Making Sense Out of Numbers
Grade Level or Special Area: 4th Grade
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Length of Unit: 12 lessons (approximately two weeks, one day = 45-60 minutes)

I. ABSTRACT
Help your students develop a broad base of knowledge as they explore the meaning of numbers. This unit will cover place value up to the hundred millions, rounding (estimating) to the nearest thousand and beyond, comparing numbers using greater than, less than, and equal to, as well as ordering numbers from greatest to least and least to greatest, and much more. The students will have plenty of opportunities to make sense out of numbers by exploring them with a variety of techniques that is sure to interest the many different learning styles found in today’s classroom.

II. OVERVIEW
A. Concept Objectives
1. Students develop number sense and use numbers and number relationships in problem-solving situations and communicate the reasoning used in solving these problems. (adapted from Colorado Model Content Standards for Mathematics, Standard 1, Fourth Grade)
2. Students understand how to use data collections and analysis, statistics, and probability in problem-solving situations and communicate the reasoning used in solving these problems. (adapted from Colorado Model Content Standards for Mathematics, Standard 3, Fourth Grade)
3. Students understand how to link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculations, and computers, in problem-solving situations and communicate the reasoning used in solving these problems. (adapted from Colorado Model Content Standards for Mathematics, Standard 6, Fourth Grade)

B. Content from the Core Knowledge Sequence
1. Fourth Grade Mathematics: Numbers and Number Sense (page 101)
   a. Read and write numbers (in digits and words) up to nine digits.
   b. Recognize place value up to hundred millions.
   c. Order and compare numbers to 999,999,999 using <, >, and =.
   d. Write numbers in expanded form.
   e. Use a number line; locate positive and negative whole numbers
   f. Round to the nearest ten, hundred, and thousand.
   g. Identify perfect squares (and square roots) to 144; recognize the square root sign.
   h. Identify Roman Numerals from 1 to 1,000 (I-M), and identify years as written in Roman Numerals.
   i. Create and interpret bar graphs and line graphs.
   j. Plot points on a coordinate plane (grid), using ordered pairs of positive whole numbers.
   k. Order numbers from least to greatest and greatest to least. (not in the Core Knowledge Sequence)

C. Skill Objectives
1. Students will identify place value in digits up to nine digits.
2. Students will identify the one’s, thousand’s, and million’s periods and be able to separate them with a comma in the correct location.
3. Students will read and write place value digits in numbers and words up to nine digits.
4. Students will write a check, matching Standard Form with Word Form.
5. Students will write numbers in Expanded Form up to nine digits.
6. Students will round numbers to the nearest ten, hundred, thousand, and beyond.
7. Students will compare numbers using the $<$, $>$, $=$ signs up to nine digits.
8. Students will order numbers from least to greatest and greatest to least up to nine digits.
9. Students will create a number line plotting positive and negative whole integers.
10. Students will understand how to use a number line to add positive and negative numbers.
11. Students will write their own question using a number line.
12. Students will correctly locate points on a coordinate grid using an ordered pair.
13. Students will correctly identify Roman Numerals; 1 to 1,000.
14. Students will convert Roman Numerals to Arabic Numerals.
15. Students will convert Arabic Numerals to Roman Numerals.
16. Students will learn the rules for writing Roman Numerals.
17. Students will recognize the square root symbol.
18. Students will identify perfect square numbers up to 144.
19. Students will match square roots with its perfect square.
20. Students will interpret a bar and line graph.
21. Students will gather data from a population.
22. Students will graph the data using bar and line graphs.
23. Students will interpret a graph in order to solve an arithmetic problem.

III. BACKGROUND KNOWLEDGE
A. For Teachers
1. There are no resources that a teacher will need to teach this unit, everything is included in the unit.

B. For Students
1. 3rd Grade Core Knowledge: Mathematics: Numbers and Number Sense
   a. Read and write numbers (in digits and words) up to six digits.
   b. Recognize place value up to hundred thousands.
   c. Order and compare numbers to 999,999, using the signs $<$, $>$, and $=$.
   d. Write numbers in expanded form.
   e. Use a number line.
   f. Round to the nearest ten; to the nearest hundred.
   g. Identify Roman Numerals from 1 to 20 (I-XX).
   h. Understand what negative numbers are in relation to familiar uses (such as temperatures below zero).
   i. Locate positive and negative numbers on a number line.
   j. Create and interpret bar graphs and line graphs.

IV. RESOURCES
No resources necessary needed to teach this unit, all needed resources are included in the appendices.
V. LESSONS
Lesson One: Identifying Place Value from 1 to 100 Million (one lesson, approximately 60 minutes)

A. Daily Objectives
   1. Concept Objective(s)
      a. Students develop number sense and use numbers and number relationships in problem-solving situations and communicate the reasoning used in solving these problems.
      b. Students understand how to link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculations, and computers, in problem-solving situations and communicate the reasoning used in solving these problems.
   2. Lesson Content
      a. Recognize place value up to hundred millions.
   3. Skill Objective(s)
      a. Students will identify place value in digits up to nine digits.
      b. Students will identify the one’s, thousand’s, and million’s periods and be able to separate them with a comma in the correct location.

B. Materials
   1. Appendix A, page 1 (one for each student)
   2. Appendix A, page 2 (one for each student)
   3. Appendix A, page 3 (one for teacher reference)
   4. Number cards (1 through 9); cards should be about 2” X 3” {spinners or 10 sided dice work, too} (one set for each team)
   5. Non-transparent container {bag, hat, etc.} (one for each team)
   6. Nine whiteboards {if you don’t have whiteboards, sheets of paper will work}
   7. Dry-erase markers (one for each whiteboard)

C. Key Vocabulary
   1. One’s period - the place values of ones, tens, and hundreds
   2. Thousand’s period - the place values of thousands, ten thousands, and hundred thousands
   3. Million’s period - the place values of millions, ten millions, and hundred millions

D. Procedures/Activities
   1. Review with students the background knowledge that they should have learned in previous grades. Write a three-digit number on the board. Ask the students what place the first digit is in. {The one’s column.} Ask them how much each digit is worth. Write the name of each column above each digit. Repeat this with the ten’s and hundred’s. Next, add another digit to the number. {Don’t put the comma in yet.} Ask the students what the new column is. {The thousand’s column.} Ask them how much that digit is worth. Then say, “I can’t help but think that something is missing. Does anybody get the same feeling?” When somebody realizes that the comma is missing, ask that student how he/she knows that a comma is missing. {The reason is because when you go from right to left, you put a comma for every three digits.} Continue the same pattern with the ten thousands, and hundred thousands. Show them that the same patterns happen over and over again in different periods.
   2. Add another digit to the million’s column. {Don’t put the comma in yet.} Ask the students if anybody can identify what this new column is. {The million’s column.} Don’t say anything about the missing comma. See if any of your students will remember the rule. If no one remembers after a minute, say,
“Hmm, I’m getting that, ‘something’s missing’ feeling again.” That should be enough to remind them. Continue the previous patterns with the ten millions and hundred millions. Go back to showing them that the same patterns happen over and over again. If they know the one’s period, they should be able to figure out the rest.

3. Heads Up, Nine Up! Review the rules for playing the game, “Heads Up, Seven Up!” Pass out nine whiteboards to nine different students. While you pass them out, assign each student a number to write on the board. Have them line up side by side in the front of the room. Do not allow them to switch positions. When you are ready to begin the game, have all of the other students put their heads down and thumbs up. The other students that have the boards with go around and put down the thumb of one person each. After all of the students with the boards have return to the front of the room in the same position, call out, “Heads up, nine up!” The nine students that had their thumbs pushed down will stand up. They will try to predict the person that pushed down their thumb. However, instead of saying that person’s name, they must say the value of their number. If they predict correctly and say the value correctly, the two people switch places. If something was not correct, those two people stay put. (Duration: 10-15 minutes.)

4. After everybody has returned to their seats, pass out or have them create number cards that have 1-9 on them. Tell the students that they are going to play another game, this time with one partner. Each player will pull out a number from a bag/hat. They will have to predict which period the number should go in, in order to create the biggest 9-digit number possible. The player that creates the bigger number wins. You will need Appendix A for this game. If you put Appendix A, pages 1 and 2 back to back, do NOT allow them to continue to parts two, three, or four. (Duration: 5-10 minutes.)

5. After the game, have the students return to their seats. Instruct the students to look at Appendix A, page 2. Explain to them what they will be expected to do. You may want to review with them the rule for placing commas. Also, tell them that the comma farthest to the right is a “Secret Code” for thousand, and the comma on the left is the “Secret Code” for million. Also, you may want to go over sample problems for parts three and four. Once all students are clear on what is expected, allow them to continue working on parts two, three, and four individually. (Duration: 10 minutes)

E. Assessment/Evaluation
1. Teacher will circulate around the room while students are working on Appendix A.
2. Teacher will collect and grade Appendix A to check for understanding.

Lesson Two: Reading and Writing Numbers (one lesson, approximately 60 minutes)

A. Daily Objectives

1. Concept Objective(s)

a. Students develop number sense and use numbers and number relationships in problem-solving situations and communicate the reasoning used in solving these problems.

b. Students understand how to link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculations, and computers, in problem-solving situations and communicate the reasoning used in solving these problems.
2. Lesson Content
   a. Read and write numbers (in digits and words) up to nine digits.

3. Skill Objective(s)
   a. Students will read and write place value digits in numbers and words up to nine digits.
   b. Students will write a check, matching Standard Form with Word Form.

B. Materials
   1. Appendix B, page 1 (one for each student)
   2. Appendix B, page 2 (one for each student)
   3. Appendix B, page 3 (one for each student)
   4. Appendix B, page 4 (one for teacher reference)

C. Key Vocabulary
   1. Standard form - written with regular numbers
   2. Word form - numbers written with words

D. Procedures/Activities
   1. Review with the students the previous lesson. Create a row of nine boxes on the board. Write a number in each of the boxes. Have them tell you 1) what the column is and 2) how much that digit is worth. If you feel that your students understand this very well, move on to the next activity. If they need more instruction, do the activity again. (Duration: 5-10 minutes.)

   2. After the review pass out Appendix B, pages 1-3. With the last number that you created during the review, write that number in word form. Explain the importance of being able to write numbers in words; writing checks, etc. Explain to them how to do it. (A clear explanation is on Appendix B.) Read the procedure with your students and go over it several times with different numbers. (Duration: 5 minutes.)

   3. Ask for volunteers to come up to the board and write a number in word form that you create. Other students may do the same thing on a separate sheet of paper. This takes quite a while for each student, so only do this for two or three people. You don’t want them to get too bored. (Duration: 5-10 minutes.)

   4. Now, switch roles. Write a number in word form and explain to them how to rewrite it into standard form. Again, this takes a long time for each problem, so only do a few examples. (Duration: 5 minutes.)

   5. Once you feel like your students understand the processes, allow them to continue working on Appendix B. Walk around the room checking for understanding. (Duration: 10-15 minutes.)

   6. Once the students have completed Appendix B, pass out Appendix B, pages 2 and 3 (back to back). Go over the directions and explain to them what is expected. (Duration: 15-20 minutes.)

E. Assessment/Evaluation
   1. Teacher will circulate around the room while students are working on Appendix B.
   2. Teacher will collect and grade Appendix B to check for understanding.

Lesson Three: Expanded Form (one lesson, approximately 60 minutes)

A. Daily Objectives
   1. Concept Objective(s)
      a. Students develop number sense and use numbers and number relationships in problem-solving situations and communicate the reasoning used in solving these problems.
b. Students understand how to link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculations, and computers, in problem-solving situations and communicate the reasoning used in solving these problems.

2. Lesson Content
   a. Write numbers in expanded form.

3. Skill Objective(s)
   a. Students will write numbers in Expanded Form up to nine digits.

B. Materials
   1. Appendix C, page 1 (one for each student)
   2. Appendix C, page 2 (one for teacher reference)
   3. Medium sized ball  {volleyball, kickball, etc.}
   4. Empty trashcan  {big enough for the ball to fit in}

C. Key Vocabulary
   1. Expanded form - to write a number by separating each value, then adding it up

D. Procedures/Activities
   1. Review the previous lesson with the students. Write a nine-digit number on the board. Ask a volunteer to help you write the number in word form. While the student is helping you, remind him/her to repeat the process aloud. If you feel that your students have a firm grasp on how to do this, move on to the next step. If not, repeat this with a different number. (Duration: 5-10 minutes.)
   2. Write another number on the board. It could even be the last number that you reviewed with. Ask the students what the value of hundred million’s digit is. Write the value on the board. Continue with the ten million’s digit. You can write that number to the side of the first number or below it. Sometimes it is easier to write the numbers on top of each other so that the students don’t get too confused. Continue all the way to the one’s digit. Express to the students that the form that you just wrote is called, “Expanded Form.” Tell them that it is important to learn how to write numbers like this because we need to know the value of each digit; not that it is just a number. Also, once they get used to this way of thinking, it could help them to add, subtract, multiply, and divide mentally. Repeat the process with two or three numbers until they begin to understand the process. Make sure that one of your numbers has a zero in it. (Duration: 10 minutes.)
   3. Math Basketball: Divide the class into two teams. Put the trashcan in front of the room. The teams will line up side by side in front of the trashcan. Tell them that you will give the person in front a large number. Their job is to write the number in Expanded Form correctly. If they accomplish this, they may choose to shoot the ball from one-point range, two-point range, or three-point range. (Each range will increase with difficulty.) If they don’t do it correctly, they can only shoot from the one-point range. Then, repeat with the first person in line on the other team. Keep score on the board. Note: A good management technique is to tell them that you will deduct points from a team if they are not behaving appropriately and give it to yourself. If you get five points, the game will end. Play this game until everyone has had a chance, you deduct five points, or you run out of time. (Duration: 15-20 minutes.)
   4. After the game is over, students will return to their seats. Pass out Appendix C, page 1. Ask them if they have any final questions. Allow them to work on the worksheet for the remainder of the period.
E. Assessment/Evaluation
1. Teacher will circulate around the room while students are working on Appendix C, page 1.
2. Teacher will collect and grade Appendix C to check for understanding.

Lesson Four: Place Value Quiz (one lesson, approximately 60 minutes)
A. Daily Objectives
1. Concept Objective(s)
   a. Students develop number sense and use numbers and number relationships in problem-solving situations and communicate the reasoning used in solving these problems.
   b. Students understand how to link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculations, and computers, in problem-solving situations and communicate the reasoning used in solving these problems.

2. Lesson Content
   a. Recognize place value up to hundred millions.
   b. Read and write numbers (in digits and words) up to nine digits.
   c. Write numbers in expanded form.

3. Skill Objective(s)
   a. Students will identify place value in digits up to nine digits.
   b. Students will identify the one’s, thousand’s, and million’s periods and be able to separate them with a comma in the correct location.
   c. Students will read and write place value digits in numbers and words up to nine digits.
   d. Students will write a check, matching Standard Form with Word Form.
   e. Students will write numbers in Expanded Form up to nine digits.

B. Materials
1. Appendix D, page 1 (one for each student)
2. Appendix D, page 2 (one for teacher reference)

C. Key Vocabulary
   No new vocabulary for this lesson. However, you may want to review the previous vocabulary words.

D. Procedures/Activities
1. Hollywood Squares. This is a great game that you can play to review for anything! Divide the class into three teams. One team will be the X’s, one team will be the O’s, and the third team will be the Erasers. The Erasers will take away another team’s mark if they successfully accomplish their task. Explain to the class that each team will be asked a question/to perform a task based on what they have learned in the previous three lessons. If they are successful, they can choose where they want their mark (or which one they want erased). Continue playing until a team wins or you run out of time. If you run out of time and no one has won, the Erasers are victorious. (Duration: 20-25 minutes.)
2. After the game, students will return to their seats. Go over each of the three concepts from the earlier lessons. After each concept, ask if anyone wants to go over it again before you move on. (Duration: 10-15 minutes.)
3. Once all questions have been answered, pass out Appendix D, page 1. Allow the students to work on the quiz for the remainder of the period. (Duration: 10-15 minutes.)
E. **Assessment/Evaluation**
   1. Teacher can assess students’ understanding during the game and final review.
   2. Teacher will collect and grade Appendix D to check for understanding over the previous three lessons.

**Lesson Five: Rounding (one lesson, approximately 60 minutes)**

A. **Daily Objectives**
   1. Concept Objective(s)
      a. Students develop number sense and use numbers and number relationships in problem-solving situations and communicate the reasoning used in solving these problems.
      b. Students understand how to link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculations, and computers, in problem-solving situations and communicate the reasoning used in solving these problems.
   2. Lesson Content
      a. Round to the nearest ten, hundred, and thousand.
   3. Skill Objective(s)
      a. Students will round numbers to the nearest ten, hundred, thousand, and beyond.

B. **Materials**
   1. Appendix E, page 1 (one for each student)
   2. Appendix E, page 2 (one for each student)
   3. Appendix E, page 3 (one for each student)
   4. Appendix E, page 4 (one for teacher reference)

C. **Key Vocabulary**
   1. Rounding - an estimation of a number; coming close to the exact number

D. **Procedures/Activities**
   1. Review with the students how to round to the nearest ten and hundred. They should have already learned this in previous grades. Remind them that if the second digit is four or less, you round down. If the second digit is five or higher, you round up. Write all of this information on the board for your visual learners. Explain that there are two steps to rounding any number. First, decide what the two choices they have are. They can either round up to the next highest ten/hundred, or they can round down to the next lowest ten/hundred. Go over several examples of each type. Repeat the same thinking process each time. It’s important to repeat yourself so that the students will get into the same habit when they do it on their own. (Duration: 10-15 minutes.)

   2. Once you feel that your students have a firm grasp on rounding to the nearest ten and hundred, you can move on to rounding to the nearest thousand. Remind them that the process does not change. Just look at the second digit. If it is four or less, round down. If it is five or higher, round up. Practice rounding to the nearest thousand several times until your students understand it. Make sure that you are rounding to the nearest thousand with six or more digit numbers. (Duration: 10 minutes.)

   3. Once you feel that the students are clear on how to round, pass out Appendix E, pages 1-3. Explain to them what is expected. You may want to go over a couple sample problems. Circulate through the room to check for understanding.


E. Assessment/Evaluation
1. Teacher will circulate around the room while students are working on Appendix E, pages 1-3.
2. Teacher will collect and grade Appendix E, pages 1-3 to check for understanding.

Lesson Six: Comparing Numbers Using <, >, and = (one lesson, approximately 60 minutes) {Note: This lesson and the next are very simple for students to understand. Therefore, you can probably combine the two lessons into one.}

A. Daily Objectives
1. Concept Objective(s)
   a. Students develop number sense and use numbers and number relationships in problem-solving situations and communicate the reasoning used in solving these problems.
   b. Students understand how to link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil calculations, and computers, in problem-solving situations and communicate the reasoning used in solving these problems.
2. Lesson Content
   a. Order and compare numbers to 999,999,999 using the signs <, >, and =.
3. Skill Objective(s)
   a. Students will compare numbers using the <, >, = signs up to nine digits.

B. Materials
1. Appendix F, page 1 (one for each student)
2. Appendix F, page 2 (one for each student)
3. Appendix F, page 3 (one for teacher reference)
4. Dice (one pair for each student)

C. Key Vocabulary
1. > - Greater than - this symbol means that the number on the left has more value than the number on the right
2. < - Less than - this symbol means that the number on the right has more value than the number on the left
3. = - Equal to - this symbol means that both numbers have the same amount of value

D. Procedures/Activities
1. Review with students the different symbols and what they mean. Give a couple of simple comparisons (two or three digits only.) Ask them to tell you which number has more value/is bigger. Ask them how they know that the bigger number has more value. See if any of the students remember what symbols they are supposed to use. Tell them that if it helps, they can pretend that the symbols < and > are like alligator teeth. They chomp towards the bigger number/the more fish. (Duration: 5-10 minutes.)

2. Using the same two numbers, add a digit to the end of the smaller one. Ask the question, “Which one has more value now? How do you know this?” Remind the students that they need to look carefully at each number to make sure that one does not have more digits than the other. Do several examples to reiterate this fact. For example: 1,234,567 O 999,888. (Duration: 5-10 minutes.)

3. Game time! Demonstrate how to make the <, >, and = symbols with your arms. Explain that you are going to write two numbers on the board. Whichever one is bigger, they must do the “alligator chomp” with their arms towards that side of the board. They will return to their desks after everyone has the right answer. If
they are equal, they make the = sign and stay at their desks. Have the students stand up at their seats and begin the game. (Duration: 5-10 minutes.)

4. Once the game is over, pass out Appendix F, page 1 and a pair of dice for each student. The students will be paired up to play the next game. Demonstrate the game with one volunteer. Each of you will roll you dice. You will arrange your dice to get the biggest number and the volunteer will do the same. Write down the same grid example on the board as it appears on Appendix F, page 1. For an extra twist, each student can roll all four dice at once and then give the dice to their opponent so that they may try to accomplish the same goal. If you have more dice to spare, have them create bigger numbers. (Duration: 10-15 minutes.)

5. After this game, pass out Appendix F, page 2. Ask all students if they understand the concept. Once everybody is clear on what is expected, let them begin the worksheet. (Duration: 5 minutes.)

E. Assessment/Evaluation
1. Teacher will evaluate students’ understanding during the “alligator chomp” game.
2. Teacher will circulate around the room during the dice game; making sure that the game is being played correctly.
3. Teacher will circulate around the room while students are working on Appendix F, page 2.
4. Teacher will collect and grade Appendix F, page 2 to check for understanding.

Lesson Seven: Ordering Numbers (one lesson, approximately 60 minutes)
A. Daily Objectives
1. Concept Objective(s)
   a. Students develop number sense and use numbers and number relationships in problem-solving situations and communicate the reasoning used in solving these problems.

2. Lesson Content
   a. Order numbers from least to greatest and greatest to least. (not in the Core Knowledge Sequence)

3. Skill Objective(s)
   a. Students will order numbers from least to greatest and greatest to least up to nine digits.

B. Materials
1. Appendix G, page 1 (one for each student)
2. Appendix G, page 2 (one for teacher reference)
3. Whiteboards (three)
4. Dry-erase markers (three)

C. Key Vocabulary
1. Greatest - the number with the most value in the set
2. Least - the number with the smallest value in the set
3. ; - Semi-colon - in math, we use this symbol to separate numbers

D. Procedures/Activities
1. Write a set of three numbers on the board (keep it to three or four digit numbers). Be sure to use the semi-colon to separate the numbers. Explain to the students that we don’t want to use a comma because if we have numbers that are using commas to separate place value periods and whole numbers, it would get very confusing. Ask the students to order the numbers. Don’t specify greatest to least or least to greatest. (See if they’ll ask you which direction.) If they don’t, allow them to continue working it out. Explain to them that it is very important to read
which direction they are supposed to go. Remind them that it is okay to cross off the numbers as they use them or they can rank the numbers by putting tiny 1’s, 2’s, and 3’s above the sets. Repeat this process a few times increasing in difficulty each time.

2. Ask for three volunteers to stand at the front of the room. Give each of them a whiteboard and a dry-erase marker. Tell them to write down a specified digit number on their boards without looking at the other volunteers. Once they have the numbers written, show them to the rest of the class. All the other students will order the numbers whichever way you tell them on a separate sheet of paper. Once all the students have their answers, ask one person to physically move the students with the boards to the correct positions. After a couple of turns, have other students write on the boards. Play until everyone has had a turn with the boards. Start off easy but increase in difficulty. (Duration: 10-15 minutes.)

3. After the game, pass out Appendix G, page 1. Ask them to look over the page and ask for help if they need it. Once everybody is clear on what is expected, allow them to work for the remainder of the period.

E. Assessment/Evaluation
1. Teacher will assess the students’ understanding during the game.
2. Teacher will circulate around the room while students are working on Appendix G
3. Teacher will collect and grade Appendix G and check for understanding.

Lesson Eight: Number Lines (one lesson, approximately 60 minutes)

A. Daily Objectives
1. Concept Objective(s)
   a. Students develop number sense and use numbers and number relationships in problem-solving situations and communicate the reasoning used in solving these problems.
   b. Students understand how to link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculations, and computers, in problem-solving situations and communicate the reasoning used in solving these problems.

2. Lesson Content
   a. Use a number line; locate positive and negative whole numbers.

3. Skill Objective(s)
   a. Students will create a number line plotting positive and negative whole integers.
   b. Students will understand how to use a number line to add positive and negative numbers.
   c. Students will write their own question using a number line.

B. Materials
1. Appendix H, page 1 (one for each student)
2. Appendix H, page 2 (one for each student)
3. Appendix H, page 3 (one for teacher reference)
4. One piece of yarn {approximately 20 feet in length}
5. 21 sheets of paper that are numbered –10 to 10 (the number will vary depending on how many negative numbers you want your students to practice with; you might only want to go back to –5)
6. Clothespins (same amount as you have of sheets of paper)
7. One large, durable bag i.e.: potato sack {for the purpose of the game, even a skateboard would work; however, they will only sit on the skateboard; these items are optional but they would be more fun for your students}

C. Key Vocabulary
1. Number line - a line that has numbers evenly spaced out
2. Positive number - a number that has more value than a zero; on a number line, positive numbers are to the right of the zero
3. Negative number - a number that has less value than a zero; on a number line, negative numbers are to the left of the zero; also, they have a minus sign in front of the number

D. Procedures/Activities
1. Begin this lesson by drawing a number line on the board. Start with a zero and express to the students the importance of evenly spacing out the numbers. Give a couple of problems where it would be helpful to use a number line to solve a problem. (Only use positive numbers for now.) For example: Starting at 3, add 4. Where do you end up? After a couple of problems, your students should be able to move on. (Duration: Less than five minutes.)
2. Extend the number line to the left and add negative numbers. Express to the students that negative numbers have a value less than zero. Give more problems where it would be helpful to use a number line to solve a problem. This time, involve starting in positive AND negative numbers as well as ending in a positive or negative number. (Duration: 5-10 minutes.)
3. Extend the piece of yarn with the clothespins on them. You may want to tie the clothespins on the yarn before you begin class. Have some volunteers attach the sheets of paper to the clothespins in the appropriate locations. Mixing up the numbers might add a challenge for the students. Once all of the sheets of paper are attached, you may continue on with the second part of the activity. (Duration: 5-10 minutes.)
4. Ask for volunteers to be a “jumping number.” They will jump from one number to the next to solve a problem that you tell them to. For example: If the problem is, 5 minus 8, the student will start on positive five, move/jump/roll eight spaces to the left and end up on negative three. Allow all of your students to try this. (Duration: 10-15 minutes.)
5. Once all of your students have played, pass out Appendix H, pages 1 and 2 (back to back). Ask your students if they have any questions regarding these worksheets. When everybody is clear on what is expected, allow them to work on it for the remainder of the period. (Duration: 10-15 minutes.)

E. Assessment/Evaluation
1. Teacher will assess the students’ understanding during the game.
2. Teacher will circulate around the room while students are working on Appendix H, pages 1 and 2.
3. Teacher will collect and grade Appendices H and H-1 to check for understanding.

Lesson Nine: Coordinate Grids and Ordered Pairs (one lesson, approximately 60 minutes)
A. Daily Objectives
1. Concept Objective(s)
   a. Students develop number sense and use numbers and number relationships in problem-solving situations and communicate the reasoning used in solving these problems.
b. Students understand how to link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculations, and computers, in problem-solving situations and communicate the reasoning used in solving these problems.

2. Lesson Content
   a. Plot points on a coordinate plane (grid), using ordered pairs of positive and whole numbers.

3. Skill Objective(s)
   a. Students will correctly locate points on a coordinate grid using an ordered pair.

B. Materials
   1. Appendix I, page 1 (one for each student)
   2. Appendix I, page 2 (one for each student)
   3. Appendix I, page 3 (one for teacher reference)
   4. Small cards with letters on them {on the back, write an ordered pair up to (10, 10)} (one letter card for each student)
   5. Two 10 foot long pieces of yarn
   6. Two sets of numbers 1-10
   7. Tiled floor

C. Key Vocabulary
   1. Coordinate grid - a grid that has numbers on the bottom and left side; it has points located on the lines inside the grid
   2. Ordered pair - location of a point on a grid; the first number tells you how many spaces to move to the right; the second number tells you how many spaces to move up

D. Procedures/Activities
   1. Draw a coordinate grid on the board (5 X 5). Put few objects on the grid such as a star, heart etc. Tell the students that in order to locate points on a grid, you have to use an ordered pair. Show them what one looks like. Instruct them that the first number tells them to move to the right and the second number tells them to move up. Give an example of an ordered pair using the grid and one of the objects. Ask other students to locate the other points using ordered pairs. (Duration: 10 minutes.)
   2. On the tiled floor, lay out the pieces of yarn and numbers to look like a coordinate grid. Pass out a letter card to each of your students. Tell them one at a time to place their letter at the location where the ordered pair instructs them. For example: If their letter is A and the ordered pair is (2, 3), they will place their letter on the lines that the tiles create. Once all of your students have placed their letter cards down, you may continue the activity by having them pick up the cards at the ordered pairs that you give them. For example: Tell the first student to pick up the letter at (7, 4). (Duration: 15-20 minutes.)
   3. After the game, the students will return to their seats. Pass out Appendix I, pages 1 and 2. Make sure that all of your students are clear on what is expected on Appendix I, page 1. Then, explain what is expected on Appendix I, page 2. Once everything is clearly understood, allow them to continue working on the worksheets for the rest of the period. (Duration: 25-30 minutes.)

E. Assessment/Evaluation
   1. Teacher will assess the students’ understanding during the game.
   2. Teacher will circulate around the room while students are working on Appendix I, pages 1 and 2.
3. Teacher will collect and grade Appendix I, pages 1 and 2 to check for understanding.

Lesson Ten: Roman Numerals (one lesson, approximately 60 minutes)

A. Daily Objectives
   1. Concept Objective(s)
      a. Students develop number sense and use numbers and number relationships in problem-solving situations and communicate the reasoning used in solving these problems.
      b. Students understand how to link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculations, and computers, in problem-solving situations and communicate the reasoning used in solving these problems.

   2. Lesson Content
      a. Identify Roman numerals from 1 to 1,000 (I-M), and identify years as written in Roman numerals.

   3. Skill Objective(s)
      a. Students will correctly identify Roman Numerals; 1 to 1,000.
      b. Students will convert Roman Numerals to Arabic Numerals.
      c. Students will convert Arabic Numerals to Roman Numerals.
      d. Students will learn the rules for writing Roman Numerals.

B. Materials
   1. Appendix J, page 1 (one for each student)
   2. Appendix J, page 2 (one for each student)
   3. Appendix J, page 3 (one for teacher reference)
   4. One individual whiteboard
   5. One dry-erase marker

C. Key Vocabulary
   1. Roman Numerals - a system of writing numbers created by the Romans; Roman Numerals are written with letters that stand for numbers
   2. Arabic Numerals - regular numbers that are most commonly used in our country

D. Procedures/Activities
   1. Pass out Appendix J, page 1. Review with the students what the seven main symbols are. (I, V, X, L, C, D, M) Review these with your students until they know them by heart. (Duration: 10-15 minutes.)

   2. Go over the rules for writing Roman Numerals for larger numbers. Read step by step with the students. Go over several examples with the class. Begin with easy numbers and progressively get more difficult. Teach them to go from Arabic to Roman, THEN Roman to Arabic. Don’t expect your class to understand this right away or to be able to do it quickly even after they understand it. Encourage them to think out the rules step by step. (Duration: 15-20 minutes.)

   3. Roman Numeral Baseball. Divide the class into two teams. The first team will go up to the front of the classroom. Ask the first student to identify a Roman Numeral. If they get it correct, they get to move to first base (a location towards the right and at a diagonal). If they don’t get it right, mark an out for the team on the whiteboard and that student sits down. Repeat the process for the following students. Once a student has made it all the way around the bases and scores a homerun, erase an out for the team. After everybody has had a turn, the first repeat-student (the first one that got a homerun) gets one chance to get a Grand Slam. Then, the entire team sits down and the other team gets their
chance. Play two or three innings; depending on time. The team with lower score wins. (Duration 15-20 minutes.)

4. After the game, the students will return to their seats. Pass out Appendix J, page 2. Remind them to use Appendix J, page 1 to help them. Ask if anyone has questions about what is expected. You may want to go over some of the problems with the class. Once everybody is clear, allow them to work on the worksheet for the rest of the period. You will have to circulate around the room to help struggling students. (Duration: 15-20 minutes.)

E. Assessment/Evaluation
1. Teacher will assess the students’ understanding during the game.
2. Teacher will circulate around the room while students are working on Appendix J, page 2.
3. Teacher will collect and grade Appendices J and J-1 to check for understanding.

Lesson Eleven: Perfect Squares and Square Roots (one lesson, approximately 60 minutes)
A. Daily Objectives
1. Concept Objective(s)
   a. Students develop number sense and use numbers and number relationships in problem-solving situations and communicate the reasoning used in solving these problems.
   b. Students understand how to link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculations, and computers, in problem-solving situations and communicate the reasoning used in solving these problems.
2. Lesson Content
   a. Identify perfect squares (and square roots) to 144; recognize the square root sign.
3. Skill Objective(s)
   a. Students will recognize the square root symbol.
   b. Students will identify perfect square numbers up to 144.
   c. Students will match square roots with its perfect square.

B. Materials
1. Appendix K, page 1 (one for each student)
2. Appendix K, page 2 (one for each student)
3. Appendix K, page 3 (one for each student)
4. Appendix K, page 4 (one for teacher reference)
5. One set of small cards with square roots on them {1 through 12}

C. Key Vocabulary
1. Perfect square - a perfect square number is when you can divide a number (dividend) by another number (divisor) and get the same number as the answer (quotient)
2. Square root - the number that, multiplied by itself, will give you the perfect square number

D. Procedures/Activities
1. Introduce this lesson asking students to tell you what 2 X 2, 3 X 3, etc. is. Write the factors in one column and the products in another column. When you’re finished, you should to explain to them that the factors are the square roots and the products are the perfect squares. Students might not be able to know what all the roots and squares are right away, but they will get the concept down fairly quickly. Practice with your students by covering up the roots’ column and asking
them to tell you what the square number is. After a while, repeat this by covering up the other column. (Duration: 10-15 minutes.)

2. Once you feel that your students have a good grasp on this, pass out Appendix K, page 3. Read over the directions with them. Once everybody understands, begin playing a shortened version of Bingo. Allow the students time to put the square numbers in the boxes. When everyone is finished, call out the root and if they have the square, they put a star in that box. Game continues until someone has filled up ALL of the boxes. Then, play another game. (Duration: 10-15 minutes.)

3. After the game, pass out Appendix K, pages 1 and 2. Check to see if all of the students understand what is expected. Allow them to work on the worksheet for the remainder of the period. (Duration: 10-15 minutes.)

E. Assessment/Evaluation
1. Teacher will assess the students’ understanding during the game.
2. Teacher will circulate around the room while students are working on Appendix K, pages 1 and 2.
3. Teacher will collect and grade Appendix K, pages 1 and 2 to check for understanding.

Lesson Twelve: Bar and Line Graphs (one lesson, approximately 60 minutes)
A. Daily Objectives
1. Concept Objective(s)
   a. Students develop number sense and use numbers and number relationships in problem-solving situations and communicate the reasoning used in solving these problems.
   b. Students understand how to use data collections and analysis, statistics, and probability in problem-solving situations and communicate the reasoning used in solving these problems.
   c. Students understand how to link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculations, and computers, in problem-solving situations and communicate the reasoning used in solving these problems.

2. Lesson Content
   a. Create and interpret bar graphs and line graphs.

3. Skill Objective(s)
   a. Students will interpret a bar and line graph.
   b. Students will gather data from a population.
   c. Students will graph the data using bar and line graphs.
   d. Students will interpret a graph in order to solve an arithmetic problem.

B. Materials
1. Appendix L, page 1 (one for each student)
2. Appendix L, page 2 (one for each student)
3. Appendix L, page 3 (one for each student)

C. Key Vocabulary
1. Bar graph - a graph that uses bars to give us information
2. Line graph - a graph that uses lines to give us information

D. Procedures/Activities
1. Pass out Appendix L, page 1. Your students should have already learned about bar and line graphs. Therefore, this should be a review and the amount of
instruction time should be minimal. Begin by creating a bar graph of your own using the class as a population. As you create your graph, express the importance of having every part of a graph in place. A possible topic might be, “How many brothers and sisters do you have?” Once you are finished with the bar graph, use the exact same information to create a line graph. It’s important that they realize that both graphs tell us the same thing; they just look a little different. Make sure that all of your students understand what is expected. (Duration: 10-15 minutes.)

2. Note: For this activity, it helps if you can get another teacher’s permission for your class to survey their students. That way there is a larger population. If not, that’s okay; just do the survey in your class. Explain to the class that they are going to do the exact same thing that you just showed them. Pass out Appendix L, pages 1 and 2. Explain what is expected; not only to get a good grade, but what is expected out of their behavior. Allow your students to disperse and complete the survey. They should return to their seats once all of the data is collected. They can finish the work at their desks. (Duration: 20-25 minutes.)

E. Assessment/Evaluation

1. Teacher will assess the students’ understanding during the review and activity.
2. Teacher will collect and grade Appendix L, pages 1 and 2 to check for understanding.

VI. CULMINATING ACTIVITY

A. The Culminating Activity will be a Unit Test (Appendix M, pages 1-4). The unit test will cover everything from the first unit to the last. Before passing out the Appendices, the teacher should play Hollywood Squares with the class. The rules for playing this game are found in Lesson Four, Place Value Quiz. Play the game for about 15 minutes. After that, have them return to their desks and ask if there are any final questions about anything they have gone over. Reiterate that you can help them before the test, but you can’t help them during the test. Once they are ready, pass out the appendices and allow the students to continually work on this for the remainder of the period. Circulate around the room to help maintain security and to keep students on task.

VII. HANDOUTS/WORKSHEETS

A. Appendix A: Identifying Place Value from 1 to 100 million
B. Appendix B: Reading and Writing Numbers
C. Appendix C: Expanded Form
D. Appendix D: Place Value Quiz
E. Appendix E: Rounding Numbers to the Nearest 10, 100, 1,000
F. Appendix F: Comparing Numbers Using <, >, and =
G. Appendix G: Ordering from Least to Greatest and Greatest to Least
H. Appendix H: Number Lines: Positive and Negative Numbers
I. Appendix I: Coordinate Grids and Ordered Pairs
J. Appendix J: Roman Numerals
K. Appendix K: Square Roots and Perfect Squares
L. Appendix L: Interpreting Bar and Line Graphs; Creating Bar and Line Graphs
M. Appendix M: Number Sense Unit Test: Culminating Activity

VIII. BIBLIOGRAPHY

No resource materials used in this unit
Appendix A, page 1
Identifying Place Value from 1 to 100 million

Name: ____________________
Date _____/_____/_____
Score _____ out of 39 = _____%

Part 1- Exploring Place Value with a Friend (0 points)
Directions:
Create number cards 1-9 (nine cards all together). Put them in a container that you can’t see through. You and your partner will take turns pulling the number cards out of the container. Your job is to predict where to place the numbers in the spaces below to make the biggest number possible. The player that has created the largest number wins that round.

{You can substitute the cards with a spinner or 10 sided dice if you have these materials}

Part 2- The Secret Code (10 points)
Clue:
When you start on the right side of a number and go to the left, count three numbers and stop. This is where you put a comma. A comma tells you are in a new period. The periods we have learned so far are the ones’ period, the thousands’ period, and the millions’ period. When there is one comma, we know we start off in the thousands’ period. When there are two commas, we know we start off in the millions’ period. If there is one comma, it means, “thousand.” If there are two commas, the one farthest to the left means, “million” and the one farthest to the right still means, “thousand.” Commas help out a lot when we try to say the numbers.

Now it’s your turn! Look very carefully at the following numbers. Place the commas where they belong. Remember, start from the right, count three numbers to the left, and put a comma there.

#1. 3 6 5 4 1 #2. 9 8 4 3 8 5 #3. 3 6 5 1 6 8 7 9

#4. 2 7 8 4 6 3 5 7 1 #5. 6 7 5 3 1 8 3 4 5

How many commas do you need in the first number? _____
How many commas do you need in the third number? _____
How many commas do you need in the fifth number? _____
What period does the second number start in? ____________________
What period does the fourth number start in? ____________________
Appendix A, page 2
Identifying Place Value from 1 to 100 Million continued

**Part 3- Where are you? (9 points)**
Directions: Use the number below to answer the questions. Write the letter in the space.

```
5  2  9  ,  4  7  1  ,  3  6  8
```

What place is the 1 in? _____ A. Tens
What place is the 2 in? _____ B. Millions
What place is the 3 in? _____ C. Hundred Thousands
What place is the 4 in? _____ D. Ten Millions
What place is the 5 in? _____ E. Hundreds
What place is the 6 in? _____ F. Ones
What place is the 7 in? _____ G. Thousands
What place is the 8 in? _____ H. Hundred Millions
What place is the 9 in? _____ I. Ten Thousands

**Part 4- Where do you belong? (11 points)**
Directions: Using the instructions below, create a new number. Don’t forget to put to the commas in the right place.

```

```

Put a 5 in the hundred thousand’s place.        How much is it worth?____________________
Put a 9 in the ten’s place.                    How much is it worth?____________________
Put a 0 in the million’s place.                How much is it worth?____________________
Put a 1 in the hundred’s place.                How much is it worth?____________________
Put a 6 in the hundred million’s place.        How much is it worth?____________________
Put a 7 in the ten thousand’s place.           How much is it worth?____________________
Put a 4 in the one’s place.                    How much is it worth?____________________
Put a 2 in the thousand’s place.               How much is it worth?____________________
Put a 3 hundred million’s place.              How much is it worth?____________________
Appendix A, page 3
Answer Key for Appendix A, page 1 and page 2

Part 2- The Secret Code (10 points)

#1. 3 6 5 4 1  #2. 9 8 4 3 8 5  #3. 3 6 5 1 6 8 7 9

#4. 2 7 8 4 6 3 5 7 1  #5. 6 7 5 3 1 8 3 4 5

How many commas do you need in the first number? One
How many commas do you need in the third number? Two
How many commas do you need in the fifth number? Two
What period does the second number start in? Thousands
What period does the fourth number start in? Millions

Part 3- Where are you? (9 points)

<table>
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<tr>
<th>5</th>
<th>2</th>
<th>9 ,</th>
<th>4</th>
<th>7</th>
<th>1 ,</th>
<th>3</th>
<th>6</th>
<th>8</th>
</tr>
</thead>
</table>

What place is the 1 in? G
      A. Tens
What place is the 2 in? D
      B. Millions
What place is the 3 in? E
      C. Hundred Thousands
What place is the 4 in? C
      D. Ten Millions
What place is the 5 in? H
      E. Hundreds
What place is the 6 in? A
      F. Ones
What place is the 7 in? I
      G. Thousands
What place is the 8 in? F
      H. Hundred Millions
What place is the 9 in? B
      I. Ten Thousands

Part 4- Where do you belong? (11 points)

<table>
<thead>
<tr>
<th>3</th>
<th>6</th>
<th>0 ,</th>
<th>5</th>
<th>7</th>
<th>2 ,</th>
<th>1</th>
<th>9</th>
<th>4</th>
</tr>
</thead>
</table>

Put a 5 in the hundred thousand’s place. How much is it worth? 500,000
Put a 9 in the ten’s place. How much is it worth? 90
Put a 0 in the million’s place. How much is it worth? 0 (It just keeps a place.)
Put a 1 in the hundred’s place. How much is it worth? 100
Put a 6 in the ten million’s place. How much is it worth? 60,000,000
Put a 7 in the ten thousand’s place. How much is it worth? 70,000
Put a 4 in the one’s place. How much is it worth? 4
Put a 2 the thousand’s place. How much is it worth? 2,000
Put a 3 hundred million’s place. How much is it worth? 300,000,000
This is where the “Secret Code” really comes in handy. Here’s a good trick to help you learn how to read and write big numbers.

Here is your number: 123,456,789

First, look only at the millions’ period (123). How do you say this number? **One hundred twenty-three**. The first comma means, “million.” So the first period is, “One hundred, twenty-three million.”

Now, look at the thousands’ period (456). How do you say this number? **Four hundred fifty-six**. The second comma means, “Thousand.” So the middle period is, “Four hundred, fifty-six thousand.”

Finally, look at the ones’ period (789). How do you say this number? **Seven hundred eighty-nine**.

Put it all together and you have, “**One hundred twenty-three million, Four hundred fifty-six thousand, seven hundred eighty-nine.**”

Here is another example to follow:

635,491,784 - Six hundred thirty-five **million**, four hundred ninety-one **thousand**, seven **hundred eighty-four**.

**Now it’s your turn! Write each of these numbers in word form. (Zero points for no understanding, one point for partial understanding, two points for complete understanding.)**

1. 32,654

2. 786,315

3. 123,846,123

**Write each of these numbers in Standard Form. (Zero points for no understanding, one point for partial understanding, two points for complete understanding.)**

4. Sixty-four thousand, nine hundred forty-eight.

5. Seven hundred thirty-one thousand, two hundred one.

6. Thirty-three million, twenty-nine thousand, eight hundred seventy-four.

7. Nine hundred eighteen million, three hundred seven thousand, fifty-six.
Congratulations! Your favorite grandfather, who happens to be the richest person in the history of the world, just died and gave you five blank checks. He was very clear in his will, “Money is not an object.” The only rule, you must write all five checks correctly. Be sure that the standard form and the written form, match. An example has been done for you. (Zero points for no understanding, one point for partial understanding, two points for complete understanding.)

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<tr>
<td></td>
<td>Nine thousand, eight hundred fifty-four Dollars</td>
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<tr>
<td>A new computer</td>
<td>Rich Grandpa (Memo) (Signature)</td>
</tr>
</tbody>
</table>

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<td></td>
</tr>
<tr>
<td></td>
<td>A brand new sports car Dollars</td>
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<td>(Memo)</td>
<td>Rich Grandpa (Signature)</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>My own fighter jet Dollars</td>
</tr>
<tr>
<td>(Memo)</td>
<td>Rich Grandpa (Signature)</td>
</tr>
<tr>
<td>Your name</td>
<td>0003</td>
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<td>$</td>
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<tr>
<td></td>
<td>Dollars</td>
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<td>A sailboat</td>
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<td>(Signature)</td>
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<tr>
<td></td>
<td>$</td>
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<tr>
<td></td>
<td>Dollars</td>
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<td>An oil field</td>
<td>Rich Grandpa</td>
</tr>
<tr>
<td>(Memo)</td>
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<table>
<thead>
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<tbody>
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<td>Your Address</td>
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<td>$</td>
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<tr>
<td>(Memo)</td>
<td>(Signature)</td>
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</table>
Appendix B, page 4  
Answer Key for Appendix B, page 1

1. 32,654  Thirty-two thousand, six hundred fifty-four
2. 786,315 Seven hundred eighty-six thousand, three hundred fifteen
3. 123,846,123 One hundred twenty-three million, eight hundred forty-six thousand, one hundred twenty-three

4. Sixty-four thousand, nine hundred forty-eight.  64,948
5. Seven hundred thirty-one thousand, two hundred one.  731,201
6. Thirty-three million, twenty-nine thousand, eight hundred seventy-four.  33,029,874
7. Nine hundred eighteen million, three hundred seven thousand, fifty-six.  918,307,006

Answer Key for Appendix B, page 2 and 3
Answers will vary. Students will write the checks for any amount they want. Check to make sure that:

- The word form matches the standard form.
- The standard form is written correctly.
- The word form is written correctly.
Expanded Form

Name: ____________________
Date _____/_____/_____
Score _____ out of 44 =_____%

You might be thinking, “Why do we need to learn Expanded Form?” Or, “What’s up with all those zeros?” The answer is, this helps us know the value of each digit in a number. There are only two important parts when you’re working with Expanded Form. First, make sure that when you write down the first digit, you follow it up with the right number of zeros. For example: 25,396. When you write down the 2, follow it up with exactly four zeros (That’s how many spaces there are after the two). Second, line your columns up perfectly.

For example: 25,396.

20,000
5,000
300
90
+ 6
25,396

(Note: You can write in Expanded Form linearly side by side, but this way is usually easier.)

Now it’s your turn! Write each of these numbers in Expanded Form. (One point for each line.)

1. 64,387
   +
   2. 193,527

3. 5,431,182
   +
4. 39,865,138

5. 513,278,765
   +
6. 391,588,147

For example: 25,396.
Appendix C, page 2
Answer Key for Appendix C, page 1

1. 64,387  
   60,000  
   4,000  
   300  
   80  
   + 7
2. 193,527  
   100,000  
   90,000  
   3,000  
   500  
   + 20
   + 7

3. 5,431,182  
   5,000,000  
   400,000  
   30,000  
   1,000  
   100  
   80  
   + 2
4. 39,865,138  
   30,000,000  
   9,000,000  
   800,000  
   60,000  
   5,000  
   100  
   + 30
   + 8

5. 513,278,765  
   500,000,000  
   10,000,000  
   3,000,000  
   200,000  
   70,000  
   8,000  
   700  
   60  
   + 5
6. 391,588,147  
   300,000,000  
   90,000,000  
   1,000,000  
   500,000  
   80,000  
   8,000  
   100  
   + 40
   + 7
**Appendix D, page 1**

**Place Value Quiz**

Name: ____________________
Date: _____/_____/_____
Score: _____ out of 25 = _____%

**Part 1- Identifying Place Value (12 points)**

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>4</td>
<td>8</td>
<td>1</td>
</tr>
</tbody>
</table>

Put a 0 in the tens place.   What is the value of the 7?_______________
Put a 6 in the millions place.   What is the value of the 4?_______________
Put a 5 in the hundreds place.   What is the value of the 8?_______________
Put a 9 in the ten millions place.  What is the value of the 1?_______________
Put a 3 in the ten thousands place.

What 3 numbers are in the millions’ period?   ___,___,___
What 3 numbers are in the thousands’ period?  ___,___,___
What 3 numbers are in the ones’ period?  ___,___,___

**Part 2- Expanded Form (9 points)**

Write the number you created above in Expanded Form.

_______________
_______________
_______________
_______________
_______________
_______________
_______________
_______________
+_______________

**Part 3- Word Form (Zero points for no understanding, one point for partial understanding, two points for complete understanding.)**

Write the number you created above in Word Form.

______________________________________________________________________________
______________________________________________________________________________
Part 1 - Identifying Place Value (12 points)

|   |   |   |   |   |   |   | 7 | 9 | 6 | 4 | 3 | 8 | 5 | 0 | 1 |

Put a 0 in the tens place.   What is the value of the 7?  700,000,000
Put a 6 in the millions place.   What is the value of the 4?  400,000
Put a 5 in the hundreds place.   What is the value of the 8?  8,000
Put a 9 in the ten millions place.   What is the value of the 1?  1
Put a 3 in the ten thousands place.

What 3 numbers are in the millions’ period?  7, 9, 6
What 3 numbers are in the thousands’ period?  4, 3, 8
What 3 numbers are in the ones’ period?  5, 0, 1

Part 2 - Expanded Form (9 points)
Write the number you created above in Expanded Form.

\[
\begin{align*}
&700,000,000 \\
&90,000,000 \\
&6,000,000 \\
&400,000 \\
&30,000 \\
&8,000 \\
&500 \\
&+ 1
\end{align*}
\]

Part 3 - Word Form (Zero points for no understanding, one point for partial understanding, two points for complete understanding.)
Write the number you created above in Word Form.

Seven hundred ninety-six million, four hundred thirty-eight thousand, five hundred one
Appendix E, page 1
Rounding Numbers to the Nearest 10
Name: ____________________
Date: _____/_____/_____
Score: _____ out of 42 = _____%

Part 1- Rounding to the Nearest 10. (14 points)

* First step: Look at the number and decide which two choices you have. If your number is 53, you could go down to 50 (which is the next lowest ten) or you could go up to 60 (which is the next highest ten).

* Second step: If the number ends in a 0, 1, 2, 3, or 4 you round down. If the number ends in a 5, 6, 7, 8, or 9 you round up.

Example : 1. Your number is 47.
Your choices are 40 or 50.
The number ends in a 7 and that tells you to round up to 50.
47 rounds to 50!

2. Your number is 73.
Your choices are 70 and 80.
The number ends in a 3 and that tells you to round down to 70.
73 rounds to 70.

Now it’s your turn. Decide what the nearest 10 is for each of these numbers.

1. 21 Your two choices are _____ and ____. The _____ tells you to round ______. 21 rounds to _____.

2. 39 Your two choices are _____ and ____. You round ______. 39 rounds to _____

3. 75 Your two choices are _____ and ____. 75 rounds to _____

4. 64 rounds to _____

5. 12 rounds to _____
Appendix E, page 2
Rounding Numbers to the Nearest 100

Part 2- Rounding to the Nearest 100 (14 points)

Here's how to do it!

* First step: Look at the number and decide which two choices you have. If your number is 375, you could go **down** to 300 (which is the next lowest hundred) or you could go **up** to 400 (which is the next highest hundred).

* Second step: If the ten’s digit is a 0, 1, 2, 3, or 4 you round **down**. If the ten’s digit is a 5, 6, 7, 8, or 9 you round **up**.

**Example:**
1. Your number is 261.
   - Your choices are 200 or 300.
   - The number ends in a 61 and that tells you to round **up** to 300.
   - 261 rounds to 300!
2. Your number is 411.
   - Your choices are 400 and 500.
   - The number ends in an 11 and that tells you to round **down** to 400.
   - 411 rounds to 400.

Now it’s your turn. Decide what the nearest 100 is for each of these numbers.

1. 374 Your two choices are _____ and _____.
   - The _____ tells you to round ______
   - 374 rounds to _____.

2. 718 Your two choices are _____ and _____.
   - You round ______
   - 718 rounds to _____

3. 496 Your two choices are _____ and _____.
   - 496 rounds to _____

4. 649 rounds to _____

5. 32 rounds to _____
Appendix E, page 3
Rounding Numbers to the Nearest 1,000

Part 3- Rounding to the Nearest 1,000 (14 points)

Here’s how to do it!

* First step: Look at the number and decide which two choices you have. If your number is 7,491, you could go down to 7,000 (which is the next lowest thousand) or you could go up to 8,000 (which is the next highest thousand).

* Second step: If the hundred’s digits is a 0, 1, 2, 3, or 4 you round down. If the hundred’s digits is a 5, 6, 7, 8, or 9 you round up.

Example: 1. Your number is 3,541.
   Your choices are 3,000 or 4,000.
   The hundred’s digit is a 5 and that tells you to round up to 4,000.
   3,541 rounds to 4,000!

   2. Your number is 8,165.
   Your choices are 8,000 and 9,000.
   The hundred’s digit is a 1 and that tells you to round down to 8,000.
   8,165 rounds to 8,000.

Now it’s your turn. Decide what the nearest 100 is for each of these numbers.

1. 3,657 Your two choices are _______ and _______.
   The _____ tells you to round _______.
   3,657 rounds to _______.

2. 9,384 Your two choices are _______ and _______.
   You round _______
   9,384 rounds to _______

3. 2,763 Your two choices are _______ and _______.
   2,763 rounds to _______

4. 9,954 rounds to _______

5. 1,499 rounds to _______
Appendix E, page 4
Answer Key for Appendices E, pages 1, 2, and 3

Part 1- Rounding to the Nearest 10. (14 points)

1. 21 Your two choices are 20 and 30
   The 1 tells you to round down
   21 rounds to 20

2. 39 Your two choices are 30 and 40
   You round up
   39 rounds to 40

3. 75 Your two choices are 70 and 80
   75 rounds to 80

4. 64 rounds to 60

5. 12 rounds to 10

Part 2- Rounding to the Nearest 100 (14 points)

1. 374 Your two choices are 300 and 400
   The 7 tells you to round up
   374 rounds to 400

2. 718 Your two choices are 700 and 800
   You round down
   718 rounds to 700

3. 496 Your two choices are 400 and 500
   496 rounds to 500

4. 649 rounds to 600

5. 32 rounds to 0

Part 3- Rounding to the Nearest 1,000 (14 points)

1. 3,657 Your two choices are 3,000 and 4,000
   The 6 tells you to round up
   3,657 rounds to 4,000

2. 9,384 Your two choices are 9,000 and 10,000
   You round down
   9,384 rounds to 9,000

3. 2,763 Your two choices are 2,000 and 3,000
   2,763 rounds to 3,000

4. 9,954 rounds to 10,000

5. 1,499 rounds to 1,000
Appendix F, page 1
Comparing Numbers Using <, >, and =

When we decide which of two numbers is bigger we use the signs > (greater than), < (less than), or = (equal to). The = sign is easy to remember because that means that both numbers are the same value. A good way to remember the other two signs is by imagining that they are alligator teeth. The open side is the alligator’s mouth is going towards the bigger number (or more fish).

Example:

\[ 27 \quad O \quad 31 \]

31 is a bigger number (more fish) so the alligator teeth will go towards that direction.

\[ 27 < 31 \]

**Part 1- Explore with a Friend**

Directions:
You and your partner will each need a pair of dice. Both of you will roll the dice. Each of you will adjust your dice to try and get the biggest number. Write your number down in your column and when you see your partner’s number, write it down in his/her column. See how many times, out of 15, you can make a bigger number! (Remember no cheating!)

<table>
<thead>
<tr>
<th>Your name:_______________</th>
<th>Your partner's name:_______________</th>
</tr>
</thead>
<tbody>
<tr>
<td>You</td>
<td>Them</td>
</tr>
<tr>
<td>___ O ___</td>
<td></td>
</tr>
<tr>
<td>You</td>
<td>Them</td>
</tr>
<tr>
<td>___ O ___</td>
<td></td>
</tr>
<tr>
<td>You</td>
<td>Them</td>
</tr>
<tr>
<td>___ O ___</td>
<td></td>
</tr>
<tr>
<td>You</td>
<td>Them</td>
</tr>
<tr>
<td>___ O ___</td>
<td></td>
</tr>
<tr>
<td>You</td>
<td>Them</td>
</tr>
<tr>
<td>___ O ___</td>
<td></td>
</tr>
<tr>
<td>You</td>
<td>Them</td>
</tr>
<tr>
<td>___ O ___</td>
<td></td>
</tr>
<tr>
<td>You</td>
<td>Them</td>
</tr>
<tr>
<td>___ O ___</td>
<td></td>
</tr>
</tbody>
</table>
Appendix F, page 2
Comparing Numbers Using <, >, and = continued

Name: ____________________
Date: _____/_____/_____  
Score: _____ out of 15 =_____%

Directions:
Use the signs <, >, or = to compare each set of numbers.

1.  56  O  65  
2.  51  O  48  

3.  67  O  67  
4.  354  O  453  

5.  958  O  985  
6.  721  O  712  

7.  6,548  O  5,965  
8.  8,441  O  8,414  

9.  3,586  O  3,586  
10. 65,419  O  56,419  

11. 96,514  O  95,614  
12. 651,328  O  700,000  

13. 987,413,565  O  987,413,566  

14. 11,222,333  O  100,000,000  

15. 516,848,978  O  516,848,978
Appendix F, page 3
Answer Key for Appendix F, page 2

1. 56 < 65  2. 51 > 48

3. 67 = 67  4. 354 < 453

5. 958 < 985  6. 721 > 712

7. 6,548 > 5,965  8. 8,441 > 8,414

9. 3,586 = 3,586  10. 65,419 > 56,419

11. 96,514 > 95,614  12. 651,328 < 700,000

16. 987,413,565 < 987,413,566

17. 11,222,333 < 100,000,000

18. 516,848,978 = 516,848,978
Appendix G, page 1
Ordering from Least to Greatest and Greatest to Least

Name: ____________________
Date: _____/_____/_____
Score: _____ out of 10 =_____%

One of the most important things to remember when you are trying to order numbers from least to greatest (smallest to biggest) or greatest to least (biggest to smallest) is to know which one you are doing. You may assume that you are going from least to greatest and order the numbers that way but, you were supposed to do it the other way and you would get that problem wrong. Also, please use a ; (semi-colon) to separate each number. Don’t use a comma because if you are working with numbers that have commas already in them, you could get very confused!

Order these numbers from greatest to least.

2,968; 2,531; 3,021
Answer is: 3,021; 2,968; 2,531

{Hint: Sometimes it helps if you cross off each number when you use it. Also, you can put a tiny 1, 2, and 3 above each number before you write your final answer. That way you know which number comes first, second, and third.}

Now it’s your turn! Order these numbers from least to greatest.

1. 654; 831; 355
2. 985; 895; 589
3. 7,342; 7,423; 4,732
4. 8,264; 8,642; 8,462
5. 63,454; 36,544; 63,544

Order these numbers from greatest to least.

6. 651,981; 615,981; 651,891

7. 8,936,513; 8,963,513; 8,369,513

8. 321,165,132; 321,156,132; 321,651,132

9. 654,879,453; 654,879,345; 654,879,543

10. 76,921,835; 9,476,387; 120,468,385
Order these numbers from least to greatest.

1. 355; 654; 831
2. 589; 895; 985
3. 4,732; 7,342; 7,423
4. 8,264; 8,462; 8,642
5. 36,544; 63,454; 63,544

Order these numbers from greatest to least.

6. 651,981; 651,891; 615,981
7. 8,963,513; 8,936,513; 8,369,513
8. 321,651,132; 321,165,132; 321,156,132
9. 654,879,543; 654,879,453; 654,879,345
10. 120,468,385; 76,921,835; 9,476,387
Number Lines
Positive and Negative Numbers

Name: ____________________
Date: _____/_____/_____
Score: _____ out of 32 =_____%

Shown above is a number line. We all know about numbers that are bigger than zero. Those numbers are to the right of the zero on the number line and they are called positive numbers. However, there are numbers that are smaller than zero. Those numbers are to the left of the zero and they are called negative numbers. When you add positive numbers, you move to the right. When you use negative numbers, you go to the left.

For Example:

You start off at 2.
Then, you add 3. (Moving to the right.)
You end up at 5.

You start off at 4.
Then, you subtract 7 (Moving to the left)
You end up at –3.

In this lesson, you will learn how to plot numbers on a number line as well as create your own number line. A couple of things to remember! First, when you create your own number line, make sure that the numbers are spaced out evenly. Second, if you put negative numbers on your number line, put a negative sign (-) in front of the number. Otherwise, it would just be a regular number. {You do not need to put a positive sign (+) in front of positive numbers.}

Now it’s your turn! Start off by creating your own number line below starting with -5 and going to 5. (10 points)
Appendix H, page 2
Number Lines
Positive and Negative Numbers continued

Now create your own number line below starting with -7 and going to 2. (You’ll have more negative numbers than positive numbers.) Don’t forget the zero! (10 points)

Good job! Now, using the number line at the very top of Appendix H, answer the following questions. (10 points)

1. If you start on the number 4 and add 3, where do you end up? _____
2. If you start on the number 7 and subtract 5, where do you end up? _____
3. If you start on the number 6 and subtract 9, where do you end up? _____
4. If you start on the number -1 and add 2, where do you end up? _____
5. If you start on the number -2 and subtract 3, where do you end up? _____
6. If you start on the number -5 and add 8, where do you end up? _____
7. If you start on the number -9 and add 9, where do you end up? _____
8. How many spaces would you have to move to the right to go from -2 to 4? _____
9. How many spaces would you have to move to the left to go from 7 to -5? _____
10. Which direction would you have to go to get from 7 to -8? ___________

Great job! Last challenge. Create your own number line. Begin and end wherever you want. Come up with your own question (like the ones above), and answer it. (Zero points for no understanding, one point for partial understanding, two points for complete understanding.)

_____________________________________________________? _____
Appendix H, page 3
Answer Key for Appendices H, page 1 and 2

Now it's your turn! Start off by creating your own number line below starting with -5 and going to 5. (10 points)

-5 -4 -3 -2 -1 0 1 2 3 4 5

Now create your own number line below starting with -7 and going to 2. (You'll have more negative numbers than positive numbers.) Don't forget the zero! (10 points)

-7 -6 -5 -4 -3 -2 -1 0 1 2

Good job! Now, using the number line at the very top of Appendix H, answer the following questions. (10 points)

1. If you start on the number 4 and add 3, where do you end up? 7
2. If you start on the number 7 and subtract 5, where do you end up? 2
3. If you start on the number 6 and subtract 9, where do you end up? -3
4. If you start on the number -1 and add 2, where do you end up? 1
5. If you start on the number -2 and subtract 3, where do you end up? -1
6. If you start on the number -5 and add 8, where do you end up? 3
7. If you start on the number -9 and add 9, where do you end up? 0
8. How many spaces would you have to move to the right to go from -2 to 4? 6
9. How many spaces would you have to move to the left to go from 7 to -5? 12
10. Which direction would you have to go to get from 7 to -8? Left

Great job! Last challenge. Create your own number line. Begin and end wherever you want. Come up with your own question (like the ones above), and answer it. (Zero points for no understanding, one point for partial understanding, two points for complete understanding.) Answers will vary.
Using a coordinate grid is very simple. It’s kind of like using a map and finding certain objects. In order to find the objects, you have to use something called an “Ordered Pair.” An ordered pair consists of two numbers in parenthesis separated by a comma; like this: (2,4).

There’s one main thing that people make mistakes about when locating and plotting objects on a coordinate grid. A lot of people tend to go up and then over. That’s not right! GO OVER, THEN UP! The first number tells you to go over and the second number tells you to go up. Let’s practice on the coordinate grid below:

What is the ordered pair for the moon? (___,___)
What is the ordered pair for the happy face? (___,___)
What is the ordered pair for the heart? (___,___)
What is the ordered pair for the sun? (___,___)
What is the ordered pair for the box? (___,___)
What is the ordered pair for the arrow? (___,___)
What is the ordered pair for the cloud? (___,___)
What is the ordered pair for the diamond? (___,___)
What is the ordered pair for the cylinder? (___,___)
Appendix I, page 2
Coordinate Grids and Ordered Pairs continued

Find the Mystery Creature

Place a point ( . ) at each of these locations. Label them with the letter indicated. When you are finished plotting these ordered pairs, draw a straight line connecting each letter alphabetically. The first two have been done for you.

<table>
<thead>
<tr>
<th>Over</th>
<th>Up</th>
<th>Write</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>4</td>
<td>A</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>B</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>C</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>D</td>
</tr>
<tr>
<td>5</td>
<td>8</td>
<td>E</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
<td>F</td>
</tr>
<tr>
<td>5</td>
<td>12</td>
<td>G</td>
</tr>
<tr>
<td>4</td>
<td>15</td>
<td>H</td>
</tr>
<tr>
<td>6</td>
<td>13</td>
<td>I</td>
</tr>
<tr>
<td>5</td>
<td>18</td>
<td>J</td>
</tr>
<tr>
<td>7</td>
<td>14</td>
<td>K</td>
</tr>
<tr>
<td>9</td>
<td>17</td>
<td>L</td>
</tr>
<tr>
<td>8</td>
<td>14</td>
<td>M</td>
</tr>
<tr>
<td>12</td>
<td>16</td>
<td>N</td>
</tr>
<tr>
<td>10</td>
<td>13</td>
<td>O</td>
</tr>
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<td>14</td>
<td>14</td>
<td>P</td>
</tr>
<tr>
<td>12</td>
<td>12</td>
<td>Q</td>
</tr>
<tr>
<td>15</td>
<td>9</td>
<td>R</td>
</tr>
<tr>
<td>17</td>
<td>14</td>
<td>S</td>
</tr>
<tr>
<td>17</td>
<td>8</td>
<td>T</td>
</tr>
<tr>
<td>16</td>
<td>6</td>
<td>U</td>
</tr>
<tr>
<td>14</td>
<td>5</td>
<td>V</td>
</tr>
<tr>
<td>12</td>
<td>5</td>
<td>W</td>
</tr>
<tr>
<td>10</td>
<td>6</td>
<td>X</td>
</tr>
</tbody>
</table>
Appendix I, page 3
Answer Key for Appendix I, pages 1 and 2

What is the ordered pair for the moon?   ( 3 , 3 )
What is the ordered pair for the happy face? ( 2 , 2 )
What is the ordered pair for the heart?   ( 4 , 1 )
What is the ordered pair for the sun?    ( 5 , 0 )
What is the ordered pair for the box?    ( 1 , 2 )
What is the ordered pair for the arrow?  ( 3 , 5 )
What is the ordered pair for the cloud?  ( 4 , 4 )
What is the ordered pair for the diamond? ( 1 , 0 )
What is the ordered pair for the cylinder? ( 5 , 3 )
Appendix J, page 1
Roman Numerals

The numerals that we see most often in our country are the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, 9. They are called Arabic Numerals. However, there are other numerals that you might see on clocks, books, outlines, and other places. Roman numerals are not numbers; they are letters that means different numbers.

Here are the symbols for 1-10:

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>II</td>
<td>III</td>
<td>IV</td>
<td>V</td>
<td>VI</td>
<td>VII</td>
<td>VIII</td>
<td>IX</td>
<td>X</td>
</tr>
</tbody>
</table>

Here are the symbols for 10 to 100 counting by tens:

<table>
<thead>
<tr>
<th>10</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
<th>90</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>XX</td>
<td>XXX</td>
<td>XL</td>
<td>L</td>
<td>LX</td>
<td>LXX</td>
<td>LXXX</td>
<td>XC</td>
<td>C</td>
</tr>
</tbody>
</table>

If you learn the following Roman Numerals, you will be able to write numbers up to 1,000!

<table>
<thead>
<tr>
<th>1</th>
<th>5</th>
<th>10</th>
<th>50</th>
<th>100</th>
<th>500</th>
<th>1,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>V</td>
<td>X</td>
<td>L</td>
<td>C</td>
<td>D</td>
<td>M</td>
</tr>
</tbody>
</table>

There are two rules when you write in Roman Numerals.

First: If the letter after another letter is the same size or bigger, you add it to the first letter.

For Example: XV = 15. The X (10) comes first. After that, the V (5 {which is smaller}).
Therefore, 10 + 5 = 15.
X + V = 15.

Second: If the letter before another letter is smaller, you subtract it from the second letter.

For Example: IX = 9. The I (1 {which is smaller}) comes first. After that the X (10).
Therefore, 1 – 10 = 9.
I – X = 9.

Sometimes it helps to put the Roman Numerals in parenthesis. That way, you are able to break it down into sections that are easier to see. Every time you see a smaller letter in front of a bigger letter, put that group in parenthesis.

For Example: CDXLVIII = 448. The way to break it down so it’s easier to see is:

CD       XL     VIII
(100 - 500)    +    (10 – 50)    +    8
{400}    +    {40}    +    8 = 448
Appendix J, page 2
Roman Numerals continued

Part 1- Rewriting Roman Numerals into Arabic Numerals. Don't forget to break them into separate parts with parenthesis.

1. VI __________   2. XII __________
3. LI __________   4. CVI __________
5. XXVII__________ 6 IX __________
7. XL __________    8. IC __________
9. CM __________    10. MCD _________

Part 2- Rewriting Arabic Numerals into Roman Numerals.

1. 13 __________    2. 28 __________
3. 61 __________    4. 501 __________
5. 2,000 __________ 6. 29 __________
7. 54 __________    8. 109 __________
9. 496 __________   10. 1974 __________

Part 3- Writing birthdays in Roman Numerals. For example: If you were born on November 6, 1995 (11-6-1995) you would write it like this:

Write your birthday: XI-VI-MCMVC

Write your friend’s birthday: ____________________________

Write another friend’s birthday: ____________________________

Write your teacher’s birthday: ____________________________

Write your mom or dad’s birthday: ____________________________
Appendix J, page 3
Answer Key for Appendix J, page 2

Part 1- Rewriting Roman Numerals into Arabic Numerals.

1. VI  6  
2. XII  12  
3. LI  51  
4. CVI  106  
5. XXVII  27  
6. IX  9  
7. XL  40  
8. IC  99  
9. CM  900  
10. MCD  1,400

Part 2- Rewriting Arabic Numerals into Roman Numerals.

1. 13 XIII  
2. 28 XVIII  
3. 61 LXI  
4. 501 DI  
5. 2,000 MM  
6. 29 XXIX  
7. 54 LIV  
8. 109 CIX  
9. 496 IVD  
10. 1974 MCMLXXIV

Part 3- Writing birthdays in Roman Numerals. For example: If you were born on November 6, 1995 (11-6-1995) you would write it like this:

XI-VI-MCMVC

Write your birthday:  
Write your friend’s birthday:  
Write another friend’s birthday:  
Write your teacher’s birthday:  
Write your mom’s or dad’s birthday:  
Answers will vary.
Appendix K, page 1
Square Roots and Perfect Squares

Name: _____________________
Date: _____/_____/_____
Score: _____ out of 30 =_____%

A perfect square number is when you can divide a number (dividend) by another number (divisor) and get the same number as the answer (quotient).

For Example:

25 is a perfect square number because you can divide it by 5 and get 5.
\[ 25 ÷ 5 = 5 \]

49 is a perfect square number because you can divide it by 7 and get 7.
\[ 49 ÷ 7 = 7 \]

When you see the symbol \( \sqrt{\text{___}} \) that means that you need to find the divisor that is the same number as the quotient. The symbol is asking you to “find the square root.” The square root is the number that, multiplied by itself, will give you the perfect square number.

Now it’s YOUR turn!

Part 1- Identify if each of these numbers is a perfect square or not. Write yes or no. If the number is a perfect square, write down what the square root is.

1. 4 __________ 2. 11 __________
3. 15 __________ 4. 9 __________
5. 36 __________ 6. 30 __________
7. 16 __________ 8. 24 __________
9. 64 __________ 10. 81 __________
11. 72 __________ 12. 99 __________
13. 100 __________ 14. 25 __________
15. 121 __________ 16. 144 __________
17. 109 __________ 18. 116 __________
19  49 __________ 20. 50 __________
Part 2- Match each square root with its perfect square. The first one is done for you.

<table>
<thead>
<tr>
<th>Square Root</th>
<th>Perfect Square</th>
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<tbody>
<tr>
<td>2</td>
<td>* 25</td>
</tr>
<tr>
<td>3</td>
<td>* 49</td>
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<tr>
<td>4</td>
<td>* 9</td>
</tr>
<tr>
<td>5</td>
<td>* 121</td>
</tr>
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<td>6</td>
<td>* 81</td>
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<td>7</td>
<td>* 144</td>
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<td>* 100</td>
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<td>* 64</td>
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<td>10</td>
<td>* 4</td>
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<tr>
<td>11</td>
<td>* 36</td>
</tr>
<tr>
<td>12</td>
<td>* 16</td>
</tr>
</tbody>
</table>

I'm a perfect square!

49

So am I!
Square Roots and Perfect Squares continued
Square Numbers Bingo

Directions: Put all of the perfect square numbers in the blanks below in any order that you want. Perfect square numbers are: 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, and 144. The teacher will call out the square root. Draw a star ⭐ in the box that has the perfect square that goes with the square root that was called. For example: if one of your squares is a 16 and the teacher calls out 4, you put a star in that box. The first person to fill up all nine boxes wins. There are two boards so you can play another game when the first one is finished. No free spaces!

Game #1

<p>| | | |</p>
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</table>

Game #2

<p>| | | |</p>
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</tbody>
</table>
Part 1 - Identify if each of these numbers is a perfect square or not. Write yes or no. If the number is a perfect square, write down what the square root is.

1. 4    yes/ 2  2. 11    no
3. 15    no  4. 9    yes/ 3
5. 36    yes/ 6  6. 30    no
7. 16    yes/ 4  8. 24    no
9. 64    yes/ 8 10. 81    yes/ 9
11. 72    no 12. 99    no
13. 100    yes/ 10 14. 25    yes/ 5
15. 121    yes/ 11 16. 144    yes/ 12
17. 109    no 18. 116    no
19 49    yes/ 7 20. 50    no

Part 2 - Match each square root with its perfect square. The first one is done for you.

2 *    * 25
3 *    * 49
4 *    * 9
5 *    * 121
6 *    * 81
7 *    * 144
8 *    * 100
9 *    * 64
10 *    * 4
11 *    * 36
12 *    * 16
Interpreting Bar and Line Graphs

Graphs are a great way to learn information. One type of graph is called a “Bar Graph.” A bar graph tells us about a particular group such as red, blue, green, and yellow. These groups would go on the bottom of the graph. Usually numbers would go on the left side of a bar graph. Sometimes they count by ones or they may skip count (by 2’s, 5’s, 100’s etc.). When you’re dealing with large numbers, it helps to skip count. The bar goes up to the number that tells us how many fits in that group. The last important part about ANY type of graph is a title. A title helps us understand what the graph is supposed to tell us. Here is an example of a bar graph:

What Are the Favorite Colors in Ms. Smith’s Class?

Here is how to interpret/read a bar graph. First of all, when we add up all of the numbers that the bars go up to, we know that there are 18 students in Ms. Smith’s class. (6+7+2+3=18) We can easily tell which is the most popular, least popular, and we can determine the difference between how many like one color compared to another. For example: There are four more students that like red than green. (6-2=4)

Another type of graph is a Line Graph. It does the exact same thing except that lines connect the numbers.

What Are the Favorite Colors in Ms. Smith’s Class?
Appendix L, page 2
Creating Bar and Line Graphs

Name: ____________________
Date   /   /   
Score   out of 26 =   %

Ask your classmates what their favorite types of pizza are. Start off by creating a bar graph that shows your results. Then, take the same results and create a line graph. Remember, the only difference between a bar graph and a line graph is: one uses bars and the other uses lines! Don’t forget to come up with a title. {You may use the space on the back for your work.} (0 points each for no understanding, 1 point each for partial understanding, 2 points each for proficient understanding, 3 points each for complete understanding)

(Title)

(Title)
Here is some room to keep track of your work. Tally marks are a good idea!

How many students were surveyed all together? ______________
How many students like Pepperoni the most? ______________
How many students like Sausage the most? ______________
How many students like Cheese the most? ______________
How many students like Hawaiian the most? ______________

Write a number sentence to show the difference between Pepperoni and Cheese.

Which type of graph do you prefer to use? Explain your answer. (0 points for no answer, 1 point for unsatisfactory answer, 2 points for complete answer.)

______________________________
______________________________
______________________________
______________________________
Appendix M, page 1
Number Sense Unit Test
Culminating Activity

Name: _____________________
Date: _____/_____/_____
Score: _____ out of 100 = _____%

**Part 1 - Place Value (41 points)**

<table>
<thead>
<tr>
<th>5</th>
<th>4</th>
<th>9</th>
<th>3</th>
<th>7</th>
<th>8</th>
<th>2</th>
<th>1</th>
<th>6</th>
</tr>
</thead>
</table>
| What place is the 3 in? _______________ What is its value?_______________
| What place is the 2 in? _______________ What is its value?_______________
| What place is the 5 in? _______________ What is its value?_______________
| What place is the 7 in? _______________ What is its value?_______________
| What place is the 6 in? _______________ What is its value?_______________
| What place is the 4 in? _______________ What is its value?_______________
| What place is the 1 in? _______________ What is its value?_______________
| What place is the 9 in? _______________ What is its value?_______________
| What place is the 8 in? _______________ What is its value?_______________

Write a 7 in the hundreds place.
Write a 1 in the ten thousands place.
Write a 5 in the hundred millions place.
Write a 0 in the tens place.
Write a 2 in the millions place.
Write a 4 in the thousands place.
Write a 3 in the hundred thousands place.
Write a 9 in the ones place.
Write a 6 in the ten millions place.
For the following questions, use the number you just created at the bottom of Appendix M.

Between which two numbers does the comma go in the million’s period? ______
Between which numbers does the comma go in the thousand’s period? ______

Write the number in expanded form. ___________________
___________________
___________________
___________________
___________________
___________________
+ ___________________

Write the number in word form. (0 points for no understanding, One point for partial understanding, Two points for complete understanding.)

____________________________________________________________________________
____________________________________________________________________________

Part 2- Rounding. (21 points)
When rounding to the nearest 10, what are the 5 numbers that tell you to round down? ___, ___, ___, ___, ___
Round these numbers to the nearest 10:
1. 51 _____ 2. 36 _____ 3. 175 _____
When rounding to the nearest 100, what are the numbers that tell you to round down? _____-_____ 
Round these numbers to the nearest 100:
4. 121 _____ 5. 367 _____ 6. 5,549 _____
When rounding to the nearest 1,000, what are the 5 numbers in the hundreds place that tell you to round down? ___, ___, ___, ___, ___
Round these numbers to the nearest 1,000:
7. 3,982 _______ 8. 7,325 _______ 9. 12,870________
Part 3- Comparing using <, >, and =. (8 points)
The symbol < means _______  A. Greater Than
The symbol = means _______  B. Less Than
The symbol > means _______  C. Equal To

Compare the following numbers using <, >, or =.
1. 21  ○  33  2. 5,349  ○  5,349  3. 68,645  ○  68,465
   4. 548,371  ○  548,372  5. 368,625,134  ○  36,862,513

Part 4- Ordering. (2 points)
Order these numbers from greatest to least.
1. 3,458; 12,854; 1,845

Order these numbers from least to greatest.
2. 986,546,132; 689,654,231; 869,546,231

Part 5- Number Lines. (0 points for no understanding, one point for partial understanding, two points for complete understanding.)
Create a number line that goes from -8 to 4.

Part 6- Coordinating Grid and Ordered Pairs. (4 points)

Give the ordered pair for the cube.  (____, ____)
Give the ordered pair for the happy face. (____, ____)
Give the ordered pair for the heart.  (____, ____)
Give the ordered pair for the sun.  (____, ____)

108x640
Part 7- Roman Numerals (8 points)
Write down the Roman Numeral for each Arabic Numeral.

1. 1= _____  
2. 5= _____  
3. 10= _____

4. 50= _____  
5. 100= _____  
6. 500= _____

7. 1,000= _____
8. 581

Part 8- Square Numbers and Roots (8 points)
Find the square roots of these numbers.

1. 25 _____  
2. 49_____  
3. 64_____  
4. 121_____  

Find the perfect squares for these numbers.

5. 3 ____  
6. 6 ____  
7. 9 ____  
8. 12_____

Part 9- Bar Graphs and Line Graphs (0 points each for no understanding, 1 point each for partial understanding, 2 points each for proficient understanding, 3 points each for complete understanding)

With the information below, create a bar graph AND a line graph.

10 people prefer vanilla, 8 people prefer chocolate, and 5 people prefer strawberry.
### Part 1- Place Value (41 points)

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<td>8</td>
<td>2</td>
<td>1</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

**What place is the 3 in?** hundred thousands  
**What is its value?** 300,000

**What place is the 2 in?** hundreds  
**What is its value?** 200

**What place is the 5 in?** hundred millions  
**What is its value?** 500,000,000

**What place is the 7 in?** ten thousands  
**What is its value?** 70,000

**What place is the 6 in?** ones  
**What is its value?** 6

**What place is the 4 in?** ten millions  
**What is its value?** 40,000,000

**What place is the 1 in?** tens  
**What is its value?** 10

**What place is the 9 in?** millions  
**What is its value?** 9,000,000

**What place is the 8 in?** thousands  
**What is its value?** 8,000

---

**Write a 7 in the hundreds place.**

**Write a 1 in the ten thousands place.**

**Write a 5 in the hundred millions place.**

**Write a 0 in the tens place.**

**Write a 2 in the millions place.**

**Write a 4 in the thousands place.**

**Write a 3 in the hundred thousands place.**

**Write a 9 in the ones place.**

**Write a 6 in the ten millions place.**
For the following questions, use the number you just created at the bottom of Appendix M, page 1.

After what number does the comma go in the million’s period? 2 and 3
After what number does the comma go in the thousand’s period? 4 and 7

Write the number in expanded form. 500,000,000
60,000,000
2,000,000
300,000
10,000
4,000
700
9

Write the number in word form. (0 points for no understanding, One point for partial understanding, Two points for complete understanding.)

Five hundred sixty-two million, three hundred fourteen thousand, seven hundred nine

Part 2- Rounding. (21 points)
When rounding to the nearest 10, what are the 5 numbers that tell you to round down? 0, 1, 2, 3, and 4
Round these numbers to the nearest 10:
1. 51 50 2. 36 40 3. 175 180
When rounding to the nearest 100, what are the numbers that tell you to round down? 0 through 49
Round these numbers to the nearest 100:
4. 121 100 5. 367 400 6. 5,549 5,500
When rounding to the nearest 1,000, what are the 5 numbers in the hundreds place that tell you to round down? 0, 1, 2, 3, and 4
Round these numbers to the nearest 1,000:
7. 3,982 4,000 8. 7,325 7,000 9. 12,870 13,000
Part 3- Comparing using <, >, and =. (8 points)
The symbol < means B. Greater Than
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The symbol > means A. Equal To

Compare the following numbers using <, >, or =.
1. 21 < 33  2. 5,349 = 5,349  3. 68,645 > 68,465
4. 548,371 < 548,372  5. 368,625,134 > 36,862,513

Part 4- Ordering. (2 points)
Order these numbers from greatest to least.
1. 3,458; 12,854; 1,845  12,854; 3,458; 1,845
Order these numbers from least to greatest.
2. 986,546,132; 689,654,231; 869,546,231
   689,654,231; 869,546,231; 986,546,132

Part 5- Number Lines. (0 points for no understanding, one point for partial understanding, two points for complete understanding.)
Create a number line that goes from –8 to 4.

-8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4

Part 6- Coordinating Grid and Ordered Pairs. (4 points)

Give the ordered pair for the cube.  (2, 1)
Give the ordered pair for the happy face. (3, 0)
Give the ordered pair for the heart.  (1, 2)
Give the ordered pair for the sun.  (3, 3)
Part 7 - Roman Numerals (8 points)
Write down the Roman Numeral for each Arabic Numeral.

1. 1 = I  4. 50 = L  7. 1,000 = M
2. 5 = V  5. 100 = C  8. 581 = DLXXXI
3. 10 = X  6. 500 = D

Part 8 - Square Numbers and Roots (8 points)
Find the square roots of these numbers.

1. 25  5  2. 49  7  3. 64  8  4. 121  11

Find the perfect squares for these numbers.

5. 3  9  6. 6  36  7. 9  81  8. 12  144

Part 9 - Bar Graphs and Line Graphs (0 points each for no understanding, 1 point each for partial understanding, 2 points each for proficient understanding, 3 points each for complete understanding)
With the information below, create a bar graph AND a line graph.

10 people prefer vanilla, 8 people prefer chocolate, and 5 people prefer strawberry.

Title will vary

![Bar Graph for Preferences](chart1.png)

Title will vary

![Line Graph for Preferences](chart2.png)