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| **Lesson Content** | | | |
| **What Standards (national or state) relate to this lesson?**  (You should include ALL applicable standards. Rarely do teachers use just one: they’d never get through them all.) | *Focus standard-*  **MAFS.4.NBT.1.3:** Use place value understanding to round multi-digit whole numbers to any place.  **MAFS.K12.7.1:** Look for and make use of structure.    **MAFS.4.NBT.1.2:** Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons. | | |
| **Essential Understanding**  (What is the big idea or essential question that you want students to come away with? In other words, what, aside from the standard and our objective, will students understand when they finish this lesson?) | When students are finished with this lesson, they will understand the importance of rounding and the difference between rounding and estimating. Instruction will focus on understanding of the process of rounding to promote problem-solving skills, instead of providing a rigid computation method or memorizing rules. Also, students will understand when rounding is useful in real life contexts, as well as when we do operations or we want to quickly say or write a number.  Students will use place value understanding and a number line to round multi-digit numbers to the nearest 10, 100 and 1,000. The students will understand the relationship between benchmark numbers, midpoint and rounding (when we round we go to the closest benchmark number).  **Vocabulary:** rounding, estimation, benchmark number, midpoint, place value, number line | | |
| **Objectives- What are you teaching?**  (Student-centered: What will students know and be able to do after this lesson? Include the ABCD’s of objectives: action, behavior, condition, and degree of mastery, i.e., "C: Given a sentence written in the past or present tense, A: the student B: will be able to re-write the sentence in future tense D: with no errors in tense or tense contradiction (i.e., I will see her yesterday.)."  Note: Degree of mastery does **not** need to be a percentage.) | Given a multi-digit whole number, students will be able to accurately round the number to the nearest 10's, 100's and 1,000's place using benchmark numbers with no errors. | | |
| **Rationale**  Address the following questions:   * Why are you teaching this objective? * Where does this lesson fit within a larger plan? * Why are you teaching it this way? * Why is it important for students to learn this concept? | The purpose of mathematics in the fourth grade is to help students make connections between classroom concepts and real-life problem solving. In academic settings, as well as real world contexts, rounding is an essential skill to computation and understanding of mathematics.  Being able to understand and explain numbers will help students make sense of multi-digit computation and problem solving.  Students should know and understand how to round and it’s purposes in estimation or calculations.  This standard is a part of concepts including numbers and operations in base ten, as well as generalizing place value understanding for multi-digit whole numbers.  Through varying grouping patterns, students will explore and expand upon their understanding in creative ways. Mathematics instruction will be engaging, challenging and interactive. Students will learn through discovery, discussion and multiple representations. Through integrating aspects of other content areas, like creative expression and the student’s community, students receive a multidisciplinary understanding of rounding.  Moving forward, students will use what they have learned to apply place value understanding and properties of operations to perform multi-digit arithmetic. | | |
| **Evaluation Plan- How will you know students have mastered your objectives?**  Address the following:   * What formative evidence will you use to document student learning during this lesson? * What summative evidence will you collect, either during this lesson or in upcoming lessons? | **Formative assessment** will be gathered through teacher observations of students’ contributions to discussion throughout the lesson and the student’s independently completed work. This will include considering student’s responses when using their thumbs to agree or disagree, as well as teacher evaluation of group, pair and independent discussions and responses to questions. The teacher will evaluate these responses considering accuracy and depth of understanding. Teacher observations of student’s spoken, written and signed communication will contribute to the pacing and intensity of various portions of the lesson. The teacher will track student’s participation and contribution to the lesson with a checklist of important concepts and maintaining anecdotal notes. The checklist is included at the end of the Lesson Plan (page 13) and includes student’s ability to round to the 10’s, 100’s, and 1,000’s place, as well as their understanding of benchmark numbers. When the teacher’s observations confirm that students understand each of the concepts, the teacher will place a check mark in the box.  Student work will also be considered as representative of the learner’s mathematical knowledge. The student’s charts created while playing the dice game, their number lines for in class work, and the student’s presentation summarizing the video will also demonstrate understanding for the teacher to consider. The teacher will evaluate the student work based on accuracy.  **Summative assessment** methods will include the Exit Ticket provided at the end of the lesson, the student’s reflections of their understandings in their math journals, and an end-of-unit test. The Exit Ticket will include a written response answer to: round 7,684 to the nearest 10, 100 and 1,000 (Answers: 7,680, 7,700, 8,000). The students will be presented with the number on the board, given oral directions for which places to round to, and they will write their answers on a sticky note that will be given to the teacher at the end of the lesson. The end-of-unit test will include multiple choice and written response questions that consider student’s rounding abilities, as well as other mathematical concepts addressed throughout the unit. | | |
| **What Content Knowledge is necessary for a teacher to teach this material?** | The teacher must understand place value, estimation, rounding, number lines, benchmark numbers, midpoint, and working with multi-digit numbers. The teacher should also be aware of strategies for teaching mathematics, offering probing or higher-order thinking questions, and classroom management skills. | | |
| **What background knowledge is necessary for a student to successfully meet these objectives?**   * How will you ensure students’ have this previous knowledge? * Who are your learners? * What do you know about them? * What do you know about their readiness for this content? | Students should have some experiences with rounding or estimation from prior lessons in the unit. Students should have a strong understanding of place value, up to the thousands place. Students should be familiar with and know how to use a number line or a segment of a number line. Students should know how to write numbers in standard and expanded form. Students should be able to read and write numbers. Students should know the value of a ten dollar bill, a five dollar bill and a one dollar bill.  To ensure that students have this prior knowledge, the teacher will consider formative assessment (observations, student responses) throughout the lesson to determine any concepts that needed to be explained or reviewed.  In kindergarten, 1st, 2nd and 3rd grade the students have worked with numbers to the thousands place. Now, the students are building on their numerical understand to expand beyond the thousands place to the ten-thousands and further place value understandings. 4th grade students should be able to read and write whole numbers and understand place value, building upon what they have been learning in previous grades. Throughout the year, 4th graders will gain a deeper understanding of numbers in general, learning how they relate to each other as well as new ways to represent them. Continuing the work they started in previous years, fourth graders will improve their number skills, from mental computations to estimation to judging whether an answer seems reasonable. | | |
| **What misconceptions might students have about this content?** | From previous instruction, students may have gathered rules considering the digits of numbers, but have a lack of understanding for why that rule works. When comparing numbers, students might believe that numbers are greater because of the number of digits (using expanded form of numbers will help address this misconception). When rounding, students may place an emphasis on a procedure for a specific place value, but do not understand why someone would round to begin with. The student might misapply the concept of “rounding down” or “rounding up” to changing the number by lowering or increasing the value of the digit in the designated place. | | |
| **Lesson Implementation** | | | |
| **Teaching Methods**  (What teaching method(s) will you use during this lesson? Examples include guided release, 5 Es, direct instruction, lecture, demonstration, partner word, etc.) | Direct instruction is applied throughout the lesson, with opportunities for students to explore and develop conceptual understanding as a whole class, in cooperative learning groups, and with their partners. The teacher provides minimal lecturing, with more opportunities for student discovery, demonstrations, and teacher-guided questioning. Probing questions will encourage students to develop deeper levels of understanding. The teacher will be asking probing and higher-order thinking questions during small group or independent work to assess student understanding and promote concept development. This lesson applies the strategy of guided release of responsibility, or scaffolding, by beginning with whole group instruction, guiding small group activities, learning through partner work and involving independent practice.  Students will also present to the class their understandings through creativity. A multidisciplinary approach is integrated into the lesson through writing and reflection to demonstrate understanding. Students are using a chart and number line to work through rounding in their math journals. Technology is integrated into the lesson through a video and interactive, educational games. Students are provided with multimodal representations of concepts to address varying learning styles and needs.  Group work is an extremely effective way of involving students in doing mathematics. Students are able to build on their understanding by clarifying, explaining and reinforcing their knowledge of concepts in varying discussions. In this lesson, students will collaborate with their table group (4-5 students), their shoulder partner (the student sitting next to them) and the whole class for discussions, games, and concept building. Students will Turn & Talk with their partners, participate in cooperative group work, and contribute to whole class discussions. | | |
| **Step-by-Step Plan**  (What exactly do you plan to do in teaching this lesson? Be thorough. Act as if you needed a substitute to carry out the lesson for you.)  Where applicable, be sure to address the following:   * What Higher Order Thinking (H.O.T.) questions will you ask? * How will materials be distributed? * Who will work together in groups and how will you determine the grouping? * How will students transition between activities? * What will you as the teacher do? * What will the students do? * What student data will be collected during each phase? * What are other adults in the room doing? How are they supporting students’ learning? * What model of co-teaching are you using? | Time  1 min.  1 min.  3 min.  3 min.  1 min.  4 min.  13 min.  4 min.  8 min.  6 min.  5 min.  15 min.  10 min.  5 min.  2 min. | Who is responsible (Teacher or Students)?  T/S  T/S  S  S  S  T/S  S  S  S/T  S/T  S  S  T/S  S  S | Each content area may require a different step-by-step format. Use whichever plan is appropriate for the content taught in this lesson. For example, in science, you would detail the 5 Es here (Engage/Encountering the Idea; Exploring the Idea; Explanation/Organizing the Idea; Extend/Applying the Idea; Evaluation).      1. Students will be shown the following dollar bills: a ten-dollar bill, a five-dollar bill, and two one dollar bills. I will then ask the students about how much money we have, by rounding to the nearest tens. Students will Turn and Talk with their “shoulder partner” (to the right or left of them) about how they came up with their rounded number. Students will have 1 minute to discuss. The teacher will call on 3 students to come to the board and share their responses. Students will illustrate, write or add to demonstrate their strategy.  2. The teacher will show on a large number line (marked 0-10) that 5 is the midway point. The teacher will provide a random number (6, 3, 8) between 0-10 and students will be chosen to answer if that number is closer to 0 or 10.  3. Students will be asked what a “benchmark number” is. They will be guided to understanding that a benchmark number is a number that ends in 0, or is a multiple of 10 (10, 20, 30, 40, etc.). Through a whole group discussion, students will recognize that we find the closest benchmark number when rounding.  4. Students will be given their own blank number line template. The teacher will provide each table group with a two-digit number (27, 23, 26, 24) and tell the students to round to the nearest ten. Students will put the benchmark numbers 20-30 on their number lines and round the number. The teacher will rotate the room and check for understanding. Each group will share their number and their rounded number. Students in the classroom will put their thumbs up or down to signal if they agree or disagree. Any misconceptions will be cleared by having the students show and explain their methods on their number lines.  5. The students will be told the “Prize Question.” A student will be picked at random (by drawing sticks with student’s names) to win a piece of candy for their group if they answer correctly. “What is the difference between rounding and estimating?” Students have 1 minute to talk with their table groups. Until the right answer is given, 3 tables will have a chance to win the prize. The teacher should repeat the correct student’s answer: “Rounding involves finding the benchmark number. When we estimate, we round numbers and do an operation.”  6. The teacher will provide the class with the challenge question: What is “27 + 32 + 58 + 61”? The teacher will ask students how long this problem would take and if there is an easy way of getting close to the sum of the numbers. The teacher will guide the whole class discussion to include ideas on rounding each number to the nearest ten. The students will tell the teacher what to round each number to (30, 30, 60, 60). As a class, they will add the rounded numbers and get the answer of 180. The teacher will specify that we round numbers so we can do operations more easily. The teacher will ask when rounding numbers could be useful (to check answers on a test, shopping, planning a budget).  7. The teacher will play a video (<https://learnzillion.com/lesson_plans/5984-round-numbers-to-the-leading-digit-using-a-number-line>) that explains rounding longer numbers to other unit places. Students will talk and collaborate within their tables to provide a quick summary of the video. They will sing a song, create a rap, write a poem or draw a picture to represent what the learned. Students will share their group’s representation with their class.  8. Students will be provided with the following numbers and told to mark the benchmark numbers on their number lines and round the numbers independently: 27, 32, 48, 57, 61. The students will be drawn by stick to share their responses with the class. The class will indicate with a thumb up or down if they agree with the student’s benchmark numbers and rounding.  9. The teacher will write the number 148. The students will Turn & Talk with their shoulder partner about what the benchmark numbers would be if we rounded to the nearest hundred (100 and 200). One pair will share and the class will use their thumbs to signal agreeance. Students will be asked to find the midpoint (150) with their shoulder partner. One pair will share and the class will use their thumbs to signal agreeance. The teacher will ask students to round 147 to the nearest hundred and share their answers with their fingers (1 up for 100, 2 up for 200). Then, students will be asked to round 147 to the nearest ten. Students will be randomly chosen by stick until they answer 150. Students will then work with their shoulder partners to round 134, 167 and 171 to the nearest hundred (100, 200, 200) and tens (130, 170, 170). The teacher will circulate the room and monitor discussion.  10. The teacher will write the number 1,788. First, the students will help the teacher write the number in expanded form (1,000+700+80+8). The teacher will ask the same set of questions as above changing the benchmark numbers to 1000 and 2000 with the number 1500 as the middle number.  11. The class will work as a whole group to round “1,324” to the nearest 10, 100, and 1,000. In their table groups, the students will round 2,469 and 8,746 to the nearest 10, 100, and 1,000. The teacher will rotate the room and check for understanding by monitoring discussions and asking probing questions.  12. Students will be working with their shoulder partners. The teacher will tell students that they are playing a game that will involve rounding, discussing and agreeing on what value each number has in the tens, hundreds or thousands place. Each pair will receive 2 die. The students will record in their math notebooks in a two-column chart of the numbers rolled from the dice as a two-digit number. They will round the numbers they rolled to the nearest ten. (Example: If students roll the dice and get a 6 and 3, they would write 63, the round to the nearest ten [60]). Each partner is to roll the dice 10 times. Once they have both rolled, they will add up their rounded numbers. Whoever has the highest sum, wins. When most students have finished, the teacher will begin tossing another die to each pair. Students will catch the die, then repeat their game with 3 dice to have and round three-digit numbers to the nearest hundreds and tens place on a new chart.  13. During the second round of the game (with 3 dice) the teacher will pull a small group of students who have been struggling with the content for additional tutoring. They will review place value concepts prior to going over rounding.    14. After the small group tutoring and second round of the game is complete, students will work independently to reflect on their learning in their math notebook. Students will record what they learned and how they will use their new knowledge, prompted by the key words listed below. Students will write and/or draw (depending on level of English proficiency, any accommodations for students with an IEP) to record their knowledge of: rounding, estimating, benchmark numbers, a number line, midpoints, and when rounding would be used in the real world (making purchases, counting large amounts of something, etc.).  15. As an “Exit Ticket” for the lesson, students will round 7,684 to the nearest 10, 100 and 1,000 (7,680, 7,700, 8,000). |
| **What will you do if…** | **…a student struggles with the content?** During the second round of the game (with 3 dice) the teacher will pull a small group of students who have been struggling with the content for additional tutoring. They will review place value concepts prior to going over rounding, including viewing numbers in expanded form (1,863 as 1,000+800+60+3). The students will receive explicit instruction on accurate use of a number line. Possible worksheet for rounding to 10’s and 100’s: <https://drive.google.com/file/d/0B_wlnPzXZBUZSmJzOHVKOFV4cGc/view> | | |
| **What will you do if…** | **…a student masters the content quickly?** The students will use the computers or tablets to play the “Ice, Ice Maybe” game (<https://www.mangahigh.com/en-us/games/iceicemaybe>). “Help penguins migrate across a perilous ocean patrolled by hungry killer whales. Use your estimation and approximation skills to position floating icebergs and bounce the penguins safely from glacier to glacier.” The difficulty level of this game can be adjusted to three different tiers. | | |
| **Meeting your students’ needs as people and as learners** | **If applicable, how does this lesson connect to the interests and cultural backgrounds of your students?**  4th grade students show an avid adoration for playing games, as well as working in varying groups. Culturally, the students are probably aware of the U.S. monetary system. If students from diverse backgrounds were previously unfamiliar with the U.S. monetary system, the introductory portion of the lesson will present them with dollar bills. Turning and talking with their peers will give them the opportunity to expand their cultural knowledge with a developmentally-similar student. Collectivistic cultures promote group work and collaborative learning. | | |
| **If applicable, how does this lesson connect to/reflect the local community?**  United States currency is involved in the lesson, as well as an understanding of the monetary system. In the area, students participate in the economy and market. As students search for numbers in informational texts (virtual or printed), they are focusing on Florida’s environment, animals and people. | | |
| **How will you differentiate instruction for students who need additional challenge during this lesson (enrichment)?**    These students will be challenged to begin rounding larger numbers over 10,000 to the tens, hundreds, thousands, and ten-thousands places. Instead of the dice game, these students may choose to work in a small group and find examples of numbers in informational magazines or in online news articles about Florida and the local population, animals and environment. These students will round the statistics and facts found to the nearest tens, hundreds, thousands or ten-thousands place. They will use their rounded numbers to write a fun fact they learned and share it with the class.  (Example: “In the Everglades National Park, there were 64 white-tailed deer observed in 1993-1999. In 2003-2011, only 24 white-tailed deer were observed.” Possible student response: In the Everglades National Park, about/approximately 24 white-tailed deer were observed in about 10 years. There has been a drop in white-tailed deer sightings from 1999 to 2011 of approximately 40 deer. Source: <http://usatoday30.usatoday.com/tech/science/environment/story/2012-01-30/pythons-florida-everglades/52893342/1>) | | |
| **How will you differentiate instruction for students who need additional language support?**    For students in the process of second language acquisition, or those with speech-language impairments, additional support will be provided to offer equity in access to the lesson’s objectives. Prior to the lesson, these students will be taught the important vocabulary in their native language, as well as English. These students will be offered picture accompanied definitions of key words/vocabulary for the lesson. Student reflections in their math journals will be written or drawn. Students are permitted to reflect in their native language, as long as they show effort to include English content-area specific vocabulary. The teacher will be expressive in body language, as well as provide plenty of visual support by writing in large, clear handwriting on the white board. Bilingual students will be encouraged to support each other in group and partner work. The linguistic complexity of texts and academic content area vocabulary will be modified to meet the needs of these learners. Building background from real-world examples will help students to engage in the lesson and make connections. | | |
| **Accommodations (If needed)**  (What students need specific accommodation? List individual students (initials), and then explain the accommodation(s) you will implement for these unique learners.) | Students with disabilities need models, and technology offers an excellent opportunity to provide images that engage students. Accommodations for students with learning disabilities: Brief one-to-one teaching, more time to complete work, additional instruction, small group tutoring, and more examples.  Accommodations for students with vision impairments: Activate prior knowledge and vocabulary, auditory signs and cues, tactile accommodations, braille and braille devices, safety: orientation and mobility, magnifiers, large print, audio texts, adjusted lighting, raised line paper.  Some students with ASD (autism spectrum disorder) appear uncaring as a result of avoidance behaviors, but eye contact and directly engaging the attention of these students will promote task engagement. Flexible grouping will also accommodate students with ASD. | | |
| **Materials**  (What materials will you use? Why did you choose these materials? Include any resources you used. This can also include people!) | Access to the internet and a video display system (computer, monitor, projector). Internet access will also be used for student research (for those who master the content quickly). Those same students will need information texts (magazines, books, newspapers).  Computers or tablets.  A white board and dry erase markers.  Student number lines.  Enough dice for a pair of students to have 3 die (online printable templates or store bought), in this case 30 dice.  Resources:  <http://www.cpalms.org/Public/PreviewStandard/Preview/5388>  <https://learnzillion.com/lesson_plans/5984-round-numbers-to-the-leading-digit-using-a-number-line>  <https://www.mangahigh.com/en-us/games/iceicemaybe>  <http://usatoday30.usatoday.com/tech/science/environment/story/2012-01-30/pythons-florida-everglades/52893342/1>  <https://drive.google.com/file/d/0B_wlnPzXZBUZSmJzOHVKOFV4cGc/view>  Blank number line (pictured below) to print for students: <http://www.helpingwithmath.com/printables/others/lin0301number46mult.htm> | | |

Blank number line:

blank number line with large spacing

**Formative assessment** checklist (below, on page 13): When the teacher’s observations confirm that students understand each of the concepts, the teacher will place a check mark in the box.

**Student Understanding Throughout the Lesson**

*Lesson Date: 10/31/2016*

*Objective: Given a multi-digit whole number, students will be able to accurately round the number to the nearest 10's, 100's and 1,000's place using benchmark numbers with no errors.*

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| **Name** | **Rounding to the 10’s place** | **Rounding to the 100’s place** | **Rounding to the 1,000’s place** | **Using benchmark numbers** |
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