve with basic facts and which ones will you need to take away from a ten? Justify your thinking to your partner.

Discuss ideas whole group.

Have students draw a quick ten-frame sketch of 17 (10 in two rows of five dots and 7 extra dots that are open. Ask students to put x’s on the 5 they are taking away.

T: Did you need to break apart the ten?

Have students find 17 on their bead string and take 5 away.

T: Did you need to break apart the full ten?

Try a couple more based on assessment and then ask students to work with their partners to verify when they can solve other problems with basic facts or when they will need to break apart the ten. Students use both tools.

EXPLORE: (15 MIN)
- Students use Private Think Time (PTT) to analyze the first five problems in column 1, and cross out the problems if they will need to take away from a ten to solve it.
- They will only solve problems they can solve using basic facts.
- Students write the basic fact under the problem.
- Partners use mental math or if it is a basic fact they don’t know yet, they use counting on or down.

02 Unit 1- Adding and Subtracting within 100 REV 2014-15.00.00
• Partners take turns using a quick ten-frame sketch and the bead string to verify their predictions.
• They compare the models using the two representations.
Move to the second set of 5 problems.

SUMMARY: (15 MIN)
• Display 5 problems. Ask students to write the problems solved with basic facts and hold up their boards at teacher signal.
• Use A/B partner protocol to explain strategy for finding problems that can be solved with a basic fact. Remind students to be prepared to explain their partner’s explanation.
• Chart some of the student strategies.
Task 1.B.34

- Cross out the number sentence if you must subtract from the ten to solve it.
- Solve only the problems that can be solved with basic facts.
- Write the basic fact under the number sentence.

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<tbody>
<tr>
<td>10 – 2 = 10 – 7 = 10 – 4 =</td>
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</tr>
<tr>
<td>13 – 2 = 11 – 7 = 11 – 4 =</td>
<td></td>
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<tr>
<td><strong>Basic fact: 3-2 = 1</strong></td>
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<tr>
<td>12 – 2 = 12 – 7 = 12 – 4 =</td>
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<td>13 – 2 = 13 – 7 = 13 – 4 =</td>
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<td>17 – 2 = 17 – 7 = 17 – 4 =</td>
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<tr>
<td>18 – 2 = 18 – 7 = 18 – 4 =</td>
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</tbody>
</table>
LEsson 7

Target 7: Describe patterns when decomposing to make ten to add within 20.

Success Criteria:
- Visualize, predict and describe the bead string and the ten-frame models.
- Represent addition of the colored parts of the model before making ten with the first part of an equation.
- Represent making ten with the second part of the equation.
- Look for patterns in the tools and equations.

Materials:
- bead string, set of ten frames; two sided beans; Task 7-A, 1 for each pair; journals

Teaching Actions

LAUNCH:

Model with bead string:
- **T:** Add 8 + 6 with your bead string. Tell your partner what you notice about the colored parts when you add 8 bead string.
- Record the equation that represents the colored parts.
- **T:** Predict what you think you will happen if you add 8 + 7
- Share your prediction with your partner and verify with the beads.

Model with ten frame:
- **T:** Place 8 ten-frame and line up 7 beans with red side up as if they were in a ten frame with no more than 5 in one row/column.
- Make ten by filling the ten-frame with red.
- Record equation that shows the color (8 + 2 + 5 = 10 + 5)
- **T:** What is the same and what is different about using the ten frames and the bead string?

Refer to Success Criteria:

Partner A starts with bead string and Partner B starts with ten frame:
- Visualize and predict what the model will show for 8 + 8
- Build the models.
- Represent the first part of equation that shows color on journal.
- Represent making ten in second part of equation.

EXPLORE:
Task 7-A: Record equations in math notebooks/journals

Questions:
- How did you decompose or break apart the 7 when adding it to 8?
- Sketch the number bonds to model breaking apart 7 when adding to 8, to 7 and to 9.
What is different about adding to 7, 8, and 9?
How did you decompose/break apart the 6 when adding it to 8?...to 9? to 7?

SUMMARY:
Display number bonds that decompose 6 into 5 and 1, 4 and 2 and 3 and 3.
T: Which number bond represents adding $6 + 7$? Justify your answer with a model and equation.

How could the strategy of making ten help when adding $36 + 7$? Have students read 36 the tens way.

Assessment: Draw and write equations to explain how to add 8 and 5 by making ten.

CENTERS: Optional to Introduce Make 10 to Add
Fluency:
60 second Sprint 10 number Bond (1.C.8: Grade 1, Mod 1)
### Task 7-A

<table>
<thead>
<tr>
<th></th>
<th>Equation</th>
<th>Answer</th>
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<th>Equation</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>(9 + 5)</td>
<td>(9 + ____ + ____ = 10 + ____)</td>
<td>7</td>
<td>(7 + 8)</td>
<td>(7 + ____ + ____ = ____ + ____)</td>
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<tr>
<td></td>
<td></td>
<td>(9 + 5 = ____)</td>
<td></td>
<td></td>
<td>(7 + 8 = ____)</td>
</tr>
<tr>
<td>2</td>
<td>(8 + 5)</td>
<td>(8 + ____ + ____ = 10 + ____)</td>
<td>8</td>
<td>(6 + 8)</td>
<td>(6 + ____ + ____ = ____ + ____)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(8 + 5 = ____)</td>
<td></td>
<td></td>
<td>(6 + 8 = ____)</td>
</tr>
<tr>
<td>3</td>
<td>(7 + 5)</td>
<td>(7 + ____ + ____ = 10 + ____)</td>
<td>9</td>
<td>(9 + 4)</td>
<td>(9 + ____ + ____ = ____ + ____)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(7 + 5 = ____)</td>
<td></td>
<td></td>
<td>(9 + 4 = ____)</td>
</tr>
<tr>
<td>4</td>
<td>(6 + 5)</td>
<td>(6 + ____ + ____ = 10 + ____)</td>
<td>10</td>
<td>(8 + 4)</td>
<td>(8 + ____ + ____ = ____ + ____)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(6 + 5 = ____)</td>
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<td></td>
<td>(8 + 4 = ____)</td>
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<tr>
<td>5</td>
<td>(9 + 8)</td>
<td>(9 + ____ + ____ = 10 + ____)</td>
<td>11</td>
<td>(7 + 4)</td>
<td>(7 + ____ + ____ = ____ + ____)</td>
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<td></td>
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<td>(9 + 8 = ____)</td>
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<td>(7 + 4 = ____)</td>
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<td>6</td>
<td>(8 + 8)</td>
<td>(8 + ____ + ____ = 10 + ____)</td>
<td>12</td>
<td>(6 + 4)</td>
<td>(6 + ____ + ____ = ____ + ____)</td>
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<tr>
<td></td>
<td></td>
<td>(8 + 8 = ____)</td>
<td></td>
<td></td>
<td>(6 + 4 = ____)</td>
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</table>
Make 10 to Add (Center)

Directions (not meant to be read by students).

Materials: 2 dice; Make 10 Game Sheet in sheet protector for each player or team of two; double ten frame with two sided counters or beans for each player or team.

Object of the game: To be the first player to roll numbers to complete the equations.

Directions:

- Place 9 beans/double sided counters on one ten frame, white side showing.

- Take turns rolling the dice. Player chooses to use either the sum of the dice or the amount on one die. If the numbers don’t work, the player misses a turn.

- If the number completes an equation starting with 9, the player verifies that the equation is true by filling out the second ten-frame with red side of counters to represent first expression.

- Student moves red beans from the second ten frame to make ten in the first 10-frame; this represents the second expression.
• The first player to fill a set of equations wins (9's or 8's)
• Players describe patterns they notice.
• Players repeat game with 8.
• Games can also be played with 6, 7 and mixture of 6-9.

Make 10 Game Sheet A

\[
\begin{align*}
9 + 8 &= 10 + \_
\quad &8 + 7 &= 10 + \\
9 + 4 &= 10 + \_
\quad &8 + 3 &= 10 + \\
9 + 7 &= 10 + \_
\quad &8 + 5 &= 10 + \\
9 + 5 &= 10 + \_
\quad &8 + 9 &= 10 + \\
9 + 6 &= 10 + \_
\quad &8 + 4 &= 10 + \\
9 + 9 &= 10 + \_
\quad &8 + 8 &= 10 + \\
9 + 3 &= 10 + \_
\quad &8 + 6 &= 10 + 
\end{align*}
\]
LESSON 8

Target 8: Use basic facts that make 10 as tools to subtract.

Success Criteria:

- Use basic facts that make ten to complete subtraction equations.
- Explain and justify using the bead string
- Translate the model into equations.
- Visualize and describe the model without building it.
- Use the model to verify the equations

Materials:
- Bead strings; ten-frames; Task 8-A (partners can share and record

Teaching Actions

LAUNCH:
Explain that students have been using basic facts that make ten as tools Display chart from Make Ten game sheet and ask them to think about as a tool to complete the equations.

T: How did you use the basic fact 9 + 1 as a tool for these facts?

It is important to Do the Math before teaching this lesson.

Model first with back to class and bead string starting on the left side. Ask them to use their bead strings with zero and the left and 100 on the right.

Pulling away the 8 to the left will leave the 2 and the remaining part in two colors. If you pull away 8 to the right the number left will not show the pattern of 2 plus a number in colors.
Repeat for the tool 8 + 2.

\[
\begin{align*}
9 + 1 &= 10 + 0 \\
9 + 8 &= 10 + 0 \\
9 + 4 &= 10 + 0
\end{align*}
\]

\[
\begin{align*}
8 + 2 &= 10 + 0 \\
8 + 7 &= 10 + 0 \\
8 + 3 &= 10 + 0
\end{align*}
\]

Place demo bead string between 2 chairs and model behind the string.

Read the Learning Target.

“Our first basic fact tool we will use is 10 - 8. Let’s see if we can see how knowing 10 – 8 = 2 can be used as a tool to subtract 8 from any number.”

Show 12 on the bead string with space at each end (If students don’t take away to their left -toward zero-they will not see the pattern in color.

\textbf{T: Watch when I pull away 8 from 12 from the beginning of the bead string} (pull away 8 to students’ left which is beginning of bead string).

\textbf{What 2 parts do you see?} (2 red + 2 white --or whatever color beads are)

Record and have students read aloud:

\[
\begin{align*}
12 - 8 &= 2 \text{ red} + 2 \text{ white} \\
2 + 2 &= 4 \text{ beads left} \\
12 - 8 &= 4
\end{align*}
\]

\textbf{T: Show 15 on your bead string. Remember to leave room on both ends of 15.}

\textbf{T: Predict what you will see when you pull off 8 (short partner talk).}

\textbf{T: See if your prediction is correct.}

\textbf{Read aloud as you fill out the missing parts} 15 – 8 = 2 \text{ red} + 5 \text{ white}

\textit{15 - 8 = 7}

Record on chart paper right under 12 -8 = 2 + 2

\[
\begin{align*}
15 - 8 &= 2 + 5 \\
2 + 5 &= 7 \\
15 - 8 &= 7
\end{align*}
\]

Use bead string and repeat with 13 – 8

- Fill in the equation as they say it aloud:
13 - 8 = __ red + ___ white  2 + 3 = 5  13 – 8 = ___

- Stop and read through the three equations under each other. Ask:

- **What pattern do you see in the equations? What pattern do you hear when you read the equations aloud?**

- **What pattern did you see on the bead string** (always 2 of one color that will make ten with 8 for the first part and the number greater than ten for the second part)
  - How was knowing 10 – 8 = 2 used as a tool in each of these equations?

- “**What two parts do you think you will see on the bead string if you subtract 9 instead of 8 from 13, 14, 15 and 16?**”

- **What will be the same and what do you think will be different?**

- **Tell students they will look for patterns with the beads and in equations when they use basic facts that make ten as tools to subtract.**

**EXPLORE:**

- Students use bead strings for the first 2 when subtracting a given number, and then visualize what they will see on the bead string when they pull off the number of beads for the next 3.

- Students take turns describing what they see/will see on the bead string.

  For example: 14-7: *When I take 7 away from the ten, I will see 3 red and 4 white. 3 + 4 =7.* Students record in their notebooks but only record the equations, not the explanation in parentheses that are shown in the first problems.

**SUMMARY:**

Discuss the patterns students noticed.

- **What was the same when you subtracted 8 from different numbers?**......7? ...... 6?.........?

- **Where do you see the basic facts of ten in the pattern?**

- **What basic fact would we use to subtract 9….5….4….?**

- **What do you think the pattern would be if you had subtracted 9?**

If students are not able to complete the assessment, have them use their beads and note that they may need time at center and/or guided group.
• How does the pattern you noticed relate/connect to Basic Facts that make ten?

Assessment: Use your understanding of the pattern to complete the problem subtracting 9:

12 – 9 = ___ + ___

____ + ___ = ___ beads left

12 – 9 = ___
## Task 8-A

### Basic Fact: \(8 + 2 = 10\)

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<tbody>
<tr>
<td>A. (13 - 8 = _ + _)</td>
<td>C. (11 - 8 = _ + _)</td>
<td></td>
</tr>
<tr>
<td>((13 - 8 = \text{2 first color + 2 second color}))</td>
<td>(_ + _ = \text{beads left})</td>
<td></td>
</tr>
<tr>
<td>(2 + _ = _ \text{beads left})</td>
<td>(11 - 8 = _)</td>
<td></td>
</tr>
<tr>
<td>(13 - 8 = _)</td>
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</table>

| B. \(15 - 8 = \_ + \_\) | D. \(12 - 8 = \_ + \_\) |
| \((15 - 8 = \text{first color + second color})\) | \(\_ + \_ = \text{beads left}\) |
| \(2 + \_ = \_ \text{beads left}\) | \(12 - 8 = \_\) |
| \(13 - 8 = \_\) |   |

### Basic Fact: \(7 + 3 = 10\)

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<thead>
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<tbody>
<tr>
<td>A. (15 - 7 = _ + _)</td>
<td>16 – 7 = _ + _</td>
<td></td>
</tr>
<tr>
<td>(3 + _ = _ \text{beads left})</td>
<td>(_ + _ = _ \text{beads left})</td>
<td></td>
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<tr>
<td>(15 - 7 = _)</td>
<td>(16 - 7 = _)</td>
<td></td>
</tr>
</tbody>
</table>

| B. \(12 - 7 = \_ + \_\) | 11 – 7 = \_ + \_ |
| \(3 + \_ = \_ \text{beads left}\) | \(\_ + \_ = \_ \text{beads left}\) |
| \(12 - 7 = \_\) | \(11 - 7 = \_\) |

### Basic Fact: \(6 + 4 = 10\)

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<tbody>
<tr>
<td>A. (15 - 6 = _ + _)</td>
<td>C. (16 - 6 = _ + _)</td>
<td></td>
</tr>
<tr>
<td>(4 + _ = _ \text{beads left})</td>
<td>(_ + _ = _ \text{beads left})</td>
<td></td>
</tr>
<tr>
<td>(15 - 6 = _)</td>
<td>(16 - 7 = _)</td>
<td></td>
</tr>
</tbody>
</table>

| B. \(12 - 6 = \_ + \_\) | D. \(11 - 6 = \_ + \_\) |
| \(4 + \_ = \_ \text{beads left}\) | \(\_ + \_ = \_ \text{beads left}\) |
| \(12 - 6 = \_\) | \(11 - 6 = \_\) |
LESSON 9

Target 9: Make a ten to add within 100.

Success Criteria:

- Use basic facts that make ten to decompose (break apart) numbers.
- Describe patterns in 10-frame models and equations when making a ten to add.
- Visualize the ten-frame model that represents a number sentence.
- Give directions for your partner to build the model that represents the problem.
- Draw number bonds to explain how to decompose the numbers.

Materials:

- White boards, Task 9-A, 9-B (1.C.21 and 1.C.22) 1 sheet for partners, teacher sketch on chart that is uncovered one part at a time (see Launch), 9 filled ten frame cards, beans and a set of 1-9 ten frame cards for partners.

Teaching Actions

LAUNCH:

- T: We are going to use the basic fact $7 + 3 = 10$ for our first pattern of problems.
- Display a sketch of a 10-frame of 7 and the 3 red to represent the basic fact $7 + 3 = 10$.
- Ask partners to build the same model with their 7 ten-frame and 3 red beans.
- Record $7 + 5 = 12$ and ask students to add red beans to the model to match the number sentence (uncover the 2 red on the sketch).
- Ask students to add a full ten frame and explain to partner what is the same and what is different. ($7 + 3 + 2$ remains the same).
- Record $17 + 5 = 22$ and read it the Ten-Way with together (1 ten $7 + 5 = 2$ tens 2).

T: Work with your partner and continue to add a ten. Write the new number sentence on your white boards and read it the Ten-Way.

- Give time for students to add new tens and write 3 or 4 more equations and read them the Ten-Way.
- Record the number sentences in the pattern through $87 + 5 = 92$ and make the number bonds under the number sentence.

Ask students to describe the ten-frame model of the equation and discuss whole group.

T: Explain to your partner how the number bond represents the ten-frame model.
Why is the 5 decomposed into 3 + 2 instead of 1 + 4?

87 + 5 = 80 + 10 + 2

*T:* Where do you see the basic fact in the model? Where do you see the 10 in the model?

*T:* Use the pattern you have noticed in the models and the number bonds to predict what will be the same about the number bonds for 87 + 5 and 57 + 5? (Draw the bonds with the students)

*T:* What basic fact will we use to make ten to add 26 + 5? How do you know?

*T:* How will the ten-frame model for 26 + 5 be different from 27 + 5?

*T:* Use basic facts and number bonds to justify that this equation is True or False: 35 + 7 = 40 + 3

EXPLORE: (15 MIN)
Task 9-A and 9-B
- Students complete 9-A with partner for first half of the
- Ask all students to work on 9-B independently even if they with 9-A.
- Have students needing more support work with teacher on

SUMMARY:
*T:* Visualize the Ten-Frame model that will represent the sentence 28 + 4.

*T:* Partner A, give directions to Partner B for building the with 27 + 9).

Individual Assessment:

1. 28 + 4 =
2. 39 + 4 =
3. 27 + 9 =
4. 38 + 9 =
Task 9-A
Take turns giving directions for building the model for number 1 and number 2.
Solve the addition problems.
Draw the number bonds.
Read each equation the Say-Ten way.

1. $78 + 4 =$
2. $58 + 5 =$

$70 \ 8 \ 2 \ 2$

3. $54 + 6 =$
4. $88 + 2 =$

- Label each number sentence as true or false.
- Make number bonds to justify your label.

5. $22 + 8 = 20 + 10$

6. $57 + 6 = 50 + 10 + 2$

7. $83 + 9 = 80 + 10 + 1$

8. $35 + 8 = 30 + 3$
Task 9-B

• Solve the addition problems.
• Draw the number bonds.
• Read each equation the Say-Ten way.

1. 26 + 8 = 2. 48 + 6 =

3. 45 + 6 = 4. 89 + 9 =

Label each number sentence as true or false. Make number bonds to justify your label.

5. 57 + 5 = 50 + 10 + 2

6. 83 + 9 = 80 + 10 + 1

7. 68 + 7 = 70 + 5

8. 88 + 9 = 90 + 6
LESSON 10

Target 10: Make a ten to add within 100.

Success Criteria:
- Build and describe models with ten frames.
- Read equations and describe models the “Ten-Way”
- Describe what stays the same and what changes in the models and the equations that start with a basic fact of ten.
- Visualize the pattern and the model to complete equations.

Materials:
- Filled ten-frames, and one empty frame with 9 beans for each student; Task 10-A

Teaching Actions

LAUNCH:
- Ask students to use red and white beans to show $7 + 3 = 10$. Sketch the model (see models on next page)

  \[ T: \text{ Read it the Ten way: } 7 + 3 = 1 \text{ ten} \]

  \[ T: \text{ Lay down a filled ten-frame card and tell your what is the same and what is different.} \]

  \[ T: 1 \text{ ten, } 7 + 3 = 2 \text{ tens } \text{ Ask students to repeat.} \]

  \[ \text{Record } 17 + 3 = 20 \]

  Repeat after laying down a second ten (2 tens $7 + 3 = 3$ tens)

Read the ten-way and the regular way:

Lay down a third ten frame:

  \[ T: \text{ Tell your partner how the model has changed and how it has stayed the same.} \]

  \[ T: \text{ Write } 37 + 3 \text{ the Ten Way: } 3 \text{ tens } 7 + 3 = 4 \text{ tens.} \]

  \[ \text{Write the addition sentence: } 37 + 3 = \_\_\_\_\_\_ \]

  \[ T: \text{ Go back and read all four equations the Ten Way together:} \]

  \[ 7 + 3 = 1 \text{ ten; } 1 \text{ ten } 7 + 3 = 2 \text{ tens; } 2 \text{ tens } 7 + 3 = 3 \text{ tens; } 3 \text{ tens } 7 + 3 = 4 \text{ tens} \]

  \[ T: \text{ Visualize the same model with } 9 \text{ tens. Write the equation and read it the Ten-Way with your partner.} \]
T: Describe the four models on the chart as subtraction problems. Let the red beans represent the number you have taken away from the total beans shown on the ten frames. Have students remove the three red beans from 10 – 3, put back, add a ten frame, and remove them again. Repeat through 40 – 3.

T: Read the equations the Say-Tens way.
- 10 – 3 = 7 is same as 1 ten minus 3 = 7
- 20 – 3 = 17 2 tens minus 3 = 1 ten 7
- 30 – 3 = 27 3 tens minus 3 = 2 tens 7
- 40 – 3 = 37 4 tens minus 3 = 3 tens 7

Record the subtraction equations under the addition equations on the chart with the sketches of the ten frames.

- This structure is based on making 1 ten.
- Write another basic fact that makes ten.

EXPLORE:
Encourage students to read the equations and describe the models the Say-Ten Way.

Ask students to visualize and describe the model before building it and verbalize what is staying the same and what is changing in the structure of the pattern.

How are the addition and subtraction equations using the ten-frame model the same and how are they different?

SUMMARY:
T: Why can we use the same structure of the base ten model for addition and the subtraction equations (refer to Task 10-A).

T: Which is harder for you to visualize using the basic fact of ten, the addition or the subtraction model?

Individual Assessment if time:
Solve the problems. Write a related problem and solve it.

4 + 2 =
24 + 2 =
64 + 2 =

__ + ____ =

Review the LT and SC.
Have students assess themselves on the SC.
Task 10-A

- Complete the addition subtraction pattern using the basic fact of $8 + 2 = 10$.
- Build the models with your partner and complete each pair of related addition and subtraction equations.
- Read the equations the Say-Ten way.
- Describe what stays the same and what changes in the models and equations.

\[
\begin{align*}
8 + 2 &= \_\_ \\
18 + 2 &= \_\_ \\
28 + 2 &= \_\_ \\
38 + 2 &= \_\_ \\
88 + 2 &= \_\_
\end{align*}
\]  
\[
\begin{align*}
\_\_ + \_\_ &= \_\_ \\
\_\_ + \_\_ &= \_\_
\end{align*}
\]

Complete the equations by visualizing the model and the pattern.

Read the equations the Say-Ten way.

1. $3 + 7 = \_\_$  
2. $6 + 4 = \_\_$

3. $53 + 7 = \_\_$  
4. $36 + 4 = \_\_$

5. $33 + 7 = \_\_$  
6. $50 - 7 = \_\_$
Lesson 11

Target 11: Find patterns in problems when you need to subtract from a ten.

Success Criteria:
- Model problems with ten frames.
- Represent the subtraction using the ten-frames with a number bond and number sentences.
- Read number sentences the Say Ten way.
- Describe what stays the same and what changes.
- Use the same structure to subtract different numbers.

Materials:
- Full ten frames, 1 empty ten frame, red and white beans, white board, math journal/notebook

Teaching Actions

Launch:
T: Use any strategy that works for you to solve this problem:
60 – 4

When the whole class learns a strategy, make sure students know that the strategies they invent are important, not just strategies they are learning together.

- Select a couple of students to share their strategies (count down from 60, and then 2 more, using fingers to help keep track).

- Explain to students that in this lesson, we will all learn a strategy to subtract in which they can use their basic facts that make ten. Even though they might have a method that is easier, this strategy will help them solve more difficult problems later.

- Ask students to fill an empty ten frame with beans white side up and use the beans to show the basic fact 7 + 3 = 10 with white and red sides of the beans.

Uncover the ten-frame models shown in the Comments column 1 at a time as you build them during the launch.

T: How can we use the same model with 7 white and 3 red beans to represent 10 – 3 = 7?

Establish that the red can be used to show subtraction. Students can either turn the beans to the red side and then remove them or just turn them to the red side without removing them.

- Have partners lay down a ten and tell each other the new addition and subtraction number sentences (17 + 3 = 20; 20-3 = 17). Record on the chart.
- Have students add another ten frame and record 27 + 3 = 30 and 30 – 3 = 27

- Use partner and whole group talk to discuss the following questions:
**T:** Analyze or look carefully at the models. What stays the same and what is changing in the model?

**T:** Listen to what stays the same and what is changing when we read all three sets of number sentences the Say-Ten way.

**T:** Analyze the number sentences. What is the same and what is changing in the addition number sentences? .....in the subtraction number sentences?

- Bring out the idea that 10-3 is inside 30 – 3 and 20 - 3. The number of tens can increase or decrease, but 10-3 stays the same.

Ask students to describe how the model will change for 90-3.

Draw the number bond for 90 – 3 (see Comments column on previous page) and connect it to their description of 8 tens and one ten that shows 10 - 3.

Under the number bond record:

\[10 - 3 = 7\]
\[80 + 7 = 87\]
\[90 - 3 = 87\]

Together make a number bond for 30 – 3 = 27 and record the action of turning the three to red for 10 -7 and counting the tens and ones that are left in number sentences under the number bond.

\[10 – 3 = 7\]
\[20 + 7 = 27\]
\[30 – 3 = 27\]

Read the number sentences the Say-Ten way together.

- Ask students to build a ten frame model with the beans that represents 6 + 4 = 10 and 10 – 4 = 6

**T:** Add tens to your model to represent 30 – 4

Co-create the number bond with the number sentences under it. Have students show explain each number sentence with the model.

\[10 – 4 = 6\]
\[20 +6 = 26\]
\[30 – 4 = 26\]

**EXPLORE:**

Ask different groups to start with different sets so all the sets of problems have number bonds and number sentences.

1. 20 – 1, 40 – 1, 70 – 1
2. 40 – 7, 80 – 7, 100 – 7

Focus students on looking for patterns in the structure of the model, the number bonds and the number sentences.

Students who are ready to visualize the model can solve with the number bonds and number sentences and then build the model.
3. 60-5, 40-5, 70 – 5
4. 80- 6, 50 – 6, 100- 6
5. 50 – 2, 30 – 2, 70 - 2

• Students can make up one more problem for each set they complete.

• Partners take turns building the model but both partners record the number bonds and number sentences and reading the number sentence the Say-Ten way.

• Partners build models, make number bonds and write number sentences under the number bond to represent subtracting from ten for sets of problems.

• Some students may want/need to remove the beans after turning them to the red side each time.

SUMMARY:
What was the same about subtracting from a ten for any number?

How did knowing your basic facts for ten help when solving these problems?
LESSON 12

Target 12: Apply the pattern used to subtract by subtracting ones from tens to subtracting ones from number composed of tens and ones.

Success Criteria:
- Model problems with ten frames.
- Read problems the Say Ten way.
- Describe what stays the same and what changes.
- Model with a number bond and number sentences.
- Connect the ten-frame model to the number bond and number sentences that describe the solution.

Materials:
- ten frames, red and white beans, math journal/notebook; Task 12-A

Teaching Actions
LAUNCH:
T: Use any strategy that works for you to solve this problem: 73 – 2.

- Select a couple of students to share their strategies. Include a student who used the basic fact 3-2 = 1.

Have 2 students hold the bead string and pull over 73. Read the number the Say Ten way. When I subtract 2, will I need to subtract any beads from the ten (point to the ten right before the color change to the 3 beads)? How do you know?

Keep the bead string up.

T: I am going to change the problem to 73 – 8 (record it on the chart) Tell your partner how you can tell by looking at the bead string model of 73 that I will have to subtract from the ten to subtract 8?

- Surface idea that 8 is greater than 3 so you will need to take some beads from the ten.

Share the learning target and explain that in this lesson we will use the strategy they modeled yesterday when subtracting from tens.
Grade 2 Unit 1: Adding and subtracting within 100

- Ask partners to build 11, one ten 1 with white side of the beans.
  
  **T: Subtract 5 from the ten by turning them to the red side.**

- Color 5 red on the chart model and say: 10 minus 5 equal 5. 5 plus 1 equals 6.
  10 – 5 = 5 so 11 – 5 = 6

- Have students lift the 5 red beans from the counter this time as you say it.

- Have students add a second ten to their model as you uncover the second model on the chart. Point to the model: 20 minus 5 equals 15. What is 21 – 5?

- Repeat adding tens to model 31-5 and 41 – 5.

  Draw a number bond for 41 – 5 and have the students connect it to the ten frame model and the model and number bond for 40 – 3.

  \[ \begin{array}{c}
  41 - 5 \\
  31 - 10 \\
  10 - 5 = 5 \\
  31 + 5 = 36 \\
  \end{array} \]

- **How did we use 10 – 5 = 5 to solve all the these problems?**

  **Note:** It is important that students have time to build the model for different sets of related problems. When students can visualize the structure of the pattern and can solve them mentally, have them verify their answer with the 10-frame model.
EXPLORE:
Task 12- A
If students need more support to build and describe the structure, add the Explore time to centers and rotate 1/3 of the students through this task for 15 minutes each.

SUMMARY:
Ask students to look for patterns between the problems on the left and on the right.

What was the same about subtracting from a ten for any number?
Task 12-A

1. Model with the ten-frames before solving or to verify answers after solving.
2. Draw number bonds to help you subtract from the ten.
3. Fill in the blanks to make the number sentences true.
4. The first two number bonds are done for you.

Example:

\[
\begin{align*}
40 - 8 &= \_ \\
30 &\quad 10 \\
\_ &\quad \_ \\
41 - 8 &= \_ \\
31 &\quad 10 \\
\_ &\quad \_ \\
10 - 3 &= \_ \\
\_ &\quad \_ \\
11 - 3 &= \_ \\
\_ &\quad \_ \\
20 - 5 &= \_ \\
\_ &\quad \_ \\
21 - 5 &= \_ \\
\_ &\quad \_ \\
50 - 7 &= \_ \\
\_ &\quad \_ \\
52 - 7 &= \_ \\
\_ &\quad \_ \\
70 - 8 &= \_ \\
\_ &\quad \_ \\
71 - 8 &= \_ \\
\_ &\quad \_ \\
60 - 4 &= \_ \\
\_ &\quad \_ \\
63 - 4 &= \_ \\
\_ &\quad \_ \\
\end{align*}
\]
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Lesson 13

Target 13: Invent strategies to add and subtract two 2-digit numbers within 100 to solve word problems.

Success Criteria:
- Read and visualize the problem.
- Model the problem without solving it:
  - Work together to label and complete information about the parts and whole of a number bond
  - Write and label an equation.
- Explain how your group decided the problem is an addition or subtraction situation.
- Solve using any strategy and tools that make sense to you.
- Explain your strategy using words, numbers and sketches.

Materials:
- bead strings; ten frames, two colored beans/counters, hundreds chart, cubes; Task 13-A

Teaching Actions

Launch:
There are more problems than students have time to do. You may want to cut the problems in strips and let them choose a second one if they solve the first one.

- Emphasize that students shouldn’t try to solve the problem until after they have represented it with a labeled number bond.
- Model the process for the activity with the first problem on Task 12-A, using the Success Criteria as a guide.
- Ask students to think and talk about whether the numbers and question mark should be put in a part or in the whole and why.
- Make sure students know they will write the ?, not the answer, in the number bond and equation.
- Call on a group to share their number bond and equation.
  - How did you decide it was a subtraction/addition problem?
  - Where do you see subtraction/addition in the number bond (missing part)?
  - How did you decide if the question mark went in the whole or a part?
- Have students begin to solve the problem in PTT and then share their strategy with their partner. Remind them to show their thinking with words, numbers, and sketches.
- Students continue to work with a partner.
- Students only call the teacher over if everyone in the group is stuck or has the same question.
EXPLORE:
Task 13-A
Students follow the procedure in the Launch.

SUMMARY:
Save time to have students explain different strategies and ask questions.
During the Explore, select strategies you want to have students share.

Have students explain their strategies to a student from a different group before having selected students present their solutions.

Encourage students to ask questions to understand the solutions.

It is important that the students work together to complete the number bond and equation, but that students choose a strategy to add or subtract in PTT.

Add to the chart of number bonds and equations for addition and subtraction word problems you started in Lesson 5. Students will use the chart later to explain where they see addition or subtraction in the numbers bond.
Task 13-A

1. Dane collected 22 cans. His mother returned 15 cans. How many cans does Dane have left?

   **Challenge:** What if Dane collected another 54 cans after his mother returned the 15 cans? Then how many cans would he have?

2. Annie had $41. After she spent some money, she had $36 left. How much money did she spend?

   **Challenge:** What if Annie earned another $24, and then spent $12. How much money would she have then?

3. Lucy loves to read. She read 24 books the first 5 months of school and 27 more books during the rest of the school year. How many books did she read during the school year?

4. Sammy started biking 5 times a week. During the first 2 weeks he biked miles 78 miles altogether. During the first week he only biked 27 miles, but the second week he biked farther. How far did he bike the second week?