Instructional Plan

Concrete Level

Name of Math Skill/Concept: Rounding to the nearest ten and/or hundred using concrete materials.

Prerequisite Skills Needed:

- "counting on" and "counting back"
- counting by ones; "skip counting" by tens
- familiarity with discrete concrete objects and base ten concrete materials

Learning Objectives:

1.) Round to the nearest ten using discrete (non-linked) counting objects.

2.) Round to the nearest hundred using "linked" proportional concrete materials.

3.) Round to the nearest ten using discrete (non-linked) counting objects and a number line.

4.) Round to the nearest hundred using base ten materials and a number line.

5.) Round to the nearest ten and the nearest hundred with values that represent 100-999 using base-ten materials and a number line.

Important Ideas for Implementing This Teaching Plan:

1.) At the concrete level, it is helpful to first explicitly teach and then provide practice opportunities for rounding sets of concrete objects to the nearest ten or hundred without reference to numerals or number lines.

2.) When students demonstrate mastery of rounding sets of concrete objects without reference to numerals, then they should be taught how to round by drawing (See sections A and B under Explicit Teacher Modeling in the Representational Level Instructional Plan.). After students have demonstrated understanding of this process, then helping them to begin to associate these "pure" concrete and drawing experiences to numerals via a number line is a productive "next step."

3.) Students with learning difficulties need explicit instruction and practice rounding to the nearest ten *before* rounding to the nearest hundred.

Instructional Phase 1: Initial Acquisition of Skill/Concept – Teacher Directed Instruction

I. Teach Skill/Concept within Authentic Context

Description:

Several story contexts including students helping the teacher decide the correct size box for storing books.

Build Meaningful Student Connections

*The following description is an example of how you might implement this instructional strategy for rounding to the nearest ten using discrete counting objects. A similar process can be used for the other learning objectives in this plan.

Purpose: to assist students to build meaningful connections between what they know about "counting on" and "counting back" by ones and rounding to the nearest ten.

Materials:

Teacher –

- a set of ten counting objects (e.g. counting chips, unifix cubes, beans.).
- "round a set of objects to the nearest ten" written on a card or on the chalkboard/dry-erase board.

Description:

Learning Objective 1: Round to the nearest ten using discrete counting objects.

1.) **L** ink to students' prior knowledge of

For Example:

(Display a group of ten counting objects.) I have a group of ten counting chips. Count them aloud with me as I lay them in a row/line. (Count aloud with your students as you line the counting chips in a row.) We have ten counting chips here. You already know how to count on from one number to a number that is greater. Let's do that now. Let's count on from the fifth counting chip to the tenth counting chip. (Count to the fifth chip and then encourage your students to "count on" to ten with you. *Move each chip that you count on slightly above chips 1-5.) How many chips did we count one? (Elicit the response, "five.") Good, we counted on five chips. Ok, now lets count back. Let's start at the seventh chip and count back to the second chip. (Follow the same process as counting on.) How many chips did we count back? (Elicit the response, "five chips.") Yes, we counted back five chips. We can use what we know about "counting on" and "counting back" to learn something new today.

2.) **I** dentify the skill students will learn

For Example:

Today we're going to learn how to find which "ten" a set of objects are closest to. Another way to say this is that we are going to learn how to round a set of objects to the nearest ten. (Display a visual representation of the learning objective.)

3.) **P** rovide rationale/meaning for

For Example:

Being able to round a set of objects to the nearest ten, or being able to determine which ten a set of objects is closest to can be a very useful skill. For example, this skill can come in handy when you need to store things like CD's, video games, baseball cards, or stamps. When you collect things such as these, you will need to keep them in a safe place like a box or notebook. Boxes and notebooks come in different sizes. Some may hold ten items, some twenty, some thirty or more. If you can determine which "ten" the number of CD's or cards you have is closest to, then you can easily decide what size container you need. I'm going to show you what I mean now by showing you how to round to the nearest ten using some books I need to store away.

Provide Explicit Teacher Modeling

Purpose: to provide students a clear teacher of rounding to the nearest "ten" or "hundred" with concrete materials.

Learning Objective 1: Round to the nearest ten using discrete counting objects.

Materials:

Teacher –

- a variety of discrete counting objects of sufficient number to represent various multiples of ten - up to ninety (e.g. books, unifix cubes, counting chips, beans, etc.)
- a visual platform from which to display concrete objects so all students can clearly see them (*there should be enough room to line concrete objects side-by-side in the form of a line in multiples of ten.).

Description:

A. Use "non-linked" discrete concrete objects to determine which multiple of ten a selected set of objects is closest to when the numerical value of the set lies between the two multiples of ten (e.g. Is a set of 17 objects closer in value/number to "10" or "20?").

A. Break down the skill of using concrete objects to round to the nearest ten using discrete counting objects.

1.) Introduce a story problem situation/context.
2.) Read story aloud; then have students read with you.
3.) Line objects of the set in a row.
4.) Count the total number of objects; say total.
5.) Count on to higher ten with additional objects; say number "counted on."
6.) "Count back to lesser ten; say number "counted back."
7.) Compare "count on" group and "count back" group.
8.) Determine closer ten.
9.) Relate answer to story problem.

B. Explicitly describe and model how to round to the nearest ten using discrete concrete objects.

1.) Introduce story problem.

- color-code important information
- all students see it clearly

For Example:

Ms. Gray is packing books away for the summer. She has smaller boxes that can hold about ten or so books and larger boxes that can hold around twenty or so books. Ms. Gray only has a limited number of boxes so she needs to make the best decision about which boxes to use for her different sets of books. Ms. Gray has seventeen reading books. Which size box should she use to store her books? Why?

2.) Read story aloud and then have students read with you a second time.

- Point to words as you read
- Read at normal pace.

3.) Line objects of the set into a row.

- side-by-side
- emphasize objects should be in straight line
- cue with finger

For Example:

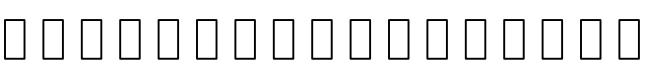
We've read the story problem. What is it that we need to find out? (Elicit the response, "whether seventeen books are closer to "ten" books or to "twenty books.") That's right. I need to determine whether the seventeen books I have are closer to ten books or to twenty books. Ok, guys, I have my set of books here. I'm going to line them up to make one row of books. I'll do that by placing them one beside the other until I have no more books left. How am I going to line the books into a row? (Elicit the response, "place them side-by-side until you have no more books left.") That's right, I'll line them side-by-side until I have no books left. Everybody watch me to be sure I line the books in a row correctly. (Line the books side by side in a way that all students can see. *Once or twice, place a book in a position not representing a line and prompt them to say what it is you did not do correctly.) Ok, are all my books in one line? (Elicit the response, "yes.") Yes, my books are all in one line. I know this because each book is laying side-by-side in the same way. (Move your finger/hand along the line of books to emphasize.)

4.) Count the total number of objects and say the total.

- count aloud
- students count with you
- point to each object

For Example:

Now that I have arranged my books into one line, I can count them. I'll start counting with the book at beginning. Everybody count with me. (Point to each book as you count them with your students.) How many total books do we have? (Elicit the response, "seventeen.") That's correct, we have seventeen total books.



5.) Count on to the higher multiple of ten by adding additional objects in the line and then say the number of objects "counted on;" distinguish the "added on objects from the original set.

- place objects above original line
- count aloud
- students count second time
- point to objects
- say total

For Example:

I have seventeen books. I wonder whether my seventeen books are closer to "twenty" or closer to "ten?" One way to determine this is to first "count on" to twenty and then "count back" to ten. I can count on from seventeen books by continually adding one more book until I get to twenty books. I'll do that now. Count with me as I place each additional book down. I will place each book I "count on" above my original line of seventeen books. (Place and count each additional book until you reach "twenty.") I now have a total of twenty books. How many books did I "count on" to reach twenty books? (Elicit the response, "three.") Yes, I added three books to the original set of seventeen books to make a total of twenty books. (First point to the set of three "counted on" books and then to the original set of seventeen books as you say this.) Let's count all of the books together to be sure we have twenty books. (Count aloud with your students the total number of books.) Do we have twenty books total? (Elicit the response, "yes.") Yes, we have twenty books total.

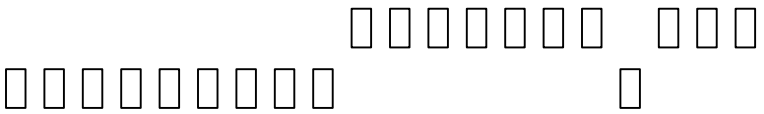
I placed the three books we counted slightly above the original line of seventeen books because it will help us compare the set of three books we just "counted on" to make twenty to the set of books we will "count back" to make ten. (Point to the three "counted on" books and move your hand to emphasize where they are in relation to the original set of seventeen books.)

6.) "Count back" to the lower multiple of ten and distinguish this subset of objects from the original set, then say aloud the number of objects counted back.

- more objects above original line
- count aloud
- students count second time
- point to objects
- say total

For Example:

Now, I am going to count back from the seventeenth book until I reach ten. Why will I start with the seventeenth book? (Elicit the response, "because that book represents the total of the original set of seventeen books.) That's correct. I counted on from the seventeenth book to reach twenty because I had seventeen books in my original set. I also need to start from the seventeenth book when I count back to ten. I need to do this because I am trying to determine whether my original set of seventeen books is closer to "twenty" or closer to "ten." Hmm, I wonder how I could count back? I know, I can start with the seventeenth or last book in my original set (Point to the seventeenth book.) and count back one book at a time until I reach ten. When I count back, I will move the book above my original line of books. This will help me compare the set of books I count back to reach ten to the set of three books I counted on to reach twenty. Count with me as I count back from seventeen to ten. (Count back aloud with your students while you move each book you count back slightly above the original line.) How many books did we count back from seventeen to reach ten? (Elicit the response, "seven.") That's right, we counted back seven books to reach ten. (Point to the set of seven books now laying above the original line of books.)



7.) Compare the total number of objects between the "count on" group and the "count back" group and determine which group has the fewest objects.

- prompt student to identify both groups
- re-count groups
- say which group has fewest objects

For Example:

I've counted on to twenty and I've counted back to ten. To determine whether my original set of seventeen books is closer to "twenty" or to "ten," I need to compare the sets that represent how many I counted on to twenty and how many I counted on to ten. I can do that by finding the set of objects I counted on to twenty.

Which set represents how many I counted on to "twenty"? (Elicit the response, the set of three books.) That's correct! (Point to the set of three books.) How many books did I count on from seventeen to make twenty? (Elicit the response, "three.") That's right, I "counted on" three books. (Count the three books aloud to emphasize.) Which set represents the set of books I counted back to "ten"? (Elicit the response, "the set of seven books.") That's correct! (Point to the set of seven books.) How many books did I count back to "ten?" (Elicit the response, "seven.") Yes, I counted back seven books. (Count the seven books aloud to emphasize.) Which set has fewer books? (Elicit the response, "the set of three books.") Yes, the set of three books has fewer books than the set of seven books.

8.) Determine which multiple of ten the original group of objects is closer to and say why.

- prompt students thinking
- cue group with fewest objects
- select closest ten
- emphasize "why"

For Example:

Hmm, I wonder how I can determine whether my original set of seventeen books is closer to "ten books" or closer to "twenty books?" (Prompt student thinking.) Well, I know the closest number of books would be the number of books for which I had to "count on" or "count back" the fewest times. In other words, I can compare how many books I had to "count on" to make "twenty "and how many books I had to "count back" to "ten." The group with the fewest books tells me whether seventeen books is closer to "ten" or closer to "twenty." Which group has fewer books?: The set of three books I "counted on" to make "twenty?" (Point to the set of three books.) Or, the set of seven books I "counted back" to "ten?" (Point to the set of seven books.) (Elicit the response, "the set of three books.") That's right. So are the seventeen books in my original set closer to "twenty books" or closer to "ten books?" (Elicit the response, "twenty books.") Yes, the seventeen books I originally counted out are closer to twenty books than it is to ten books. How do you know this? (Elicit the response, "because it takes fewer books to reach twenty that it does to reach ten.") Excellent thinking guys! I know the original set of seventeen books is closer to twenty books than it is to ten books because it takes fewer books to reach "twenty" than it takes to reach "ten."

9.) Relate answer to story problem.

- cue students to question
- prompt students to answer question
- prompt students – why?

For Example:

Now that we know my seventeen books are closer to twenty than to ten, we need to go back and answer the story problem. What is it that we needed to find out? (Point to the question in the story problem, and elicit the response, "which size box should she use to store her books? Why? ") That's right. And what did we

learn? (Elicit the response, "that the seventeen books are closer to twenty books than to ten books.") Excellent! My seventeen books are closer to twenty books than it is to ten books. Why is this so? (Elicit the response, "because it takes fewer books to reach twenty than it does to reach ten.") Good thinking guys! Seventeen books are closer to twenty books than to ten books because it takes fewer books to reach twenty than it does to reach ten." So which size box should I use? (Elicit the response, "the larger box that can hold about twenty books.") Yes, I should use the larger box that holds about twenty books. Why should I use this box? (Elicit the response, "because the larger box will hold all the books and the smaller one will not.") Excellent thinking! The larger box will hold all seventeen books while the smaller one probably will not. I'd have to use an extra box to store all seventeen books, and I only have a limited number of boxes. I need to use the best box for each set of books I have.

10. Repeat this process with several different types of discrete concrete objects (e.g. unifix cubes, beans, counting chips.), choosing different multiples of ten to compare the original set to (e.g. 20 and 30; 40 and 50). *It may be helpful for some students to color code the last concrete object in the original set (e.g. if the original set contains 34 objects, then the thirty-fourth object should be color-coded. This will provide students a visual cue from which to "count on" and "count back."

Learning Objective 2: Round to nearest hundred using "linked" proportional concrete materials.

Materials:

Teacher –

- a story problem depicting a situation where "rounding to the nearest hundred" is necessary to solve the story problem.
- base-ten materials (ten sticks and one cubes)
- a visual platform from which to display concrete objects so all students can clearly see them (*there should be enough room to line ten sticks end-to-end to represent several hundreds (e,g, 0 to 300.).
- language card with "nearest hundred" written.
- markers/chalk for writing numerical values in word form.

A. Break down the skill of rounding to t he nearest hundred using linked proportional (base-ten) concrete materials.

1.) Introduce a story problem situation/context.

2.) Read story aloud then have students read with you.

3.) Represent number with base ten materials; line up in row.

4.) Count and say the total.

5.) Count on to the greater hundred by tens.

6.) Say how many objects were "counted on."

7.) "Count back" to the lesser hundred.

8.) Say how many objects were "counted back."

9.) Compare the "count on" group and the "count back" group.

10.) Determine which group represents fewer objects.

11.) Say which hundred the original group of objects is closer to and why.

12.) Relate the solution to the story problem context.

B. Explicitly describe and model how to use linked proportional (base-ten) concrete objects to find the "nearest hundred."

1.) Follow the same process as described for Learning Objective 1, "rounding to the nearest ten using discrete counting objects." Line the ten sticks "end-to-end" as you represent the original value. Then count on and count back using ten sticks. *For original sets that are not multiples of ten (e.g. "135"), simply use ten sticks to represent the Hundreds and tens place and one cubes to represent the ones place.

Key Ideas

2.) Begin by representing a numerical value that is a multiple of ten (e.g. "130") that can be completely represented with base-ten materials given the room you have to display the concrete objects (e.g. if you are using a chalkboard/dry-erase board and base-ten materials with magnetic strips, be sure you have enough room length-wise on the chalkboard/dry-erase-board to represent each value in a single row. Also, be sure you have enough room left over to "count on" ten sticks to reach the next "hundred." *Values between "100" and "200" would be logical ones to choose. As students demonstrate understanding, then move to representing base-ten materials on number lines that depict other values (e.g. a number line from "300" to "400."). Move to values that are not multiples of ten (e.g. "153").

3.) Link this process to students' previous experience with using discrete counting objects to find the closest "ten." Provide rationale that counting by ones to values that represent hundreds would be time consuming and mistakes could be made easily because of the large number of objects you would need to count. Using ten-sticks is a simpler way to represent greater values.

4.) Display language card ("nearest hundred") when introducing this concept.

5.) When counting on or counting back by tens for values that are not multiples of ten, model counting from the last full ten (e.g. for "123," count on and back from the ten stick representing "120."). This process will be a natural link to the "talking digit" strategy explicitly modeled at the abstract level of understanding for this skill.

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Learning Objective #3: Round to the nearest ten using discrete concrete objects and a number line.

Materials:

Teacher –

- a variety of discrete counting objects of sufficient number to represent various multiples of ten - up to ninety (e.g. books, unifix cubes, counting chips, beans, etc.)
- a number line representing 1-90.
- a visual platform from which to display concrete objects so all students can clearly see them (*there should be enough room to line concrete objects side-by-side in the form of a line in multiples of ten.).
- a language card with the word "rounding" written.

A. Break down the skill of rounding to the nearest ten using discrete concrete objects and a number line.

1.) Introduce the number line.
2.) Represent value of numbers on number line with concrete objects.
3.) Relate value of numbers on number line to concrete objects.
4.) Represent number to be rounded with concrete objects.
5.) Count on to "greater" ten with concrete objects; say total.
6.) "Count back to "lesser" ten; say total.
7.) Compare "count on" group and "count back" group; determine fewest objects.
8.) Determine which "ten" the original group of objects is closer to.
9.) Introduce the term "rounding."

B. Explicitly Describe and Model how to round to the nearest ten using discrete concrete objects and a number line.

1.) Introduce the number line.
   - point to and count numbers
   - introduce language "number line"
   - cue pattern of numbers

<u>For Example:</u>

I have a line (Point to the line and run your finger the length of the line) represented here. There are numbers written along the line (Point to several numbers.) Let's count all the numbers written on the line. (Count aloud with your students all of the numbers on the number line. Point to each number as you and your students count.) There is a special name for the line and the numbers written on it. It is called a "number line." (Display a card with the phrase "number line" written on it and which has a drawing of a number line on it.) Everybody say this name with me. (Elicit the response, "number line.") A number line is a line that represents a pattern of numbers. The pattern of numbers for this number line is, "one, two, three….twenty." Each number is one greater than the number before it. What does a number line represent? (Elicit the

response, “a pattern of numbers.”) Yes, a number line represents a pattern of numbers. What is the pattern of numbers for this number line? (Elicit the response, “one, two, three, ….twenty.”) Yes, and how much greater is each number compared to the number before it? (Point to “5” and then to “4” to cue students, and elicit the response, “one.”) Great! The pattern for this number line is that each number is one greater than the number before it.

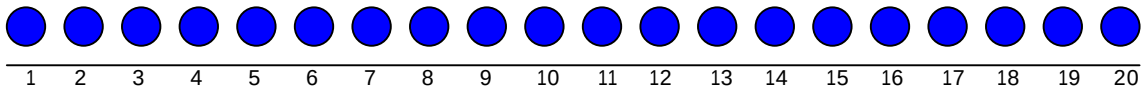
2.) Represent the value of numbers on the number line with discrete concrete objects.

- one object per number
- point to and count concrete objects
- say total

For Example:

Earlier, we lined our counting chips side by side without a number line. Now we have a number line. How could I use my counting chips to represent the numbers on the number line? (Elicit the response, “place one chip on each number until you reach ‘twenty.’ “) That’s right, I can place one counting chip on each number of the number line. I’ll put each chip just above each number so that we will be able to see the numbers. While I do this, I want you to count aloud with me. (Place the counting chips on the number line while students count aloud with you.)

“one” “two” “three” “four” “five” “six” “seven” “eight” “nine” “ten” “eleven” “twelve” “thirteen”



How many chips do we have total? (Elicit the response, “twenty.”) Yes, there are twenty chips. What is the last number on the number line? (Elicit the response, “twenty.”) Good. The last number on the number line is “twenty.”

3.) Relate the value of numbers on the number line to the total number of chips laid out up to that point on the number line.

- cue with finger
- point to number and objects representing number
- count objects to check

For Example:

So, if I point to the number “twenty,” how many chips does that represent? (Elicit the response, “twenty.”) Yes, the number “twenty” on the number line represents twenty counting chips. How do you know this? (Elicit the response, because there are a total of twenty chips laid up to that number.”) Yes, there are twenty chips

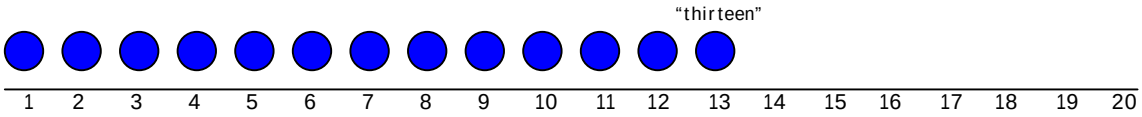
laid up to the number twenty. (Point to the chips and move your finger along the line.) Let's count the chips to be sure. I'll point to both the chip and the number as we count. (Count aloud with your students while pointing to each number and chip "pair.") Were we correct? (Elicit the response, "yes.") Good. Now, I'll point to the number "fifteen." How many chips are laid up to this number? (Elicit the response, "fifteen.") Yes, there are fifteen. Let's count to be sure. (Count the chips/numbers aloud with your students.) Now, we counted to be sure there were fifteen chips. How would you know there were fifteen chips if you didn't count the chips? (Elicit the response, "because there is one chip for each number so there are fifteen chips for the number fifteen.") Yes, there is one chip for each number, so I know that when I point to a number on the number line that the total number of chips it represents is that number. Let's do a few more. (Continue this until students demonstrate an understanding of the relationship of the concrete objects and the numbers on the number line.

4.) Represent number to be rounded with concrete objects - count out a set of concrete objects that is between "ten and "twenty" and relate the total to the appropriate number on the number line by saying the total.

- say total of set
- lay objects on number line
- count aloud
- point to/say number and objects representing number

For Example:

I have a set of counting chips (e.g. 13). I'll represent them on the number line by placing each counting chip above a number on the number line. I'll start with the number "one" and place a chip on each number until I run out of chips. (Place the counting chips on the number line and count them aloud as you do this.) How many chips do I have? (Elicit the response, "thirteen.") Yes, I have thirteen chips (Point to the row of chips and then point to the number "thirteen" on the number line.)



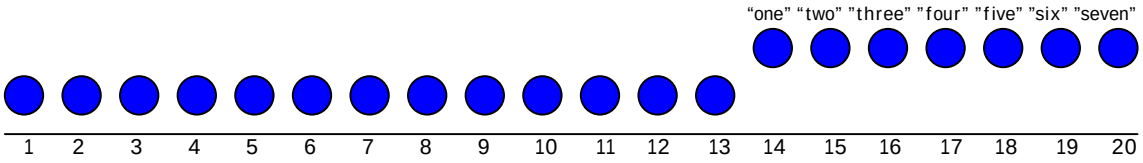
5.) Count on to "greater" ten with concrete objects - add additional objects above the line and then say the number of objects "counted on."

- think aloud
- place objects slightly above original line
- students count with you
- say total counted on

- use finger to cue

For Example:

I have thirteen counting chips represented on the number line. I wonder whether my thirteen chips are closer to "twenty" or closer to "ten?" (Point to "20" and "10" on the number line.) I already know one way to determine this. I know I can count on to "twenty" and then count back to "ten" and then compare the number of chips it takes to reach twenty to the number of chips it takes to reach ten. First, I'll "count on" to twenty and then I'll "count back" to ten. I can count on from thirteen by continually adding one more chip until I get to twenty. I'll put the chips I am counting on slightly above where the original chips are so I will be able to tell them apart. Count with me as I place each additional chip down (Place and count each additional chip until you reach "twenty.") How many chips did I "count on" to reach twenty? (Elicit the response, "seven.") Yes I counted on "seven." (First point to the set of seven "counted on" chips and then to the original set of thirteen chips as you say this.)

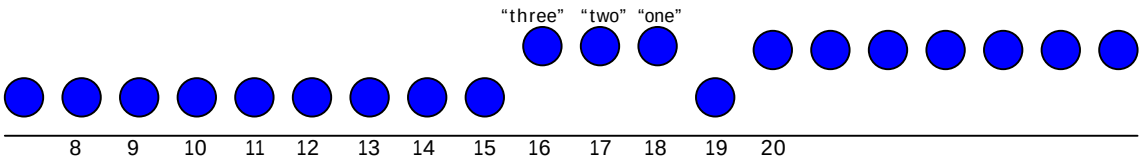


5.) "Count back" to "lesser" ten and distinguish this subset of objects from the original set, then say aloud the number of objects counted back.

- think aloud
- cue where count back from
- move objects slightly above original line
- count aloud
- say total counted on
- use finger to cue

For Example:

Now that I have counted on and know "thirteen" is seven from twenty, I am going to count back from the thirteenth chip until I reach ten. Why will I start with the thirteenth chip? (Elicit the response, "because that chip represents the total of the original set of thirteen chips.) That's correct. I counted on from the thirteenth chip to reach twenty because I had thirteen chips in my original set, therefore I also need to start from the thirteenth chip when I count back to ten. I need to do this because I am trying to determine whether my original set of thirteen chips is closer to "twenty" or closer to "ten. When I count back, I'll move the chip above my original line of chips. This will help me compare the set of chips I count back to reach ten to the set of seven chips I counted on to reach twenty. (Point to the set of seven chips that represent the "count on" set.) Count with me as I count back from seventeen to ten. (Count back aloud with your students while you move each chip slightly above the original line.) How many chips did we count back from thirteen to reach ten? (Elicit the response, "three.") That's right, we counted back three books to reach ten. (Point to the set of three chips now laying above the original line of chips.)



7.) Compare the total number of objects between the "count on" group and the "count back" group and determine which group has the fewest objects.

- think aloud
- cue "count on" group with finger
- say total
- cue "count back" group with finger
- say total
- identify group with fewer objects with finger

For Example:

I've counted on to twenty and I've counted back to ten. To determine whether my original set of seventeen books is closer to "twenty" or to "ten," I need to compare the sets that represent how many I counted on to twenty and how many I counted on to ten. I can do that by finding the set of objects I counted on to twenty. Which set represents how many I counted on to "twenty"? (Elicit the response, "the set of seven chips.") That's correct! (Point to the set of seven chips.) How many chips did I count on from thirteen to make twenty? (Elicit the response, "seven.") That's right, I "counted on" seven" chips. (Count the seven chips aloud to emphasize.) Which set represents the set of chips I counted back to "ten"? (Elicit the response, "the set of three chips.") That's correct! (Point to the set of three chips.) How many chips did I count back to "ten?" (Elicit the response, "three.") Yes, I counted back three chips. (Count the three chips aloud to emphasize.) Which set has fewer chips? (Elicit the response, "the set of three.") Yes, the set of three chips has fewer chips than the set of seven chips.

8.) Determine which "ten" the original group of objects is closer to.

- cue with finger
- prompt student-thinking - why?

For Example:

Is the original set of thirteen (Point to the thirteenth chip on the number line) chips closer to "twenty" (point to "20" on the number line) or to "ten" (Point to "10" on the number line.)? (Elicit the response, "ten.") Yes, the thirteen chips I originally counted out are closer to ten than they are to twenty. How do you know this? (Elicit the response, "because it takes fewer chips to reach ten than it does to reach twenty.") Excellent thinking

guys! I know the original set of thirteen chips is closer to "ten" than it is to twenty" because it takes fewer chips to reach "ten" than it takes to reach "twenty." "Thirteen" is closer to "ten" than it is to "twenty." (Point to "13" on the number line and then move your finger along the number line to "10. Then point to "13" again and move your finger along the number line to "20.")

9. Introduce the term "rounding" by relating it to the concept of "closest to."

- display language card
- relate to "closest to"

For Example:

Now that we know that "thirteen" is closer to "ten" than it is to "twenty," I want to introduce you to a special name we use for what we have just done. When we determine what number another number is closer to, we call it "rounding." (Display a card with the word "rounding" written.) What do we call it when we find what number another number is closer to? (Elicit the response, "rounding.") Yes, we call it "rounding." Looking at our last example, which number did we round "thirteen" to; did we round it to "ten" or to "twenty?" (Elicit the response, "ten.") Yes, we rounded thirteen to "ten." Why did we "round" "thirteen" to "ten?" (Elicit the response, "because "thirteen" is closer to "ten" than it is to "twenty.") Yes, we rounded "thirteen" to "ten" because "thirteen" is closer to "ten" than it is to "twenty." What does the special name, "rounding" mean then? (Point to the language card with "rounding" written and elicit the response, "it means 'closer to'.") Excellent! Rounding means "closer to." And when we round a number, we are determining which number it is closer to.

10. Repeat this process with several different types of discrete concrete objects (e.g. unifix cubes, beans, counting chips.) and number lines that extend up to ninety. Choosing different multiples of ten to compare the original set to (e.g. 20 and 30; 40 and 50). *It may be helpful for some students to color code the last concrete object in the original set (e.g. if the original set contains 34 objects, then the thirty-fourth object should be color-coded. This will provide students a visual cue from which to "count on" and "count back."

Learning Objective 4: Rounding to the nearest hundred using base-ten materials and a number line.

Materials:

Teacher –

- number lines representing hundreds (e.g. "100" to "200;" "400" to "500;" "800 to "900"). Number lines should represent ten multiples. Color-coding the "tens" digit in the ten multiples to the color of the ten sticks can be a helpful cue for students with visual processing problems or attention difficulties. *The

number lines should be measured so they are the same length as ten "ten sticks laid side-to-side. Each ten multiple should be written so that it occurs at the beginning/end of the ten sticks.

For Example:

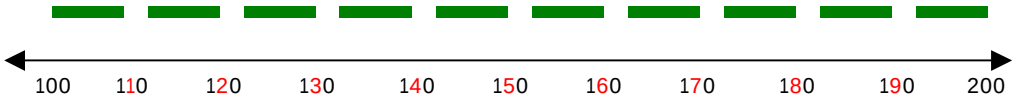
- base-ten materials (ten sticks and one cubes).
- a visual platform from which to display concrete objects so all students can clearly see them (*there should be enough room to line concrete objects side-by-side in the form of a line in multiples of ten.).
- a language card with the word "rounding" written.

A. Break down the skill of rounding to the nearest ten using base-ten materials and a number line.

1.) Introduce the number line. (

2.) Represent the value of numbers on the number line with base-ten materials (i.e. lay ten sticks side by side above number line).

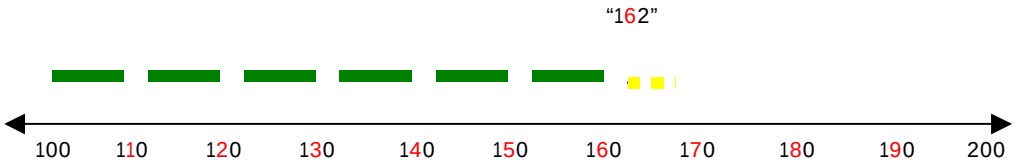
For Example:



3.) Relate value of numbers on number line to base-ten materials.

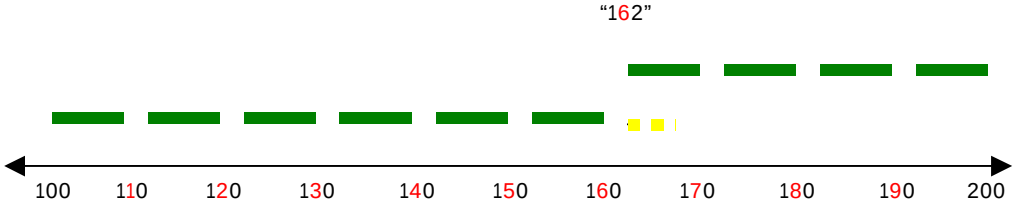
9.) Represent number to be rounded with base-ten materials.

For Example:



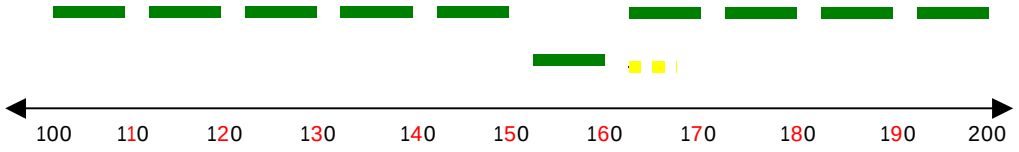
5.) "Count on" to the greater "hundred" and say total.

For Example:



6.) “Count back to the lesser “hundred” and say total.

For Example:



7.) Compare “count on” group and the “count back” group; determine fewest objects.

8.) Determine which “hundred” the original group of objects is closer to.

9.) Review the term “rounding.”

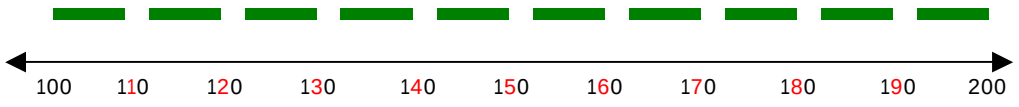
B. Explicitly Describe and Model how to round to the nearest hundred using base-ten materials and a number line.

*Follow the same process described for Learning Objective 3: “Rounding to the nearest ten using discrete concrete objects and a number line.” The major difference is that you will be using ten sticks to represent multiples of ten on the number line and you will be “counting on” and “counting back” by tens rather than ones.

1.) Introduce the number line (Emphasize what it represents and that it represents multiples of ten. Cue students to the color-coding and that it represents the tens place in each ten multiple.)

2.) Represent the value of numbers on the number line with base-ten materials (i.e. lay ten sticks side by side above number line).

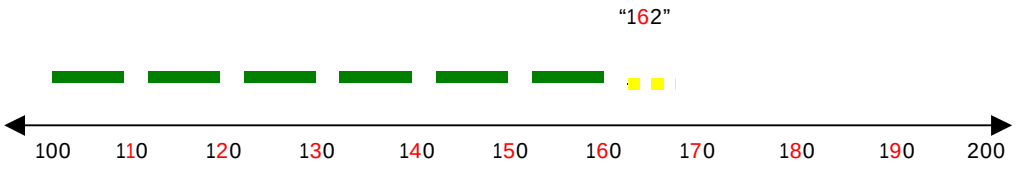
For Example:



3.) Relate the value of numbers on the number line to base-ten materials. (e.g. the total number of ten sticks laid out up to that point on the number line).

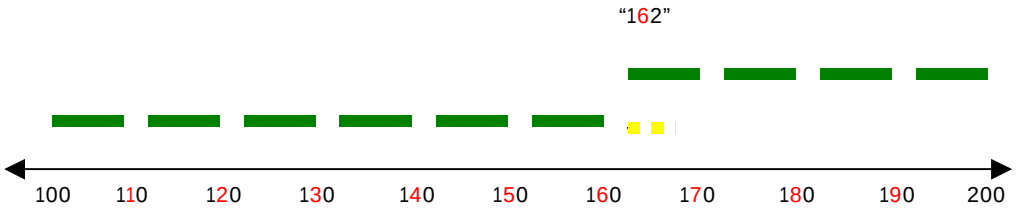
4.) Represent number to be rounded with base-ten materials. Count out a set of ten sticks and one cubes which has a value between the two "hundreds depicted on either end of the number line. Relate the total to the appropriate number on the number line.

For Example:



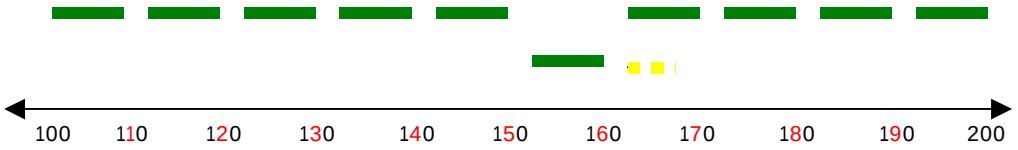
5.) "Count on" to the greater "hundred" by representing each number (multiple of ten) with a ten stick. *Place the ten sticks you "count on" slightly above the original row of ten sticks so they can be differentiated from the original set. Say how many tens were "counted on" to reach the higher multiple of ten and write the value in word form above the set of "counted on" ten sticks (e.g. "three tens/thirty").

For Example:



6.) "Count back to the lesser "hundred" and distinguish this subset of ten sticks from the original set just as you did for the "count on" set. Say how many tens were "counted back" and write the value in word form above the set of "counted back" ten sticks.

For Example:



7.) Compare the values of the "count on" group and the "count back" group and determine which group has the fewest objects.

8.) Determine which "hundred" the original group of objects is closer to. Say and then circle which hundred the original group of objects is closer to and why.

9.) Review the term "rounding."

Learning Objective 5: Round to the nearest ten and the nearest hundred with values that represent 100-999 using base-ten materials and a number line.

Materials:

Teacher –

- number lines representing hundreds (e.g. "100" to "200;" "400" to "500;" "800 to "900"). Number lines should represent ten multiples. Color-coding the "tens" digit in the ten multiples to the color of the ten sticks can be a helpful cue for students with visual processing problems or attention difficulties. *The number lines should be measured so they are the same length as ten "ten sticks laid side-to-side. Each ten multiple should be written so that it occurs at the beginning/end of the ten sticks.

  For Example:

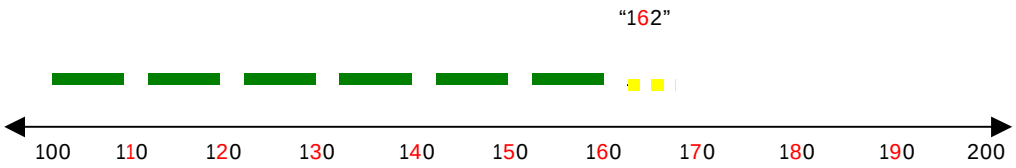
- base-ten materials (ten sticks and one cubes).
- a visual platform from which to display concrete objects so all students can clearly see them (*there should be enough room to line concrete objects side-by-side in the form of a line in multiples of ten.).
- a language card with the word "rounding" written.

A. Break down the skill of rounding to the nearest ten and the nearest hundred with values that represent 100-999 using base-ten materials and a number line.

1.) Review the number line (Emphasize that it represents multiples of ten and cue students to the color-coding.)

2.) Represent number to be rounded with base-ten materials.

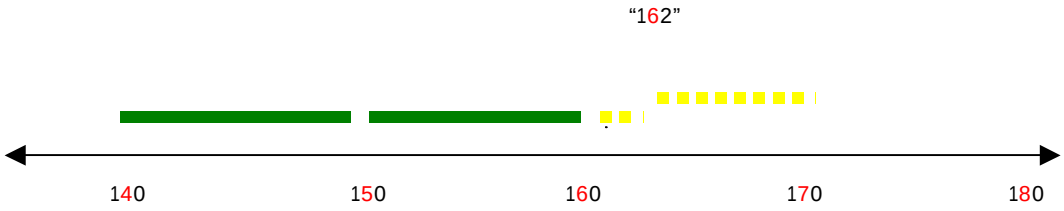
For Example:



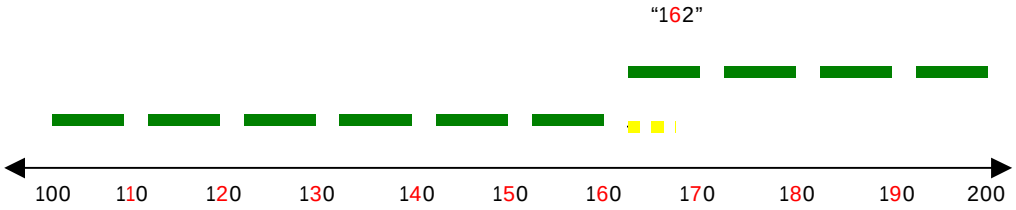
3.) Identify whether you are rounding to the nearest ten or to the nearest hundred.

4.) "Count on" to the greater "ten" or "hundred" using concrete materials and say the total.

Example for rounding to "tens:"



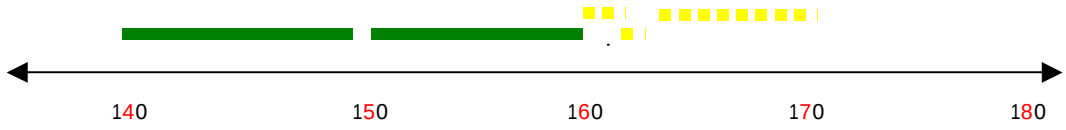
For Example for rounding to "hundreds:"



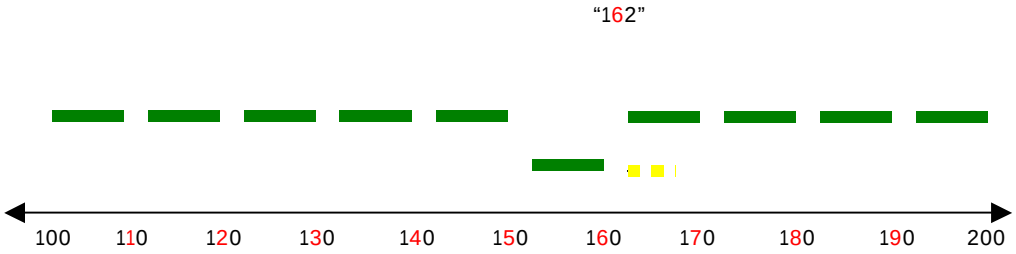
5.) "Count back to the lesser "ten" or "hundred" and say total.

Example for rounding to "tens:"

"162"



Example for rounding to "hundreds:"



6.) Compare the "count on" group and the "count back" group; determine fewest objects.

7.) Determine which "ten" or "hundred" original group is closest to.

8.) Review the term "rounding."

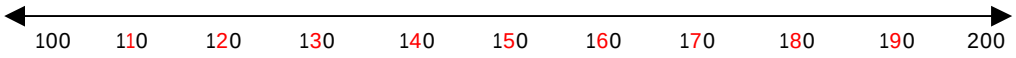
E2. Explicitly Describe and Model how to round to the nearest ten and the nearest hundred with values that represent 100-999 using base-ten materials and a number line.

*Follow the same process described for rounding to the nearest ten and hundred using base-ten materials (Learning Objectives 3 & 4) following the teaching steps outlined for this learning objective). Emphasize to students that the process for rounding to tens and hundreds when given values of 100-999 is the similar to what they have already learned. The primary difference is that for rounding to the nearest ten, you count on/count back to the next greater/lesser ten by ones and when rounding to the nearest hundred, you count on/count back to the next greater/lesser hundred by tens.

1.) Review the number line (Emphasize what it represents and that it represents multiples of ten. Cue students to the color-coding and that it represents the tens place in each ten multiple.)

2.) Represent the number to be rounded with base-ten materials. Count out a set of ten sticks and one cubes which has a value between the two "hundreds depicted on either end of the number line. Relate the total to the appropriate number on the number line.

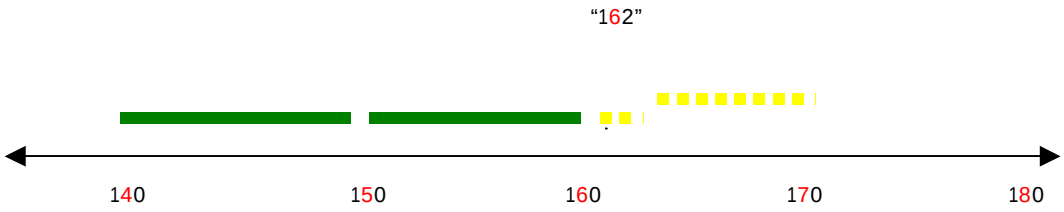
For Example:



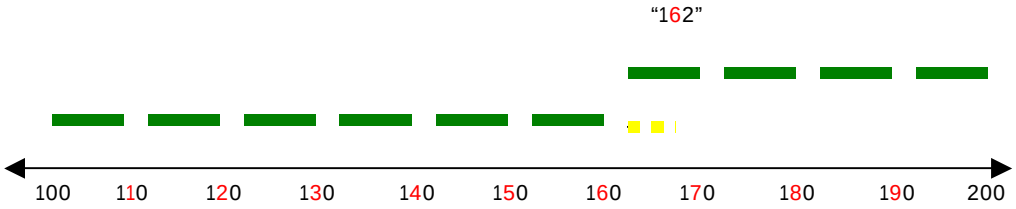
3.) Identify whether you are rounding to the nearest ten or to the nearest hundred.

4.) "Count on" to the greater "ten" or "hundred" using one cubes (for rounding to nearest "ten") or using ten sticks (for rounding to nearest "hundred") by representing each number (multiple of ten) with a ten stick. *Place the one cubes or ten sticks you "count on" slightly above the original row of base-ten materials so they can be differentiated from the original set. Say how many ones or tens were "counted on" to reach the greater ten or hundred and write the value in word form above the set of "counted on" one cubes or ten sticks (e.g. "three tens/thirty").

Example for rounding to "tens:"

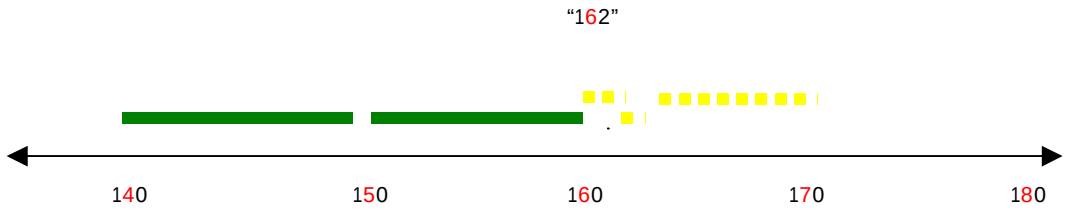


For Example for rounding to "hundreds:"

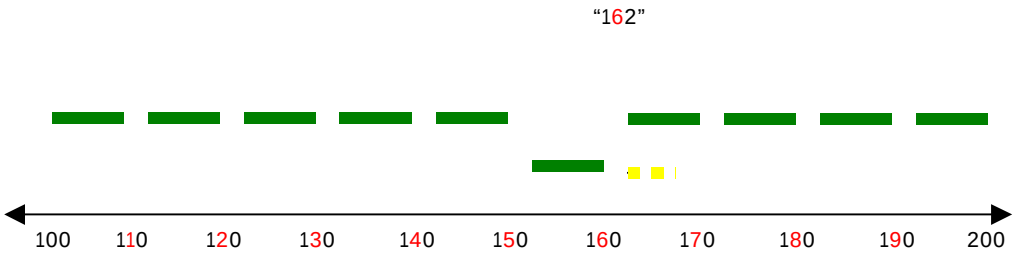


5.) "Count back to the lesser "ten" or "hundred" and distinguish this subset of one cubes or ten sticks from the original set just as you did for the "count on" set. Say how many ones or tens were "counted back" and write the value in word form above the set of "counted back" one cubes or ten sticks.

Example for rounding to “tens:”



Example for rounding to “hundreds:”



6.) Compare the values of the “count on” group and the “count back” group; determine which group has fewer ones cubes or ten sticks.

7.) Determine which “ten” or “hundred” original group is closest to. Say and then circle which ten or hundred the original group of objects is closer to and why.

8.) Review the term “rounding.”

IV. Scaffold Instruction

*The following description is for the skill of “Rounding to the nearest hundred using base ten materials and a number line.”

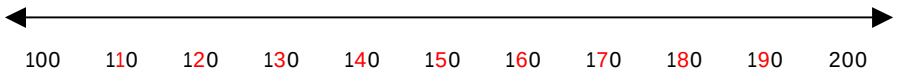
Purpose: to provide students the opportunity to build their initial understanding of how to round to the nearest hundred using base-ten materials and a number line, and to provide you the opportunity to evaluate your students' level of understanding after you have initially modeled this skill.

Materials:

Teacher –

- number lines representing hundreds (e.g. "100" to "200;" "400" to "500;" "800 to "900"). Number lines should represent ten multiples. Color-coding the "tens" digit in the ten multiples to the color of the ten sticks can be a helpful cue for students with visual processing problems or attention difficulties. *The number lines should be measured so they are the same length as ten "ten sticks laid side-to-side. Each ten multiple should be written so that it occurs at the beginning/end of the ten sticks.

  For Example:



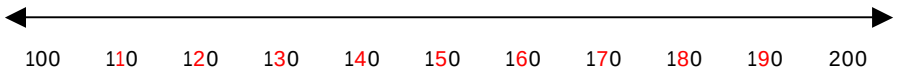
- base-ten materials (ten sticks and one cubes).
- a visual platform from which to display concrete objects so all students can clearly see them (*there should be enough room to line concrete objects side-by-side in the form of a line in multiples of ten.).
- a language card with the word "round to nearest hundred" written.
- markers/chalk for writing

Students –

*For Low Level of Teacher Support

- individual number lines representing hundreds (e.g. "100" to "200;" "400" to "500;" "800 to "900"). Number lines should represent ten multiples. Color-coding the "tens" digit in the ten multiples to the color of the ten sticks can be a helpful cue for students with visual processing problems or attention difficulties. *The number lines should be measured so they are the same length as ten "ten sticks laid side-to-side. Each ten multiple should be written so that it occurs at the beginning/end of the ten sticks.

  For Example:



- base-ten materials (ten sticks and one cubes).
- pencils for writing

Description:

1.) Scaffold Using a High Level of Teacher Direction/Support

a. Choose one or two places in the problem-solving sequence to invite student responses. Have these choices in mind before you begin scaffolding instruction. (Examples of choices are shown in red.) This example is for the number "324."

- Introduce the number line.
    - "What is this called (Point to the number line.)? (Elicit the response, "number line.") Good. What does this number line represent? (Elicit the response, "numbers three-hundred through four-hundred.") Yes. Do the numbers written on the number line increase by ones or by tens? (Elicit the response, "tens.") Great!"

- Count out a set of concrete objects that is between "ten and "twenty" and relate the total to the appropriate number on the number line by saying the total.
    - " I have a set of base-ten materials that represent "three-hundred twenty four". I'll lay them on the number line and count aloud as I do this. Everyone count aloud with me. (Count aloud with your students (e.g. "three hundred ten, three-hundred twenty, three-hundred twenty-one, three-hundred twenty two…) What is the number we have represented? (Elicit the response, "three-hundred twenty-four.") I'll write "three-hundred twenty four" to help me remember what my materials represent. (Write "324" just above the last one cube and draw a line down to the number line to indicate where the number lies on the number line."

- Count on to the higher multiple of ten by adding additional objects in the line and then say the number of objects "counted on."
    - "Now that I have represented my number, I have to count on to the higher hundred. Looking at my number line, I see that the higher hundred is four-hundred. (Point to "400" on the number line. When I'm rounding to the nearest hundred, I know it is easier to count on by tens rather than ones. I can start counting on from "three-hundred twenty" since it is easier to do this than counting by tens from "three-hundred twenty-four." ("Count on" by placing ten sticks slightly above the original row of objects.) I counted on eight ten sticks to four hundred. (Point to the group of eight ten sticks.) I'll write "eight tens" above the set of eight ten sticks. I also know that eight tens is eighty, so I'll write "eighty" as well." (Write both "eight tens" and "eighty" above the set of eight ten sticks.)
- "Count back" to the lower multiple of ten and distinguish this subset of objects from the original set, then say aloud the number of objects counted back.
    - "Now that I've counted on to the higher hundred by tens, I need to count back to the lesser hundred by tens. Looking at my number line, I see that the lesser hundred is

three-hundred. (Point to "300" on the number line. When I'm rounding to the nearest hundred, I know it's easier to count back by tens rather than ones. I can start counting back from "three-hundred twenty" since it is easier to do this than counting by tens from "three-hundred twenty-four." ("Count back" by moving ten sticks slightly above the original row of objects as you count back.) I counted back two ten sticks to three-hundred. (Point to the group of two ten sticks.) I'll write "two tens" above the set of eight ten sticks. I also know that two tens is twenty, so I'll write "twenty" as well." (Write both "two tens" and "twenty" above the set of two ten sticks.)

- Compare the total number of objects between the "count on" group and the "count back" group and determine which group has the fewest objects.
    - "Ok, now that I've counted on by tens to four hundred (Point to the set of eight "counted on" ten sticks) and counted back by tens to three hundred (Point to the set of two "counted back" ten sticks), I have to compare the two sets to see which one has fewer tens. Well, three-hundred twenty-four is about eight tens or eighty away from four hundred. (Point to the set of eight "counted on" ten sticks.) Three-hundred twenty-four is about two tens or twenty away from three-hundred (Point to the set of two "counted back" ten sticks.) Two tens or twenty is less than eight tens or eighty." (Point to the words written above each set as you say this.)"

- Determine which hundred the original group of objects is closer to and round to that hundred.
    - "In order to round to the nearest hundred (Show the language card that reads "round to the nearest hundred."), I need to round to the hundred that is closest. Since "three-hundred twenty-four" is closer to "three-hundred" than it is to "four-hundred," then I know I need to round to "three-hundred." (Circle "300" on the number line.) I know "three-hundred twenty-four" is closer to "three-hundred" than it is to "four-hundred" because it is only about two tens or twenty away, while it is about eight tens or eighty away from "four-hundred."" (Point to each set of "counted back" and "counted on" ten sticks as you say this.)

b. Maintain a high level of teacher direction/support for another example if students demonstrate misunderstanding/non-understanding; move to a medium level of teacher direction/support if students respond appropriately to the selected questions/prompts.

2.) Scaffold Using a Medium Level of Teacher Direction/Support

a. Choose several more places in the problem-solving sequence to invite student responses. Have these choices in mind before you begin scaffolding instruction.

- Introduce the number line.
    - "What is this called (Point to the number line.)? (Elicit the response, "number line.") Good. What does this number line represent? (Elicit the response, "numbers three-hundred through four-hundred.") Yes. Do the numbers written on the number line increase by ones or by tens? (Elicit the response, "tens.") Great!"

- Count out a set of concrete objects that is between "ten and "twenty" and relate the total to the appropriate number on the number line by saying the total.
    - " I have a set of base-ten materials that represent "three-hundred twenty four". How can I represent them on the number line? (Elicit the response, "lay them on the number line side-to-side.) Good. Everyone count aloud with me as I lay them out. (Count aloud with your students (e.g. "three hundred ten, three-hundred twenty, three-hundred twenty-one, three-hundred twenty two…). What number have we represented? (Elicit the response, "three-hundred twenty-four.") What can I do to remember what value my base ten materials represent? (Elicit the response, "write three-hundred twenty just above the last one cube and draw a line down to the number line to indicate where the number lies on the number line.") Great, I'll do that now.

- Count on to the higher multiple of ten by adding additional objects in the line and then say the number of objects "counted on."
    - "Now that I have represented my number, I have to count on to the higher hundred. What's the higher hundred? (Elicit the response, "four-hundred.") Yes, four-hundred" is the higher hundred. (Point to "400" on the number line.) When we're rounding to the nearest hundred, is it easier to count on by tens or by ones? (Elicit the response, "tens.") Where do I start counting? (Elicit the response, "three-hundred twenty.") Great, I start counting on from "three hundred twenty" since it is easier to count on by tens from "three-hundred twenty" than from "three-hundred twenty-four. Where can I place the ten sticks as I count on? (Elicit the response, "above the other ten sticks.") Count on with me as I lay the ten sticks down ("Count on" with your students by placing ten sticks slightly above the original row of objects.) How many tens did we count on? (Elicit the response, "eight.") What does that equal? (Elicit the response, "eighty.") How can I remember how many tens we counted on? (Elicit the response, write it above the set of eight ten sticks.) Good, I'll do that now. (Write both "eight tens" and "eighty" above the set of eight ten sticks.)

- "Count back" to the lesser ten and distinguish this subset of objects from the original set, then say aloud the number of tens counted back.

- "Now that I've counted on to the higher hundred by tens, I need to count back to the lesser hundred by tens. What is the lesser hundred? (Elicit the response, "three-hundred.") Yes, "three-hundred" is the lesser hundred. (Point to "300" on the number line.) When we're rounding to the nearest hundred, is it easier to count on by tens or by ones? (Elicit the response, "tens.") Where do I start counting back from? (Elicit the response, "three-hundred twenty.") Great, I start counting back from "three hundred twenty" since it is easier to count back by tens from "three-hundred twenty" than from "three-hundred twenty- four. Where can I move the ten sticks as I count back? (Elicit the response, "above the other ten sticks.") Count on with me as I move the each ten stick up. ("Count back" with your students by moving each ten stick you count on slightly above the original row of objects.) How many tens did we count back? (Elicit the response, "two.") What does that equal? (Elicit the response, "twenty.") How can I remember how many tens we counted back? (Elicit the response, write it above the set of two ten sticks.) Good, I'll do that now. (Write both "two tens" and "twenty" above the set of two ten sticks.)

- Compare the total number of objects between the "count on" group and the "count back" group and determine which group has the fewest objects.
    - "Ok, now that I've counted on by tens to four hundred (Point to the set of eight "counted on" ten sticks) and counted back by tens to three hundred (Point to the set of two "counted back" ten sticks), what do I do? (Elicit the response, "compare the two sets to see which one has fewer tens.) Good. Well, three-hundred twenty-four is about eight tens or eighty away from four hundred. (Point to the set of eight "counted on" ten sticks.) Three-hundred twenty-four is about two tens or twenty away from three-hundred (Point to the set of two "counted back" ten sticks.) Two tens or twenty is less than eight tens or eighty." (Point to the words written above each set as you say this.)"

- Determine which hundred the original group of objects is closer to and round to that hundred.
    - "In order to round to the nearest hundred (Show the language card that reads "round to the nearest hundred."), I need to round to the hundred that is closest. Since "three-hundred twenty-four" is closer to "three-hundred" than it is to "four-hundred," then I know I need to round to "three-hundred." (Circle "300" on the number line.) I know "three-hundred twenty-four" is closer to "three-hundred" than it is to "four-hundred" because it is only about two tens or twenty away, while it is about eight tens or eighty away from "four-hundred."" (Point to each set of "counted back" and "counted on" ten sticks as you say this.) Why did I round to three-hundred twenty-four to "three-hundred" instead of "four-hundred?" (Elicit the response, "because

"three-hundred twenty-four" is only about "twenty" away from three-hundred while it is about "eighty" away from "four-hundred.")

b. Maintain a medium level of teacher direction/support for another example if students demonstrate misunderstanding/non-understanding; move to a low level of teacher direction/support if students respond appropriately to the selected questions/prompts.

3.) Scaffold Using a Low Level of Teacher Direction/Support

a. When students demonstrate increased competence, do not model the process. Ask students questions and encourage them to provide all responses. Direct students to replicate the process at their desks as you work together.

- Introduce the number line.
  - "What is the name for the what you have in front of you? Good. What does this number line represent? (Elicit the response, "numbers three-hundred through four-hundred.") Yes. Do the numbers written on the number line increase by ones or by tens? (Elicit the response, "tens.") Great!"

- Count out a set of concrete objects that is between "ten and "twenty" and relate the total to the appropriate number on the number line by saying the total.
  - " You all have a set of base-ten materials. How can you use them to represent the number "three-hundred twenty-four" on the number line? (Elicit the response, "lay two ten sticks and four one cubes on the number line side-to-side.) Where do you start? (Elicit the response, "at three-hundred.") Good thinking, everybody do that now as I do it here. (Monitor students as they do this and check for understanding) Let's count aloud the number we represented. (Count aloud with your students, "three hundred ten, three-hundred twenty, three-hundred twenty-one, three-hundred twenty-two…). What number have we represented? (Elicit the response, "three-hundred twenty-four.") What can we do to remember what value my base ten materials represent? (Elicit the response, "write three-hundred twenty just above the last one cube and draw a line down to the number line to indicate where the number lies on the number line.") Great, let's do that now. (Write this on your number line and then monitor students as they do it on their number lines.)

- Count on to the higher multiple of ten by adding additional objects in the line and then say the number of objects "counted on."
  - "Now that we've represented my "three-hundred twenty-four" on our number lines, what do we do next? (Elicit the response, "count on to the higher hundred.") Good.

How can we do that with our materials? (Place one ten stick down as we count on to four-hundred.") Good. Where to we start? (Elicit the response, "three-hundred twenty.") Great. Where do we place the ten sticks as we count on to four-hundred? (Elicit the response, "above the ones we've already used to represent "three-hundred twenty-four.") Great thinking! Everybody, count on using your ten sticks. I'll count on using my ten sticks. (Monitor students as they do this to check for understanding.) How many tens did you count on? (Elicit the response, "eight.") What does that equal? (Elicit the response, "eighty.") What can you do to remember how many you counted on? (Elicit the response, write it above the set of eight ten sticks.) Good, let's do that now. (Write both "eight tens" and "eighty" above the set of eight ten sticks and monitor students as they do this on their number lines.)

- "Count back" to the lesser ten and distinguish this subset of objects from the original set, then say aloud the number of tens counted back.
    - "Now that we've counted on to "four-hundred," what do we do next? (Elicit the response, "count on to the lower hundred.") Good. How can we do that with our materials? (Move one ten stick up as we count back to three-hundred.") Good. Where to we start? (Elicit the response, "three-hundred twenty.") Great. Where do we move the ten sticks as we count on to four-hundred? (Elicit the response, "above the ones we've already used to represent "three-hundred twenty-four.") Great thinking! Everybody, count back using your ten sticks. I'll count back using my ten sticks. (Monitor students as they do this to check for understanding.) How many tens did you count back? (Elicit the response, "two.") What does that equal? (Elicit the response, "twenty.") What can you do to remember how many you counted on? (Elicit the response, write it above the set of two ten sticks.) Good, let's do that now. (Write both "two tens" and "twenty" above the set of two ten sticks and monitor students as they do this on their number lines.)

- Compare the total number of objects between the "count on" group and the "count back" group and determine which group has the fewest objects.
    - "Ok, now that we've counted on by tens to four hundred (Point to the set of eight "counted on" ten sticks) and counted back by tens to three hundred (Point to the set of two "counted back" ten sticks), what do we do? (Elicit the response, "compare the two sets to see which one has fewer tens.) Good. How will you compare the two sets? (Elicit the response, "see which set is less.") Good. Which set is less? (Elicit the response, "the one with twenty.") Good.

- Determine which hundred the original group of objects is closer to and round to that hundred.

- "In order to round to the nearest hundred what do we do? (Elicit the response, "circle the hundred that is closer to "three-hundred twenty-four.") Yes. Which hundred is closer? (Elicit the response, "three-hundred.") How do you know this? (Elicit the response, "because "three-hundred twenty-four" is only about "twenty" away from three-hundred while it is about "eighty" away from "four-hundred.") Good. We round "three-hundred twenty-four" to "three-hundred" by circling "three-hundred. Everybody do this. (Monitor students as they do this to check for understanding.)

b. When you are confident students understand, ask individual students to direct the problem solving process or have the class direct you: Students ask questions and you and the students respond/perform the skill.

B. Second learning objective

*Follow the same process as described above. Start with a high level of teacher direction support, then fade your direction to a medium level of teacher direction support. Finally, when students demonstrate understanding, move to a low level of teacher direction/support until students can direct the performance of the skill. Use the learnable steps outlined under the teacher instruction strategy, "Explicit Teacher Modeling" for this skill to structure the steps you use during scaffolding.

Instructional Phase 2: Facilitate Acquisition to Mastery – Student Practice

*The student practice strategies described below can be used for both skills taught during initial acquisition through Teacher Directed Instruction. A detailed description for providing practice for one of the skills is provided below: Explicitly relate the place value of digits in one, two, and three digit numbers to where concrete materials are grouped on the place value mat.

I. Receptive/Recognition Level

*The following description is for the skill rounding to the nearest ten using concrete objects and a number line.

A. Self-Correcting Materials

Purpose: to provide students with multiple opportunities to determine which "ten" a set of concrete objects displayed on a number line should be rounded.

Materials:

Teacher –

- choose various places in the classroom for "rounding centers."
- set up several "rounding centers" – each center contains one or more number lines with discrete concrete objects displayed. Each example should be numbered to correspond with the learning sheet for that center.

- "learning sheets" for each center. Each learning sheet has the following prompts/questions: How many total? How many to the higher "ten?" How many to the lower ten? Closest "ten?" For each question two or three choices are provided. Students circle the appropriate choice. Each learning sheet has a colored circle to indicate which center it is for. The colored circle matches the colored circle on the master key for that center.
- a timer to determine when students should move to the next center and when to "check" their answers.
- a "Master Key" for each center that has the appropriate choice circled for each question and for each example. Color coding the answer keys by placing a different colored circle on each one that corresponds to the learning sheet for that center will be helpful.

Students -

- pencils for circling the appropriate response on the learning sheets

Description:

Activity:

Teacher creates "rounding centers" around the room. Each center has one or more number lines (*depicting "tens") with discrete concrete objects lined to represent a given value. Learning sheets for each "rounding center" are made available at each center. Each learning sheet has a set of questions for each example that "ask" the student make the best choice based on their understanding of rounding (See "Materials" for suggestions of learning sheet questions/prompts). A "master key" for each center is placed in a folder or envelope that students can use to "check" their answers when the signal is given by the teacher. Students are assigned to particular "rounding centers." The teacher signals students to begin, when to "check" their answers, as well as when to stop and move to the next center.

This activity could be used as an independent student practice activity where students work individually or it could be used as a structured peer tutoring or structured cooperative group activity (*See the descriptions for "Structure Peer Tutoring" and "Structured Cooperative Learning Groups" at the Instructional Strategies site. These descriptions can be found by clicking on "Instructional Strategies" on the left menu bar and then clicking on "Instructional Strategies Lists. Descriptions of these strategies can be found under the heading "Student Practice Strategies.) A game format could also be used, so that student teams earn points as they respond to the learning sheets and number line examples at the centers (*See the description for "Instructional Games" at the Instructional Strategies site. This description can be found by clicking on "Instructional Strategies" on the left menu bar and then clicking on "Instructional Strategies List." Descriptions of these strategies can be found under the heading "Student Practice Strategies.). *For motivation, the teacher can also periodically sound a "bonus" signal that means "double points" for the example students are working on at the time the signal sounds; or a "secret bonus tag" contained in an envelope can be placed at one or more of the centers. After the activity is over, the teacher reveals which "center" or

example gets "double points." Students place a mark on the learning sheet to indicate that example gets "bonus points."

Self-Correcting Materials Steps:

1.) Introduce self-correcting material (i.e. learning sheets and "Answer Keys.").

2.) Provide directions for using self-correcting materials at the centers, what you will do, what students will do, and reinforce any behavioral expectations for the activity.

3.) Provide time for students to ask questions.

4.) Model responding/performing skill within context of the self-correcting material.

5.) Model how students can keep track of their responses by using the answer key at each center.

6.) Have students practice one time so they can apply what you have modeled. Provide specific feedback/answer any additional questions as needed.

7.) Monitor students as they work

8.) Provide ample amounts of positive reinforcement as students practice.

9.) Provide specific corrective feedback/ re-model skill as needed.

10.) Review individual student response/learning sheets.

II. Expressive Level

A. Structured Peer Tutoring

*The following description is for the skill rounding to the nearest ten using concrete objects and a number line. This student practice activity is very similar to the one described for "Receptive/Recognition Level" student practice. The main differences are that this practice activity is at the "Expressive Level" and it necessitates students working in pairs.

Purpose: to provide students with multiple opportunities to determine which "ten" a set of concrete objects displayed on a number line should be rounded.

Materials:

Teacher –

- choose various places in the classroom for "rounding centers" or assign student pairs to a particular space.
- set up several "rounding centers" – each center contains one or more number lines with appropriate concrete materials displayed; or each student pair is provided a number line and appropriate concrete materials.
- sets of cards that have various numbers written on them (e.g. two-digit numbers for rounding to "tens" and three digit numbers for rounding to "hundreds." *When you model how to round to "tens" with three-

digit numbers or round to the nearest "hundred" with two-digit numbers, such examples can also be included.) Each card also has the answers to each question/prompt on the learning sheet written on the back.

- "learning sheets" for each center/student pair. Each learning sheet has numbered sets of the following prompts/questions: *What is the number? Represent the number on the number line. How many to the higher ten/hundred? How many to the lower ten/hundred? Which is the closest ten/hundred?* The player responds to each prompt/question. The coach checks the player's response by turning the number card over.
- a timer to determine when students should begin and when they should switch roles.
- a number line, appropriate concrete materials, a number card, and a learning sheet to model what to do.

Students -

- one number line and set of appropriate concrete materials per student pair.
- learning sheets for each student.
- one set of number cards with answers written on back.
- pencils for writing.
- one blank sheet of paper for each student so coaches can record points.

Description:

Activity:

Teacher creates "rounding centers" around the room or students can work in pairs at their desks. Each center or student pair has one or more number lines (*depicting "tens") and discrete concrete objects. Learning sheets for each "rounding center"/student pair are made available. Each learning sheet has a set of questions for each example that students respond to based on their understanding of rounding (See "Materials" for suggestions of learning sheet questions/prompts). A "master key" for each center/student pair is provided so that student playing the role of "coach" can "check" the player's answers when the signal is given by the teacher. The practice period is divided into two equal time segments. For the first time segment, one student is the "player" and one student is the "coach," and then students switch roles for the second time period. The teacher signals students to begin and when to switch roles. Coaches provide feedback and positive reinforcement for each example the player responds to. *Coaches can record "points" based on student responding if appropriate (e.g. two points for correct responses; one point for correct responses on the second try after feedback was provided.) Each coach can make tallies on a sheet of paper to keep track of their player's score. The teacher circulates the room as students practice, answering questions, providing specific corrective feedback, and providing positive reinforcement as appropriate.

*For motivation, the teacher can also periodically sound a "bonus" signal that means "double points" for the example students are working on at the time the signal sounds; or a "secret bonus tag" contained in an

envelope can be placed at one or more of the centers. After the activity is over, the teacher reveals which "center" or example gets "double points." The coach doubles the points for the player for that example.

Structured Peer Tutoring Steps:

1.) Select pair groups and assign each pair a place to practice (try to match students of varying achievement levels if possible).

2.) Review directions for completing structured peer tutoring activity and relevant classroom rules. Practice specific peer tutoring procedures as needed (see step #4).

3.) Model how to perform the skill(s) within the context of the activity *before* students begin the activity. Model both what the coach does (e.g. reads the questions/prompts on the learning sheet; check answers using number card; provide corrective feedback; record points) and how the player responds (e.g. using concrete materials).

9.) Divide the practice period into two equal segments of time. One student in each pair will be the player and will pick the top card from the set of cards and then will respond to the questions/prompts given by the coach, using concrete materials. The other student will be the coach and will say each question or prompt on the learning sheet. The coach will then write the response in the appropriate space on the player's learning sheet, check the answer key, and provide feedback regarding the player's response (e.g. positive verbal reinforcement for accurate responses and corrective feedback for inaccurate responses.) For inaccurate responses, the coach provides feedback and the player attempts the question a second time. The first response is crossed out and the second response is recorded. The "listener/describer" will also tally corrects and in-corrects based on the player's responses.

10.) Provide time for student questions.

11.) Signal students to begin.

12.) Signal students when it is time to switch roles.

13.) Monitor students as they work in pairs. Provide positive reinforcement for both "trying hard," responding appropriately, and for students using appropriate tutoring behaviors. Also provide corrective feedback and modeling as needed.

Instructional Phase 3: Evaluation of Student Learning/Performance (Initial Acquisition through Mastery/Maintenance)

I. Continuously Monitor & Chart Student Performance

Purpose: to provide you with continuous data for evaluating student learning and whether your instruction is effective. It also provides students a visual way to "see" their learning.

Materials:

Teacher –

- appropriate prompts if they will be oral prompts
- appropriate visual cues when prompting orally

Student –

- appropriate response sheet/curriculum slice/probe
- graph/chart

Description:

Steps for Conducting Continuous Monitoring and Charting of Student Performance:

1.) Choose whether students should be evaluated at the receptive/recognition level or the expressive level.

2.) Choose an appropriate criteria to indicate mastery.

3.) Provide appropriate number of prompts in an appropriate format (receptive/recognition or expressive) so students can respond.

- Based on the skill, your students' learning characteristics, and your preference, the curriculum slice or probe could be written in nature (e.g. a sheet with appropriate prompts; index cards with appropriate prompts), or oral in nature with visual cues (e.g. say, " I have thirteen counting chips lined in a row…based on you seeing me count on and count back, which ten is the closes?") or a combination of written curriculum slices/probes and oral prompts with visual cues (e.g. students have concrete materials and respond to your prompts or prompts provided on a sheet of paper/on chalkboard/dry-erase board.).

4.) Distribute to students the curriculum slice/probe/response sheet/concrete materials.

5.) Give directions.

6.) Conduct evaluation.

7.) Count corrects and incorrects/mistakes (you and/or students can do this depending on the type of curriculum slice/probe used – see step #3).

8.) You and/or students plot their scores on a suitable graph/chart. A goal line that represents the proficiency (for concrete level skills, this should be %100 – 5 out of 5 corrects) should be visible on each students' graph/chart).

9.) Discuss with children their progress as it relates to the goal line and their previous performance. Prompt them to self-evaluate.

10.) Evaluate whether student(s) is ready to move to the next level of understanding or has mastered the skill at the abstract level using the following guide:

Concrete Level: demonstrates %100 accuracy (given 3 to 5 response tasks) over three consecutive days.

11.) Determine whether you need to alter or modify your instruction based on student performance.

II. Additional Assessment Activity Appropriate For This Math Skill/Concept

A. Flexible Math Interview

Purpose: to check student understanding of "rounding" to nearest ten or hundred using concrete objects.

Materials:

Teacher/Student –

- appropriate concrete materials
- appropriate prompts to round (predetermined number values that student will round.)
- a sheet of paper of notebook for teacher to record observations

Description:

For students who are demonstrating non-understanding or misunderstanding, ask them to round give sets of concrete objects to the nearest ten or hundred. Ask them to describe each step they would take to do this and then observe them as they do it. Encourage students to "think aloud" as they round their concrete objects. Another approach would be for you to "round" using the concrete objects and think aloud what you are doing. Tell the student to watch and listen to you closely because you may do something incorrectly. Purposefully use one or more incorrect procedures and observe whether the student can describe what you did incorrectly. Note missed steps, faulty thinking, and whether students can say what to do but not do it or vice-versa. After your interview, review your notes and decide where the student's understanding is breaking down. Then develop a plan for re-teaching the skill/concept.

Instructional Phase 4: Maintenance – Periodic Practice to Maintain Student Mastery of Skills

I. Center Time

Purpose: to provide students periodic opportunities to maintain mastery of a skill previously learned and mastered.

*See the description of the center activity described in the section "Instructional Phase 2: Facilitate Acquisition to Mastery – Student Practice

II. Problem of the Day

Purpose: to provide students periodic opportunities to maintain mastery of a skill previously learned and mastered.

Materials:

Teacher –

- visual platform to display concrete objects and supporting materials (e.g. number line)
- appropriate materials

Students -

- pencil and paper for writing.

Description:

Students respond to the "Problem of the Day" when they first arrive or at the beginning of math time.

Display a row of concrete materials on a number line. The number representing the value to be rounded is circled. A set of objects that represent those "counted on" to the next higher ten or hundred is positioned slightly above the "original" row of objects representing the numerical value to be rounded. The set of objects that represent those "counted back" are moved slightly above the "original" row as well. A variety of prompts or questions could be written that students respond to:

What ten/hundred should the number be rounded to?
Why?
How many to reach the higher ten/hundred?
How many to reach the lesser ten/hundred?

Students can respond in writing or they can respond orally to the teacher on an individual basis (if writing is a difficult process for them). The teacher can take a minute or two after students have had the opportunity to respond to discuss the "Problem" and elicit student ideas and provide corrective feedback and modeling.