Instructional Plan

Abstract Level

Name of Math Skill/Concept: Rounding to the nearest ten or hundred.

Prerequisite Skills Needed:

- round to the nearest ten and hundred using concrete materials and by drawing without a number line.

- round to the nearest ten and hundred using a number line with concrete materials and by drawing.

- skip count by tens.

- identify place value of digits in three digit numbers.

Learning Objectives:

1.) Round to the nearest ten or hundred by identifying the "talking digit" in two and three digit numbers.

2.) Round to the nearest ten or hundred by writing numbers to represent "counting on" and "counting back."

3.) Round to the nearest ten or hundred using proximity cues (*Round to the Nearest Ten Chart* or *Round to the Nearest Hundred Chart).*

Important Ideas for Implementing This Teaching Plan:

1.) Because students with learning difficulties often have difficulty performing math skills at the abstract level, it is important that explicit links are made between both their concrete and drawing experiences and their abstract level instruction.

2.) Students will most likely benefit from first

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

I. Teach Skill/Concept within Authentic Context

Description: Continue to link abstract level instruction to contexts used to teach the skills at the concrete and representational/drawing levels.

II. Build Meaningful Student Connections

Purpose: to assist students to build meaningful connections between what they know about rounding to the nearest ten and/or hundred by drawing to rounding numbers without drawing pictures.

Learning Objective 1: Round to the nearest ten or hundred by identifying the talking digit in two and three digit numbers.

Materials:

Teacher –

- one example of the rounding process using concrete materials and a number line that can be clearly seen by all students.
- one example of the rounding process using drawings and a number line that can be clearly seen by all students.
- a written learning objective that is clearly visible to all students: "Use the TALKING DIGIT to round numbers to the nearest ten or hundred."

Description:

1.) **L** ink to students' prior knowledge of rounding to the nearest ten and hundred using concrete materials, by drawing, and using a number line with drawings.

  For Example:

  You have learned to round to the nearest ten and to the nearest hundred by using three very helpful strategies. You first learn how to round by using concrete materials like these base-ten materials (Hold up/display an example of rounding with concrete materials.). You also have learned how to draw pictures to help you round to the nearest ten and hundred (Display an example of rounding a number with drawings and a number line.) Last, you learned how to use both concrete materials and drawings to round using a number line. (Point to the number line in both the concrete and drawing examples.)

2.) **I** dentify the skill students will learn: "Round to the nearest ten or hundred by identifying the talking digit in two and three digit numbers**."**

  For Example:

  Today, we are going to learn how to round to the nearest ten and hundred by using a number line without concrete materials or drawings. We are going to learn something special about the digits in the number we want to round. I will show you how to use the "Talking Digit" to help us round numbers to the nearest ten or hundred. (Display the written learning objective and point to it as you say it.) What are we going to learn today? (Point to the written learning objective and elicit the response, "Use the TALKING DIGIT to round numbers to the nearest ten and hundred.") That's right, we're going to learn how to use the talking digit to round numbers to the nearest ten and hundred.

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

  For Example:

Learning how to use the talking digit in a number to round will really help you to round when you don't have concrete materials and when you don't have time to draw in order to round a number. You will not always have concrete materials when you need to round and there will be times when drawing will take too long. What are some examples of times we might need to round a number to its nearest ten or hundred? (Prompt students to offer previous contexts used to teach at the concrete and representational levels and to offer "new" examples.)

III. Provide Explicit Teacher Modeling

Purpose: to provide students a clear teacher model of rounding to the nearest ten and hundred without using concrete materials and without drawing.

Learning Objective 1: Round to the nearest ten or hundred by identifying the talking digit in two and three digit numbers.

Materials:

Teacher –

- an appropriate format to display numbers and number lines so that all students can see and hear.
- a selection of three digit numbers that are color coded (e.g. ones place is green, tens place is red, and hundreds place is blue – 347.)
- a language card with the following phrase written: "round to the nearest HUNDRED."
- number lines prepared that represent the appropriate "hundreds" the given three digit number might be rounded to. The numbers represented should be increments of ten and the tens digit should be color-coded appropriately.

  For Example:

  347

  300   310   320   330   340   350   360   370   380   390   400
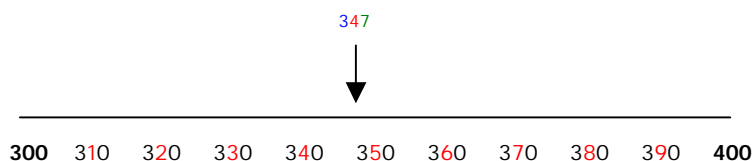
Description:

A. Break down the skill of rounding to the nearest ten or hundred by identifying the talking digit in two and three digit numbers.

1. Read the number.

2. Identify whether you are rounding to the "ten" or to the "hundred."

3. Identify the "talking digit" and underline it.

4. If talking digit is "5" or greater, then round up; if the talking digit is less than "5" then round down.

5. Check your answer by forming a number line and counting on or counting back, or by using proximity cues.

B. Explicitly describe and model how to round to the nearest ten or hundred by identifying the talking digit in two and three digit numbers.

*This example involves rounding to the "hundred" with three digit numbers. You should begin modeling "talking digits" by rounding to the nearest "ten" with two digit numbers. (Color-code the ones digit green and the tens digit red.) After students develop mastery of this skill, then move to modeling "talking digits" with three digit numbers and rounding to the nearest "hundred."

1.) Read the number (e.g. 347). *Color code the "talking digit" (tens place) for rounding to "hundreds" red. The ones digit should be color-coded green as you did with rounding two-digit numbers to the nearest ten. The hundreds place can be color-coded blue. *Color-coding can help students with visual processing difficulties or attention problems to discriminate individual place values and their importance for rounding.
- Point to the numbers and digits
- Prompt student thinking – place value

For Example:
I have a three digit number here. (Point to the number.) The number is "three-hundred forty-seven." (Point to each numeral as you say what it represents.) What is the number? (Elicit the response, "three-hundred forty-seven.") Yes, the number is "three-hundred forty-seven." (Point to each numeral as you say what it represents.) What does the "three" represent? (Elicit the response, "three hundreds.") Good, the three is in the hundreds place and it represents "three" hundreds. What does the "four" represent? (Point to the "4" and elicit the response, "four tens.") Excellent! The four is in the tens place and it represents "four" tens. And what does the "seven" represent? (Point to the "7" and elicit the response, "seven ones.") Yes, the "seven" represents seven ones. So, the number "three-hundred forty-seven" means "three-hundreds," "four tens," and "seven ones." (Point to each numeral as you say what it represents.)

2.) Identify whether you are rounding to the "ten" or to the "hundred."
- Point to language card
- Prompt students to say what they are rounding to

For Example:

Now that I know what my number is and what it represents, its time to round it. I have some cards here that will tell me whether I need to round this number to the nearest "ten" or nearest "hundred." (Display the card that says "round to the nearest HUNDRED.") I know I need to round the number "three-hundred forty-seven" to the nearest hundred. (Point to the phrase, "round to the nearest HUNDRED.")

3.) Identify the "talking digit" and underline it.
- Link to identifying "talking" digit for nearest tens place
- Cue by color coding digits and pointing to digits with finger
- Prompt student thinking

For Example:

Like we learned when we rounded two-digit numbers to the nearest ten place, finding the "talking digit" can help us a lot. If I covered the "three" in the number "three-hundred forty-seven," what number appears now? (Cover the "3" and elicit the response, "forty-seven.") That's right, the number left is "forty-seven." What would be the talking digit in "forty-seven" if you were going to round it to the nearest ten? (Elicit the response, "the seven.") That's right, the number in the one's place, "seven," is the talking digit if we were going to round "forty-seven" to the nearest ten. The number in the one's place is the talking digit when we round to the nearest ten because any number in the one's place comes between the two tens we might round to.

(Uncover the "3.") This time, we have a three-digit number instead of a two digit number. More importantly, we have to round to the *nearest hundred* instead of the *nearest ten*. Do you think the number in the one's place will be the talking digit when we want to round to the nearest hundred? (Elicit the response, "no.") You are right. The one's digit is not the "talking digit" when we want to round to the nearest hundred. What digit do you think is the talking digit for rounding to the nearest hundreds place? (Elicit several student responses.) Thanks for taking a chance by giving us your ideas. Great thinking guys! The "talking digit" for rounding to the hundreds place is the digit in the "tens place." (Point to the "4.") Just like the green color of the ones digit (Point to the "7.") helps us know it is the talking digit for rounding to the tens place, the red color of the tens place digit (Point to the "4.") helps us to remember that this is the talking digit for rounding to the nearest hundreds place. Why do you think the digit in the "tens place" is the talking digit for rounding to the nearest hundred. (Elicit several responses.) Again, thanks for taking a chance and sharing your ideas. You all have some excellent thoughts!

4.) Use a number line to develop understanding why the digit in the tens place is the "talking digit" for rounding to the nearest hundred.

- Display a number line and cue students to important features.

- Prompt student thinking about number line

- Color-code "tens place" in numbers on number line

- Color –code "talking digits"

- Point to unique characteristics

- Point to numbers as you say them

For Example:

Let me show you with a number line why the "tens place" is the talking digit for rounding to the nearest hundred. (Display a number line between "300" and "400" by tens with "347" represented.)

347

300   310   320   330   340   350   360   370   380   390   400
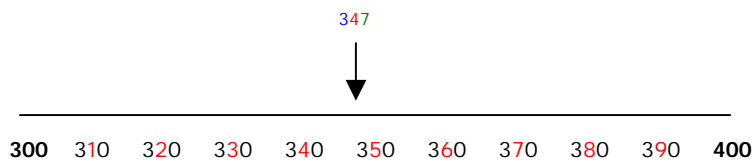
Let's look at the number line. What do you see? (Elicit a variety of responses, "it goes from three hundred to four hundred;" the numbers go up by ten;" "three-hundred forty-seven is between three-hundred forty and three-hundred fifty.") Great observations! This number line represents the numbers from "three-hundred" to "four hundred." "Four hundred" is one-hundred more than "three-hundred." (Point to each number as you say the number.) The numbers written along the number line increase by tens: "three-hundred ten, three-hundred twenty, three-hundred thirty…" (Point to each number as you say it.) The number we want to round to the nearest hundred, "three-hundred forty seven," is also represented. (Point to "347.") I see one more thing. The tens place in each number between "three-hundred" and "four-hundred" is color-coded red. (Point to each tens place digit in the numbers "310 – 390.") They are colored red for a purpose. Which digit in "three-hundred forty-seven" is also colored red? (Elicit the response, "four/the tens digit.") Yes, the "four" which is in the tens place is also colored red.

- link the process of counting on and counting back by tens using base-ten materials and drawings to counting on and counting back by tens with numbers only.

  - Think aloud

For Example:

In order to understand why the tens digit is the "talking digit" for rounding to the nearest hundred, we can look at the tens digits in this number line. When we used base-ten materials and drawings to round numbers to the nearest hundred, we counted on to the nearest hundred greater than our number. We

also counted back to the nearest hundred less than our number. We do the same thing when we are just using numbers and not using base-ten materials or drawings.

- Model "counting on" by tens.
    - cue to start at "tens" place
    - make tallies as you count on
    - point to each multiple of ten on number line as you count on

For Example:

Now, we could count on by ones from "three-hundred forty-seven" to "four-hundred." (Point to "347" and then point to "400.") We could start with "three-hundred forty-seven" and count on: "three-hundred forty-eight, three-hundred forty-nine, three-hundred fifty, three-hundred fifty-one." (Demonstrate using your fingers to keep count as you count on to "three-hundred fifty-one.") Now, I could continue to count on to "four-hundred" but it would take a long time and I probably don't have enough fingers to count on all the way to "four-hundred." An easier way is to count on by tens, just like you did with your base-ten materials and drawings. The "talking digit," which is the red colored tens digit (Point to several of the red color-coded tens digits.), represents tens. We can count on by tens by counting on using our "talking digits." Let me show you what I mean. I start with the "talking digit" or tens place in my number, "three-hundred forty-seven." (Point to the "4" in 347.") I can count on by tens to "four-hundred" by starting at "three-hundred forty." I don't really need to read the "seven" (Point to the "7.") since I am counting on by tens and not ones. "Seven" is in the ones place. When I count on, I'll make tallies on the board so I can keep track of how many tens I count on to four-hundred. To count on by tens, I count on from three-hundred forty by saying, three-hundred fifty, three-hundred sixty, three-hundred seventy, three-hundred eighty, three-hundred ninety, four-hundred. (Point to each number on the number line as you say the number and record each "ten" you count on by making a tally mark on the board underneath each number.)

- Model determining how many tens were "counted on" and "how many" that represents.
    - Prompt student thinking – "How many?"
    - Point to groups of tally marks
    - Use place value language ("six tens") and say what that represents ("sixty")

For Example:

How many tens is "three-hundred forty-seven from four-hundred? (Point to the tally marks, and elicit the response, "six tens.") Yes, "three-hundred forty-seven is **about** six tens from four-hundred. How many is six tens? (Elicit the response, "sixty.") Yes, six tens equals "sixty." Is "three-hundred forty-seven" exactly six tens, or sixty from "four-hundred?" (Elicit the response, "no.") Why? (Elicit appropriate

responses, e.g. "because we didn't include the seven ones in three-hundred forty-seven; we started counting on with three-hundred forty, not three-hundred forty-seven.") Great thinking guys!

- Model "counting back" by tens.
    - cue to start at "tens" place/prompt student thinking – "Why?"
    - make tallies as you count back
    - point to each multiple of ten on number line as you count back

<u>For Example:</u>

Now, let's count back to "three-hundred" to see if "three-hundred forty-seven" is nearer to three-hundred than it is to "four-hundred." Our we counting back by ones or by tens? (Elicit the response, "tens.") Yes, we are counting back by tens. What is the "talking digit" for rounding to the nearest hundred? (Elicit the response, "the red colored tens digit.") Yes, the "talking digit" for rounding to the nearest hundred is the tens place digit. It is colored red in this example. (Point to several "tens digits.") To count back from "three-hundred forty-seven" to "three-hundred" (Point to each number on the number line as you say it.) what number do we start with since we are counting back by tens? (Elicit the response, "three-hundred forty.") Why do we start with "three-hundred forty" rather than "three-hundred forty-seven?" (Elicit the response, "because we are counting by tens; the forty in three hundred forty-seven is the talking digit so we don't need to worry about the ones place.") Great thinking! Since we know the talking digit for rounding to the nearest hundred is the tens place and we are counting back by tens, we only have to consider the numbers to the tens place. Ok, I say "three-hundred forty" (Point to "340.") and then count back by tens. I'll write tally marks again to count the number of tens we count back. Everyone, count back with me. (Count back by tens with your students, writing tally marks under each number as you count back: "three-hundred thirty, three-hundred twenty, three-hundred ten, three-hundred.")

- Model determining how many tens were "counted back" and "how many" that represents.
    - Prompt student thinking
    - Point to group of tally marks

<u>For Example:</u>

How many tens is "three-hundred forty seven" from "three-hundred?" (Point to the tally marks and elicit the response, "four tens.") Yes, three-hundred forty-seven is **about** "four tens" from "three-hundred." How many is "four tens?" (Elicit the response, "forty.") Yes, four tens equals "forty." Is "three-hundred forty-seven" exactly four tens, or "forty" from "three-hundred?" (Elicit the response, "no.") Why? (Elicit appropriate responses, e.g. "because we didn't include the seven ones in three-hundred forty-seven; we started counting back with three-hundred forty, not three-hundred forty-seven.") Great thinking guys!

- Model comparing the total number of tens "counted on" and the total number of tens "counted back."
  - Prompt student thinking
  - Point to each group of tally marks
  - Say value of each group
  - Use place value language and prompt students to say what it represents

For Example:

Now that we have counted on to "four hundred" and counted back to "three-hundred" from "three-hundred forty-seven," what do we need to do to determine which is the nearest hundred we round to? (Elicit the response, compare how many tens "three-hundred forty-seven" is from "four-hundred" and how many tens it is from "three-hundred.") Yes, we need to compare how many tens "three-hundred forty-seven" is from "four-hundred" and how many tens "three-hundred forty-seven" is from "three-hundred." (Point to each group of tally marks that represents the "counted on" number of tens and the "counted back" number of tens.) How many tens did we count on to "four-hundred?" (Point to the appropriate group of tally marks and elicit the response, "six.") Yes, we counted on six tens to "four-hundred." (Point to each tally mark or number on the number line and count them aloud.) How many is "six tens?" (Elicit the response, "sixty.") Yes, six tens equals "sixty." How many tens did we count back to "three-hundred?" (Point to the appropriate group of tally marks and elicit the response, "four.") Yes, we counted on four tens to "three-hundred." (Point to each tally mark or number on the number line and count them aloud.) How many is "four tens?" (Elicit the response, "forty.")

- Model deciding which "hundred" to round to.
  - Prompt student thinking – "Why?"
  - Point to groups of tally marks to cue

For Example:

Ok, which hundred should we round "three-hundred forty-seven" to? (Elicit the response, "three-hundred.") Yes, we should round "three-hundred forty-seven" to "three-hundred" to round it to the nearest hundred. Why? (Elicit the response, "because it is closer to "three-hundred" than it is to "four-hundred.") Yes, we know "three-hundred forty-seven" is closer to "three-hundred" than it is to "four-hundred" and therefore we round "three-hundred forty-seven" to three-hundred. How did we find out "three-hundred forty-seven" is closer to "three-hundred?" (Elicit the response, "by counting on and counting back by tens.") Yes, we counted on from "three-hundred forty-seven" to "four-hundred" (Point to "347" and then to "400.") by tens (Point to the numbers, "350, 360, 370...") We also counted back from "three-hundred forty-seven" to "three-hundred" (Point to "347" and then to "300.") by tens (Point to the numbers, "330, 320, 310..."). We found that "three-hundred forty-seven" is about six tens, or "sixty" from "four-hundred" and it is about four tens, or "forty" from "three-hundred." (Point to each set of tally marks as you say this.) Because four tens, or "forty" is less than six tens, or "sixty," then we

know that "three-hundred forty-seven is nearer to "three-hundred" than it is to "four-hundred." Because "rounding to the nearest hundred" means we find the hundred a number is closest to, then we now know we round "three-hundred forty-seven" to "three-hundred."

5.) Review what digit in a number is the "talking digit" for rounding to the nearest hundred and prompt student thinking about why the "talking digit" for rounding to the nearest hundred is the digit in the tens place.

- Prompt student thinking – "What is talking digit?"
- Point to "talking digit"
- Prompt student thinking – "Why?"

For Example:

What is the talking digit that helps us round numbers to the nearest hundred? (Elicit the response, "the digit in the tens place.") Yes, the digit in the tens place is the "talking digit" for rounding numbers to the nearest hundred. How does knowing this help us to round to the nearest hundred? (Elicit the response, "because it reminds us to count on and back by tens.") That's correct. Because the "talking digit" for rounding to the nearest hundred is the digit in the tens place, it reminds us to count on and count back to the nearest hundred by "tens." What is the "talking digit" for "three-hundred forty-seven" when we want to round to the nearest hundred? (Point to "347" and elicit the response, "the four.") Yes, the four is the "talking digit" in the number "three-hundred forty-seven." (Point to "4.") Why is "four" the "talking digit"? (Elicit the response, "because it is in the tens place.) Exactly! The "four" is in the tens place, and the digit in the tens place is the "talking digit" for rounding to the nearest hundred.

6.) Repeat steps 1-5 at least three more times with different three digit numbers. *You may decide to fade the use of the number line after the second or third example.

Learning Objective 2: Round by writing numbers to represent "counting on" and "counting back" to the nearest ten or hundred.

Materials:
Teacher –
- chalkboard, dry-erase board, chart paper, or overhead to write on.
- multicolored chalk, markers or pens for writing.

A. Break down the skill of rounding by writing numbers to represent "counting on" and "counting back" to the nearest ten or hundred.
1.) Identify whether you are rounding to the nearest ten or hundred and decide what the "greater" and "lesser" ten or hundred is.

2.) Identify the talking digit of the number to be rounded and decide whether the "talking digit" tells you to "count on" and "count back" by ones or by tens.

3.) Count on by writing numbers (by ones for rounding to the nearest ten and by tens for rounding to the nearest hundred.).

4.) Count back by writing numbers (by ones for rounding to the nearest ten and by tens for rounding to the nearest hundred.).

5.) Compare the "count on" set of numbers to the "count back" set of numbers and decide which ten or hundred the number should be rounded to.

6.) Write the nearest ten or hundred.

B. Explicitly Describe and Model how to round by writing numbers to represent "counting on" and "counting back" to the nearest ten or hundred.

Key Ideas:

1.) Follow the same process described in the Representational Level Instructional Plan for rounding to the nearest ten or hundred by drawing except model how to write numbers when counting on and counting back instead of drawing pictures.

2.) Emphasize the link between the pictures students learned to draw (long lines for tens and shout lines/dots/circles/squares for ones) and the numbers they now write when counting on and counting back by ones and tens (e.g. the numbers are what we actually say when we counted on and counted back while drawing pictures.)

3.) For step number one, it may be helpful to cue students by using a number line to identify what the "greater" and "lesser" ten or hundred is. Student's knowledge of the "talking digit" can also be a useful cue. The talking digit "talks to" the lesser ten or hundred. Once students can identify the "lesser ten or hundred, then they can simply count on by ten or hundred to determine the "greater" ten or hundred.

Example for "tens:"

1.)   4 7 - the "7" talks to the "4" which represents "four tens" or "forty." Forty is the "lesser ten."

2.)   Count on from 40 by "ten" and you reach "50." "50" is the "greater" ten.

Example for "hundreds:"

3.)   3 4 7 - the "4" talks to the "3" which represents "three hundreds" or "three-hundred." Three-hundred is the "lesser hundred."

4.)   Count on from "300" by "one-hundred" and you reach "400." "400" is the "greater" hundred.

4.) When counting on and counting back, write numbers in a row. *Replicating the process used for drawing by writing the numbers slightly above the number to be rounded can be a useful cue and provides a nice link to their drawing and concrete experiences using a number line. When counting back by tens to round to the nearest hundred, remember to continue to model counting on and counting back starting at the "tens" place. In the example below for "hundreds," notice that you are counting on and counting back from "340" not "347." This replicates the process you taught at the concrete and drawing levels as well as when you taught how to use the talking digit to round to the nearest hundred.

Example for "tens:"

40 41 42 43 44 45 46   48 49 50

47

Example for "hundreds:"

300 310 320 330   350 360 370 380 390 400

347

5.) Use the color cueing for the talking digit that you used when teaching how to round by identifying the talking digit, but fade the color cueing as students demonstrate understanding.

6.) When modeling how to compare the set of numbers "counted on" and "counted back," circling each group may help as you count the number of ones or tens the number to be rounded is from the "greater" and "lesser" tens/hundreds.

7.) Model this process at least three times for both rounding to the nearest ten and rounding to the nearest hundred before moving to Scaffolding Instruction.

Learning Objective 3: Rounding to the nearest ten or hundred using proximity cues (*Round to the Nearest Ten Chart* or *Round to the Nearest Hundred Chart*).

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*The *Round to Nearest Ten Chart* and *Round to Nearest Hundred Chart* provide students a clear teacher model of how to use proximity as a cue for rounding.

Materials:
Teacher –

- a "Round to Nearest Ten Chart" (i.e. a chart that depicts the numbers 0 –100 grouped by tens in rows so that each row depicts the "lesser" and "greater" ten:

<u>For Example:</u>

0	1	2	3	4	5	6	7	8	9	10
10	11	12	13	14	15	16	17	18	19	20
20	21	22	23	24	25	26	27	28	29	30
30	31	32	33	34	35	36	37	38	39	40
40	41	42	43	44	45	46	47	48	49	50
50	51	52	53	54	55	56	57	58	59	60
60	61	62	63	64	65	66	67	68	69	70
70	71	72	73	74	75	76	77	78	79	80
80	81	82	83	84	85	86	87	88	89	90
90	91	92	93	94	95	96	97	98	99	100

- a "Round to Nearest Thousand Chart" (i.e. a chart that depicts multiples of ten from 0-1000 grouped by ten multiples in rows so that each row depicts a the "lesser" and "greater" hundred.

0	10	20	30	40	50	60	70	80	90	100
100	110	120	130	140	150	160	170	180	190	20
200	210	220	230	240	250	260	270	280	290	300
300	310	320	330	340	350	360	370	380	390	400
400	410	420	430	440	450	460	470	480	490	500
500	510	520	530	540	550	560	570	580	590	600
600	610	620	630	640	65	660	670	680	690	700
700	710	720	730	740	750	760	770	780	790	800
800	810	820	830	840	85	860	870	880	890	900

900	910	920	930	940	950	960	970	980	990	1000

- nine "peep hole" cards. Each card is one row wide and nine columns long. Each card has one square cut-out space positioned for one number position in columns 2-9 (e.g. one card when positioned between the first and last number in a row will reveal the second number in the row; the second card when positioned between the first and last number in a row will reveal the third number in the row; etc.)

For Example:

*This "peep hole" card reveals the "third" number in a row when placed between the first and last number in the row.

0	10	20	30	40	50	60	70	80	90	100
100		120								200
200	210	220	230	240	250	260	270	280	290	300
300	310	320	330	340	350	360	370	380	390	400
400	410	420	430	440	450	460	470	480	490	500
500	510	520	530	540	550	560	570	580	590	600
600	610	620	630	640	65	660	670	680	690	700
700	710	720	730	740	750	760	770	780	790	800
800	810	820	830	840	85	860	870	880	890	900
900	910	920	930	940	950	960	970	980	990	1000

- a ruler or tape measure

A. Break down the skill of rounding to the nearest ten or hundred using proximity cues (*Round to Nearest Ten Chart* and *Round to Nearest Hundred Chart).*

1.) Introduce the *Round to Nearest Ten Chart* and/or *Round to Nearest Hundred Chart.*
2.) Identify a number to be rounded and whether it will be rounded to the nearest ten or hundred.
3.) Identify which chart can be used for rounding to the nearest ten (*Round to Nearest Ten Chart*) and which chart can be used for rounding to the nearest hundred (*Round to Nearest Hundred Chart*).
4.) Identify the "talking digit" and what number on the *Round to Nearest Ten Chart* or *Round to Nearest Hundred Chart* the "peep hole" card should be placed.
5.) Choose the appropriate "peep hole" card to use and place it between the "lesser" and "greater" tens or the "lesser" or "greater" hundreds.

6.)   Model determining which ten or hundred to round to by pointing out the distance between the number you are rounding and each ten or hundred.

7.)   Repeat this process at least three times for both rounding to the nearest ten and to the nearest hundred.

B. Explicitly Describe and Model how to round to the nearest ten or hundred using proximity cues (*Round to Nearest Ten Chart* and *Round to Nearest Hundred Chart*).

1.) Introduce the *Round to Nearest Ten Chart* and/or *Round to Nearest Hundred Chart*. *Explicitly model the number sequence of each chart, the manner in which numbers are represented (e.g. in the *Round to Nearest Ten Chart*, the numbers increase from one to one-hundred by ones while the numbers increase from "0" to "1000" in the Round to Nearest Hundred Chart.), and the fact that each number is equidistant apart*. **Because you will be using proximity the rounding cue, it is important that students know the space between numbers is the same.** Prompt your students' thinking regarding why the Round to Nearest Ten Chart would be useful for rounding to the nearest ten and why the Round to Nearest Hundred Chart would be helpful for rounding to the nearest hundred (e.g. the *Round to Nearest Ten Chart* represents "tens" and the *Round to Nearest Hundred Chart* represents "hundreds.").

2.) I identify a number to be rounded and whether it will be rounded to the nearest ten or hundred.

3.) I identify which chart can be used for rounding to the nearest ten (*Round to Nearest Ten Chart*) and which chart can be used for rounding to the nearest hundred (*Round to Nearest Hundred Chart*). *Re-emphasize *why* each chart can be used for rounding to the nearest ten or hundred (re-state the rationale students stated in step #1).

4.) I identify the "talking digit" and what number on the *Round to Nearest Ten Chart* or *Round to Nearest Hundred Chart* the "peep hole" card should be placed (e.g. for rounding to the nearest ten, the number to be rounded will be the number visible through the peep hole. For rounding to the nearest hundred, students must identify the "ten" they should round from – for 347, the talking digit is "4" therefore they round from "340." The "peep hole" should be placed to reveal "340.").

5.) Choose the appropriate "peep hole" card to use and place it between the "lesser" and "greater" tens or the "lesser" or "greater" hundreds (dependent on the position of the number is in the row of the chart – e.g. the number "44" would require the "peep hole" card that has a space that is positioned over the "fifth" number in the row. The card would then be positioned between the "lesser" ten – 40 – and the "greater" ten – 50.).

6.) Model how to determine which ten or hundred the number should be rounded to by pointing out the how much distance there is from the number you are rounding (number revealed by the "peep hole") and each ten or

hundred. The ten or hundred that is closer to the "peep hole" number is the ten or hundred the number should be rounded to.   Have your students estimate which distance is less. *Use a ruler or tape measure to verify which distance is less and which distance is greater.

For Example:

*The distance from "120" to "100" is less than the distance from "120" to "200." The card makes the distance "stand out."

0	10	20	30	40	50	60	70	80	90	100
100		120								200
200	210	220	230	240	250	260	270	280	290	300
300	310	320	330	340	350	360	370	380	390	400
400	410	420	430	440	450	460	470	480	490	500
500	510	520	530	540	550	560	570	580	590	600
600	610	620	630	640	65	660	670	680	690	700
700	710	720	730	740	750	760	770	780	790	800
800	810	820	830	840	85	860	870	880	890	900
900	910	920	930	940	950	960	970	980	990	1000

7.) Repeat this process at least three times for both rounding to the nearest ten and to the nearest hundred.

*Key Ideas:
1.)   This method provides an effective way to use "proximity" as a cue for rounding. It is not meant to be the primary way to teach rounding at the abstract level. However, some students will greatly benefit from such cueing.
2.)   It is very important that those characteristics of both the *Round to Nearest Ten Chart* and *Round to Nearest Hundred Chart* described in step #1 are explicitly modeled before this method of teaching rounding is taught. Linking students' knowledge of/experiences of a Hundreds Chart to these two charts can be helpful.
3.)   As described, this method necessitates that students understand how to identify the talking digit and what it means. Therefore, this method should be introduced after you have taught how to use the talking digit to round.
4.)   The use of the *Round to Nearest Ten Chart* and the *Round to Nearest Hundred Chart* can be excellent cues for counting on and counting back by ones and tens when rounding.

Scaffold Instruction

Purpose: to provide students the opportunity to build their initial understanding of how to round numbers to the nearest ten/hundred without concrete materials or drawings, and to provide you the opportunity to evaluate your students' level of understanding after you have initially modeled this skill.

Materials:

*Dependent on the skill you are Scaffolding Instruction for (See the materials listed for the specific skill you want to scaffold under Explicit Teacher Modeling).

Description:

*Scaffolding at the abstract level of instruction should occur using the same process as scaffolding instruction at the concrete and representational/drawing levels of instruction (See the description of Scaffolding Instruction for, "rounding to the nearest hundred using base ten materials and a number line," in the Concrete Level Instructional Plan.). The steps listed for each skill during Explicit Teacher Modeling should be used as structure for scaffolding your instruction.

A. Scaffold instruction using a high level of teacher direction/support. (*Dependent on the needs of your students, you may want to continue to associate drawings to the abstract level rounding process during this phase of scaffolding (See Learning Objective 1 described under Explicit Teacher Modeling.) Move to the next phase of scaffolding only when students demonstrate understanding and ability to respond accurately to your prompts.

B.   Scaffold instruction using a medium level of teacher direction/support. (If you associated drawings with the abstract process for rounding while scaffolding using a high level of teacher direction/support, then do not include drawings during this phase of scaffolding). Move to the next phase of scaffolding only when students demonstrate understanding and ability to respond accurately to your prompts.

C.   Scaffold instruction using a low level of teacher direction/support. (Students should actually round as you prompt them during this phase of Scaffolding Instruction.) Move students to independent practice of the skill only after they demonstrate the ability to perform the skill with limited prompting from you.

Instructional Phase 2: Facilitate Acquisition to Mastery – Student Practice

 1. Receptive/Recognition Level

Purpose: to provide students multiple opportunities to round to the nearest ten or hundred by writing numbers (instead of drawing pictures) to "count on" and "count back" to round to the nearest ten or hundred..

Learning Objective 3: Round to the nearest ten/hundred by drawing using a number line.

Instructional Game – Board Game

Materials:

Teacher –

- generic game boards (*Game boards can be made by using manila folders or square pieces of tag-board and configuring multiple spaces (i.e. 15-30 spaces will provide multiple practice opportunities) on which students can move their game pieces. A rectangle can be drawn on the game-board to represent where the response cards are placed. At the beginning of the year, students can be taught how to make game boards and then these game-boards can be used throughout the year!) Game-boards can be as colorful/creative or as simple in nature as appropriate given your time and your student's ability level. Old or discarded commercially made game boards also can be used (e.g. "Monopoly," "Life," "Stratego," etc.)

- dice or spinners

- multiple sets of cards that have: Front - 1.) the number to be rounded and the numbers representing counting on/counting back to the nearest ten/hundred written on either side (e.g. 30 21 32 **33** 34 35 36 37 38 39 40); 2.) below the example is written one or more questions with three choices; Back – 1.) the correct choice(s) is written. *To facilitate making these cards, you can make one set for each level of difficulty using plain paper so that the examples, questions, and choices are a size that can fit on one side of a 4x5 note-card. Number each example #1 - #20 in the top right corner so that each card has the number appear at the top right corner. Then you can make multiple copies of the one set, cut them out, paste them on note-cards, and laminate the note-cards. Students can assist in pasting the drawings/choices & answers on note-cards!

- a copy of the original set of problems so the teacher can check individual student response sheets.

Students -

- each small group has a game-board, die or spinner, a set of cards.

- a sheet of paper to record which number example they respond to and whether they answered it correctly or not.

Description:

Activity:

Students play in small groups using a generic game board (See description under "Materials.") Students respond to cards that depict the number to be rounded in a dark color (black or blue) and then numbers that count on and count back to the nearest ten or hundred in a contrasting color (red). A simple question is written below the example with three choices (e.g. What is the nearest ten? How many ones to the greater ten?" How many tens to the lesser hundred?). On the back is the correct answer. To move, students roll a die or spin a spinner. If they respond correctly, then they move the appropriate number of spaces. To evaluate student performance, students can record the question number they respond to on a sheet of paper and make a mark indicating whether they answered it correctly or incorrectly. To add more challenge, cards can be divided into two or three piles that represent more and more challenging questions. Students choose which level they want to answer. Students can be rewarded for answering more challenging questions correctly by moving one or more additional spaces.

Instructional Game Steps:

1.) Introduce game.

2.) Distribute materials.

3.) Provide directions for game, what you will do, what students will do, and reinforce any behavioral expectations for the game.

4.) Provide time for students to ask questions.

5.) Model how to respond to the card prompts.

6.) Provide time for students to ask questions about how to respond.

7.) Model how students can keep track of their responses.

8.) Play one practice round so students can apply what you have modeled. Provide specific feedback/answer any additional questions as needed.

9.) Monitor students as they practice by circulating the room, providing ample amounts of positive reinforcement as students play, providing specific corrective feedback/ re-modeling skill as needed.

11.) Play game.

12.) Encourage students to review their individual response sheets, write the total number of "correct" responses under the "C" (Correct) column and do the same for the "H" (Help) column.

13.) Review individual student response sheets to determine level of understanding/proficiency and to determine whether additional modeling from you.

2. Expressive Level

Purpose: to provide students multiple opportunities to "solidify" connections between what they know about rounding to the nearest ten and hundred by drawing to rounding to the nearest ten and hundred at the abstract

level. The use of a structured "planned discovery activity sheet" provides students who have learning problems appropriate cueing that allows them to independently make the connections between their "representational/drawing level" of understanding and their abstract level of understanding.

Learning Objective 1: Round to the nearest ten or hundred by identifying the "talking digit" in two and three digit numbers.
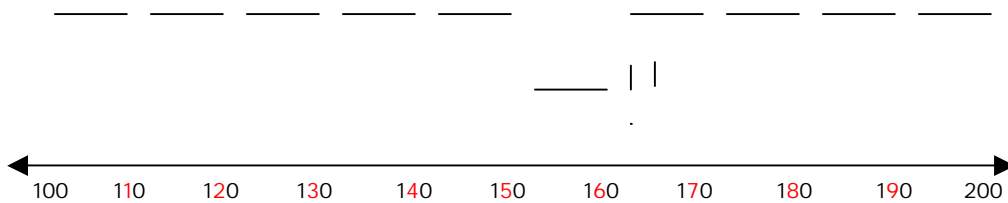
1. Planned Discovery Activity

Materials:
Teacher –
- appropriate number of structured "planned discovery activity sheets. The sheet contains multiple examples of the following: 1.) a drawing of rounding to the nearest ten or hundred (e.g. a number line with the appropriate drawings above that represent the number to be rounded, the "count on" drawings, and the "count back" drawings.); 2.) the following prompts/questions with a space provided to write the player's answer: What number is being rounded? Rounding to nearest ten or hundred? What is the talking digit? What ten or hundred should number be rounded?

  Example for rounding "162" to nearest hundred:

  _____ _____ _____ _____ _____   _____ _____ _____ _____

                                            _____ | |
                                                 .

  | | | | | | | | | | |
  100 110 120 130 140 150 160 170 180 190 200

  What number is being rounded? _____   Rounding to the nearest ten or hundred? _____

  What is the talking digit? _____   What ten or hundred should number be rounded? _____

- Answer key for planned discovery activity sheet.
- Cue cards that show one example of rounding to tens and one example of rounding to hundreds with appropriate answers to the questions/prompts. *Students who need additional prompting can use these cards as needed to respond to the planned discovery activity sheet.*

Students -

- each pair has two planned discovery activity sheets.
- "example" cue cards if appropriate.
- pencils for writing.

Description:

Activity:

Students work in pairs to respond to a planned-discovery learning sheet (See description under "Materials."). Each sheet has drawings on a number line that represent rounding to the nearest ten or hundred (*the numerical form of the value to be rounded is not written). Students respond by writing the number that is being rounded, identifying whether the drawing represents rounding to the nearest ten or hundred, identifying the "talking digit," and identifying what ten or hundred the number should be rounded to. Students take turns responding to each example. The "coach" describes the drawings and then asks the "player" to respond to each question/prompt for that drawing. The coach writes the player's answer in the appropriate space on that student's planned-discovery learning sheet. The coach and player then refer to the answer key to check the player's responses. If the player's responses are correct, the students switch "roles" and move to the next example. If the player's responses are incorrect, the coach and player discuss why the player's response differed from the correct answer. After they have reached agreement, the students raise their hand to signal the teacher. When the teacher approaches them, the player (or coach and player) explain what they learned (why the response was not correct). *For students who may need additional prompting/cueing, two example cards could be provided.* One "example" could show a drawing representing rounding to tens with appropriate responses to the questions and one "example" could show a drawing representing rounding to hundreds with appropriate responses to the questions. Students could refer to these "example" cards as needed as they respond. The teacher circulates the room monitoring students as they work, providing positive reinforcement, specific corrective feedback, and listening to student explanations.

Planned Discovery Activity Steps:
1. Develop Planned Discovery Activity Learning Sheet as described under *Materials*.
2. Distribute the Planned Discovery Activity Learning Sheet and provide clear directions for completing the activity, including appropriate behavioral rules.
3. Model how to respond to one example on the Planned Discovery Learning Sheet (and model appropriate behaviors as needed).
4. Provide students with appropriate materials (e.g. Cue cards).
5. Monitor students as they practice, providing appropriate corrective feedback, prompting student thinking, providing positive reinforcement, and modeling or cueing as needed.

6. At the conclusion of the activity, provide students with solutions to the Planned Discovery Activity Learning Sheet.   Emphasize *why* the answers are correct.

7. Review student response sheets and note special difficulties individual students may be having and/or progress they are making.

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

1. 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.

- At the abstract level of understanding, the most efficient format for a curriculum slice/probe is written (e.g. student responds in writing to written prompts). In some cases, you may want to use oral prompts where written examples are provided on the chalkboard/dry-erase board or overhead projector (e.g. three digit numbers written above various number lines and students respond to several teacher

questions about each example: "What is the nearest ten? What is the nearest hundred? How many ones did you count on to the greatest ten? How many tens did you count back to the lesser hundred?).

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 should be visible on each students' graph/chart that represents the proficiency (near 100% accuracy with two or fewer incorrects/mistakes) and a rate (# of corrects per minute) that will allow them to be successful when using that skill to solve real-life problems and when using the skill for higher level mathematics that require use of that skill.

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:

Abstract Level: demonstrates near 100% accuracy (two or fewer incorrects/mistakes) and a rate (# of corrects per minute) that will allow them to be successful when using that skill to solve real-life problems and when using the skill for higher level mathematics that require use of that skill.

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

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

*This assessment activity can be used with students who demonstrate difficulty with rounding at the abstract level.

A. Flexible Math Interview/C-R-A Assessment
  Purpose: to assess where student understanding of the rounding process is "breaking down."

  Materials:
  Teacher –
  - appropriate concrete materials for rounding (See Concrete Level Instructional Plan – Explicit Teacher Modeling.).
  - number lines for rounding to nearest ten or hundred.
  - appropriate examples for assessment (nearest ten and nearest hundred)
  - paper to record notes.

Description:

Have students round to the nearest ten and hundred using concrete materials, by drawing, and without concrete materials or drawings. Also have students round with and without the use of number lines. Ask students to explain their answers as they respond. Note where in the rounding process students "break down;" both at what level they begin having difficulty and at what point within that level of understanding they demonstrate misunderstanding/non-understanding. Based on where students demonstrate difficulty, provide explicit teacher modeling at that level of understanding and for the particular sub-skill they are having difficulty with. As the student demonstrates understanding, scaffold your instruction until they are ready to practice the skill independently. As students demonstrate mastery of the skill at that level of understanding, then provide explicit teacher modeling at the next level of understanding. Follow this process until students demonstrate mastery at the abstract level.

<u>Key Ideas</u>

1.) Students who demonstrate difficulty at the abstract level of understanding may have "gaps" in their understanding that can trace back to the representational/drawing level or even the concrete level. By providing additional teacher modeling at the level their "gap" in understanding began and then moving them from a concrete-to-representational-to-abstract level of understanding, you can assist students to become successful at the abstract level of understanding.

2.) Sometimes students demonstrate difficulty at the abstract level because they did not receive enough practice opportunities at the concrete and representational/drawing levels. The drawing level is a very important step for these students. Some students need continued practice drawing solutions and associating their drawings to the abstract symbols and the mental processes necessary to perform at the abstract level.

3.) Some students understand the concept, but have difficulty remembering the steps involved to perform the skill at the abstract level. Providing students with cues they can refer to as they practice at the representational/drawing and abstract levels of instruction is very helpful. Such cueing provides them the independence to practice. Multiple practice opportunities translate into repetition and repetition enhances memory.

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

*See suggestions described under this section for both the concrete and representational level instructional plans.