Alaska Mathematics Standards
Math Tasks
Grade 1

Making Sets of More/Less/Same

Content Standard

- **1.NBT.1.** Count to 120. In this range, read, write and order numerals and represent a number of objects with a written numeral.

Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. **Model with mathematics. Students draw pictures using dot cards, number lines, picture cards, and counters to represent and compare quantities or sets.**
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure. Students will use tally marks to represent benchmarks (5, 10) of counting.
8. Look for and express regularity in repeated reasoning.

Task Description
In this task students will explore math language in comparing amounts of objects in different sets.

Materials:

- More, Less, Same cards
- Dot cards
- Small counters
- *Just Enough Carrots* by Stuart Murphy or similar book
- Carrot picture cards

****Please visit link for task cards and carrot picture cards (pg. 19): Math Tasks Grade 1 Unit 1**

Gather students together. Read aloud the book *Just Enough Carrots* by Stuart J. Murphy. While reading, discuss the different sets the characters are comparing at the grocery store. What math language are the characters using that is important? Tell students that today they comparing the amount of objects in different sets. Discuss what it means to create a set, and the process of comparing.

Part I
Pose this example on the board. Rabbit has 4 bags of peanuts. Bird has 6 bags of peanuts. Who has more peanuts? Draw a number line on the board and have the students help you label the numbers. Draw a picture to represent each peanut. Ask who has more. You may also draw both picture representations on top. Ask how a number line can help them see more or less. Complete multiple examples allowing students to compare numbers on a number line.

Part II
Cut out the MORE, LESS and SAME cards and the carrot picture cards. You will use these to model the idea of creating and comparing sets. Have the students sit in a circle on the floor. Choose a number of carrots less than 10. Ask how you would create a set that is the same. Let a student use the carrot picture cards to represent this set. If you choose 5 carrots, then use the same card and show five carrot pictures under this word. Ask how to create a set that is More and Less. Allow the students to take part in creating these sets and have conversations about why the sets are the same, more or less. Encourage the students to begin with the equal group and then create a less than/more than group. Continue this activity with multiple numbers until students understand the process.

Part III
Next, students will be given a set of dot cards with arrangements from 4-12, set of small counters and word cards labeled More, Less, and Same. Students will cut out the cards prior to starting the activity. Turn all the dot cards face down in a stack and lay out the More, Less, and Same cards. Students will take turns flipping over the top cards and creating 3 different sets using the counters. They will create one set that is less, one set that is more, and one set that is equal. The students will talk through their thinking to their partner. The partner will check to make sure the sets are correct making adjustments as needed. Students continue taking turns until all the dot cards have been used.

Part IV - Closest to 10 Game
Lastly, students will play Closest to 10. This is a game where two students are comparing their numbers to see which player's number is closest to 10. Students will play with a partner. Each pair will need a set of playing cards without the face cards and 20 small counters. (Ace-10 of each suit with the Ace representing a 1) One player deals the cards evenly between the two players and places the counters in a pile in the center. Both players turn over their top card. Each player determines how close their number is to ten. The player whose number is closest gets a counter from the center pile. A number line or blank tens frame and set of counters may be used if needed to help students identify the distance to ten. If the numbers are the same, both players are awarded a chip. The game is over when the chips are gone and the player with the most chips wins.

Number Talk:

Strategy: Counting All/Counting On: Dot Cards

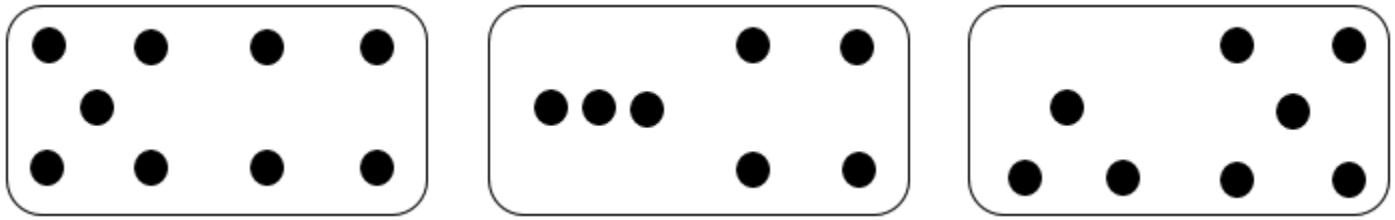
Counting All: Counting every number is an addition strategy used primarily by kindergarten and beginning first grade students. Students who use this strategy are not yet able to add on from either addend. They cannot visualize and hold a number in their mind; instead they must mentally build every number quantity.

8 + 9 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17	The student literally starts with 1 and counts up to 17 using every number. Using models to help the student keep track of their location when counting is helpful.

Counting On: Counting On is a transitional strategy used primarily in first grade an early-second grade. The student starts with one of the numbers and counts on from this point. When students are able to conceptualize a number, they will transition from Counting All to Counting On. It is tempting to show or tell students this strategy in an attempt to move them to a more efficient strategy. However, if students don't construct this strategy for themselves, it becomes a magical procedure without any foundation.

8 + 9 8...9, 10, 11, 12, 13, 14, 15, 16, 17 Or 9...10, 11, 12, 13, 14, 15 16, 17	It is not unusual to hear students say, "I put the eight in my head and counted up nine more." From an efficiency standpoint, it is important to note whether the student counts on from the smaller or larger number.

Below are some Dot Image Number Talks for you to try with your students using the Counting All and Counting Up strategies. As each number talk is shown ask students, "How many dots do you see? How do you see them



For more Dot Card number talks using these strategies please see *Number Talks* by Sherry Parrish.

Question Recommendations for Number Talks:

- How did you think about that?
- How did you figure it out?
- What did you do next?
- Why did you do that? Tell me more.
- Who would like to share their thinking?
- Did someone solve it a different way?
- Who else started the problem this way?
- Who else used this strategy to solve the problem?
- What strategies do you see being used?
- Which strategies seem to be efficient, quick, simple?

Background Knowledge/Common Misconceptions:

Students have difficulty with ten as a singular word that means 10 things. For many students, the understanding that a group of 10 things can be replaced by a single object and they both represent 10 is confusing. Help students develop the sense of 10 by first using group able materials then replacing the group with an object representing 10. Examples: base ten blocks, trading 10 pennies for a dime, trading 2 nickels for a dime. Teachers should watch for and address the issue of attaching words to materials and groups without knowing what they represent. If this misconception is not addressed early on, it can cause additional issues when working with numbers 11-19 and beyond.

Formative Assessment Questions:

- Can you find more than one way to make a set less than ____?
- Can you find more than one way to make a set more than____?
- Can you tell me a sentence that describes your sets using the term less, more or same?
- Tell me how you know that ____ is less or more than ____?
- What is another way to represent a set less than/greater than _____?

Differentiation:

Extension

- Allow students to use larger numbers and create additional dot arrangements on index cards. Be sure to give students additional counters for larger numbers.

Intervention

- Allow students to use smaller numbers and make only one comparison at a time. Offer a blank tens frame to place the counters in as they count and compare.

Vocabulary:

Compare/comparing	Set	
Less than	More than	Equal

References:

Parrish, Sherry. Number Talks: Helping Children Build Mental Math and Computation Strategies, Grades K 5. Sausalito: Math Solutions Publications, 2010

How Many Are Here Today?

Content Standard

- **1.NBT.1.** Count to 120. In this range, read, write and order numerals and represent a number of objects with a written numeral.
- **1.MD.7**. Organize, represent and interpret data with up to three categories. Ask and answer comparison and quantity questions about the data.

Mathematical Practices

1. **Make sense of problems and persevere in solving them. Students solve real-life problems posed using tally marks to represent different sets.**
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. Students will use tally marks to represent benchmarks (5, 10) of counting.**
8. Look for and express regularity in repeated reasoning.

Task Description

In this task students will use tally marks and real-life problems to keep track of information for graphing.

Materials:

- *Tally O'Malley* by Stuart J. Murphy or similar book about tally marks
- chart paper for class graph
- dry erase board or scratch paper

****Please visit link for tally sheet for the Number Tally Game (pg. 32): Math Tasks Grade 1 Unit 1**

Part I

Gather students together in a common place. Read aloud the book *Tally O'Malley* by Stuart J. Murphy. While reading, discuss how Tally keeps track of data. Tell students that today they will be keeping track of data using a tally chart. Review the format of tally marks and have students practice constructing a tally mark. Ask the students, *"Why do you think we would make the fifth mark cross the other four?", "How does that help us count the tally marks?*" Tell students that they will work together to determine the total number of students present today by creating a class tally chart. The teacher will start with having all the students close their eyes. Have the students predict how many students are present. Record the students' predictions on the board and discuss what an accurate prediction might be. On the large piece of chart paper, draw two columns, one for boys and one for girls. Allow each student to come to the front of the room and draw one tally mark on the chart in the correct column. Use this whole-group experience as an opportunity to discuss the proper formation of tally marks. Upon chart completion, generate a discussion using the formative assessment questions shown below about the attendance for today.

Part II
Next, the teacher will provide students with the following word problem. The students will act out the word problem and create a tally chart on the board. Discuss how the tally marks were created and how they can check to make sure they have the correct number for each animal. *At the Veterinarian Office today, the doctor saw 5 dogs, 8 cats and 2 birds. How many animals did the doctor see in all?* Provide students with additional word problems and allow them time to create a tally chart to represent the information from the problem. Put a problem on the board and ask the students to chart the tally marks on a scratch sheet of paper or on a dry erase board.

There are 3 examples below about a Veterinarian Office.
1. At the Veterinarian Office today, the doctor saw 7 dogs and 13 cats. How many animals did the doctor see in all?
2. At the Veterinarian Office today, the doctor saw 11 dogs, 6 cats and 9 birds. How many animals did the doctor see in all?
3. At the Veterinarian Office today, the doctor saw 22 animals. Draw a tally chart and show how many dogs and cats the doctor could have seen.

Part III
Students will play the number tally game. Players will play on their own with dice. Roll the dice and record one tally mark for the number rolled. The tally mark represents that the number has been rolled one time. Students should continue playing until a number has been rolled 10 times. Students will answer the two questions at the bottom of the chart and play again. Are the results the same or different this time? Why do you think this is the case?

Number Talk:
Strategy: Counting All/Counting On: Ten-Frames
Counting All: Counting every number is an addition strategy used primarily by kindergarten and beginning first grade students. Students who use this strategy are not yet able to add on from either addend. They cannot visualize and hold a number in their mind; instead they must mentally build every number quantity.

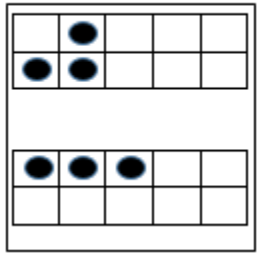
8 +9 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17	The student literally starts with 1 and counts up to 17 using every number. Using models to help the student keep track of their location when counting is helpful.

Counting On: Counting On is a transitional strategy used primarily in first grade an early-second grade. The student starts with one of the numbers and counts on from this point. When students are able to conceptualize a number, they will transition from Counting All to Counting On. It is tempting to show or tell students this strategy in an attempt to move them to a more efficient strategy. However, if students don't construct this strategy for themselves, it becomes a magical procedure without any foundation.

8 + 9 8...9, 10, 11, 12, 13, 14, 15, 16, 17 Or 9...10, 11, 12, 13, 14, 15, 16, 17	It is not unusual to hear students say, "I put the eight in my head and counted up nine more." From an efficiency standpoint, it is important to note whether the student counts on from the smaller or larger number.

Below are some Double Ten-Frame Number Talks for you to try with your students using the Counting All and Counting Up strategies. When the focus is on the numbers 3 to 9, ask students, "How many dots do you see? How do you see them?" When the focus is on the number 10, the question shifts to, "How many more to make ten?"

A.



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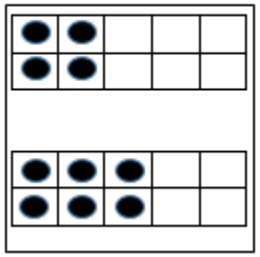

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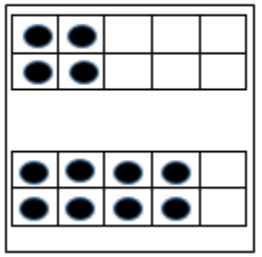


Additional number talks with five-and-ten frames can be found in *Number Talks* by Sherry Parrish.

Question Recommendations for Number Talks:

- How did you think about that?
- How did you figure it out?
- What did you do next?
- Why did you do that? Tell me more.
- Who would like to share their thinking?
- Did someone solve it a different way?
- Who else started the problem this way?
- Who else used this strategy to solve the problem?
- What strategies do you see being used?
- Which strategies seem to be efficient, quick, simple?

Background Knowledge/Common Misconceptions:

Some students may have difficulty with the proper formation of tally marks in groups of five. Help students with tally mark formation by using concrete objects such as popsicle sticks in order to physically create correct groups of five. Additionally, students may need multiple opportunities to practice counting groups of tally marks, focusing on changing the counting pattern from five to one when necessary.

Formative Assessment Questions:

- How could we find the total number of students present today?
- How can we find out how many boys are present today?
- How can we find out how many girls are present today?
- What makes counting our tallies easier?
- What is the purpose of the tally marks?
- How could we find the total number of students present today?
- How can we find the number of students who are absent?
- Why do you think a tally chart is a good way to present this information?
- Can you think of other times when using tally marks would be helpful?

Differentiation:

Extension

- Students may be given the opportunity to create a graph with tally marks that represents the number of students present in class, students who like particular objects or have certain hobbies. This will require the teacher to allow time for the students to survey their peers regarding the chosen topics.
- Create a class collection of questions they could answer through the use of tally marks and tally charts.

Intervention

- Fold a sheet of paper in half and label one side red and one side blue. Fill a container with up to 20 cubes, some red and some blue. Have the student take out one cube at a time and record the color they selected with a tally mark. Repeat this activity until they can demonstrate that they understand that the tally mark represents the item they selected.

Vocabulary:

Data
Tally mark

References:

Parrish, Sherry. Number Talks: Helping Children Build Mental Math and Computation Strategies, Grades K 5. Sausalito: Math Solutions Publications, 2010

Group It and Move It

Content Standard

- **1.NBT.1.** Count to 120. In this range, read, write and order numerals and represent a number of objects with a written numeral.
- **1.MD.7**. Organize, represent and interpret data with up to three categories. Ask and answer comparison and quantity questions about the data.

Mathematical Practices

1. Make sense of problems and persevere in solving them. Students solve real-life problems posed using tally marks to represent different sets.
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. Students will use tally marks to represent benchmarks (5, 10) of counting.**
8. Look for and express regularity in repeated reasoning.

Task Description
Students will use a life size tens frame as a conceptual way of experiencing place value.

Materials:

- Large sheet of butcher paper cut to form a tens and ones place value chart
- Student size place value chart
- Large dice or regular dice (1-6)
- Ten sets of two small dice or number cards
- Base-ten blocks
- At least two ropes for grouping students in sets of ten (jump ropes or ribbon work well)

****Please visit link for the "Build 30" game score card and place value chart (pg. 37): Math Tasks Grade 1 Unit 1**

Part I

Gather students together in a common area. Tell the students you have a story to tell them so they need to listen carefully. *"I have a story to tell you about my nephew Aaron. His mom told him he had too many video games. Aaron said, "No, I do not!" Aaron tried to count them, but he lost count around 33 when his sister walked in and asked him a question. So Aaron decided that there must be a better way to count the video games. Can you all help Aaron solve his problem?"* Students should talk with their elbow buddies then share with the group. At least one group should suggest making groups of 10. If not, you may need to lead this to this strategy. Discuss how Aaron could use the groups of 10 to help him keep track of his counting. Have counters available for a student to model how to make groups.

Part II

Create a large place value chart on the floor (using butcher paper, masking tape, or using sidewalk with chalk and play the game outside). Create a large tens frame with chart paper or masking tape in the ones column. Make sure the chart is largest enough to fit a tens frame for students to sit inside of in the ones column and 2 groups of ten in the tens column. Using a large die, roll a number. Ask the class for volunteers and have that number of students sit in the ones column. Explain that each student will sit in one spot in the tens frame. Roll or draw another number. Ask for more volunteers and add that many more students to the ones column. The area might be getting a little more crowded now. If the group consists of ten or more then have ten students link their arms and wrap a length of rope around those 10 students and move them to the tens place. The teacher will tell the students that the 10^{th} student in the ones column picks up the group and moves over to the tens column. It is important that the students understand that this student does not sit. This gives a false impression that ten ones "fit" in the ones column. If there are any extra students, ask "Where will these students go? Why don't they go in the tens column? Will they ever get to the ten's column? When?" Example: If a 6 is rolled, six students go into the ones column. If a five is rolled next ask, "Can 11 ones fit into the ones column? What happens when we have 11?" You may want to use a large piece of string to "rope" the group of ten into the tens column.

Repeat the game as needed until students have a good understanding of the transition of numbers into the tens column. It is very important to stress that when the tens frame is full, it must move over to the tens column. The full tens frame is 1 ten. Continue with the game by rolling the die until all the students are standing on the board. Have students explain what is happening and why groups are moving. While playing the game, ask the following questions as appropriate.

- What will happen when 10 people get into the ones column?
- Is there room for any more students in your column? How do you know?
- How do you know that more students can join you in the ones column?
- How many students are now in the ones column?
- Do we have enough students to make a group of ten?
- Are there any students left over?
- Where do these students go?
- How many more students do we need before we can make a group of ten?

Part III Game-Build 30

Gather the students in a common place a model the game prior to students playing independently. They will need to have a clear understanding of how to model each number and record each turn on the recording sheet. Each group will need 2 place value charts, 2 recording sheets, base ten blocks and a die. The first player will roll the die and place that many units in the ones column on their place value chart. They will also record this representation on their own recording sheet. The next student will take a turn, rolling the die and making the number on his or her own place value chart and filling in their own recording sheet. When the students have reached ten ones then they must trade for one ten rod. You will need to model this trade for the students to ensure they understand that the ten rod replaced the ones. The students will take turns rolling, trading their ones and tens rods, and recording on their own sheet. The first student to reach thirty wins. While students are playing, circulate the room asking questions to ensure understanding. You may extend the game to 50 once students have a deep understanding.

Number Talk:

Strategy: Making Tens: Double Ten-Frames (with five and ten-frames)

Making tens is an important focus in the primary grades. By now students should be able to break numbers apart quickly to make ten. The focus of this strategy is to be able to utilize fluency with ten to expedite adding. Being able to take numbers apart with ease, or fluency, is the key to using this strategy.

This strategy encourages students to "make 10" as they add mentally. "The sequence of problems within a given number talk allows students to apply strategies from previous problems to subsequent problems."

For Example:

8 + 9 (7 + 1) + 9 7 + (1 + 9) 7 + 10 = 17	By changing the 8 to a 7 + 1 the student can restructure the problem to create a combination of 10 with 1 + 9.

Or

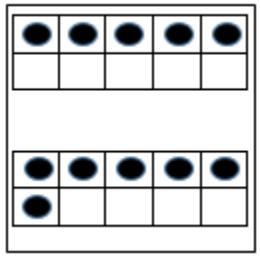
8 + 9 8 + (2 + 7) (8 + 2) + 7 10 + 7 = 17	The student could also choose to make a 10 by breaking apart the 9 into 7 + 2 and combining the 2 with the 8 to create 10.

Ten Frames can be used to foster fluency, subitizing, working with place value, and computing with addition and subtraction. Varying the questions posed to students can change the purpose and focus of each ten-frame.

Five-and-ten frames can be used as a single row of five (five-frame), two rows of five (ten-frame), or as two ten-frames together to provide the opportunity to work with numbers to twenty. Five and ten-frame number talks are each designed to be used in a single session, in any order. The focus for the numbers 3 to 9 is to ask students, "How many dots' do you see? How do you see them?" With frames for the number 10, the question shifts to, "How many more to make ten?"

Below is a Making Tens: Double Ten-Frames Number Talk that you can try with your students. Focus on questions such as, "How many do you see? How do you see them? **How many more do you need to make ten?**"

A.



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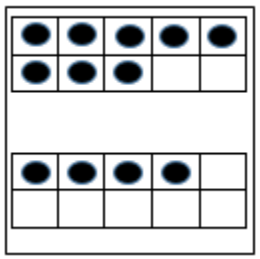

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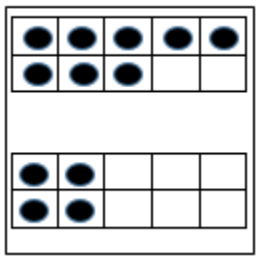


Additional examples of five-and-ten frames can be found in *Number Talks* by Sherry Parrish.

Background Knowledge/Common Misconceptions:

Students have difficulty with ten as a singular word that means 10 things. For many students, the understanding that a group of 10 things can be replaced by a single object and they both represent 10 is confusing. Help students develop the sense of 10 by first using group-able materials then replacing the group with an object representing 10.

Formative Assessment Questions:

Part II

- How many students are now in the ones column?
- Do we have enough students to make a group of ten?
- How many more students do we need before we can make a group of ten?
- Why have we moved this group to the ten's place?
- Where will these students go? Why don't they go in the tens column?
- Will they ever get to the ten's column? When?

Part III

- What number is now represented on the place value chart?
- How many units are now in the ones column?
- Do you have enough units to make a group of ten? How do you know?
- Why have you moved this group to the ten's place?
- What number is now represented on the place value board? Explain how you determined the number.
- How would you write this number? What do these two digits stand for?
- What is the amount in the tens place?
- What is the amount in the ones place?
- Why do you have to group numbers by tens?

Differentiation:

Extension

- Some students may be developmentally ready to work with numbers larger than 30. These students can play the game Race to Fifty or One Hundred. Students continue playing the game until someone reaches one hundred by having ten base ten blocks in their tens place. Once the students reach one hundred, the teacher can introduce the students to the regrouping of their ten tens into a hundred flat.

Intervention

- Use connecting cubes to aid students in connecting single units to create a ten rod. Use a tens frame in the ones column to help students understand when to group and move.
- Use a ten frame with the last block highlighted as a visual reminder of when to bundle pg 37.
  Example shown at this link: **Math Tasks Grade 1 Unit 1**

Vocabulary:
Column
Ones
Tens
Hundreds

References:

Parrish, Sherry. Number Talks: Helping Children Build Mental Math and Computation Strategies, Grades K 5. Sausalito: Math Solutions Publications, 2010

Finding Neighbors

Content Standard

- **1.NBT.1.** Count to 120. In this range, read, write and order numerals and represent a number of objects with a written numeral.
- **1.MD.7.** Organize, represent and interpret data with up to three categories. Ask and answer comparison and quantity questions about the data.

Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics. Students draw pictures using dot cards, number lines, picture cards, and counters to represent and compare quantities or sets.
5. **Use appropriate tools strategically.**
6. Attend to precision.
7. **Look for and make use of structure. Students will use tally marks to represent benchmarks (5, 10) of counting.**
8. Look for and express regularity in repeated reasoning.

Task Description

Students will use a 0-99 chart to create a number line. They will use this number line to play two games that involve moving a counter up and down the number line.

Materials:

- *Centipede's One Hundred Shoes* by Tony Ross or similar book about tally marks
- 0-99 chart printed on tag board
- Tape or glue
- 2 different colored counters
- spinner (1 more, 1 less, 10 more, 10 less)
- dice/spinner labeled with 10 and 1

****Please visit link for 0-99 chart (pg. 51): Math Tasks Grade 1 Unit 2**

Part I

By this time in the year, students should be familiar with a 0-99 chart. Assess prior knowledge and record what they know and how can use the chart as a tool.

Give each student a 0-99 chart and have them color each row of ten a different color. Ask the students what the benefits will be of coloring each row of ten a different color. After each student has colored their chart, have them cut their 99 chart into strips (0-9, 10-19, 20-29, etc.). Observe which students immediately start lining strips in order. Praise this concept and ask all students to do the same thing. After each student has put their number line in order, connect them together.

This is a teacher preference: some teachers like to glue strips together using the extra flap on the end and some teachers cut the flap off and put a piece of tape on the back to connect. Either way is fine, however, keep in mind the number lines will be reused through the unit and year so they will need to be folded up.

Part II: Race to 99 (2 players)
Each player should place their counter on zero. Players will take turns using the spinner and moving the corresponding number of spaces on the number line. (Example: if player 1 is on zero, and spins 10 less, they stay on zero. If player 1 spins 1 more, they move their counter to 1 on the number line. If player 2 is on 23 and spins 10 more they move their counter to 33.) The first player to reach the number 99 or beyond that number wins the game.

Part III: Tug-A-War (2 players)
Place the counter at the number 50 on the number line. Player 1 wants the counter to reach 0 on the number line and player 2 wants the counter to reach 99. 1 counter is shared between players and each player takes turn pulling the counter towards their designated side of the number line.

Player 1 uses the spinner and moves the counter the corresponding number of spaces towards zero on the number line. (If the chip is on fifty and player 1 spins 10, they move the chip 10 spaces towards the zero) Player one must identify and say the location of the chip on the number line. If player 1 is unable to identify the correct location of the chip, it moves back to the previous location.

Player 2 spins and moves the counter that many spaces towards 99. (If the chip is on 40 and player 2 spins 1, they move the counter to 41) If player 2 is unable to correctly identify the location of the chip, it moves back to the previous location. If the chip reaches zero on the number line, player 1 wins. If the chip reaches 99 on the number line, player 2 wins.

Number Talk:
Strategy: Counting All/Counting On: Number Sentences
Counting All: Counting every number is an addition strategy used primarily by kindergarten and beginning first grade students. Students who use this strategy are not yet able to add on from either addend. They cannot visualize and hold a number in their mind; instead they must mentally build every number quantity.

8 + 9 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17	The student literally starts with 1 and counts up to 17 using every number. Using models to help the student keep track of their location when counting is helpful.

Counting On: Counting On is a transitional strategy used primarily in first grade an early-second grade. The student starts with one of the numbers and counts on from this point. When students are able to conceptualize a number, they will transition from Counting All to Counting On. It is tempting to show or tell students this strategy in an attempt to move them to a more efficient strategy. However, if students don't construct this strategy for themselves, it becomes a magical procedure without any foundation.

8 + 9 8...9, 10, 11, 12, 13, 14, 15, 16, 17 Or 9...10, 11, 12, 13, 14, 15, 16, 17	It is not unusual to hear students say, "I put the eight in my head and counted up nine more." From an efficiency standpoint, it is important to note whether the student counts on from the smaller or larger number.

Below are some Number Sentence Number Talks for you to try with your students using the Counting All and Counting Up strategies:

3 + 6 3 + 7 3 + 8	4 + 6 7 + 4 4 + 8 4 + 9	9 + 1 9 + 3 9 + 5 9 + 7

For more Number Talks using the Counting All/Counting On strategies with number sentences please see *Number Talks* by Sherry Parrish.

Background Knowledge/Common Misconceptions:

Although the 0-99 chart is a critical tool to develop students understanding, students must also realize that the 0-99 chart is a folded number line. This task is developed to help students make the connection between a 0-99 chart and number line. A number line measures distance from zero to any number the same way a ruler does. In the early grades, students focus on the dots or numerals on a number line instead of the spaces, which is incorrect (Van de Walle, page 73).

Formative Assessment Questions:

- What do a 0-99 chart and a number line have in common?
- Can you recognize any patterns on the number line?
- What strategy are you using to move forward or backwards by 10 or 1?

Differentiation:

Extension

- Have students extend their number line to 120 and play Race to 99 and Tug-O-War.
- Have students use a ten-sided die instead of using spinners with ones and tens.

Intervention

- Have students play Tug-O-War from the Kindergarten Frameworks with numbers 0-20.
- Modify Race to 99and Tug-O-War to only use a section of the number line.
- Utilized enlarged copies of number chart or number line

Vocabulary:

Number line
Row of ten
More
Less

References:

Parrish, Sherry. Number Talks: Helping Children Build Mental Math and Computation Strategies, Grades K 5. Sausalito: Math Solutions Publications, 2010

Number Hotel

Content Standard

- **1.NBT.1.** Count to 120. In this range, read, write and order numerals and represent a number of objects with a written numeral.
- **1.MD.7.** Organize, represent and interpret data with up to three categories. Ask and answer comparison and quantity questions about the data.

Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics. Students draw pictures using dot cards, number lines, picture cards, and counters to represent and compare quantities or sets.
5. **Use appropriate tools strategically.**
6. Attend to precision.
7. Look for and make use of structure. Students will use tally marks to represent benchmarks (5, 10) of counting.
8. Look for and express regularity in repeated reasoning.

Task Description
In this task students will use a 0-99 chart to recognize patterns and similarities and differences.

Materials:

- Number Hotel game board
- Arrow cards
- Counters to use on the game board

****Please visit link for Number Hotel game board and arrow cards (pgs. 64-66): Math Tasks Grade 1 Unit 2**

Part I

Gather the students together to compare and analyze the Number Hotel and the 0-99 Chart. Have the students participate in a class discussion which includes reviewing and finding new patterns. Ask questions, rather than pointing out the differences, to prompt students to explain their discoveries of the Number Hotel, such as:

- *What differences do you notice between the Number Hotel and the 0-99 Chart?*
- *In what ways are they the same?*
- *What strategies might you need to know in order to use the Number Hotel?*

Part II
Pair the students into partner groups to play *Let Me Out* using the *Number Hotel* game board.

There are two exits out of the Number Hotel. The students must exit the hotel through the 0 door or the 119 door. Each player will place a counter on numeral 60 on their own game board. Using the stack of arrow cards, players will turn over five arrow cards each. The arrow cards can be arranged in any order for the player to find the quickest way to get out of the building. Each arrow represents one move on the Number Hotel game board. Players may move up, down, left or right. Once the players have moved five spaces, they may turn over five more arrow cards. Play stops and the player closest to their door wins.

Part III
Revisit the task, *Exploring the 99 Chart*, from the previous unit and incorporate some of the activities mentioned in the task. In particular, *Special Numbers* and *What's My Picture*?

For *Special Numbers*, have the students pair up and cover three numbers special to them (ex.: birthday, address, numbers in their phone number)and have their partner guess the player's numbers.

For *What's My Picture*, have students pair up and cover numbers to create a picture using counters. Player one then calls out the numbers to a partner. The partner uses those numbers to recreate the picture made by player one.
Then the players' roles are reversed, giving each player a chance to recreate a picture.

****Please visit link for the tasks mentioned in Part I-III (pg. 64): Math Tasks Grade 1 Unit 1**

Part IV
Gather the students together for a class discussion about what was learned from the *Number Hotel*. Have the students reflect on any connections they have made between the 0-99 chart and the *Number Hotel*. Have the students record what they learned in their math journals.

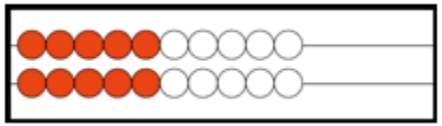
Number Talk:
Strategy: Counting All/Counting On: Rekenreks
Counting All: Counting every number is an addition strategy used primarily by kindergarten and beginning first grade students. Students who use this strategy are not yet able to add on from either addend. They cannot visualize and hold a number in their mind; instead they must mentally build every number quantity.

8 +9 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17	The student literally starts with 1 and counts up to 17 using every number. Using models to help the student keep track of their location when counting is helpful.

Counting On: Counting On is a transitional strategy used primarily in first grade an early-second grade. The student starts with one of the numbers and counts on from this point. When students are able to conceptualize a number, they will transition from Counting All to Counting On. It is tempting to show or tell students this strategy in an attempt to move them to a more efficient strategy. However, if students don't construct this strategy for themselves, it becomes a magical procedure without any foundation.

8 + 9 8...9, 10, 11, 12, 13, 14, 15, 16, 17 Or 9...10, 11, 12, 13, 14, 15 16, 17	It is not unusual to hear students say, "I put the eight in my head and counted up nine more." From an efficiency standpoint, it is important to note whether the student counts on from the smaller or larger number.

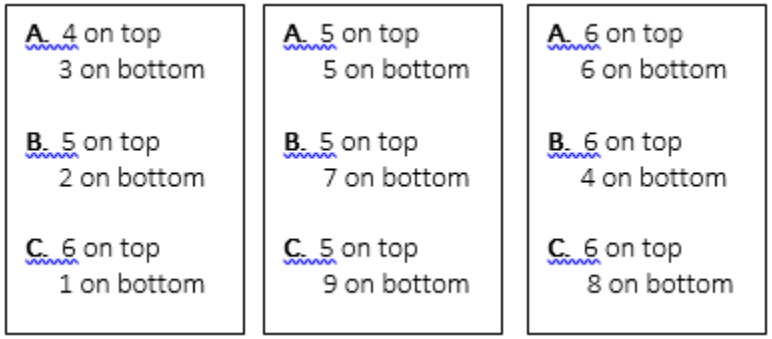
Rekenreks are an important tool to help students reason about numbers, subitize, build fluency, and compute using number relationships. The rekenrek is composed of two rows of stringed beads with five beads of one color and five beads of another color on each row. They are colored in groups of five to help students "see" or subitize the quantity of five. The teacher has the option of only using one row of beads at a time to build fluency up to ten or using both rows to work on fluency with numbers up to twenty.



Rekenrek number talks consist of three to five problems, each sequentially labeled A, B, C and so on. The sequence of problems within a given number talk allows student to apply strategies from previous problems to subsequent problems or provides opportunities for students to reason with the same quantity from multiple perspectives.

As each problem is show on a rekenrek, ask students, "How many beads do you see? How do you see them?"

Below are some Rekenrek Number Talks for you to try with your students using the Counting All and Counting Up strategies.



Additional examples of rekenrek number talks can be found in *Number Talks* by Sherry Parrish.

Background Knowledge/Common Misconceptions:

On a conventional 0-99 and hundred chart, each row below the previous is greater than the one above. It can be conceptually hard for many children to understand that when you move down, the numbers actually get bigger. Using the Number Hotel will allow students to make the connection that as the height of the hotel increases so do the numbers in general.

Formative Assessment Questions:

- How is the Number Hotel different from the 0-99 chart?
- How is the Number Hotel the same as the 0-99 chart?
- What new patterns did you find in the Number Hotel?
- Does the order of the arrows change where you would end up?
- What strategy did you use to make it as close as you could to the door?
- What would you do differently if you could play again?
- What special numbers did you cover up? Why?
- What picture did you make with your counters?
- Was it difficult to recreate a picture from you partner? Why or why not?

Differentiation:

Extension

- Have the students continue playing *Let Me Out* until they have reached the exit.
- Instead of recording arrows at the bottom of the recording sheet, have the students record the numerical representation of what they need to do to exit the building. (Example: if the counter is at 77 they would need to move +10, +10, +1, +1. Or, if the counter was at 22, they would need to record -10, -10, -1, -1.)

Intervention

- Have the students use the 0-99 chart to *play Let Me Out*.
- In *What's My Picture*, give the students an outline of a picture such as a flower to replicate.

Vocabulary:

Differences
Similarities
Strategies

References:

Parrish, Sherry. Number Talks: Helping Children Build Mental Math and Computation Strategies, Grades K 5. Sausalito: Math Solutions Publications, 2010

Dropping Tens

Content Standard

1.NBT.1. Count to 120. In this range, read, write and order numerals and represent a number of objects with a written numeral.

Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. **Reason abstractly and quantitatively.**
3. **Construct viable arguments and critique the reasoning of others.**
4. **Model with mathematics. Students draw pictures using dot cards, number lines, picture cards, and counters to represent and compare quantities or sets.**
5. Use appropriate tools strategically.
6. **Attend to precision.**
7. Look for and make use of structure. Students will use tally marks to represent benchmarks (5, 10) of counting.
8. Look for and express regularity in repeated reasoning.

Task Description
In this task students will practice counting by groups of ten.

Materials:

- 25-100 piece collection of dried beans
- Tongue depressors
- School glue
- Dot sticks (craft sticks/popsicle sticks)

****Please visit link for Dropping Tens tally sheet and *Who Has More?* score card sheet (pg. 78): Math Tasks Grade 1 Unit 2**

Part I

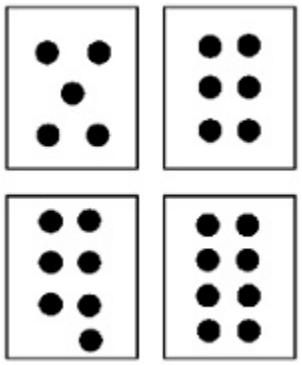
Gather the students together for a class discussion on ways to represent a number. Dump the collection of beans (Teacher Tip: use stickers or other items in place of beans) on the floor, and ask the students to count the beans. Have students share their method of counting the beans. Note*: Having the students group items in groups of ten is the most efficient means to count the items. However, this strategy needs to be found by the students and not prompted by the teacher*. Continue the discussion after the number of items on the floor is determined. Ask the students how this number could be represented. (Example: How can we represent the number 54?) Chart the students' responses and ideas. Continue the class discussion until the students understand that when representing the number 54, there are five sets of ten and 4 ones left over. Note: Some students may say 4 sets of ten and 14 ones.

Part II
Show students how to make base-ten models by gluing ten beans on each tongue depressor to represent one group of ten. Have them work independently, to make the base-ten models until all the possible groups of ten beans are used.
Comment: Bean sticks are an excellent way to connect unitizing to base-ten blocks and should be used interchangeably. Physical models for base-ten concepts helps students to develop the idea of "a ten" as both a single entity and as a set of 10 units. (Van de Walle, p. 127)

Part III
Comment: Prior to this activity, the teacher should make dot sticks to represent the base-ten model. To make dot sticks, place a set of ten dots on one side of the stick and one dot on the reverse side of the stick. This will allow students to represent both tens and ones.
Gather students in a common area to introduce the dot sticks and to play Dropping Tens. Students will be given ten dot sticks each. The students will drop the ten sticks to see what combination of tens and ones are created. The students will then record the number created on their recording sheet. Please refer to the key at the bottom of the recording sheet to explain to students how to record their number.

Part IV
Gather the students in a common area to explain the *Who Has More?* game. With students in pairs, player one drops their group of ten sticks and records their number on the game board. Then, player two drops their group of ten sticks and records their number on the game board. The player with the most circles their number. Play continues until each player has gone 5 times. The player with the most groups circled wins. If there is a tie, students must count up all the ones recorded to determine the winner.

Number Talk:
Strategy: I Wish I Had 10: Dot Cards
Flash a dot card or ten frame showing 9 or less and say, "I wish I had 10". Students respond with the part that is needed to make ten. The game can focus on a single whole, or the "wish I had" number can change each time.



Variation: teacher flashes card and students write the complement of ten on individual whiteboards with dry erase markers.

Here are some great questions to use with this number talk game:

- *Who would like to share their **thinking**?*
- *Who did it another way?*
- *How many people solved it the same way?*
- *Does anyone have any questions for ____?*
- *How did you figure that out?*
- *What was the first thing your eyes saw, or your brain did?*

Background Knowledge/Common Misconceptions:

Place-value requires the understanding of grouping by tens and how groups are recorded in our place-value system, how numbers are written, and how they are spoken. We want children to recognize that making groupings of tens and left-overs is a way of counting the same quantity by ones. (Van de Walle, p. 124)

Formative Assessment Questions:

- How many beans were counted? How many tens? How many ones?
- How can a set of ten be represented?
- How can ones be represented?
- What is the smallest number that could have been made with your dot sticks?
- What is the largest number that could have been made with your dot sticks?

Differentiation:

Extension

- Have students model their number with base-ten blocks.
- Have students place the numbers they created in order from least to greatest.

Intervention

- Have the students use fewer sticks to play Dropping Tens.
- Have students model their number dropped with the bean sticks.

Vocabulary:

Base-ten Tens Ones

References:

Van de Walle, John A., and Lou Ann H. Lovin. Teaching Student-Centered Mathematics: Grades K-3, Volume 1. Pearson, 2006

Day At The Museum

Content Standard

- **1.G.1.** Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes. Identify shapes that have non-defining attributes (e.g., color, orientation, overall size). Build and draw shapes given specified attributes.
- **1.G.2.** Compose (put together) two-dimensional or three-dimensional shapes to create a larger, composite shape, and compose new shapes from the composite shape.

Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. **Construct viable arguments and critique the reasoning of others.**
4. Model with mathematics. Students draw pictures using dot cards, number lines, picture cards, and counters to represent and compare quantities or sets.
5. Use appropriate tools strategically.
6. Attend to precision.
7. **Look for and make use of structure. Students will use tally marks to represent benchmarks (5, 10) of counting.**
8. Look for and express regularity in repeated reasoning.

Task Description

In this task students will explore the similarities and differences between 2D and 3D shapes

Materials:

- Geometric solid models for: cylinder, cone, and rectangular prism
- Modeling clay or play dough
- Connecting cubes
- *Captain Invincible and the Space Shapes* by Stuart J. Murphy
- Before reading, prepare a chart/organizer to record characteristics of the three dimensional figures while you read the story.
- File folders cut in half or half sheets of construction paper (See Part IV)
- Pictures of 2-D shapes (see Part IV)

Part I
Read *Captain Invincible and the Space Shapes* by Stuart J. Murphy or other book about 3D shapes. Prepare a chart/graphic organizer to record the characteristics of the three-dimensional figures as you read the story. Pass around solid 3D shapes (cube, right rectangular prism, right circular cone, right circular cylinder) and ask students to describe how each one looks and feels and record these characteristics in the graphic organizer. Ask the students, "How are these different from the shapes we have been using?" Allow students to engage in the conversation that defines the difference between 2D and 3D. More than likely students will identify the obvious characteristics. The teacher may guide the conversation if needed. Add any additional information to the chart created above if needed.

One way to describe a 2D shape is to explain that it only has 2 dimensions such as, width and height, but no thickness. Then, show students examples of 2D shapes such as a triangle, a circle, a rectangle, etc. Then, compare the 2D shape to a 3D shape and guide students to an understanding that a 3D shape has height, width, and depth. Describe the components of a 3D shape by pointing out the faces, vertices, and sides.

It is natural for students to initially talk about the faces as "sides" but as you talk about them make sure to use the word faces not sides. Gradually the students will pick up on this and will start calling the "sides" faces. This is important because "side" actually refers to a two dimensional shape. When you are talking about a three-dimensional shape, for instance a cube, it has 6 faces but 12 edges. Each face has four sides.

Part II
Have students work at their seats for the next activity. Give students connecting cubes and ask, *What shape does each connecting cube remind you of? What shapes can be made using these connecting cubes?* Allow students to work with the cubes to create other 3D shapes, share their creations, and have a class discussion of each.

Part III
After a class discussion on the differences between three dimensional and two dimensional shapes, explain to students that they will go on a shapes hunt in the school to identify 2D and 3D shapes found within their environment. Tell them that they will work with members of a group to locate specific items on a list and bring them back or take a picture of the items to include in a "Shapes Museum".

Divide students in to groups and assign them each a specific list of items to locate, such as:

- Two or more shapes that make another shape
- Solids that are like a box, a cylinder, a pyramid, a cone
- Five shapes that are alike in some way

Give students the option to take a picture with a digital camera, draw a picture, collect the items, or make the shapes using clay, to display in a "Shapes Museum" in the classroom.

Part IV

Students will work with a partner to play, "What's My Shape" (Van de Walle, Activity 7.2, page 195). Make a set of 2-D shapes on paper. Cut out a third of the shapes and paste each inside a folded half-sheet of construction paper to make "secret shape" folders. One student will be the leader and the other will hold the secret shape folder. The leader will ask yes or no questions about the shape to lead to a correct guess.

Number Talk:

Even though this task aligns with a geometry standard, it is still important to practice number talks daily. There is an example of a number talk appropriate for 1st grade below. However, feel free to choose or create a number talk that is relevant and/or needed for the students in your classroom.

Strategy: Making 10: Number Sentence

Making tens is an important focus in the primary grades. By now students should be able to break numbers apart quickly to make ten. The focus of this strategy is to be able to utilize fluency with ten to expedite adding. Being able to take numbers apart with ease, or fluency, is the key to using this strategy. This strategy encourages students to "make 10" as they add mentally. "The sequence of problems within a given number talk allows students to apply strategies from previous problems to subsequent problems."

For Example:

8 + 9 (7 + 1) + 9 7 + (1 + 9) 7 + 10 = 17 Or	By changing the 8 to a 7 + 1 the student can restructure the problem to create a combination of 10 with 1 + 9.
8 + 9 8 + (2 + 7) (8 + 2) + 7 10 + 7 = 17	The student could also choose to make a 10 by breaking apart the 9 into 7 + 2 and combining the 2 with the 8 to create 10.

Below is a Making Tens number talk to try with your students:

9 + 1 9 + 3 + 1 9 + 5 + 1	8 + 2 8 + 3 + 2 2 + 5 + 8

For more "Making Tens: Number Sentences Number Talks" please see *Number Talks* by Sherry Parrish.

Background Knowledge/Common Misconceptions:

As children explore their geometric world, they should have experiences with a rich variety of both two-and three-dimensional shapes (Van de Walle, p. 306). Students will have some background knowledge on what defines two dimensional or three dimensional shapes, but they may need additional assistance and guidance as you work through the task.

Formative Assessment Questions:

- Is this object exactly like our model? How is it the same? How is it different?
- Which solid is the hardest to find in the classroom? Why?
- What do you notice about the faces of objects?
- Where would you find _____ at your house?
- How are the students describing the shapes they are finding?
- Tell me about the shape you are looking for? The shape you found? (What attributes are the students using to describe the shape?)

Differentiation:

Extension

- Students could determine attributes and then use that information to graph objects from the "Shape Museum".
- A home connection could be made by sending a parent letter asking for students to search for solids they could bring back to school to add to the "Shape Museum" or to share during show and tell.

Intervention

- Give students who struggle cards with examples of 3-D solids that can be used when they are looking for objects for the "Shape Museum."

Vocabulary:

2D Shape	3D Shape	Faces
Cube	Right rectangular prism	Right circular cone
Right circular cylinder	Width	Height
Depth		

Resources:

Parrish, Sherry. Number Talks: Helping Children Build Mental Math and Computation Strategies, Grades K 5. Sausalito: Math Solutions Publications, 2010

Van de Walle, John A., and Lou Ann H. Lovin. Teaching Student-Centered Mathematics: Grades K-3, Volume 1. Pearson, 2006

I Want Half!

Content Standard

- **1.G.3**. Partition circles and rectangles into two and four equal shares. Describe the shares using the words, halves, fourths, and quarters and phrases half of, fourth of and quarter of. Describe the whole as two of or four of the shares. Understand for these examples that decomposing (break apart) into more equal shares creates smaller shares.

Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. **Construct viable arguments and critique the reasoning of others.**
4. **Model with mathematics. Students draw pictures using dot cards, number lines, picture cards, and counters to represent and compare quantities or sets.**
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure. Students will use tally marks to represent benchmarks (5, 10) of counting.
8. Look for and express regularity in repeated reasoning.

Task Description
In this task students will begin to explore the concepts of whole and half.

Materials:

- *Give Me Half!* by Stuart J Murphy or similar book
- 5 brown rectangles, for teacher demonstration
- Bags filled with a set of pattern blocks for each pair of students
- Paper for drawing and writing
- Many sets of fractional parts (fraction strips, pattern blocks, etc.)

Part I

Have the students gather in a common area. Ask students if they have ever had to share something with someone and invite them to share their experiences with a buddy next to them. Allow a few students to share with the whole class. Next, share with the class the title of the book you are about to read, *Give Me Half*! by Stuart J Murphy or similar book. Have them make predictions about the story before reading.

At the conclusion of the story, review what it means to have half of something (that there are two equal parts). Discuss situations in which you would make half of something and give students a variety of examples.

Part II
Show students one brown rectangle and tell them that it represents a brownie that you made to share with another student. Invite one student to join you in front of the group. Ask students, *How can this brownie be shared equally between me and _____?* Allow all students who want to share their solution to do so and discuss each. Divide the rectangle equally between you and the other student and ask, *Which two shapes can be used to create a whole rectangle?*
How do I know that these are fractional parts? What fraction did I create when I divided the rectangle (brownie)?

Part III
Give each pair of students a bag full of pattern blocks. Tell them they are going to act like the children in the story and share their materials. Have students find the yellow hexagon and review its attributes. Next, ask students to find another shape in their bag that could be used to cover up only half of the hexagon. Facilitate the investigation with a discussion like, "Think about the two children in the story. If they have to share this hexagon, how much will each one get? (half) What shape represents half of the hexagon? (red trapezoid) How do you know? (It takes two to cover it up). Why didn't you say the triangle? (It takes 6 of triangles to cover it up.) What if you only had triangles to use, could they still get half of the hexagon? Prove it: how many would each child get? (3) Would that be half of the hexagon? (yes) How do you know? (Each person gets the same amount. Is there another shape that covers the hexagon? (yes, blue rhombus) How many does it take? (3) Would one of those three pieces make half of the hexagon? (no) How do you know? (It can't be shared equally by two people).

Part IV
In small groups, have students play
"More, Less, or Equal to One Whole" (Activity 14.4, page 262. Van de Walle). Give students a collection of fractional parts and have students decide if the set is less than a whole, equal to a whole, or less than a whole.

Part V
Have students describe and illustrate something being shared equally in their math journal. They can draw a picture of the story they told their partner, what their buddy told them at the beginning of the lesson, or they can draw a picture of something else. For students having difficulty thinking of an object that can be shared, show them picture prompts to get them started.

Number Talk:
Even though this task aligns with a geometry standard, it is still important to practice number talks daily. There is an example of a number talk appropriate for 1st grade below. However, feel free to choose or create a number talk that is relevant and/or needed for the students in your classroom.

Strategy: Doubles/Near-Doubles: Number Sentences
Beginning as early as kindergarten, children are able to recall sums for many doubles. This strategy capitalizes on this strength by adjusting one or both numbers to make a double or near-doubles combination.

For Example:

8 + 9 8 + (8 + 1) (8 + 8) + 1 16 + 1 = 17 8 + 9 +1 9 + 9 = 18 - 1 17 8 + 9 +2 + +1 10 + 10 = 20 -3 17	The student could choose from several doubles/near-doubles combinations to solve the problem: 8 + 8 Using this double requires the student to decompose 9 into 8 + 1. 9 + 9 Using this double requires the student to add an extra 1 and then subtract it from the total. 10 + 10 Using this double requires the student to add 3 extra and then subtract the extra 3 from the total.

Below is a Double/Near Doubles: Number Sentences Number Talk for you to try with your classroom:

2 + 2 2 + 3 3 + 3 3 + 4	7 + 7 7 + 6 7 + 8 8 + 8

For additional number talks using this strategy, please see *Number Talks* by Sherry Parrish.

Background Knowledge/Common Misconceptions:

Students often think of half as any part of a whole, rather than one of two equal parts and they often refer to one half as being larger than another. It is important to build on student's previous experiences and clarify the ideas they have encountered. Provide many opportunities throughout the year for children to make sense of fractions, use fractional language, and represent fractions with standard symbols (Burns 2007). Sharing tasks should be presented in the form of a story problem. Over time, change the task difficulty by changing the numbers involved, the types of things to be shared, and with the presence or use of a model (Van de Walle & Lovin 2006).

Formative Assessment Questions:

- Are students able to show what "equal shares" look like?
- (see Part III)

Differentiation:

Extension

- "Finding Fair Shares" (Activity 14.2, page 261. Van de Walle) Give students models and have them find thirds, fourths, etc. using the models.

Intervention

- Provide students with paper shapes (wholes and halves). Have students glue a half on each whole to help build the relationship.

Vocabulary:

Whole
Half
Divide
Part
Fraction/Fractional
Rectangle
Hexagon
Triangle
Rhombus
Less than
Equal to

References:

Burns, Marilyn. About Teaching Mathematics, A K-8 Resource. Sausalito: Math Solutions Publications, 2007

Parrish, Sherry. Number Talks: Helping Children Build Mental Math and Computation Strategies, Grades K 5. Sausalito: Math Solutions Publications, 2010

Van de Walle, John A., and Lou Ann H. Lovin. Teaching Student-Centered Mathematics: Grades K-3, Volume 1. Pearson, 2006

Half And Not Half

Content Standard

- **1.G.3**. Partition circles and rectangles into two and four equal shares. Describe the shares using the words, halves, fourths, and quarters and phrases half of, fourth of and quarter of. Describe the whole as two of or four of the shares. Understand for these examples that decomposing (break apart) into more equal shares creates smaller shares.

Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. **Reason abstractly and quantitatively.**
3. Construct viable arguments and critique the reasoning of others.
4. **Model with mathematics. Students draw pictures using dot cards, number lines, picture cards, and counters to represent and compare quantities or sets.**
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure. Students will use tally marks to represent benchmarks (5, 10) of counting.
8. Look for and express regularity in repeated reasoning.

Task Description
In this task students will learn about fractional parts, mathematical notation of fractions, and use colored tiles to experiment with fractions.

Materials:

- *Eating Fractions* by Bruce McMillan or a similar book about fractions
- Various examples of fractional parts and non-fractional parts (made of construction paper, fraction strips, pattern block sets, etc.) for teacher demonstration
- A set of pencils, some sharpened, some unsharpened for teacher demonstration
- Colored square tiles
- Half and Not Half recording sheet
- crayons

****Please visit link for Half and Not Half recording sheet (pg. 64): Math Tasks Grade 1 Unit 6**

Part I

Gather students to a common area for math discussion. Review what it means to have a whole object and to divide it in to fractional parts. Lead students to discuss that fractional parts must be equal and that they are parts of a whole. Also review a few examples of when they have made fractional parts of a whole by dividing an object in half and then explain that you do not always have to cut or divide a whole object to have fractional parts. Explain to students that fraction of a whole, can also mean a *whole set*.

Read the book *Eating Fractions* by Bruce McMillian. After reading, show students various examples of fractions and non-fractions. Lead a class discussion about each set of fractional and non-fractional parts by using the following questioning, *"Based on your knowledge of fractional parts, which sets of objects or whole shapes are or are not, divided into equal parts? If they are, then what fraction could name this set or part of the whole? If you do not think they are fractional parts, then justify your reasoning."*

Part II

Show students a set of pencils, some sharpened and some unsharpened. Ask,
What fraction of the set are sharpened? Unsharpened? Have good points? Have erasers? For each example, show students the mathematical notation that corresponds with the set (ex: If 1 of the 4 pencils is sharpened, the write ¼ for students to make the connection between the set of objects and the symbol that represents the set.). As you show students various examples of fractions with a set and write the symbol, pose the following questions:

- *What do you think the 1 stands for?*
- *What do you think the 2 (or 4) refers to?*
- *Why does this mathematical notation make sense?*

Be sure to also show students sets of objects that are more than 2 or 4. This may help them make the connection of using doubles to identify half (ex.: When shown 3 pencils without erasers within a set of 6 pencils, students will identify 3 as half of 6.).

Part III

Show students a set of square tiles. Ask students how they think fractions can be made with square tiles. Divide students into small groups and provide each group with a tub or bowl of mixed color tiles. Allow the students a few minutes to explore with the shapes. Allow students to share their thinking.

After this time, have the student's select 6 tiles using two different colored tiles and make a rectangle. Tell them to draw their rectangle in their math journal and write about their observations. Notice if students automatically took 3 of each color tiles. Did they realize that 3 is half of 6? Did they count one at a time? Did they look around before beginning? Did they check to see what a rectangle was before starting? When students are finished recording their observations, allow a few students share their picture. Discuss the variations and ask students to compare them. (Some students may not have half, some may have 2 of one color and 4 of another, etc.)

Explain to students that half does not always mean that there are only two parts. Show students that even though there are 6 parts in the set, half of them are one color and the other half is another. There are an equal number of ____ (color) and ____ (color) tiles. Repeat this same activity using other even numbers until students show an understanding of half of a set of objects.

Now have the students put away their tiles and do activity again with 7 tiles. After a few minutes, stop and ask them to share what they tried and explain their thinking. Refer to the brownie activity in the previous lesson, what was a solution that worked in that situation?

Part IV

Have students independently build rectangles, matching the ones on the "Half and Not Half" activity page, to demonstrate their understanding of sets of objects that are divided in two equal parts and those that are not divided correctly into two equal parts. For the first round, they will make and color halves. Then, they will make colored rectangles that are not divided into halves. (For example, the student may color in three of the six squares of the fraction strip to show halves. In the second fraction strip, they may color in four of the squares, which is not half of six.) Have students partner share their work.

Number Talk:

Even though this task aligns with a geometry standard, it is still important to practice number talks daily. There is an example of a number talk appropriate for 1st grade below. However, feel free to choose or create a number talk that is relevant and/or needed for the students in your classroom.

Strategy: Making Landmark or Friendly Numbers

Landmark or friendly numbers are numbers that are easy to use in mental computation. Fives, multiples of ten, as well as monetary amounts such as twenty-five and fifty are examples of numbers that fall into this category. Students may adjust one or all addends by adding or subtracting amounts to make a friendly number.

For example:

$$\begin{array}{r} 23 + 48 \\ \underline{+\ 2\ \ } \\ 23 + 50 = 73 \\ \underline{-\ 2} \\ 71 \end{array}$$

In this example only the 48 is adjusted to make an easy landmark number. The extra 2 that was added on must be subtracted.

Here is a Making Landmark or Friendly Numbers number talk for you to try with your classroom:

9 + 1	20 + 5
9 + 1 + 4	19 + 1 + 4
9 + 5	19 + 5
9 + 6	19 + 8

For additional number talks using this strategy please see *Number Talks* by Sherry Parrish.

Background Knowledge/Common Misconceptions:

Students should be familiar with fractions of a whole and of a whole set. According to Van de Walle: "In the primary grades the use of models to explore fractions is essential. Students can represent fraction concepts with physical materials and drawings in many different ways. Not only should students use these models, but also they should explore fractional concepts with a wide variety of models so that fractions don't simply become 'pie pieces'." (Van de Walle & Lovin 2006)

Formative Assessment Questions:

- What is the difference between a half and a whole?
- How do we know these are not divided into halves?
- See questions also noted within task description

Differentiation:

Extension

- "Kids and Cookies" –kids-and-cookies

This interactive website offers students the opportunity to work on partitioning strategies in the context of fairly sharing cookies with friends. The number of friends, the shape of the cookie, the number of cookies to share, and the number of equal pieces you can cut a cookie into can be changed.

Intervention

- "Fair and Unfair Shares" (Van de Walle, Activity 14.1, page 260). Students will examine examples and non-examples of fractional parts. Students will identify the wholes that are correctly divided into requested fractional parts and those that are not. For each response, students should share their reasoning. In this activity, the wholes are already partitioned either correctly or incorrectly; the children are not involved in the partitioning.

Vocabulary:

Half	Whole	Equal parts
Fraction/fractional part	Rectangle	Fraction Strip

References:

Parrish, Sherry. Number Talks: Helping Children Build Mental Math and Computation Strategies, Grades K 5. Sausalito: Math Solutions Publications, 2010

Van de Walle, John A., and Lou Ann H. Lovin. Teaching Student-Centered Mathematics: Grades K-3, Volume 1. Pearson, 2006

How Big Is A Foot?

Content Standard

- **1.MD.1.** Measure and compare three objects using standard or non-standard units.
- **1.MD.2.** Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps.
- **1.MD.7.** Organize, represent and interpret data with up to three categories. Ask and answer comparison and quantity questions about the data.

Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. **Construct viable arguments and critique the reasoning of others.**
4. Model with mathematics. Students draw pictures using dot cards, number lines, picture cards, and counters to represent and compare quantities or sets.
5. Use appropriate tools strategically.
6. Attend to precision.
7. **Look for and make use of structure. Students will use tally marks to represent benchmarks (5, 10) of counting.**
8. Look for and express regularity in repeated reasoning.

Task Description

Students will experiment with the concept of distance and measurements.

Materials:

- Reproducible foot cut-outs (all one foot long)
- *How Big Is a Foot?* by Rolf Myller or similar book
- "How Big is Foot" Student Task Sheet (copied twice, back to back, per student)
- Sentence strips or strips of tag board

****Please visit link for student task sheet (pg. 32): Math Tasks Grade 1 Unit 4**

Part I

Read the book *How Big Is a Foot?* by Rolf Myller (or similar book). If the feet need to be cut out, have the students do so at this time. Have students work with partner to lay their feet cut-outs end to end. This will allow students to see why it is important to use the measurement tool back to back and not leave big gaps when measuring. You can also have students practice walking the rug, or the length of tables by walking heel to toe, heel to toe, to help them see this. Allow students time to measure several distances with their "feet".

Part II

Next, students should choose 5 items from the classroom to measure. They must estimate the number of "feet" first; measure the item next, and then record the actual measurement on the recording sheet. Also, have the students place the items they measured in order from longest to shortest or vice-versa. This could be recorded on their student task sheet. While students are measuring, ask the following questions about their findings:

- *Which of the two objects is longer than the other?*
- *Show me how to put these in order.*
- *What will you do for objects longer than your feet?*
- *Is it important to put the "feet" end to end? Why?*

After all groups have completed their recording sheet, take time to share results with the entire class. Be sure to ask each group of students if they measured using the length or the width of their foot. Encourage them to give reasons to support one way over the other but do not discourage them from choosing a particular way. However, make sure to discuss how this might affect their results.

Part III

Review Parts I and II of this lesson with the students. Ask them to share what they remember about using multiple feet versus only one unit of measure (a single footprint). Ask, *"What are the drawbacks to using only one unit of measure to determine the length of an object?", "How might using only one unit affect your findings?"* Ultimately, you want students to discover that using only one single unit is not efficient. Have them create a measurement tool using their "feet" by using multiple copies to create a measurement tool of "5 feet". Students could glue their footprints to sentence strips or tape each footprint, toe-to-heel, in groups of five to create a measurement tool. Once each student has created a tool, have them re-measure the same objects and record their findings on the second recording sheet.

Once students have completed the task with their measurement tool, have them answer the following question in their math journals:

- *What is an efficient method of measuring an object? Why?*

Number Talk:

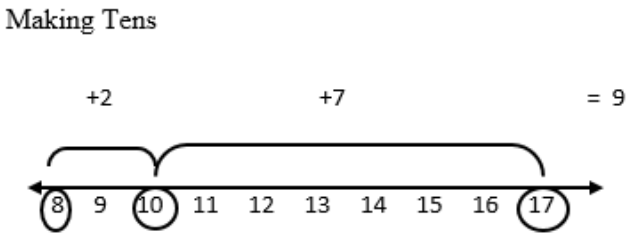
Strategy: Making Tens: Number Line

Making tens is an important focus in the primary grades. By now students should be able to break numbers apart quickly to make ten. The focus of this strategy is to be able to utilize fluency with ten to expedite adding. Being able to take numbers apart with ease, or fluency, is the key to using this strategy.

For Example:

8 + 9 (7 + 1) + 9 7 + (1 + 9) 7 + 10 = 17 Or 8 + 9 8 + (2 + 7) (8+ 2) + 7 10 + 7 = 17	By changing the 8 to a 7 + 1 the student can restructure the problem to create a combination of 10 with 1 + 9. The student could also choose to make a 10 by breaking apart the 9 into 7 + 2 and combining the 2 with the 8 to create 10.

Using this strategy with a number line:
A number line allows the students to visualize the action of the operation. See picture below for the correct use of the open number line for 8 + 9:



Try using the number talk below using the Making Ten strategy and a number line:

7 + 3 7 + 5 + 3 3 + 6 + 7	8 + 2 2 + 4 + 8 8 + 3 + 2

For more number talks using the strategy please see *Number Talks* by Sherry Parrish.

Background Knowledge/Common Misconceptions:
Students often overlap or leave spaces when using multiple objects. Students sometimes do not realize they are measuring a unit of space.

Formative Assessment Questions:
- What will/did you do when the item was longer or further than the number of "feet" you had, what did you do to figure out an answer?
- Which do you prefer to use to measure, a single footprint or your measurement tool of "5 feet"? Why?

- How are you able to determine which the objects you have measured are longer than the other?

Differentiation:

Extension

- Have the students measure objects that are longer than the tool they created with the 5 feet. Have them explain how they dealt with this situation.

Intervention

- Have the students make a tool that is 3 feet long rather than 5 feet. Provide them with a precut strip of tag board upon which they will glue the feet.

Vocabulary:

Longest
Length
Unit of Measure
Shortest
Width
Measurement
Estimate

References:

Parrish, Sherry. Number Talks: Helping Children Build Mental Math and Computation Strategies, Grades K 5. Sausalito: Math Solutions Publications, 2010

What Shape Are You?

Content Standard

1.MD.1. Measure and compare three objects using standard or non-standard units.
1.MD.2. Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps.
1.MD.7. Organize, represent and interpret data with up to three categories. Ask and answer comparison and quantity questions about the data.

Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics. Students draw pictures using dot cards, number lines, picture cards, and counters to represent and compare quantities or sets.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure. Students will use tally marks to represent benchmarks (5, 10) of counting.
8. Look for and express regularity in repeated reasoning.

Task Description
In this task students will work with the concept of height and measurement. (Task adapted from *Are You a Square?* By Marilyn Burns)

Materials:

- Yarn (enough for each student)
- Various units of measure for students to choose from (various small and large tools for discussion in Part I)
- Sticky notes (enough for each student to have 1)
- Chart paper (1-2 sheets, see diagram in Part II)
- "What Shape Are You?" recording sheet (1 per pair of students)

****Please visit link for "What Shape Are You" recording sheet (pg. 51): Math Tasks Grade 1 Unit 4**

Part I
Students will work in pairs for this activity. They will measure each other's height and length of reach by using a piece of yarn. The teacher will need to model these measurements so that all the students are clear on the procedure. Then, they will decide on a measuring tool (from a set) to determine the number of units long their height and length of reach are. Once they have determined their "measurements" they will then decide which category they belong in (square, tall or wide rectangle) and place their sticky note on the chart.

Part II

Once everyone in the class has posted their findings, allow students to share their results. Then, graph the results and have a class discussion. Possible questions to pose include:

- *Which does our class have the most of? Tall or wide rectangles?*
- *How many squares does our class have?*
- *Do we have an equal amount of any shapes?*

Discuss the various measurement tools students chose to use. Ask students to explain why they chose the tool they used and ask students if they would be able to determine, based on the data they collected, who is the tallest (or shortest) in the class? Why or why not?

Number Talk:

Strategy: Making Tens: Number Line

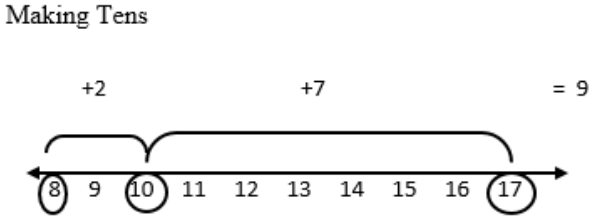
Making tens is an important focus in the primary grades. By now students should be able to break numbers apart quickly to make ten. The focus of this strategy is to be able to utilize fluency with ten to expedite adding. Being able to take numbers apart with ease, or fluency, is the key to using this strategy.

For Example:

8 + 9 (7 + 1) + 9 7 + (1 + 9) 7 + 10 = 17 Or 8 + 9 8 + (2 + 7) (8 + 2) + 7 10 + 7 = 17	By changing the 8 to a 7 + 1 the student can restructure the problem to create a combination of 10 with 1 + 9. The student could also choose to make a 10 by breaking apart the 9 into 7 + 2 and combining the 2 with the 8 to create 10.

Using this strategy with a number line:

A number line allows the students to visualize the action of the operation. See picture below for the correct use of the open number line for 8 + 9:



For more number talks using the strategy please see *Number Talks* by Sherry Parrish.

Try using the number talk below using the Making Ten strategy and a number line:

Background Knowledge/Common Misconceptions:

Students should have some understanding of appropriate units of measure in relationship to the size of the object being measured. Ex: It would not be efficient to measure the length of the white board using inch long paper clips. More appropriate tools would include: outline of foot from previous task, inchworm ruler, and ladybug ruler.

Formative Assessment Questions:

- Which does our class have the most of? Tall or wide rectangles?
- How many squares does our class have?
- Do we have an equal amount of any shapes?
- Explain why you chose the tool that you did.
- Were you able to determine, based on the data you collected, who is the tallest (or shortest) in the class? Why or why not

Differentiation:

Extension

- Use Van de Walle, Activity 15.13, "Changing Units," page 284 to give students opportunities to estimate the length of their height using a different unit of measure than they used in the task.

Intervention

- You may want to provide a large standard unit of measurement for the student to use when measuring his or her height or length of reach, so that organization is less of an issue.
- *Who is taller than* _____? Students will stand back-to-back with the other students and determine if they are taller than, the same as, or shorter than each classmate. As they identify which of those they are in relation to each student, they will record the information on a task sheet. After all data is collected, the student will answer questions about the data, such as: *Are you taller or shorter than most students in the class? How many students are the same height as you?*

Vocabulary:

Tall Wide Rectangle Square Equal Tallest Shortest

References:

Parrish, Sherry. Number Talks: Helping Children Build Mental Math and Computation Strategies, Grades K 5. Sausalito: Math Solutions Publications, 2010

Van de Walle, John A., and Lou Ann H. Lovin. Teaching Student-Centered Mathematics: Grades K-3, Volume 1. Pearson, 2006

Lots Of Dots

Content Standard

- **1.OA.3.** Apply properties of operations as strategies to add and subtract. (Students need not know the name of the property.) For example: If 8 + 3 = 11 is known, then 3 + 8 = 11 is also known (Commutative property of addition). To add 2 + 6 + 4, the second two numbers can be added to make a ten, so 2 + 6 + 4 = 2 + 10 = 12 (Associative property of addition). Demonstrate that when adding zero to any number, the quantity does not change (Identity property of addition).
- **1.OA.4**. Understand subtraction as an unknown-addend problem. For example, subtract 10 -8 by finding the number that makes 10 when added to 8.
- **1.OA.5.** Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).
- **1.OA.6.** Add and subtract using numbers up to 20, demonstrating fluency for addition and subtraction up to 10. Use strategies such as
  - counting on
  - making ten (8 + 6 = 8 + 2 + 4 = 10 + 4 = 14)
  - decomposing a number leading to a ten (13 -4 = 13 -3 -1 = 10 -1 = 9)
  - using the relationship between addition and subtraction, such as fact families, (8 + 4 = 12 and 12 -8 = 4)
  - creating equivalent but easier or known sums (e.g., adding 6 + 7 by creating the known equivalent 6 + 6 + 1 = 12 + 1 = 13).

Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. **Reason abstractly and quantitatively.**
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics. Students draw pictures using dot cards, number lines, picture cards, and counters to represent and compare quantities or sets.
5. Use appropriate tools strategically.
6. Attend to precision.
7. **Look for and make use of structure. Students will use tally marks to represent** benchmarks (5, 10) of counting.
8. Look for and express regularity in repeated reasoning

Task Description

During this task students will explore finding sums, forming equations, expressions, and the Commutative Property (Task adapted from NCTM Navigating Through Algebra K-2)

Materials:

- Lots of Dots blackline master
- Copy one set of 6 ladybugs for each student
- Student math journals
- How Many Counters Game
- Small Counters

****Please visit link for blackline master and ladybugs (pg. 27): Math Tasks Grade 1 Unit 3**

Part I

Students will explore finding sums, forming equations, expressions, and the Commutative Property. Place the ladybugs (cut apart) in an envelope. Have the students count the number of dots on the ladybugs. Ask, "How many ways can you put the ladybugs together to make three, four, or five?" Discuss the different ways that the lady bugs can be put together and record the student's responses on chart paper, as they record classmate responses in their personal math journals. Be sure to point out the variety of ways the students are coming up with. They may discover that one and two are the same as two and one. Encourage the discussion and allow students to create their own rule.

Continue by having them find as many number combinations for 6, 7, and 8as they can. They will write expressions to match their number combinations. A possible solution might be: *7 is 3 + 4, 2 + 5, 1 + 2 + 4, 0 + 3 + 4, 0 + 2 + 5.* End by having students write in their journal about the number 9.

Part II

Begin to pose situations where dots are missing. For example, "All together the ladybugs have 4 dots. If one has 3 dots, how many does the other ladybug(s) have?" Record the equation 3 + □ = 4. Provide students with additional "missing dots" questions and have them record and solve the equations in their math journals.

Part III

Students combine envelopes of ladybugs to represent larger quantities. They will continue to write equations with and without missing dots. They will also have opportunities to put together more than two addends.

Part IV

Students should play the game, *How Many Counters?* This partner game was created to increase proficiency with number combinations. Students will need blank ten-frames, counters and a number cube. One player secretly arranges some counters on a ten-frame. The other player asks questions that can be answered "yes" or "no", trying to gain enough clues to work out the arrangement of counters. For example: Is the top row full? Are there 8 counters? Is there an empty box in the bottom row? As players become more skilled, the number of questions can be counted. The player asking fewer questions wins.

Number Talk:

Strategy: Making 10: Number Sentence

Making tens is an important focus in the primary grades. By now students should be able to break numbers apart quickly to make ten. The focus of this strategy is to be able to utilize fluency with ten to expedite adding. Being able to take numbers apart with ease, or fluency, is the key to using this strategy. This strategy encourages students to "make 10" as they add mentally. "The sequence of problems within a given number talk allows students to apply strategies from previous problems to subsequent problems."

For Example:

8 + 9 (7 + 1) + 9 7 + (1 + 9) 7 + 10 = 17	By changing the 8 to a 7 + 1 the student can restructure the problem to create a combination of 10 with 1 + 9.
Or 8 + 9 8 + (2 + 7) (8 + 2) + 7 10 + 7 = 17	The student could also choose to make a 10 by breaking apart the 9 into 7 + 2 and combining the 2 with the 8 to create 10.

Below is a Making Tens number talk to try with your students:

5 + 5 + 8 3 + 4 + 6 4 + 5 + 6 + 5	2 + 8 2 + 5 + 8 8 + 6 + 2

For more Making Tens: Number Sentences Number Talks, please see *Number Talks b*y Sherry Parrish.

Background Knowledge/Common Misconceptions:

First graders might have informally encountered negative numbers in their lives, so they think they can take away more than the number of items in a given set, resulting in a negative number below zero. Provide many problems situations where students take away all objects from a set, e.g. 19 -19 = 0 and focus on the meaning of 0 objects and 0 as a number. Ask students to discuss whether they can take away more objects than what they have. (N.C. Dept. of Public Instruction)

Formative Assessment Questions:

- Is there another way that you could make the number?
- How did you determine the missing addend?
- Are you sure that you have found them all? Why do you think so? How do you know?
- Did you identify any patterns or rules? Explain!

Differentiation:

Extension

- Provide students with problems involving two expressions where one has a missing addend. For example: There were two windows with two ladybugs on each window. Both sets of ladybugs have the same number of spots. If one window has ladybugs with three spots and four spots, and the other window has one ladybug with 2 spots, how many spots does the other lady bug have? Write an equation to solve this problem.

Intervention

- Complete this task in a smaller setting. Students may work in pairs and the sum may not be greater than five. Gradually increase the sum until the concept is grasped.

Vocabulary:

Expression
Equals
Sum

References:

Green, Carol E., et al. Navigating Through Algebra in Prekindergarten – Grade 2 (Principles and Standards for School Mathematics Navigations Series). Reston: National Council of Teachers of Mathematics, 2001

Parrish, Sherry. Number Talks: Helping Children Build Mental Math and Computation Strategies, Grades K 5. Sausalito: Math Solutions Publications, 2010