SCAFFOLDING TASK: "THE ISLAND HOP!"

This task is an introductory lesson for rounding. Students build this understanding using a number line.

STANDARDS FOR MATHEMATICAL CONTENT

MCC.3.NBT.1 Use place value understanding to round whole numbers to the nearest 10 or 100.

STANDARDS FOR MATHEMATICAL PRACTICE (SMP)

1. Reason abstractly and quantitatively.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

This will be the students' first experience with the estimation strategy of rounding. Prior to Kindergarten students have had experience reasoning through the ideas of more and less, and shorter and longer. In kindergarten students began working with benchmark numbers and estimating with measurement. This continued through second grade.

Rounding is used to simplify computation in a story, chart or conversation and should be context specific. "To round a number simply means to substitute a nice number that is close, so that some computation can be done more easily."   For example, if you are talking about the amount of time it takes you to do homework, most people will not say 57 minutes, they will say about an hour. The first

number is a precise amount of time. The second number refers to an approximate amount of time for better communication. (Van de Walle p. 47)

COMMON MISCONCEPTIONS

The use of terms like "round up" and "round down" confuses many students. for example, the number 37 would round to 40 or they say it "rounds up". The digit in the tens place is changed from 3 to 4 (rounds up). This misconception is what causes the problem when applied to rounding down. The number 32 should be rounded (down) to 30, but using the logic mentioned for rounding up, some students may look at the digit in the tens place and take it to the previous number, resulting in the incorrect value of 20. To remedy this misconception, students need to use a number line to visualize the placement of the number and/or ask questions such as: "What tens are 32 between and which one is it closer to?" Developing the understanding of what the answer choices are before rounding can alleviate much of the misconception and confusion related to rounding. (Adapted from Ohio Department of Education Model Curricula)

ESSENTIAL QUESTIONS

- How are digits in a number related?
- What can we learn about the value of a number by examining its digits?
- What is an effective way to estimate numbers?

MATERIALS

- Sidewalk Chalk
- Number line, or 0-99 chart

GROUPING

Students should work in groups of 3 or 4.

NUMBER TALK (*SMP 1, 2, 3, 6, and 8*)

In the third grade overview, the importance of giving students opportunities to mentally compute and explain computational strategies is discussed. *Number Talks* is an excellent way to do this. Beginning your lesson daily with between 5 and 15 minutes of time dedicated to students sharing the authority of determining whether answers are accurate, and are expected to think through all solutions and strategies carefully (Parrish, 2010). During a *Number Talk*, the teacher is not the definitive authority. The teacher is the facilitator and is listening and learning for and from the students' natural mathematical thinking. The teacher writes a problem horizontally on the board in whole group or a small setting. The students mentally solve the problem and share with the whole group HOW they

derived the answer. They must justify and defend their reasoning. The teacher simply records the students thinking and poses extended questions to draw out deeper understanding for all. The effectiveness of numbers talks also has a lot to do with the routines and environment that is established. Students must be given time to think quietly without the pressure of their peers. To develop this, the teacher now should establish a signal of some sort to identify that one has a strategy to share. One way to do this is to place a finger on their chest indicating that they have one strategy to share. If they have two strategies to share, they place out two fingers on their chest and so on.

Number Talk problem possible student responses:

29 + 8	**Possible Strategy #1-** 29 can become 30 and take 1 from 8 reducing it to 7.	**Possible Strategy #2** 20 plus 17
54 + 86	50 + 80 + 10=	Add 6 to 54 to get 60. Then 60 + 80 = 140

Number talks often have a focus strategy such as "Making Tens", or "Compensation". You may start with a number string such as $7 + 3$. Once students discuss their strategies for this expression, a closely related one can follow. ($7 + 4$, $7 + 2$, $7 + 5$). Students will begin to develop relationships between the expressions within the number string. Below is a video link of a third grade Number Talk.

http://www.youtube.com/watch?v=OeEjoEQQNNI&list=PLA80594C7CF447011

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

Part I (SMP 1, 3, 4, 5 and 6)
        The teacher will begin the lesson outside on the sidewalk. S/he will introduce the decade numbers. The teacher may have the students count by 10s to 100. As the students are counting the teacher will use sidewalk chalk to draw "islands" on the sidewalk. Be sure to leave enough room in between each decade number to make the tick marks for the numbers in between.
        Next, the class will discuss what can go in between the decade numbers. Have the groups of students, using sidewalk chalk, record the numbers that are in between the decade numbers. *Please note that the measurement between the numbers will probably not be equal. As long as they do not skip any numbers it should be fine.*
    The teacher will now set the stage for rounding. You can start by asking a series of questions:
- What is estimating?
- Does anyone know why we estimate?

Explain to the students that today they will learn a new estimation strategy. They are going to round to the nearest 10. "Let's look at the islands with the decade numbers, what do you notice?" Students may respond with things like, the islands count by 10s, or they are decade numbers.

When rounding, you are looking for nice numbers like the decade numbers. Ask a student to stand on a number such as 43. The student will locate 43 on the number line and stand there. The teacher will lead the students into a discussion about the nearest decade number. They can even walk/hop to the closest island by counting the steps. Continue this with other students allowing them gain an understanding of the nearest "nice number". Please avoid teaching such things as, "5 or higher, and 4 or lower". We want students to conceptualize the rounding and not memorize rules. Allow students to grapple with and discuss this in order to develop a deeper understanding.

Part II (SMP 1, 4, 5, 6, and 8)

Students will use the "Island Hop" Scavenger Hunt task sheet to answer questions about rounding. Students should use a number line (cut the attached 0-99 chart to create) or use the 0-99 chart to complete the task.

FORMATIVE ASSESSMENT QUESTIONS

- How do you determine the closest 10?
- Have you found all of the possible answers? Explain.
- When might rounding be useful?
- Can you create an additional number clue?

DIFFERENTIATION

Extension
- Have students practice rounding to the nearest ten using three-digit numbers.

Intervention
- Students can work with only 2 decade numbers at a time. They could use counters to mark their spots.

0-99 Chart

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

Name_____ Date_____

THE ISLAND HOP SCAVENGER HUNT

1. I am a number that rounds to 40. What can I be? Could I be another number? Justify your thinking.

2. I am a number that rounds to 90. What can I be? Could I be another number? Justify your thinking.

3. I am a number that rounds to thirty. One of my digits is 2. What number am I? Could I be another number? Justify your thinking.

4. I am a number that rounds to 60. What can I be? Could I be another number? Justify your thinking.

5. Jalynn told Tameka that she has about 50 stickers. Tameka has 48 stickers. Knowing that Jaylynn rounded her total, is it possible that Tameka has more stickers than Jalynn? Justify your thinking using words, pictures and numbers.

6. Jay has *about* 70 baseball cards. Mark has 72 baseball cards. Is it possible for Jay to have more baseball cards than Mark? Justify your thinking using words, pictures, and numbers.