Georgia
Standards of Excellence
Curriculum Frameworks

Mathematics

GSE First Grade

Unit 5: Understanding Place Value

Georgia Department of Education

Richard Woods, Georgia's School Superintendent

"Educating Georgia's Future"

Unit 5: Understanding Place Value

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IF YOU HAVE NOT READ THE FIRST GRADE CURRICULUM OVERVIEW IN ITS ENTIRETY PRIOR TO USE OF THIS UNIT, PLEASE **STOP** AND CLICK HERE:

https://www.georgiastandards.org/Georgia-Standards/Frameworks/1st-Math-Grade-Level-Overview.pdf

Return to the use of this unit once you've completed reading the Curriculum Overview. Thank you!

OVERVIEW

In this unit, students will:

- understand the order of the counting numbers and their relative magnitudes
- use a number line and 99 chart to build understanding of numbers and their relation to other numbers
- unitize a group of ten ones as a whole unit: a ten, and understand that a group of ten pennies is equivalent to a dime.
- compose and decompose numbers from 11 to 19 into ten ones and some further ones
- think of whole numbers between 10 and 100 in terms of tens and ones
- explore the idea that decade numbers (e.g., 10, 20, 30, 40) are groups of tens with no left over ones
- compare two numbers by examining the amount of tens and ones in each number using words, models and symbols greater than (>), less than (<) and equal to (=)
- create concrete models, drawings and place value strategies to add and subtract within 100 (*Students should not be exposed to the standard algorithm of carrying or borrowing in first grade.)*
- use place value understanding and properties of operations to add and subtract
- mentally add ten more and ten less than any number less than 100
- use concrete models, drawings and place value strategies to subtract multiples of 10 from decade numbers (e.g., 30, 40, 50)
- work with categorical data by organizing, representing and interpreting data using charts and tables
- pose questions with 3 possible responses and then work with the data collected

As students in first grade begin to count larger amounts, they should group concrete materials into tens and ones to keep track of what they have counted. This is an introduction to the concept of place value. Vocabulary such as digit, place, and value should be integrated while students are mastering the concept of place value. Students must learn that digits represent different values depending on their position in numbers.

Although the units in this instructional framework emphasize key standards and big ideas at specific times of the year, routine topics such as counting, time, money, positional words, patterns, and tallying should be addressed on an ongoing basis through the use of calendar centers and games. The units should establish these routines, allowing students to gradually understand the concept of number sense.

For more detailed information about unpacking of and clarification of the content standards, unpacking a task, math routines and rituals, maintenance activities and more, please refer to the Grade Level Overview.

STANDARDS FOR MATHEMATICAL PRACTICE

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education.

Students are expected to:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

*****Mathematical Practices 1 and 6 should be evident in EVERY lesson*****

STANDARDS FOR MATHEMATICAL CONTENT

Understand place value.

MGSE1.NBT.2 Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:

a. 10 can be thought of as a bundle of ten ones – called a "ten."

b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.

c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).

MGSE1.NBT.3 Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.

Use place value understanding and properties of operations to add and subtract.

MGSE1.NBT.4 Add within 100, including adding a two-digit number and a one-digit number and adding a two-digit number and a multiple of ten (e.g., 24 + 9, 13 + 10, 27 + 40), using concrete models or drawings and strategies based on place value, properties of operations, and/or relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

MGSE1.NBT.5 Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.

MGSE1.NBT.6 Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range of 10-90 (positive or zero differences), using concrete models or drawings and strategies based on

place value, properties of operations and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. (e.g.,70 – 30, 30 – 10, 60 – 60)

MGSE1.NBT.7 Identify dimes, and understand ten pennies can be thought of as a dime. (Use dimes as manipulatives in multiple mathematical contexts.)

Represent and interpret data.

MGSE1.MD4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.

BIG IDEAS

- Quantities up to 120 may be compared, counted, and represented in multiple ways, including grouping, pictures, words, number line locations, and symbols.
- Collections can be separated into equal groups of ten objects and can be counted by 10's.
- Numbers larger than 10 can be represented in terms of tens and ones.
- The order of numbers may be represented with a list, a number line, and a 99 chart.
- Two numbers may be compared by examining the amount of tens and ones in each number using words, models and symbols greater than (>), less than (<) and equal to (=).
- Knowing and using number benchmarks can help make sense of numbers, estimating, and simplify computations.
- Concrete models, drawings, and place value strategies can be used to add and subtract within 100.
- Important information can be found in representations of data such as tallies, tables, and charts.
- Tables and charts can help make solving problems easier.
- Questions can be solved by collecting and interpreting data

ESSENTIAL QUESTIONS

- What is the largest digit we can use when representing amounts?
- How do represent a collection larger than 9?
- How does using 10 as a benchmark help us compose numbers?
- How do we represent a collection of objects using tens and ones?
- How can making equal groups of ten objects deepen my understanding of the base 10 number system?
- How can large quantities be counted efficiently?
- How can words be used to illustrate the comparison of numbers?
- How can benchmark numbers build our understanding of numbers?
- How can I represent addition and subtraction?
- What are some strategies that help me count efficiently?

- How can different combinations of numbers and operations be used to represent the same quantity?
- How are the operations of addition and subtraction alike and different?
- What strategies can we use to locate numbers on a 99 chart?
- How can number benchmarks build our understanding of numbers?
- What is an efficient way to count pennies and dimes?

CONCEPTS/SKILLS TO MAINTAIN

- Count to 120 starting with any number less than 120
- Count to 100 by ones and by tens
- Count forward from a given number other than one
- Represent a number of objects with a written numeral
- Compare two sets of objects using greater than, less than, or equal to
- Compose and decompose numbers from 11 to 19 into ten ones
- Record each composition or decomposition by a drawing or equation
- Use benchmark numbers in counting, adding and subtracting
- Represent addition and subtraction with objects or an equation
- Solve addition and subtraction word problems

Fluency: Procedural fluency is defined as skill in carrying out procedures flexibly, accurately, efficiently, and appropriately. Fluent problem solving does not necessarily mean solving problems within a certain time limit, though there are reasonable limits on how long computation should take. Fluency is based on a deep understanding of quantity and number.

Deep Understanding: Teachers teach more than simply "how to get the answer" and instead support students' ability to access concepts from a number of perspectives. Therefore, students are able to see math as more than a set of mnemonics or discrete procedures. Students demonstrate deep conceptual understanding of foundational mathematics concepts by applying them to new situations, as well as writing and speaking about their understanding.

Memorization: The rapid recall of arithmetic facts or mathematical procedures. Memorization is often confused with fluency and automaticity. Fluency implies a much richer kind of mathematical knowledge and experience.

Number Sense: Students consider the context of a problem, look at the numbers in a problem, make a decision about which strategy would be most efficient in each particular problem. Number sense is not a deep understanding of a single strategy, but rather the ability to think flexibly between a variety of strategies in context.

Fluent students:

- flexibly use a combination of deep understanding, number sense, and memorization.

- are fluent in the necessary baseline functions in mathematics so that they are able to spend their thinking and processing time unpacking problems and making meaning from them.
- are able to articulate their reasoning.
- find solutions through a number of different paths.

For more about fluency, see:
http://www.youcubed.org/wp-content/uploads/2015/03/FluencyWithoutFear-2015.pdf
and:
https://bhi61nm2cr3mkdgk1dtaov18-wpengine.netdna-ssl.com/wp-content/uploads/nctm-timed-tests.pdf

STRATEGIES FOR TEACHING AND LEARNING (Ohio DOE)

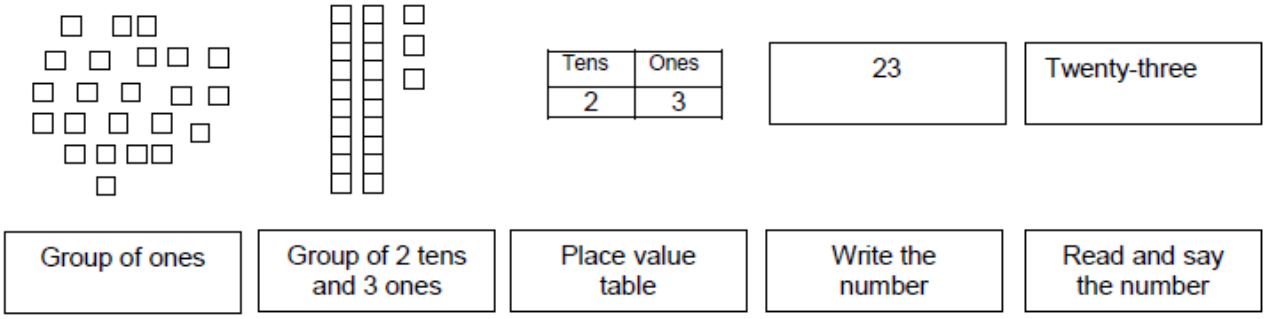
Understand Place Value

Instructional Strategies
Provide multiple and varied experiences that will help students develop a strong sense of numbers based on comprehension – not rules and procedures. Number sense is a blend of comprehension of numbers and operations and fluency with numbers and operations. Students gain computational fluency (using efficient and accurate methods for computing) as they come to understand the role and meaning of arithmetic operations in number systems. Students should solve problems using concrete models and drawings to support and record their solutions. It is important for them to share the reasoning that supports their solution strategies with their classmates. Students will usually move to using base-ten concepts, properties of operations, and the relationship between addition and subtraction to invent mental and written strategies for addition and subtraction. Help students share, explore, and record their invented strategies. Recording the expressions and equations in the strategies horizontally encourages students to think about the numbers and the quantities they represent. Encourage students to try the mental and written strategies created by their classmates.

Students eventually need to choose efficient strategies to use to find accurate solutions. Students should use and connect different representations when they solve a problem. They should start by building a concrete model to represent a problem. This will help them form a mental picture of the model. Now students move to using pictures and drawings to represent and solve the problem. If students skip the first step, building the concrete model, they might use finger counting to solve the problem. Finger counting is an inefficient strategy for adding within 100 and subtracting within multiples of 10 between 10 and 90. Have students connect a 0-99 chart or a 1-100 chart to their invented strategy for finding 10 more and 10 less than a given number. Ask them to record their strategy and explain their reasoning.

Students will learn and develop essential skills for making tens (composing) and breaking a number into tens and ones (decomposing). Composing numbers by tens is foundational for representing numbers with numerals by writing the number of tens and the number of leftover

ones. Decomposing numbers by tens builds number sense and the awareness that the order of the digits is important. Composing and decomposing numbers involves number relationships and promotes flexibility with mental computation.



The beginning concepts of place value are developed in Grade 1 with the understanding of ones and tens. The major concept is that putting ten ones together makes a ten and that there is a way to write that down so the same number is always understood. Students move from counting by ones, to creating groups and ones, to tens and ones. It is essential at this grade for students to see and use multiple representations of making tens using base-ten blocks, bundles of tens and ones, and ten-frames. Making the connections among the representations, the numerals and the words are very important. Students need to connect these different representations for the numbers 0 to 99. Students need to move through a progression of representations to learn a concept. They start with a concrete model, move to a pictorial or representational model, then an abstract model. For example, ask students to place a handful of small objects in one region and a handful in another region. Next, have them draw a picture of the objects in each region. They can draw a likeness of the objects or use a symbol for the objects in their drawing. Then they count the physical objects or the objects in their drawings in each region and use numerals to represent the two counts. They also say and write the number word. Now students can compare the two numbers using an inequality symbol or an equal sign.

Represent and interpret data.

Instructional Strategies
Students can create real or cluster graphs after they have had multiple experiences with sorting objects according to given categories. The teacher should model a cluster graph several times before students make their own. A cluster graph in Grade 1 has two or three labeled loops or regions (categories). Students are building the foundation for Venn diagram understandings in later grades. Students place items inside the regions that represent a category that they chose. Items that do not fit in a category are placed outside of the loops or regions. Students can place items in a region that overlaps the categories if they see a connection between categories. Ask questions that compare the number of items in each category and the total number of items inside and outside of the regions.

Ask students to sort a collection of items in up to three categories. Then ask questions about the number of items in each category and the total number of items. Also ask students to compare the number of items in each category. The total number of items to be sorted should be less than

or equal to 100 to allow for sums and differences less than or equal to 100 using the numbers 0 to 100.
Connect to the geometry content studied in Grade 1. Provide categories and have students sort identical collections of different geometric shapes. After the shapes have been sorted, ask these questions: How many triangles are in the collection? How many rectangles are there? How many triangles and rectangles are there? Which category has the most items? How many more? Which category has the least? How many less?

SELECTED TERMS AND SYMBOLS

The following terms and symbols are often misunderstood. These concepts are not an inclusive list and should not be taught in isolation. However, due to evidence of frequent difficulty and misunderstanding associated with these concepts, instructors should pay particular attention to them and how their students are able to explain and apply them.
The terms below are for **teacher reference only** and are not to be memorized by the students. Teachers should present these concepts to students with models and real life examples. Students should understand the concepts involved and be able to recognize and/or demonstrate them with words, models, pictures, or numbers.

- **addition**
- **benchmark**
- **chart**
- **compare**
- **compose**
- **counting on**
- **data**
- **decompose**
- **equal to**
- **less than**
- **more than**
- **number line**
- **place value –tens and ones**
- **representation**
- **subtraction**
- **table**
- **tally mark**
- **ten frame**

http://www.corestandards.org/Math/Content/mathematics-glossary/glossary

COMMON MISCONCEPTIONS

Often when students learn to use an aide (Pac Man, bird, alligator, etc.) for knowing which comparison sign (<, >, =) to use, the students don't associate the real meaning and name with the sign. The use of the learning aids must be accompanied by the connection to the names: <

less than, > ***greater than***, and = ***equal to***. More importantly, students need to begin to develop the understanding of what it means for one number to be greater than another. In Grade 1, it means that this number has more tens, or the same number of tens, but with more ones, making it greater. Additionally, the symbols are shortcuts for writing down this relationship. Finally, students need to begin to understand that both inequality symbols (<, >) can create true statements about any two numbers where one is greater/smaller than the other, (15 < 28 and 28 >15).

FALS

The linked Formative Assessment lesson is designed to be part of an instructional unit. This assessment should be implemented approximately two-thirds of the way through this instructional unit and is noted in the unit task table. This assessment can be used at the beginning of the unit to ascertain student needs. The results of this task should give you pertinent information regarding your students learning and help to drive your instruction for the remainder of the unit.

SAMPLE UNIT ASSESSMENTS

Math Unit Summative Assessments were written by the First Grade Mathematics Assessment and Curriculum Team, Jackson County, Georgia. The team is comprised of first grade teachers and administrators whose focus is to provide assessments that address depth of knowledge and higher order thinking skills. These assessments are provided as a courtesy from the Jackson County School System as samples that may be used as is or as a guide to create common assessments.

NUMBER TALKS

In order to be mathematically proficient, today's students must be able to compute accurately, efficiently, and flexibly. Daily classroom number talks provide a powerful avenue for developing "efficient, flexible, and accurate computation strategies that build upon the key foundational ideas of mathematics." (Parrish, 2010) Number talks involve classroom conversations and discussions centered upon purposefully planned computation problems.

In Sherry Parrish's book, Number Talks: Helping Children Build Mental Math and Computation Strategies, teachers will find a wealth of information about Number Talks, including:

- Key components of Number Talks
- Establishing procedures
- Setting expectations
- Designing purposeful Number Talks
- Developing specific strategies through Number Talks

There are four overarching goals upon which K-2 teachers should focus during Number Talks. These goals are:

1. Developing number sense

2. Developing fluency with small numbers
3. Subitizing
4. Making Tens

Suggested Number Talks for Unit 5 are addition: making landmark or friendly numbers; breaking each number into its place value; compensation; and adding up chunks are suggested. Also, Number Talks for subtraction including; adding up; removal; counting back; and place value are suggested. Specifics on these Number Talks can be found on pages 118-217 of Number Talks: Helping Children Build Mental Math and Computation Strategies.

WRITING IN MATH

The Standards for Mathematical Practice, which are integrated throughout effective mathematics content instruction, require students to explain their thinking when making sense of a problem (SMP 1). Additionally, students are required to construct viable arguments and critique the reasoning of others (SMP 2). Therefore, the ability to express their thinking and record their strategies in written form is critical for today's learners. According to Marilyn Burns, "Writing in math class supports learning because it requires students to organize, clarify, and reflect on their ideas--all useful processes for making sense of mathematics. In addition, when students write, their papers provide a window into their understandings, their misconceptions, and their feelings about the content." (Writing in Math. Educational Leadership. Oct. 2004 (30).) The use of math journals is an effective means for integrating writing into the math curriculum.

Math journals can be used for a variety of purposes. Recording problem solving strategies and solutions, reflecting upon learning, and explaining and justifying thinking are all uses for math journals. Additionally, math journals can provide a chronological record of student math thinking throughout the year, as well as a means for assessment than can inform future instruction.

The following website provides a wealth of information and grade specific activities for math journaling: http://www.k-5mathteachingresources.com/math-journals.html. Though this is not a free site, there are some free resources that are accessible.

PAGE CITATIONS

Teaching Student-Centered Mathematics written by Van de Walle, Lovin, Karp, and Bay-Williams, has been recently revised. Page citation numbers may vary due to this change.

TASK DESCRIPTIONS

Scaffolding Task	Tasks that build up to the learning task.
Constructing Task	Constructing understanding through deep/rich contextualized problem solving tasks.
Practice Task	Tasks that provide students opportunities to practice skills and concepts.

Culminating Task	Designed to require students to use several concepts learned during the unit to answer a new or unique situation. Allows students to give evidence of their own understanding toward the mastery of the standard and requires them to extend their chain of mathematical reasoning.
Formative Assessment Lesson (FAL)	Lessons that support teachers in formative assessment which both reveal and develop students' understanding of key mathematical ideas and applications. These lessons enable teachers and students to monitor in more detail their progress towards the targets of the standards.
3-Act Task	A Three-Act Task is a whole-group mathematics task consisting of 3 distinct parts: an engaging and perplexing Act One, an information and solution seeking Act Two, and a solution discussion and solution revealing Act Three. More information along with guidelines for 3-Act Tasks may be found in the ***Guide to Three-Act Tasks*** on georgiastandards.org.

As this unit has no Culminating Task, you may pair two Performance Tasks which would include all unit standards in combination.

Task Name	Task Type/ *Grouping Strategy*	Content Standard	Content Addressed	Brief Description
Pony Bead Place Value	Constructing Task *Individual, Partner*	MGSE1.NBT.2	Place Value, Understanding Tens and Ones	Students will practice place value by collecting objects, placing on mat and bundling when possible.
Building Towers of 10	Constructing Task *Partner*	MGSE1.NBT.2 MGSE1.NBT.4	Place Value, Understanding Tens and Ones, Benchmark Numbers	Students will play a game in which they collect unifix cubes and place them on place value mat.
1st Graders in Israel	3 Act Task *Large Group, Individual*	MGSE1.NBT.2 MGSE1.NBT.3 MGSE1.NBT.4	Place Value, Understanding Tens and Ones, Benchmark Numbers	Students will use problem solving skills to complete the 3 Act Task.
Counting Cathy	Constructing Task *Partner*	MGSE1.NBT.2 MGSE1.NBT.3 MGSE1.NBT.5 MGSE1.NBT.7	Place Value, Understanding Tens and Ones, Value of Dimes and Pennies	Students will use dimes and pennies to make connections to place value and bundling groups of ten.
Make a 10 and Move On	Constructing Task *Individual; Partner*	MGSE1.NBT.2 MGSE1.NBT.3 MGSE1.NBT.5 MGSE1.NBT.7	Place Value, Understanding Tens and Ones, Value of Dimes and Pennies	Students will play a game focusing on pennies and dimes and the value of each.
Candy Shop	Performance Task *Large Group, Partner*	MGSE1.NBT.4 MGSE1.MD4	Problem Solving	Students will use problem solving skills to practice counting large quantities.
The King's Counting Crew	Scaffolding/Constructing Task *Large Group, Partners*	MGSE1.NBT.2 MGSE1.NBT.4	Comparing Multiple Representations of Numbers	Students will build on their understanding of number using place value.

Silly Symbols	Constructing Task *Large group, Individual*	MGSE1.NBT.2 MGSE1.NBT.3 MGSE1.NBT.4	Comparison of Numbers using >, =, and <.	Students will practice comparing quantities of numbers using symbols such as: >, =, and <.
Hopping Around	Constructing Task *Large Group*	MGSE1.NBT.4	Relationship between Addition and Subtraction	Students will create and use a number line to practice addition and subtraction.
Fishy Math	Performance Task *Large group, Individual*	MGSE1.NBT.2 MGSE1.NBT.4	Problem Solving	Students will solve some math story problems and then create them on their own.
FAL	Performance Assessment	MGSE1.NBT.1 MGSE1.NBT.2 MGSE1.NBT.3 MGSE1.NBT.4 MGSE1.NBT.5 MGSE1.NBT.6	FAL: Caterpillars and Leaves	Students show their progress in use of addition and subtraction in problem solving situations.
Monkeys At The Zoo	Performance Task *Individual or Partner*	MGSE1.NBT.2 MGSE1.NBT.4	Problem Solving	Students will use multiple strategies to solve problems and explain their work.
What's Around Me	Scaffolding Task *Large Group, Individual*	MGSE1.NBT.2 MGSE1.NBT.3 MGSE1.NBT.4 MGSE1.NBT.5	Exploring More and Less on 99 Chart	Students will practice finding one more/less and ten more/less than a number using math puzzles.
Different Paths, Same Destination	Scaffolding Task *Large Group, Partner*	MGSE1.NBT.2 MGSE1.NBT.5 MGSE1.NBT.6	Exploring More / Less on 99 Chart and relationship with Addition and Subtraction	Students will practice using a 99 chart to follow number path directions ultimately learning to create their own.

Number Destinations	Scaffolding Task *Large Group, Individual*	MGSE1.NBT.2 MGSE1.NBT.5 MGSE1.NBT.6	Exploring More / Less on 99 Chart and Related Number Sentences	Students will create different number paths on their own.
What's The Value of Your Name?	Performance Task *Individual, Large Group and Partner*	MGSE1.NBT.2 MGSE1.NBT.3 MGSE1.NBT.4 MGSE1.NBT.7 MGSE1.MD4	Adding Values with an Understanding of Place Value	Students will practice multiple strategies while finding the value of their name.

INTERVENTION TABLE

The Intervention Table below provides links to interventions specific to this unit. The interventions support students and teachers in filling foundational gaps revealed as students work through the unit. All listed interventions are from New Zealand's Numeracy Project.

Cluster of Standards	Name of Intervention	Snapshot of summary or Student I can statement. . .
Understand place value MGSE1.NBT.2 MGSE1.NBT.3 Use place value understanding and properties of operations to add and subtract MGSE1.NBT.4 MGSE1.NBT.5 MGSE1.NBT.6 MGSE1.NBT.7	Teen Numbers	Identify all of the numbers in the range 0-100
	Tens and Ones	Develop knowledge and understanding of two-digit numbers
	Calculator Plus Ten	Learn groupings of ten
	Guess My Number	Guess hidden number between 1 and 100
	Tens and Ones with Ten Frames	Count up to 50 objects by grouping the objects in tens.
	Visualizing/Imaging Many Hands	Solve addition and subtraction problems within 20 by counting all the objects in their head.
Represent and interpret data MGSE1.MD.4	Playing Favorites	Pose, plan, analyze data
	Playing Favorites	Pose, plan, analyze data
	Christmas Tree	Sort objects into categories and display the results Count the objects in a category Devise and us problem solving strategies to explore situations mathematically
	Greedy Cat	Describe, sort, compare and display pictures of cats
	I Like Trucks	Collect, analyze and report information about favorites
	Not Enough Drawers	Sort and analyze categories of clothes
	The Garden	Sort, count, objects in categories

CONSTRUCTING TASK: Pony Bead Place Value

Return to Task List

Approximately 2-3 days

STANDARDS FOR MATHEMATICAL CONTENT

MGSE1.NBT.2 Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:

a. 10 can be thought of as a bundle of ten ones — called a "ten."
b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics. *Students create tangible representations of tens and ones and comparing modeled numbers combinations.*
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning. *Students understand comparing numbers is looking first at the quantity of tens (if the same digit then the ones) to determine greater than, less than, or equal to.*

BACKGROUND KNOWLEDGE/COMMON MISCONCEPTIONS

Students should have prior experiences counting numbers up to 99 and representing these numbers using tens and ones. Teachers may want to have a tub of pony beads and pipe cleaners for students to practice making the beaded pipe cleaners prior to the task. The focus of the task is using the beaded pipe cleaners rather than creating them.

ESSENTIAL QUESTIONS

- How do we represent a number using the digits 0 through 9?
- What is the largest digit we can use when representing amounts?
- What happens when we have more than 9?
- How do represent a collection larger than 9?

MATERIALS

- pony beads
- pipe cleaners or other materials such as wiki sticks or yarn, etc…

- plastic bags
- 0-99 chart
- place value mat
- card set with various numbers from 1-99 or index cards labeled
- deck of cards
- digit dice
- place Value Cover Up game board
- two different color counters
- *The Blast Off Kid* by Laura Driscoll or similar book

GROUPING

Individual, Partners

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Part I

Gather students together. Read aloud *The Blast Off Kid* by Laura Driscoll or similar text. While reading, discuss how Jim was going to collect and count enough wrappers to go to space. Pose questions throughout the story that might help students relate to this type of experience. How would you collect the wrappers? How would you organize the wrappers to count them? How would you count the wrappers? What is he doing that is so important while he is collecting wrappers?

Tell the students that they are going to see how many plastic forks they can collect in one week. The students that eat lunch in the lunchroom will bring back their plastic fork each day (I would suggest that you only use the forks from students in your class and wash them after lunch. This will eliminate the sanitation issue and keep your class from collecting too many.). Each day you will count and place the forks collected on a place value mat. This is a great opportunity to develop/discuss the understanding of the digits used to represent the amount of forks. Discuss why we write numbers the way we do and what each digit and place of the digit means. Example: There may be 7 forks on Tuesday. We write the digit 7 in the ones place because it represents 7 individual forks. On Wednesday we add 5 forks to the place value mat. We count on from the 7 until we have composed a group of 10. Place a rubber band around the group of ten and then move this group to the tens place. Continue to count the 2 remaining forks in the ones place. Record the number 12 and discuss why the digits changed as we added the forks. Discuss the total number of forks after each day of collection. Continue to add the forks to the place value mat for an entire week, focusing on why the digits change as you add forks.

Part II

Place 4 pony beads on the overhead projector or document camera. Keep the beads available for students to see for approximately 5 seconds. Cover them up and have students tell you how many beads were visible. Repeat the process with 9 beads. Ask the students about the strategies they are using to count the beads and discuss why these strategies are effective. Next, show students twenty-two beads scattered or piled closely together. Ask students if they were able to determine

how many beads were displayed. Most students will not be able to count the beads within 5 seconds. Discuss why this number is more difficult and possible strategies that would make this number easier to count. If the conversation does not lead into grouping the beads, present the idea of grouping the beads into groups of ten. Discuss how this idea could have helped them count faster. Show students the number 34 with the beads scattered. How can we make this number easier to count? Allow the students to come up and demonstrate how to make groups of ten by placing ten beads on a pipe cleaner. This completes the idea that we have created a set of ten. Continue this concept with the remaining beads. Now go back and count the amount by how many groups of ten first then how many ones are left. Allow students to discuss the benefit of grouping objects when counting.

Show students the pipe cleaners with ten beads already placed on them. Ask students if this reminds them of any math tools (base-ten blocks) used in the classroom. Draw connections between beaded pipe cleaners and ten rods.

Next, provide many small plastic baggies filled with different amounts of pony beads. Allow students to work with partners to practice counting the beads. Students will create sets of ten on the pipe cleaners and leave the remaining beads next to the sets of ten. Next they will count the tens and ones to identify the number. Students will describe the number to their partner, identifying the digit in the tens and ones place. Rotate or switch bags to allow several practice opportunities. Begin a class discussion and allow the students to explain why they chose the digits they did for a particular bag. Pose questions to guide students in explaining. Did anyone else use these same digits in this same order? Could we switch the digits and still represent the same amount? This is only true with numbers such as the following special cases: 11, 22, 33, 44, 55, etc.

Have students create at least ten beaded pipe cleaners for an activity in an upcoming task. Students should count out ten beads and then group them together by sliding them onto the pipe cleaner. Each student will need approximately 100 pony beads and ten pieces of pipe cleaner. You can cut the pipe cleaners in half and they are still long enough for ten beads. This will reduce the number of pipe cleaners needed. Students may also work with a partner to reduce the number of materials needed.

Part III

Tell students that they will now work with a partner to complete a place value activity using their beaded pipe cleaners. Each partner group will need 4 sets of 0-9 cards (deck of cards without face cards and tens) and their set of beaded pipe cleaners. The beads should not be glued to the pipe cleaner. They should be loose in the bag to lend students to developing understanding with creating the sets of tens.

Allow time for additional practice prior to starting the activity. Pass out the pipe cleaners and pony beads. Have students use their pipe cleaners and loose beads to demonstrate understanding of how to make 76 and show how that is different from 67. Practice this concept several times prior to starting the activity.

Each student will draw one card. The students will combine the cards twice to create two different numbers. For example, the students draw a 4 and 8. They could make the number 48 and the number 84. One student will create 4 sets if 10 with the pipe cleaners and 8 individual beads on his or her place value mat. The other student will create 8 sets of 10 with the pipe cleaners and 4 individual beads on his or her place value mat. They will check each other's work and identify the numbers on the 99-chart. Decide which number is larger and which number is smaller. How does the pipe cleaner and bead representation help us identify where to find the numbers of the 99-chart?

While students are completing this activity, the teacher should walk around and observe the students as they create the numbers using the beaded pipe cleaners. Suggested questions include:

- Which number is larger/smaller? How do you know?
- How many groups of ten are in your number?
- How many ones are in your number?
- How did you determine where to place the digits that you selected?

Part IV-Place Value Cover Up
Place Value Cover Up is a partner game. Each group will need two different color counters (one color for player one and one color for player two) and two-digit dice. The digit dice (rather than dot dice) all the students to easily see the numbers created. One die will represent the tens and one will represent the ones. Roll the two dice, create a two-digit number, build the number using manipulatives and say your number to your partner. Next, cover the number with a counter. Players rotate turns until one player gets 4 counters in a row. They are the winner!

FORMATIVE ASSESSMENT QUESTIONS

- Why did you group ten individual beads on the pipe cleaner?
- Show me how you created the number card using groups of ten and ones?
- Can you explain the number representations?
- How does the placement of the digits affect the number?
- How did you determine which digits to use to correctly represent the number/amount?

DIFFERENTIATION

Extension
- Discuss how we could represent amounts larger than 99. What kind of model could we use? Allow students to explore the concept of developing a model after 99. Allow the students to use pipe cleaners and beads to help with this idea.
- "Say It/Press It" (Van de Walle, Activity 11.11, page 190) This activity will allow students to use models and calculators to explore 3-digit numbers.

Intervention

- Allow students to work with a partner instead of against a partner. The students should work towards getting three in a row. Have the pipe cleaners and pony beads available for the students to create if needed.

- "Groups of Ten" (Van de Walle, Activity 11.2, page 183) This activity gives students the opportunity to practice counting various groups of objects, make groups of ten, and record the total amount of objects. Use of a ten-frame to make groups of ten may be helpful for some students.

Return to Intervention Table

Place Value Mat

Tens	Ones

Place Value Cover Up

Red dice represents the number of tens. Green dice represents the number of ones. Roll the two dice, build the number using manipulatives, and say your number to your partner. Next, cover the number with a counter. Players rotate turns until one player gets 4 counters in a row. They are the winner!

11	12	13	14	15	16
21	22	23	24	25	26
31	32	33	34	35	36
41	42	43	44	45	46
51	52	53	54	55	56
61	62	63	64	65	66

CONSTRUCTING TASK: Building Towers of 10

Return to Task List

Approximately 1-2 days

STANDARDS FOR MATHEMATICAL CONTENT

MGSE1.NBT.2 Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:

a. 10 can be thought of as a bundle of ten ones — called a "ten."
b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).

MGSE1.NBT.4 Add within 100, including adding a two-digit number and a one-digit number and adding a two-digit number and a multiple of ten (e.g., 24 + 9, 13 + 10, 27 + 40), using concrete models or drawings and strategies based on place value, properties of operations, and/or relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively. *Students add the rolled combination number to each previously created sum.3. Construct viable arguments and critique the reasoning of others.*
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision. *Students discuss how to add rolled numbers and when to "bundle" a ten.*
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE/COMMON MISCONCEPTIONS

Students should have experience working with numbers up to 100 in previous tasks. Students should be able to build numbers with an understanding of place value. This task is focused on students counting collections of objects and using their understanding of place value to record larger amounts. The discussion about what happens when a student reaches ten groups of ten should happen during the modeling of this game. Students should be aware of how this number is different, what happens to the digits and understand when a new place value position is needed. ***This is not intended to introduce the strategy of regrouping.***

ESSENTIAL QUESTIONS

- How does using 10 as a benchmark help us compose numbers?
- How do we represent a collection of objects using tens and ones?
- How can making equal groups of ten objects help us count larger quantities?

- How can making equal groups of ten objects deepen my understanding of the base ten number system?

MATERIALS

- Unifix cubes (100 per partner set)
- 2 ten sided dice or 0-9 spinner for each pair of students
- Place Value Mat

GROUPING

Partners

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Part I

The teacher will model the "Building Towers of 10" game with the class. The modeling of this game is important to lead to the discussion about what happens when a student reaches ten groups of ten. The students should understand that when there are ten groups of 10 a new place is created for this bundle. Model this idea and ask students about the why this number is different. The understanding of the 3 digits should be modeled for students to gain a deep understanding of what is happening. Students should discuss how this is number different, what happens to the digits and understand when a new place value position is needed. ***This is not intended to introduce the strategy of regrouping.***

Students work with a partner and play the "Building Towers of 10" game. Students take turns tossing both number cubes and creating a number sentence with the two numbers. Students will find the sum and add this number of cubes to the place value mat. Once the ones column is full the student will connect the cubes and move them to the tens column. Players will work together on one mat until they have created ten towers of 10. Allow students to play without any recording and focus on building the representation.

Part II

Students work with a new partner and play the "Building Towers of 10" game again. This time, the students will record their equations and keep up with the total sum on a 99 chart. Students will take turns tossing both number cubes and creating a number sentence with the two numbers. For instance, if the first two numbers rolled are 7 and 2, the student will record 7 plus 2 equals 9 on the recording sheet. Then, the player who rolled the number cubes collects that many objects and adds them to the place value mat. Students will use one place value mat to manipulate the number. After each toss, the player must tell the number sentence created, and the total number of objects counting by 10s and 1s. Recording the equation allows additional practice with writing addition equations correctly. Students will then use a cube or counter to count the total number of objects on a 0-99 chart. If the current number is 16 and a player rolls a 2 and 4, then the player will record the equation and then add 6 + 16 on the place value mat and the 99 chart. This will allow them to check the representation with the total number on the 99 chart after each turn. Both players are adding the cubes to one mat and the 99 chart to form a running total.

Together partners determine their new total until they have reached 100. Discuss what happens to this number. Is there another chart that could be created for numbers larger than 99? Partners continue rolling and collecting objects until they create a collection of 100 cubes – ten towers of 10. The teacher should walk around and monitor students while playing this game. Ask the students questions throughout the game to ensure understanding.

A follow up class discussion is very important to build deeper understanding. Ask questions throughout the game and revisit the same questions during the class discussion. How many equations did it take you and your partner to get to 99? How does the cube representation help us find the number on the 99 chart? Discuss how the tens place digit determines the decade where the number can be located.

FORMATIVE ASSESSMENT QUESTIONS

- How did you add the two numbers on the dice?
- How do you write an addition equation correctly?
- Read the total number of blocks on your place value mat.
- How can you locate the number on the 99 chart?
- What happens when there are ten single cubes in the ones column?
- What happens when there are ten groups of 10 in the tens column?
- Can you represent the number ____ with a collection of objects using tens and ones?

DIFFERENTIATION

Extension

- Have students play backwards from 99 to 0. Students begin with nine groups of 10 cubes and nine ones. Students will break apart or decompose the groups to remove the sum of the dice they rolled.

Intervention

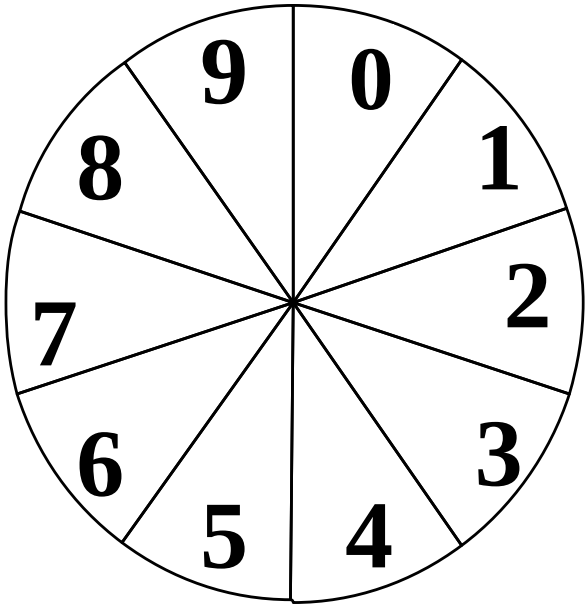
- Have students build collections to 50 and use 2 (1-6) number cubes.
- Students may use a tool (number chart, pipe cleaners from Task One, etc.) to facilitate students in addition of larger numbers.

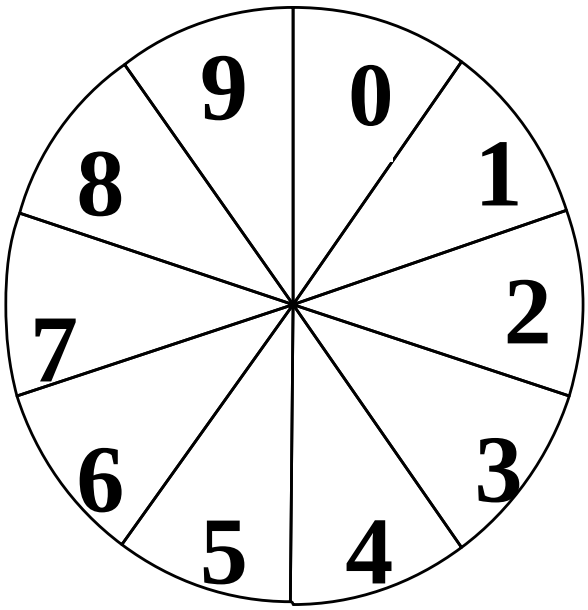
Return to Intervention Table

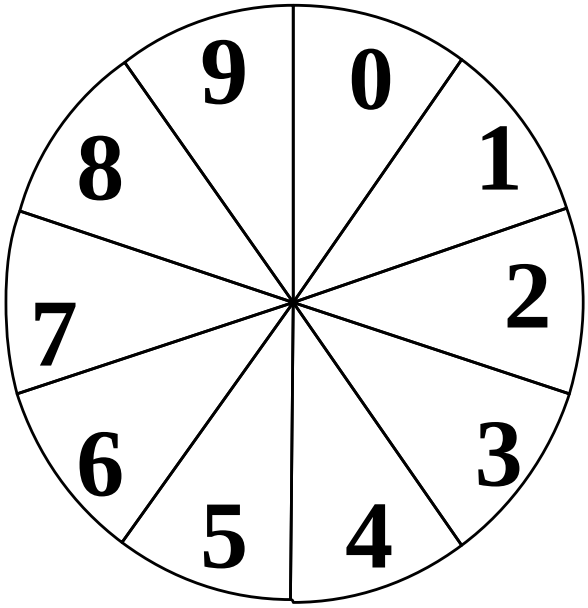
TECHNOLOGY CONNECTION

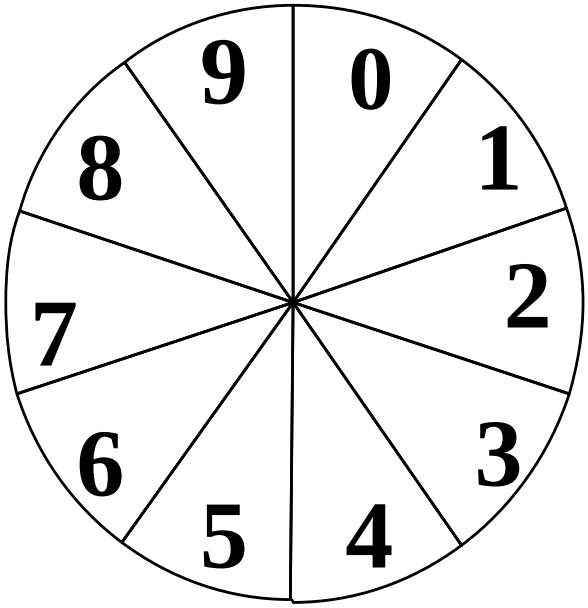
- https://apps.mathlearningcenter.org/number-pieces/ virtual base-ten materials that correspond to lengths on a virtual number line.
- https://www.nctm.org/Classroom-Resources/Illuminations/Interactives/Grouping-and-Grazing/ Help the alien spaceship move cows into corrals by counting, adding, and subtracting. This activity helps children learn grouping, tally marks, and place value.

0-9 Spinners

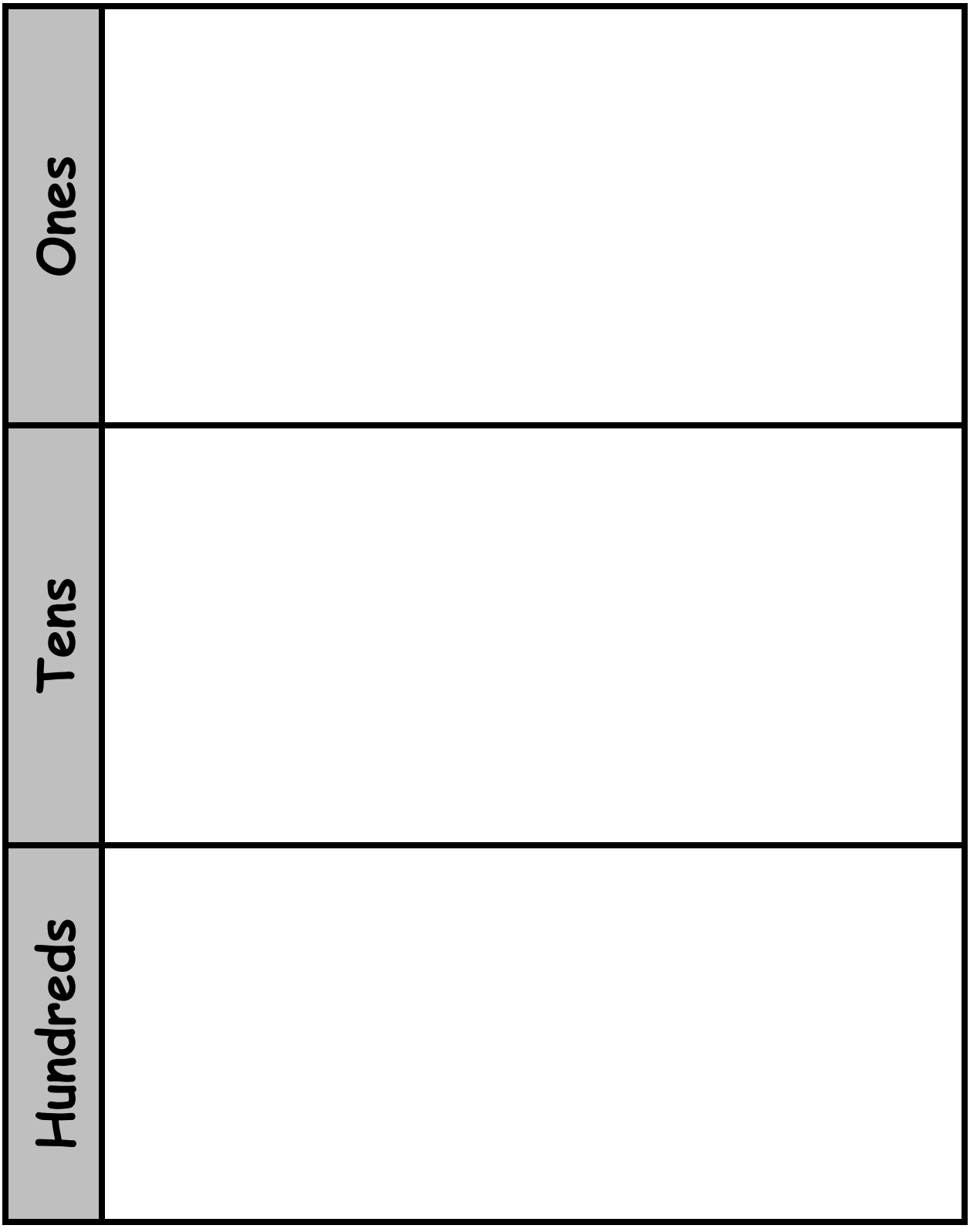








Place Value Mat



Towers of 10 Equation Recording Sheet

1st number rolled	2nd number rolled	Addition equation

3 ACT TASK: 1st Graders in Israel

Return to Task List

APPROXIMATE TIME: ONE CLASS SESSION

STANDARDS FOR MATHEMATICAL CONTENT

MGSE1.NBT.2 Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:

a. 10 can be thought of as a bundle of ten ones — called a "ten."
b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).

MGSE1.NBT.3 Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.

MGSE1.NBT.4 Add within 100, including adding a two-digit number and a one-digit number and adding a two-digit number and a multiple of ten (e.g., 24 + 9, 13 + 10, 27 + 40), using concrete models or drawings and strategies based on place value, properties of operations, and/or relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used**.**

STANDARDS FOR MATHEMATICAL PRACTICE

1. **Make sense of problems and persevere in solving them.** Students are asked to analyze and explain the meaning of the problem, actively engage in problem solving, show patience and positive attitudes, ask if their answers make sense, and check their answers with a different method.
2. **Reason abstractly and quantitatively.** Students are asked to explain their thinking and examine the reasonableness of their answers.
3. **Construct viable arguments and critique the reasoning of others.** Students are given the chance to share and critique the questions and strategies of fellow classmates.
5. **Use appropriate tools strategically.** Students can use concrete models strategically (and flexibly) to visualize, explore, and compare information
6. **Attend to precision.** Students will explain their thinking using mathematics vocabulary and use appropriate notation.
7. **Look for and make use of structure.** First graders begin to discern a number pattern or structure.

BACKGROUND KNOWLEDGE

Students will apply skills and concepts they have learned throughout the year involving number sense and place value. Students should demonstrate an understanding that the digits 0-9 are used to express or represent an amount or number and the placement of these digits determines the

value or size of the number. They should be able to build numbers with an understanding of place value in tens and ones and locate the numbers on a 99 chart. Multiple and varied experiences with the 99 chart will help students with flexible thinking throughout this activity.

ESSENTIAL QUESTIONS

In order to maintain a student-inquiry-based approach to this task, it may be beneficial to wait until Act 2 to share the EQ's with your students. By doing this, students will be allowed the opportunity to be very creative with their thinking in Act 1. By sharing the EQ's in Act 2, you will be able to narrow the focus of inquiry so that the outcome results in student learning directly related to the content standards aligned with this task.

- How does using ten as a benchmark number help us add or subtract?

MATERIALS

- Act 1 Photo: 
- 3 Act recording sheet

GROUPING

Whole/pairs/ individual task

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

In this task, students will view the picture and tell what they notice. Next, they will be asked to discuss what they wonder about or are curious about. These questions will be recorded on a class chart or on the board and on the student recording sheet. Students will then use mathematics to answer their own questions. Students will be given information to solve the problem based on need. When they realize they don't have the information they need, and ask for it, it will be given to them.

Background Knowledge:

This task follows the 3-Act Math Task format originally developed by Dan Meyer. More information on this type of task may be found at http://blog.mrmeyer.com/category/3acts/. A Three-Act Task is a whole-group mathematics task consisting of 3 distinct parts: an engaging and perplexing Act One, an information and solution seeking Act Two, and a solution discussion and solution revealing Act Three. More information along with guidelines for 3-Act Tasks may be found in the ***Guide to Three-Act Tasks*** on georgiastandards.org.

Unlike previous 3 Act Tasks found within the Georgia Frameworks for Mathematics, this task does not have one driving question for students to solve. Students should use prior experience with 3 Act Tasks to develop their own driving question and accurately explain their mathematical thinking related to the photo in Act 1.

Students need the opportunity to work with manipulatives on their own or with a partner in order to develop the understanding of addition and subtraction of numbers. From the manipulatives, students will be able to move to pictorial representations of the display, then more abstract representations (such as sketches), and finally to abstract representation of numbers. It is important to remember that this progression begins with concrete representations using manipulatives.

Task Directions

Act I – Whole Group - Pose the conflict and introduce students to the scenario by showing Act I picture.

1. Students are shown the picture.
   This is a picture of 1st graders in an Israeli classroom in 1973.

2. Ask students what they wonder about and what questions they have about what they saw. Students should share with each other first, and then the teacher records these questions (think-pair-share). The teacher may need to guide students so that the questions generated are math-related.

3. Ask students to estimate answers to their questions (think-pair-share). Students will write their best estimate, then write two more estimates – one that is too low and one that is too high so that they establish a range in which the solution should occur. Instruct students to record their estimates on a number line.

Anticipated questions students may ask and wish to answer:

- How many kids are in that class?
- How many boys are in the class?
- How many girls are in the class?
- Are there more kids in that class than in our class?

- How many more students are in their class than our class?
- How many students are in their class and our class?

Act II – **Student Exploration** - Provide additional information as students work toward solutions to their questions.

1. Ask students to determine what additional information they will need to solve their questions. The teacher provides that information only when students ask for it.:

    - There are 25 students in the class.
    - There are 8 girls.
    - There are 17 boys.

2. Ask students to work to answer the questions they created in Act I. The teacher provides guidance as needed during this phase by asking questions such as:
    - Can you explain what you've done so far?
    - What strategies are you using?
    - What assumptions are you making?
    - What tools or models may help you?
    - Why is that true?
    - Does that make sense?

Important note: Although students will only investigate the main question(s) for this task, it is important for the teacher to not ignore student generated questions. Additional questions may be answered after they've found a solution to the main question, or as homework or extra projects.

Act III – Whole Group - Share student solutions and strategies as well as Act III solution.

1. Ask students to present their questions, solutions, and strategies.

2. Refer to the photo in Act 1 for students use during the discussion.
3. Lead discussion to compare these, asking questions such as:
    - How reasonable was your estimate?
    - Which strategy was most efficient?
    - Can you think of another method that might have worked?
    - What might you do differently next time?

Act IV, The Sequel
Act IV is an extension question or situation of the above problem. An Act IV can be implemented with students who demonstrate understanding of the concepts covered in acts II and III. The following questions and/or situations can be used as an Act IV:

- Which class has the most boys, ours or theirs?

- How many more girls do we have than them?
- How can we organize this information using a chart or table?

FORMATIVE ASSESSMENT QUESTIONS

- What models did you create?
- What organizational strategies did you use?

Extension:

- Create a graph to compare the boys and girls in our class to the boys and girls in their class.

Intervention:

- Allow students to use two different color cubes to represent the girls and boys.

Return to Intervention Table

Act 1:

Name:_____

3-Act Task: 1st Graders in Israel

What problem are you trying to figure out?		
What information do you already know?		
What information do you need to solve the problem?		
Make an estimate.	Make an estimate that is too high.	Make an estimate that is too low.
Show your estimates on a number line. 		
Show your mathematical thinking using pictures, numbers, or words.		
Describe the counting strategies you used.		
What is your conclusion?		

Constructing Task: Counting Cathy

Return to Task List

Approximately one day
Adapted from: Engage NY lesson on using dimes and pennies as abstract representations of tens and ones.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Understand place value.

MGSE1.NBT.2 Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:

a. 10 can be thought of as a bundle of ten ones — called a "ten."
b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).

MGSE1.NBT.3 Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.

Use place value understanding and properties of operations to add and subtract.

MGSE1.NBT.5 Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.

MGSE1.NBT.7 Identify dimes, and understand ten pennies can be thought of as a dime. (Use dimes as manipulatives in multiple mathematical contexts.)

BACKGROUND KNOWLEDGE

It is absolutely essential that students develop a solid understanding of the base-ten numeration system in prekindergarten through grade 2. They must recognize that the word ten may represent a single entity (1 ten) or ten separate units (10 ones) and that these representations are interchangeable. Using concrete materials and calculators in appropriate ways can help students learn these concepts (NCTM, 2012).

Information quoted from Van de Walle and Lovin, Teaching Student-Centered mathematics: Grades K-3, page 150)

"The recognition of coins is not a mathematical skill at all. The names of our coins are conventions of our social system. Students learn these names the same way that they learn the names of any physical object in their daily environment-through exposure and repetition." The value of each coin, a dime is worth 10¢, and so on- is also a convention that students must simply be told. However, a student can say, "A dime is worth 10 cents" and have not really understood what that means. For these values to make sense, students have to have an understanding of 5, 10, 25. More than that, they need to be able to think of these quantities without seeing countable objects. Nowhere else do we say, "this is five," while pointing to a single item. A child whose number concepts remain tied to counts of objects is not going to be able to understand the values of coins. The social concept of having an equivalent worth or value is nontrivial for the young child. If your students seem to have good concepts of small numbers but still have difficulties with the values of single coins, then your lessons should focus on purchase power-a dime can *buy the same thing* that 10 pennies can buy."

ESSENTIAL QUESTIONS

- What is an efficient way to count pennies and dimes?

MATERIALS

- 5 sticks of 10 snap or unifix cubes
- 10 pennies and 5 dimes
- Projector for teacher to show examples or overhead manipulatives
- Place value recording template (can be copied and laminated to use with dry erase markers by students)

GROUPING

Whole group and/or Partner

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Part I

Show the students a stick of ten snap or unifix cubes. Ask: "How many cubes, or ones in this stick".

Use student responses to make sure all students agree that ten cubes make that stick of ten. Then place 10 unifix or snap cubes down next to the stick of ten already shown to the students. Ask: What is alike and different about these two groups of cubes? Encourage responses that they are both ten but one is with the cubes altogether in a stick (or bundle) and the other has the cubes separated. Lead the discussion to what would make them similar (putting the cubes together would make sticks of ten that are the same and have the same value).

Lay down a dime underneath the stick of ten cubes. Ask: "How many pennies have the same value as a dime?" Once students respond lay down 10 pennies next to the dime just as you laid down the cubes next to the stick of ten cubes. Ask: "What is alike and different about these two groups?" Encourage responses that show the relationship between a dime being the same as 10 pennies and 10 pennies being the same as a dime.

Encourage discussion about the similarities between a stick of ten being 10 cubes and a dime being the same as 10 pennies. If no student mentions breaking up the stick of ten and that being evidence of the stick of cubes being the same as 10 cubes, encourage that discussion. Then ask if you can do that with a dime. Discuss that you can't break up the dime but it still has a value of 10.

Clear your workplace of the money and unifix and snap cubes.

Part II
Let the students work in pairs with cubes and coins.

Show them 1 stick of ten cubes and 3 ones (13). Ask the students to show the same amount with the dimes and pennies. Have them work with their partner to show it on their desk. The students only have 10 pennies so some will struggle with how to show this because they don't have enough money. Encourage them to work together with the other students. Once students have the amount, discuss what should be on their desk and why.

Repeat this with combinations such as: 16, 26, 36, 14, 40, 29

Each time the students are shown an amount by the teacher using unifix or snap cubes, the students work together to show with the dimes and pennies. At this point the teacher should also show the place value recording template and have the students record the amount as seen in the example below for 16¢.

Dimes	Pennies
1	6

Once all the number combinations are done, have the students work on the Counting Cathy sheet.

TEACHER REFLECTION QUESTIONS

- Are students able to make connections between place value and money?
- Are students able to make accurate trades and then state the total of money they have?

FORMATIVE ASSESSMENT QUESTIONS

- What is an efficient way to count larger numbers?
- How many pennies are needed to make a dime?
- How is a dime similar to a stick of ten?

DIFFERENTIATION

Extension

- Students can be given a money amount and then show it with pennies and dimes.
- Help students develop an understanding of equivalency using resources such as: Coins for Unitary Thinkers- downloadable visual/mats: Click Here to Download Template: https://lorpub.gadoe.org/xmlui/bitstream/handle/123456789/52155/coins_for_unitary_thinkers.doc?sequence=1.

Interventions

- Students could model the task by using a double ten frame. When the student has reached ten they trade it in for a dime. The 10 pennies are removed from the mat and dime/rod takes the place of the ten items.
- Coins for Unitary Thinkers- downloadable visual/mats: Click Here to Download Template: https://lorpub.gadoe.org/xmlui/bitstream/handle/123456789/52155/coins_for_unitary_thinkers.doc?sequence=1.

Return to Intervention Table

TECHNOLOGY CONNECTION

- https://apps.mathlearningcenter.org/money-pieces/ virtual money manipulatives with connections to place value pieces to help students make connections.

- https://www.nctm.org/Classroom-Resources/Illuminations/Interactives/Coin-Box/ Learn how to count, collect, exchange, and make change for coins. The coin tiles help you count as you learn the value of each coin. How many of the games can you master? **This interactive is optimized for your desktop and tablet.**

Place Value Recording Sheet

Dimes	Pennies

Name_____

Counting Cathy

Cathy's mom gave her some money every day this week. Help her count the money she got every day.

Monday

Dimes	Pennies

Tuesday

Dimes	Pennies

Wednesday

Dimes	Pennies

Thursday

Dimes	Pennies

Friday

Dimes	Pennies

Constructing Task: Make a 10 and Move On

Approximately one day (adapted from Kindergarten GA Frameworks: Make a 10 and Carry On)

Return to Task List

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

STANDARDS FOR MATHEMATICAL CONTENT

Understand place value.

MGSE1.NBT.2 Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:

a. 10 can be thought of as a bundle of ten ones — called a "ten."
b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).

MGSE1.NBT.3 Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.

Use place value understanding and properties of operations to add and subtract.

MGSE1.NBT.5 Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.

MGSE1.NBT.7 Identify dimes, and understand ten pennies can be thought of as a dime. (Use dimes as manipulatives in multiple mathematical contexts.)

BACKGROUND KNOWLEDGE

It is absolutely essential that students develop a solid understanding of the base-ten numeration system in prekindergarten through grade 2. They must recognize that the word ten may represent a single entity (1 ten) or ten separate units (10 ones) and that these representations are interchangeable.

Using concrete materials and calculators in appropriate ways can help students learn these concepts (NCTM, 2012).

Information quoted from Van de Walle and Lovin, Teaching Student-Centered mathematics: Grades K-3, page 150)

"The recognition of coins is not a mathematical skill at all. The names of our coins are conventions of our social system. Students learn these names the same way that they learn the names of any physical object in their daily environment-through exposure and repetition." The value of each coin, a dime is worth 10¢, and so on- is also a convention that students must simply be told. However, a student can say, "A dime is worth 10 cents" and have not really understood what that means. For these values to make sense, students have to have an understanding of 5, 10, 25. More than that, they need to be able to think of these quantities without seeing countable objects. Nowhere else do we say, "this is five," while pointing to a single item. A child whose number concepts remain tied to counts of objects is not going to be able to understand the values of coins. The social concept of having an equivalent worth or value is nontrivial for the young child. If your students seem to have good concepts of small numbers but still have difficulties with the values of single coins, then your lessons should focus on purchase power-a dime can *buy the same thing* that 10 pennies can buy."

ESSENTIAL QUESTIONS

- What is an efficient way to count pennies and dimes?

MATERIALS

- *Make a Ten and Move On* game board
- 10 pennies and 9 dimes
- 6 sided dice

GROUPING

Whole group and/or Partner

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Part I
Each student has a game board and they take turns rolling the dice.

Students add the number of pennies to their mat that matches each roll. Because each player will have only 10 pennies they will be unable to count past ten without trading for a dime. Encourage *student observation* of the connection between 10 pennies traded for a dime and 10 cubes traded for a stick of ten.

At the end of each turn the player must state what they have on their mat as units and say the total. *(Example: I have 1 dime and 5 more which makes 15 cents).* First player to reach or go beyond 90 cents wins.

Part II

Play the same way as part one except players roll 4 times then compare to see which player has the greater number.

TEACHER REFLECTION QUESTIONS

- Are students able to make a set of pennies to match the number on the die?
- Are students able to make accurate trades and then state the total of money they have?

FORMATIVE ASSESSMENT QUESTIONS

- What is an efficient way to count larger numbers?
- How many pennies are needed to make a dime?
- Who rolled the greater amount? How do you know?
- What is the greatest/least amount you could roll?

DIFFERENTIATION

Extension

- Players can start with 9 dimes and on each roll take away the amount on the dice playing until someone reaches zero cents. This provides practice counting backwards and 1 to 1 correspondence.

Interventions

- Students could model the task by using a double ten frame. When the student has reached ten they trade it in for a dime. The 10 pennies are removed from the mat and dime/rod takes the place of the ten items.

Return to Intervention Table

Make a 10 and Move On

Making My Ten

group 10 ones into 1 group of ten

My Ten and Some More

PERFORMANCE TASK: Candy Shop

Return to Task List

Approximately 1-2 days

STANDARDS FOR MATHEMATICAL CONTENT

MGSE1.NBT.4 Add within 100, including adding a two-digit number and a one-digit number and adding a two-digit number and a multiple of ten (e.g., 24 + 9, 13 + 10, 27 + 40), using concrete models or drawings and strategies based on place value, properties of operations, and/or relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

MGSE1.MD4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them. *Students develop a procedure for solving word problems.*
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics. *Students choose candy clipart, drawings, number line, number chart, etc., to solve the word problem.*
5. Use appropriate tools strategically. *Students select appropriate clipart, drawings, etc., to solve the number problem.*
6. Attend to precision. *Students participate in a class discuss on each step in solving the word problems.*
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE/COMMON MISCONCEPTIONS

Students should have had prior experience with the steps involved in problem solving and a variety of problem-solving situations. Students should be familiar with how to use a variety of manipulatives to help with representations in problem-solving. Grouping manipulatives in this task is intended to develop the idea of counting in groups as being more efficient and accurate way to count. If this is the first time that the students are using the problem-solving steps, then conversations should develop around each stage to help build understanding.

ESSENTIAL QUESTIONS

- How can large quantities be counted efficiently?
- How can we use skip counting to help us solve problems?
- How can I solve multi-step problems?
- How can words be used to illustrate the comparison of numbers?
- How can benchmark numbers build our understanding of numbers?
- How can I represent addition and subtraction?

MATERIALS

- Candy Shop Part I recording sheet
- Candy Shop Part II recording sheet
- Candy pieces cut out
- Chart paper
- Highlighters

GROUPING

Large Group, Partner

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

(problem solving steps are adapted from Exemplars)

Part I

Part I of this task will be completed as a whole group activity. The class will work through the problem-solving steps below and engage in mathematical conversations to solve this task. If this is the first time that the students are using the problem-solving steps, then conversations should develop around each stage to help build understanding. Present the following problem:

Melissa went to the candy store and grabbed a large bag to fill with candy. There were 5 jars of yummy candy. At the first jar, she put 2 pieces of candy in the bag. At the second jar, she put 4 pieces in the bag and at the third jar, she put 6 pieces in the bag. If this pattern continues, how many pieces of candy will Melissa have after she visits all 5 jars?

Pass out Candy Shop Part I recording sheet, candy cut outs and highlighter to each student. Allow the students to cut out the candy pieces before starting the task. Read the task aloud and then have students read it silently. Proceed through the following steps, allowing the class to work together in each stage. The teacher may also complete a task sheet using an overhead projector or document camera to allow guidance for students.

During the *Understand* step of problem solving, the students will develop an understanding of what the problem is asking. They will use a highlighter to identify the question to be answered and locate any additional information that is important in solving the problem. *Why do you think this information is important? How will it help you solve the problem?* Do not allow students to highlight the entire problem, the highlighted portions should be the "important" information only. The students will then write an "I have to…" statement. This statement is redefining the

understanding of the question. Example: I have to figure out how many pieces of candy Melissa will have after she visits all 5 candy jars.

During the *Think and Plan* step of problem solving the students will brainstorm and develop a plan to solve the task. During this stage the students will identify strategies that will help them solve the problems. It may be necessary to provide students with suggested strategies and let them choose which will work best for them. (draw a picture, act it out, make a list, guess and check, find a pattern, create a chart, work backwards, etc.) Students will then create an "I will…" statement. This statement will identify "how" the student intends to solve the problem. Example: I will make a table of the candy collected at each candy jar.

During the *Solve* step of problem solving the students will use the strategy chosen to solve the problem. Students should work through the problems using the candy cut outs or manipulatives first. It is important to encourage students to work with manipulatives prior to pencil paper because they can easily rearrange the manipulatives to develop a solution. Students may become frustrated easily after too many attempts on paper. After a solution has been found using manipulatives, have them complete a table to show the solution.

During the *Math Words* step of problem solving, the students will use math language to explain their thinking. The students should be encouraged to explain their thinking along with the solution. Encourage students to write at least a couple sentences and keep in mind that someone reading their paper should know exactly what they were thinking. Example: I created a table and labeled the amount of candy collected at each jar. I added up the candy in table and found that Melissa collected 30 pieces of candy.

During the *Connections* step of problem solving, the students will make connections or identify relationships to other mathematical ideas and check their solution. Students may like to think of this stage as "thinking outside the box". Example: After I created the table I noticed a pattern with the pieces of candy at each jar. The pieces of candy increased by two at each candy jar. This made it easy for me to count. I counted the candy by two's.

Part II
Use chart paper to record the problem-solving steps used to solve the previous task. Use pictures, key words or phrases to help students identify the purpose of each step. The chart can be hung in the classroom for future use with problem solving tasks.

Understand- Underline the question, locate important information, "What do I need to find out?", "How am I going to find it out?", "I have to…"

Think and Plan- Choose your strategy (ex: draw a picture, act it out, make a list, guess and check, find a pattern, create a chart, work backwards, etc.), make a plan, "I will …"

Solve- Use your strategy, check your plan, "Did I show my thinking in a diagram/table/chart/math drawing?", "Do I have a solution- all my work, plus an answer?" "Is my answer easy to see?"

Math Words- "Did I use math language/labels to explain my strategy, diagram, solution?" (Remember- this is for other people- awareness of audience)

Connections- "Did I make any connections to other math?" "Did I check my solution by solving the problem in another way?" "Can I change the problem by changing the variables?" "Where are the patterns and relationships in this problem/solution?"

Part III

Pass out Candy Shop Part II recording sheet, candy cut outs and highlighter to each student. Allow the students to cut out the candy pieces before starting the task, if needed. Have students work with a partner to follow the steps of problem solving. The teacher should ask student pairs about their plan including if the plans make sense, etc. Ask questions such as: What led you to choose this particular plan? How do you know your plan makes sense?

Be sure to discuss and review the steps of problem solving and how these problems can be solved (using blocks to represent an animal and circles or boxes to represent cages, making drawings etc.) Share strategies that might be appropriate for a similar problem if needed. Guide and observe students as they work with a partner. The teacher should remind the students to use pictures, words, and numbers to explain their solutions and justify their thinking. After ample work time, have students share their ideas. Discuss the similar plans and solutions and encourage students to justify their thinking.

FORMATIVE ASSESSMENT QUESTIONS

- How can large quantities be counted accurately and efficiently?
- How can making equal groups of objects deepen your understanding of the base-ten number system?
- How can words be used to illustrate the comparison of numbers?
- Can you identify the amount of tens and ones in a given number?

DIFFERENTIATION

Extension

- The previous problems present situations where students are counting in groups of twos and fives. This extension develops the idea of counting in groups of four. Provide manipulatives if necessary. Present this problem to the students:
  Samantha went to the candy store and grabbed a large bag to fill with candy. There were 10 jars of yummy candy. At the first jar she put 4 pieces of candy in the bag. At the second jar she put 8 pieces in the bag and at the third jar she put 12 pieces in the bag. If this pattern continues, how many pieces of candy will Samantha have after she visits all 10 jars? How could Samantha share the candy fairly with the students in your class?
- Coins for Unitary Thinkers- downloadable visual/mats: Click Here to Download Template: https://lorpub.gadoe.org/xmlui/bitstream/handle/123456789/52155/coins_for_unitary_thinkers.doc?sequence=1.

Intervention

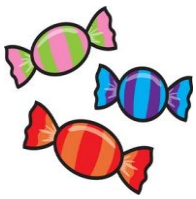
- Use the candy cut outs to help student show the candy in the bag. Present this problem to the students:

  Samantha went to the candy store and grabbed a large bag to fill with candy. There were 5 jars of yummy candy. At the first jar she put 1 piece of candy in the bag. At the second jar she put 2 pieces in the bag and at the third jar she put 3 pieces in the bag. If this pattern continues, how many pieces of candy will Samantha have after she visits all five jars?

- Coins for Unitary Thinkers- downloadable visual/mats: Click Here to Download Template: https://lorpub.gadoe.org/xmlui/bitstream/handle/123456789/52155/coins_for_unitary_thinkers.doc?sequence=1.

Return to Intervention Table

Name _____



Candy Shop Part I

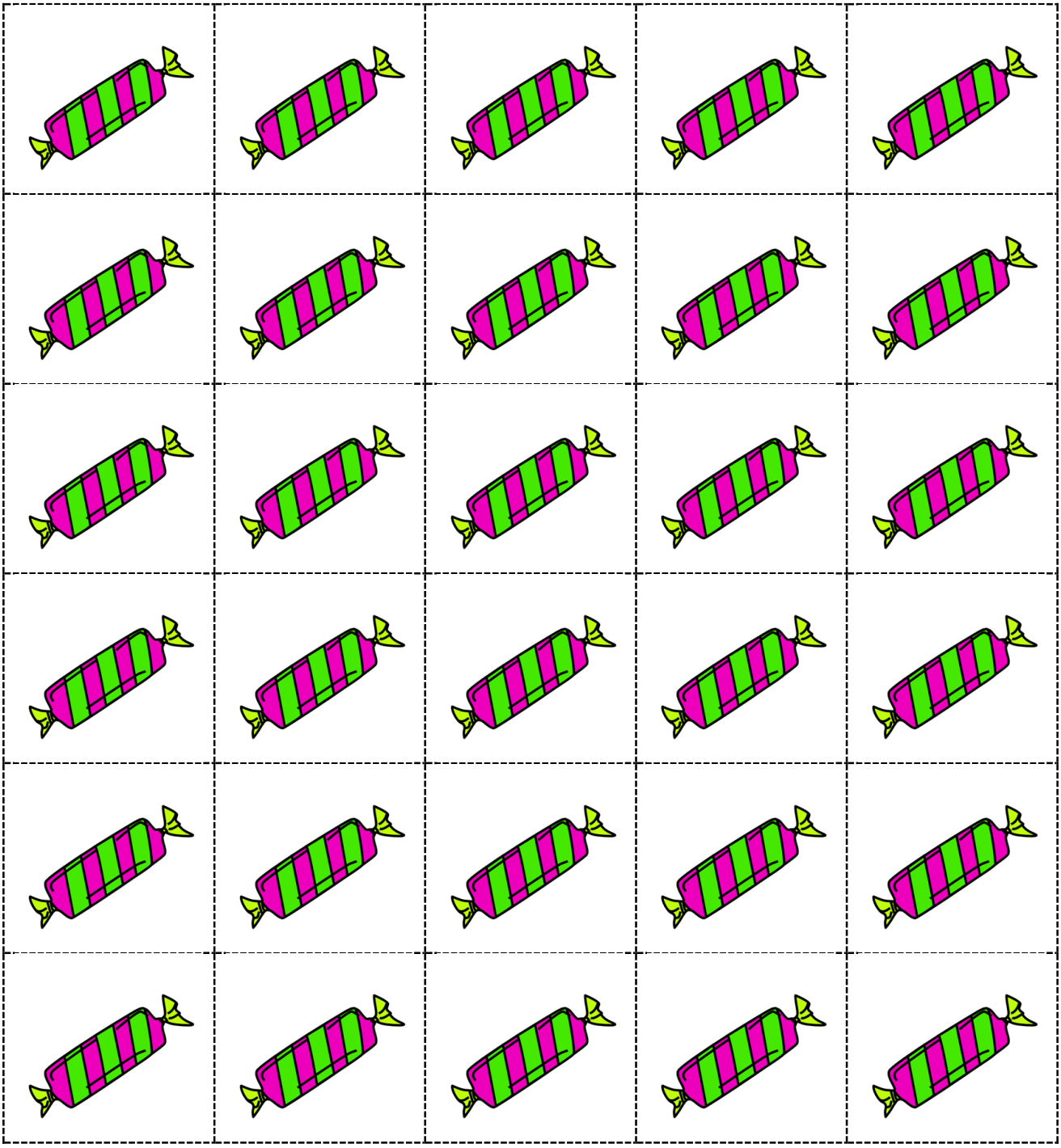
Melissa went to the candy store and grabbed a large bag to fill with candy. There were 5 jars of yummy candy. At the first jar, she put 2 pieces of candy in the bag. At the second jar, she put 4 pieces in the bag and at the third jar, she put 6 pieces in the bag. If this pattern continues, how many pieces of candy will Melissa have after she visits all 5 jars?

Name _____

Candy Shop Part II

Brent went to the new Candy Shop in town. He grabbed a large bag to fill with goodies. There were 4 jars of yummy candy. At the first jar, he put 5 pieces of candy in the bag. At the second jar, he put 10 pieces in the bag and at the third jar, he put 15 pieces in the bag. If this pattern continues, how many pieces of candy will Brent have after he visits all 4 jars?

While Brent was leaving the candy store his brother stopped by. Brent walked with his brother to all 4 jars. At each jar, he ate five pieces of candy from his bag of candy that he already collected. How many pieces of candy does he have when he finally leaves the candy store?



SCAFFOLDING/CONSTRUCTING TASK: The King's Counting Crew *Approximately 2-3 days*

Return to Task List

STANDARDS FOR MATHEMATICAL CONTENT

MGSE1.NBT.2 Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:

a. 10 can be thought of as a bundle of ten ones — called a "ten."
b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).

MGSE1.NBT.4 Add within 100, including adding a two-digit number and a one-digit number and adding a two-digit number and a multiple of ten (e.g., 24 + 9, 13 + 10, 27 + 40), using concrete models or drawings and strategies based on place value, properties of operations, and/or relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively. *Students explain why 20 + 20 + 6, 40 + 6, and 30 + 16 are all equal to 4 tens and 6 ones.*
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision. *Students explicitly discuss adding tens and ones to compose and decompose numbers.*
7. Look for and make use of structure. *Students provide multiple ways to compose a number in their journals.*
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE/COMMON MISCONCEPTIONS

Students should have experience working with numbers up to 99 in previous tasks. Students should be able to build numbers with an understanding of place value in tens and ones. Students should demonstrate an understanding that the digits 0-9 are used to express or represent an amount or number and the placement of these digits determines the value or size of the number. If your students have not had previous experience using tally marks or writing place value equations (For the number 45, 40 +5 =45), you will need to provide more experiences with these ideas.

ESSENTIAL QUESTIONS

- Why do we need to use two digits for recording certain amounts or certain numbers?

- How do we know when we are going to need two digits?
- How do we decide what two digits to use?"
- How can making equal groups of ten objects help us count larger quantities?
- What are some strategies that help me count?

MATERIALS

- "The King's Counting Crew -Tens and Ones" student task sheet
- "The King's Counting Crew - Game" student task sheet
- Two 0-9 dice for each pair of students or a 0-9 spinner
- Base ten blocks (Tens and ones for partners)
- Large foam dice, if available (if not, they can be made by following directions, here: http://www.education.com/activity/article/Make_Giant_Dice_kinder/
- *The King's Commissioners* by Aileen Friedman or similar book
- Chart paper
- Math journal or scratch paper

GROUPING

Large group, Partners

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Scaffolding Task Part I

Gather students together in a common area. Give partners a large plastic bag full of one household item (one group might get buttons, one group might get beans, one group might get macaroni noodles, but they should get a collection of the same items in their bag). These should be prepared prior to the lesson. They will be used as you read the story. Read *The King's Commissioners* by Aileen Friedman or similar book. This book illustrates counting in different ways. While reading the story, have students manipulate the situations that occur in the story using tally marks. ***Pause reading on the page when the daughter comes in to greet her father.*** At this point, refer to table 1 in this task. Read off the names of all 47 commissioners to the students, having them place a tally mark for each commissioner mentioned (please allow enough time for students to make a tally mark). The students may use scratch paper to write the tallies. Divide the students into 2 groups. One group will circle the tallies in groups of two, and the other will circle the tallies in groups of five. Ask the students to count how many commissioners the king has. Compare answers and then ask if there is another way that we could count them. Continue reading the book to discover how the king's daughter counted the commissioners.

Scaffolding Task Part II

Have a student volunteer to come up and be your partner. If you have large sponge dice or foam dice, this would work better than regular dice for the demonstration. The teacher will roll one number die, and the student volunteer will roll the other die. Put the dice together to create a two-digit number. Explain that the **digit** on the right represents how many ones are in the two-digit number. Select the amount of blocks that represent the ones place value. Put them on the work mat under the

word ONES. Explain that the **digit** on the left represents how many groups of ten are in the two-digit number. Select that many tens sticks, put them on the work mat under the word TENS. Students will complete the recording sheet by rolling two dice to create a 2-digit number, modeling the number with base 10 blocks, identifying groups of tens and individual ones and drawing the model. Encourage students to use sticks and dots when drawing the model. Students may become frustrated trying to draw an exact image of the base 10 blocks. Example of what they can do: 34

Ask the following questions,

- What two-digit number do we have?
- What digit is in the tens place?
- What digit is in the ones place?
- What do these digits represent?
- How many groups of tens and ones did we need to represent this number?
- How many tens do I have?

Example of classroom discourse for place value discussion

- If a student rolls a 3 in the tens place and 4 in the ones place, then the number 34 is created. Ask a student, **"If I count out all the ones in each ten stick, how many will we have?"** (*30*) "**Why did I only write a 3 in the tens place, instead of 30?"** (*Because while are more than 30, there are only three groups of ten. There are 4 ones also, so I cannot put 30 in the tens place. 30 in the tens place would actual represent 300(30 groups of 10) and 3 in the tens place is a much smaller amount than 300. We know that the tens place can only hold the digits 0-9, just like the ones place! I know that the number 34 is a two-digit number and in each place a digit represents a specific value.*) **"Could I count these tens sticks by ones?"** (*Yes)* **"Then why do I group them by tens?"** *(Because it is easier to count in groups, remember the story and the way we counted our objects.) IMPORTANT:* The number 24 can be represented as 24 ones or 2 tens and 4 ones, but is NOT the same as 24 tens.

Scaffolding Task Part III

Students will need a math journal or piece of paper to complete this activity. Each student will roll two dice and create a 2-digit number. Have the students record the number in their math journal in a variety of ways. For example, the student could write 46 as 40 +6, as well as 4 tens and 6 ones, as well as 20+ 20 +6, or 16 +30 etc. Provide base ten blocks or cubes for students to manipulate different representations. Teacher instruction should guide the students to develop an understanding of multiple ways to create a 2-digit number. Allow students time to practice with several numbers.

Constructing Task Part IV

Distribute "The King's Counting Crew" student task sheets. Demonstrate the task with a student volunteer. Students will work in pairs but each student will need their own recording sheet. For each roll the students will create 2 different numbers. Example: student one rolls a 7 and 5. Student one will choose to create representations for one number and the partner, student two, will complete the other number. Player 1 will complete 75 and player 2 will complete 57. They are both completing roll 1 at the same time. Next, they start roll 2. Student two will roll the dice and choose the number to represent. Student one will complete representations for the remaining number. Students must

create a 2-digit number, the tally mark picture, the tens and ones picture, and an equation for each roll. When students are writing the equation they should express the total number as a decade number plus individual ones. Example: the number 62 should be represented as the equation 60+2=62. The teacher should lead a discussion about writing a 2-digit number in expanded notation in the previous activity. Allow students several experiences practicing and modeling this concept. As you are walking around asking students about their work, watch for misconceptions (example: students saying that 53 is "35" – or that the "3" is in the tens place, 5 in the ones place). Allow 3 or 4 partners to share one of their examples with the class. The teacher could also assess students individually as needed using the assessment example included.

FORMATIVE ASSESSMENT QUESTIONS

- What two digits are used to create the number _____?
- How many tens and ones are needed to write a given two-digit number?
- Can you represent the number _____, using sets of tens and ones? (Offer a variety of manipulatives such as ten frames, stacks of Unifix cubes, dimes and pennies)
- Can you represent two digit numbers in tally pictures?
- Can you represent a two-digit number in an expanded notation? (34, 30+4=34)

DIFFERENTIATION

Extension

- Represent the number 46 as was done in the story. How many groups of 2 can you make with the number 58? How many groups of ten can you make? How many groups of five can you make? Continue with more numbers as needed.

Intervention

- Students will work with numbers 11–39, discussing the number of tens and ones in these two-digit numbers.
- Students may have access to a rekenrek to assist in adding numbers.
- "Groups of Ten" (Van de Walle, Activity 11.2, page 183) This activity gives students the opportunity to practice counting various groups of objects, make groups of ten, and record the total amount of objects. Use of a ten-frame to make groups of ten may be helpful for some students.

Return to Intervention Table

Table 1

The Commissioner of…….

Spilt Milk	Hiccups	Book Bag Finding	Face Wiping	Dirt Removal
Lost Homework	Vegetable Eating	Pencil Sharpening	Teeth Brushing	Snow Shoveling
Things that Bump in the Night	Battery Charging	Dish Washing	Book Returning	Umbrella Holding
Flat Tires	Bug Squishing	Trash Removal	Bedtime Story Reading	Toy Locating
Chicken Pox	Mosquito Slapping	Bed Making	Dog Bathing	Video Games
Foul Balls	Dog Walking	Homework Checking	Tree Climbing	Transportation
Scary Nightmares	Lawn Mowing	Lunch Money	Recycling	Late Arrivals
Mismatched Socks	Hair Brushing	Card Shuffling	Money Counting	
Wrong Turns	Clothes Folding	Meat Cutting	Nose Blowing	
Skinned Knees	Toilet Scrubbing	Lunch Packing	Alarm Clocks	

"The King's Counting Crew" Place Value Organizer

Tens	Ones

The King's Counting Crew
PART II

Write the number that you rolled (model with base 10 blocks on your desk)	How many groups of ten?	How many ones?	Draw a base 10 model of the number

The King's Counting Crew Part III Name_____

Roll 1	Number made	Tally Mark Picture	Tens and Ones Model	Equation
Roll 2	Number made	Tally Mark Picture	Tens and Ones Model	Equation
Roll 3	Number made	Tally Mark Picture	Tens and Ones Model	Equation
Roll 4	Number made	Tally Mark Picture	Tens and Ones Model	Equation

Roll 5	Number made	Tally Mark Picture	Tens and Ones Model	Equation
Roll 6	Number made	Tally Mark Picture	Tens and Ones Model	Equation
Roll 7	Number made	Tally Mark Picture	Tens and Ones Model	Equation
Roll 8	Number made	Tally Mark Picture	Tens and Ones Model	Equation

Example of Sample Assessment for Students for "The King's Counting Crew"

Use the following example questions with students, following "The King's Counting Crew" task. This should be done one on one with students, so that you can make observations regarding their understanding of place value.

Give a student 2 dice to roll. After the student rolls the dice, ask the following questions:

1. What 2 digits did you roll? ____ and _____

2. Make a 2-digit number. What was the first two-digit number you made?

   _____

3. Make another 2-digit number. What was the second two-digit number you made?
   _____

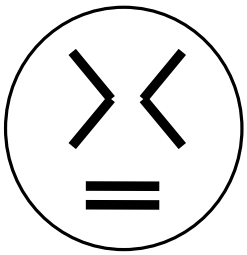
4. Draw a tally mark picture representing one of these numbers. Which number did you represent? _____

5. Draw a tens and ones picture modeling the other number. Which number did you represent? _____

6. Create 2 number sentences using your 2 numbers.

Additional Teacher Comments:

CONSTRUCTING TASK: Silly Symbols >, =, and <



Approximately 2 days

Return to Task List

STANDARDS FOR MATHEMATICAL CONTENT

MGSE1.NBT.2 Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:

a. 10 can be thought of as a bundle of ten ones — called a "ten."
b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).

MGSE1.NBT.3 Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.

MGSE1.NBT.4 Add within 100, including adding a two-digit number and a one-digit number and adding a two-digit number and a multiple of ten (e.g., 24 + 9, 13 + 10, 27 + 40), using concrete models or drawings and strategies based on place value, properties of operations, and/or relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively. *Students express the comparison value of numerals using the symbols >, <, and =.*
3. Construct viable arguments and critique the reasoning of others. *Students give evidence of the quantity of their number and how it compares to other quantities on the Silly Symbols Recording Sheet.*
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision. *Students express which number is greater than, less than, and equal to, using drawings to model quantities.*
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE/COMMON MISCONCEPTIONS

Students should be familiar with representing and comparing numbers. The symbols will be a new concept for most students and there should be ample amount of time allotted for practice. It is important that students are connecting the language with the symbols and not a trick. Often when students learn to use an aid (Pac Man, bird, alligator, etc.) for knowing which comparison sign (<, >, =) to use, the

students don't associate the real meaning and name with the sign. The use of the learning aids must be accompanied by the connection to the names: < ***less than***, > ***greater than***, and = ***equal to***.

More importantly, students need to begin to develop the understanding of what it means for one number to be greater than another. In Grade 1, it means that this number has more tens, or the same number of tens, but with more ones, making it greater. Additionally, the symbols are shortcuts for writing down this relationship. Finally, students need to begin to understand that both inequality symbols (<, >) can create true statements about any two numbers where one is greater/smaller than the other, (15 < 28 and 28 >15).

ESSENTIAL QUESTIONS

- How can large quantities be counted efficiently?
- How can words and symbols be used to illustrate the comparison of numbers?
- How can number benchmarks build our understanding of numbers?

MATERIALS

- Brown Bags of 90-100 objects (colored counters, buttons, ribbons, 1-inch tiles, beans, noodles: same objects in each bag)
- Silly Symbols Recording sheet

GROUPING

Large group, Partners

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Part I

Put the numbers 24 and 41 on the board. Discuss different ways that you could represent these numbers. Allow a few students to come up to the board and draw different representations. Have the students look at the representations and decide which number is greater and which number is smaller. Display a number line and have the students identify where the number numbers are located. When you are looking at the number line, what do you notice about the size of the number and the location on the number line? Engage in a discussion about how you can compare the numbers using the terms greater than and less than. (Example: 24 is less than 41 and 41 is greater than 24) Give the students multiple numbers to identify on the number line and practice verbally comparing. The language is very important in building a deep understanding.

Introduce the symbols that match the words. It is very important that students do not learn a "trick" when understanding the symbols. The symbols should be closely connected to the words they represent. Offer several examples on the board making sure the students are developing an understanding that the size of the number representation should match the symbols and language. The number line will help students understand the size of the number representation and use the

language correctly. Discuss the symbols and how they written. Allow additional time for students to practice writing the symbols and reading them correctly.
Now draw a representation of 26 and 26 and identify this number on the number line. How can you compare two numbers that have the same representation and live on the same spot on the number line? Ask the students how they might describe these two numbers in words. If no student presents the language of "equal" then you should introduce it. Discuss ways that show us that two numbers are equal and allow students time to practice writing the symbol and using the language.

Part II
Pass out one bag to each set of partners that were prepared before the lesson. Provide a student number line or remind students of a number line in the classroom for reference. Instruct students to empty the contents of their bag on their desk and separate the objects into 4 piles (the piles do not have to be equal). Students will count the number of objects in the first pile and record that number on the "Silly Symbols" recording sheet. Ask the students: How are you counting your manipulatives? Is there another way? How do you keep track of what has been counted?
As you observe students counting, look for efficient counting strategies. For example, you may observe some students counting by 2's, 3's, 5's, 10's etc. Allow students to choose their own counting strategy and picture representation. Students will do the same for the objects in the 2nd, 3rd and 4th pile. Remind students that they need to show that number using the number and a picture representation. The students will then identify where the numbers live on the number line. The visual location of these numbers on a number line will help students understand the size of each number when comparing. Next, students will complete the sentences at the bottom using the symbols. There should be practice with completing these at the beginning of the lesson. Students can reference the numbers on the number line when reading the sentences aloud to check their work.

Part III
Play the game "Silly Symbols". Students will play the game with a partner. Each pair will need a recording sheet, brown bag with 90-100 objects game board and the 3 symbols cut out. A student number line may also be provided to aid in comparing numbers. Player 1 will reach their hand in the bag, pull out a handful and count the number of objects. Place the objects under player one of the Silly Symbols game board. Player 2 will repeat this same process. The players will decide together which symbol to place in the middle section to make the number sentence true. The students will then identify where the numbers live on the number line. The visual location of these numbers on a number line will help students understand the size of each number when comparing. Both players will then record the information on their own game sheet. In the last column, the students will create an addition sentence combining the two sets for the total sum of pieces. Place the manipulatives back in the bag and repeat for round 2-10.

After the students have completed this game, gather in a common area. Allow the students to read some of their number sentences aloud and share their experiences with this game. Several practice opportunities are needed with reading the symbols aloud for the students to build a deep understanding. The teacher can gather assessments through informal observations, conversations with individual students, and the recording sheet responses.

FORMATIVE ASSESSMENT QUESTIONS

- How can you check if you have used the correct symbol?
- How can a number line help you compare two numbers?
- How many ways can you compare two numbers?
- How did you find the total number of manipulatives for each round?

DIFFERENTIATION

Extension

- Students can write a mathematical story with at least two different comparisons. Students will need to identify the idea of the story, the numbers to be used and the comparisons with words and representations. The students may illustrate the story when complete.

Intervention

- Students can work with numbers smaller than 30, then progress to larger numbers once they have developed some experience with smaller quantities.
- Students can use the tens and ones manipulatives from Task One to assist in visually seeing the difference in the quantities of each number.

Return to Intervention Table

Name_____ **Silly Symbols Recording Sheet**

Pile A	Pile B
Number: _____ Picture:	Number: _____ Picture:
Pile C	**Pile D**
Number: _____ Picture:	Number: _____ Picture:

Use the following symbols to complete the sentences below. **>, =, or <**

Pile A is _____than pile B. **Pile B is _____than pile A.**

Pile C is _____than pile D. **Pile D is _____than pile C.**

Pile D is _____than Pile B. **Pile A is _____than Pile C.**

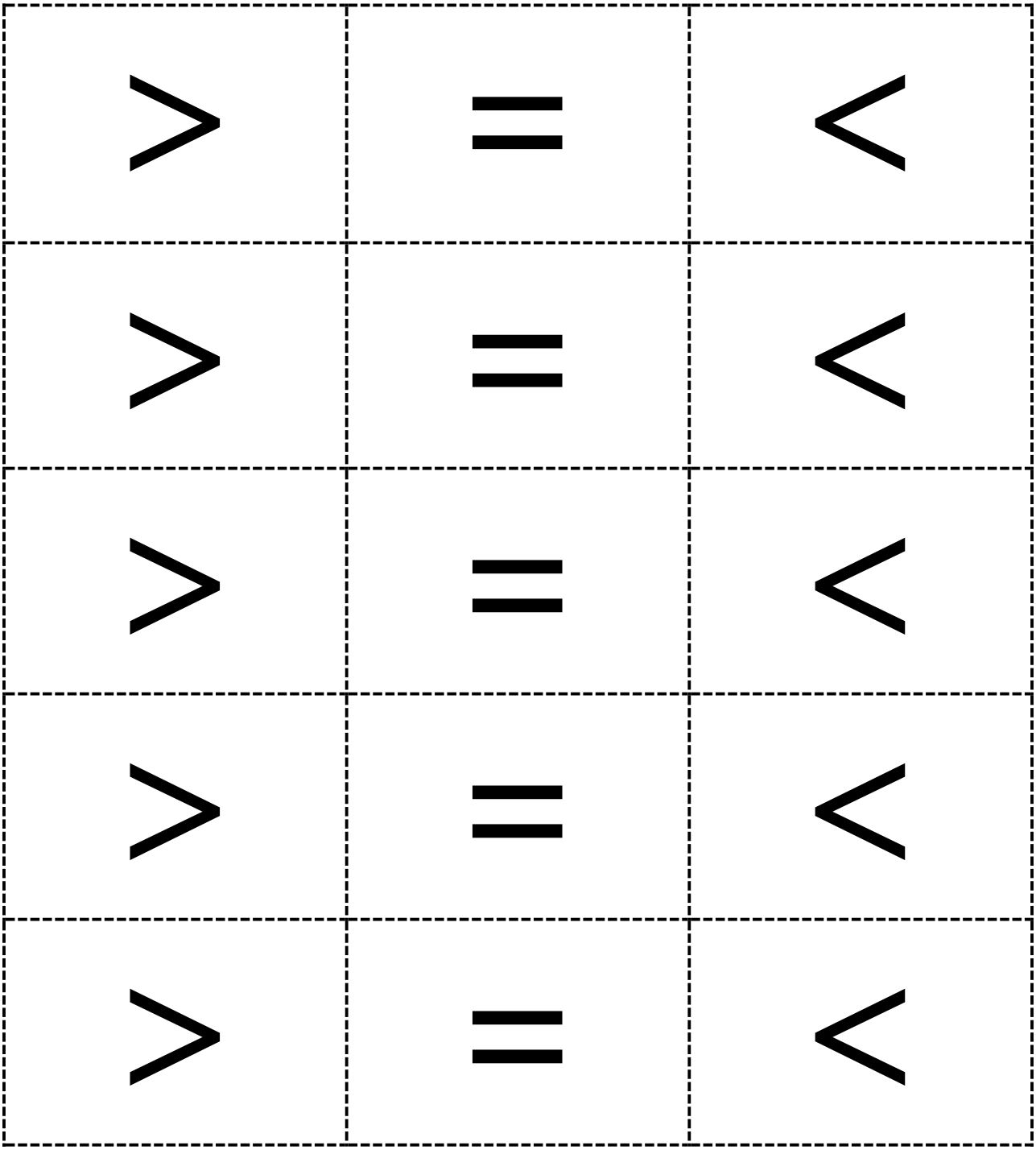
Silly Symbols Game Sheet

Round	Player 1 Number of Objects in handful	Symbol >, =, or <	Player 2 Number of Objects in handful	How many objects in all?
Example	*21*	<	*46*	*21+46=67*
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Silly Symbols Game Board

Player 2	
Symbol	
Player 1	

Cut symbols to use for Silly Symbols game. Each group will need one of each symbol.



CONSTRUCTING TASK: Hopping Around

Return to Task List

Approximately 1-2 days

SANDARDS FOR MATHEMATICAL CONTENT

MGSE1.NBT.4 Add within 100, including adding a two-digit number and a one-digit number and adding a two-digit number and a multiple of ten (e.g., 24 + 9, 13 + 10, 27 + 40), using concrete models or drawings and strategies based on place value, properties of operations, and/or relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively. *Students decompose numbers to add and subtract decade numbers.*
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure. *Students decompose numbers to add and subtract decade numbers.*
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE/COMMON MISCONCEPTIONS

The focus of the task is to develop an understanding of the relationship between addition and subtraction. This task serves as a learning task; however, similar work should continue through various routines. Add these conversations to the meeting time to support continued use of these concepts with these combinations. Be sure to discuss the concept of 0 and what happens when it is added or subtracted. These conversations are important for developing the relationship between addition and subtraction. In order to complete this task, students should have had multiple opportunities to decompose numbers and relate numbers to benchmarks such as five and ten.

ESSENTIAL QUESTIONS

- How can different combinations of numbers and operations be used to represent the same quantity?
- How are the operations of addition and subtraction alike and different?

MATERIALS

- Large number line (using masking tape or other materials)
- *Ready, Set, Hop*, by Stuart Murphy, or similar book
- Blank 0-99 and 100-199 chart for creating a number line
- Set of addition/subtraction flash cards

GROUPING

Large group

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Part I
Gather students in a common area. Read *Ready Set Hop*, by Stuart Murphy, or similar book. Encourage students to act out the story using an interactive number line. Ask students, "What happens if the frog hops forward? Backwards?" Create a number line from 0 to 30 on the floor using masking tape or something similar. Allow the students to demonstrate addition and subtraction equations that are discussed in the book by hopping forward or backward on the number line. Discuss how the number line helps to keep track of numbers. What strategies can be used when adding and subtracting on the number line?

Next the teacher models addition and subtraction stories using larger numbers. Try several scenarios of frogs jumping, allowing students to move up and down the number line.

You will want to connect your benchmark numbers by solving addition problems such as 28 + 14 = by saying 28 + 10 = 38, 38+4 (more) = 42, and solving subtraction problems such as 34 – 12 by saying 34 – 10 = 24, 24 – 2 (more) = 22.

Sample problems:

- 9 + 6 =
- 8 + 9 =
- 13 + 15=
- 18 – 7 =
- 15 – 6 =

Part II
Students will create a number line of their own using a blank 0-99 chart. The teacher will hand out the blank chart and have students fill in the numbers on their own. Discuss what the "decades" are on a 99 chart. The teacher will ask similar questions, "How can we locate these easily? How do the decades help us count easily?" The students will color each decade a different color. Cut and tape the edges to create a long number line.

Next students will use a set of addition/subtraction flash cards and practice using the number line with a partner. One partner will hold a flash card, while the other partner models the problem on the number line. It is important for the students to talk about the strategies they are using on a number line. Encourage these conversations between partners. The teachers should walk around and question students while they are working. Ask questions similar to: What happens when we add zero? Or we take zero away? What happens when we add 10? Or we take 10 away? Why is the sum not affected by the order of the numbers? Why is the difference affected by the order of the numbers?

FORMATIVE ASSESSMENT QUESTIONS

- How can a number line help you add or subtract?
- What strategies can you use with larger numbers in addition and subtraction?
- Can you use different combinations of numbers and operations to represent the same quantity? Give an example.
- How are the operations of addition and subtraction alike and different?

DIFFERENTIATION

Extension

- Give students an additional blank chart and extend the activity with a 100-199 chart.
- Interactive number lines are available at: www.ictgames.com/numberlineJumpMaker/index.html and https://apps.mathlearningcenter.org/number-line/
- Students can practice using a jump strategy to find the distance between two numbers. The starting place on the number line can be changed.

Intervention

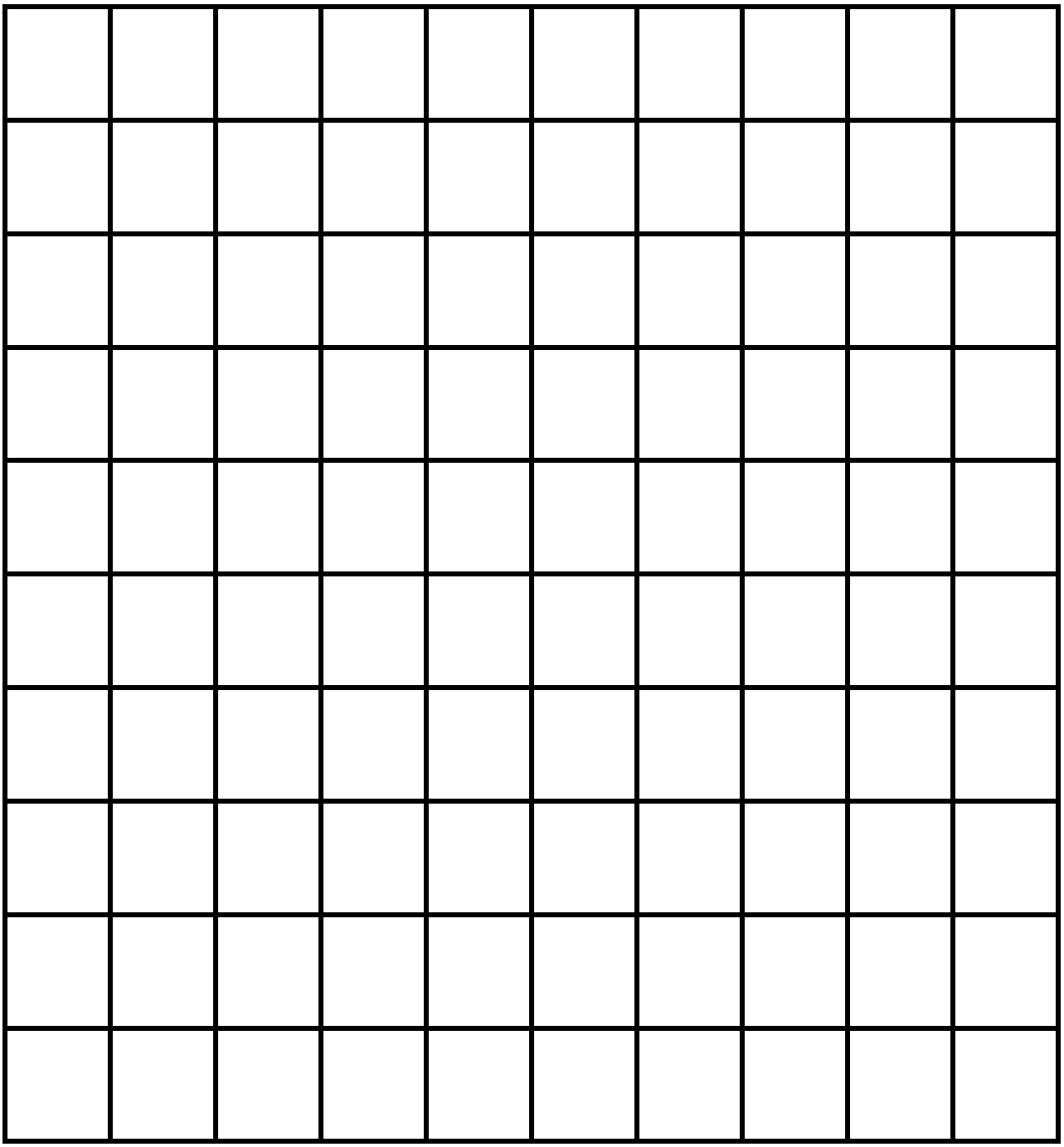
- The website http://nlvm.usu.edu/en/nav/frames_asid_156_g_1_t_1.html, gives practice with addition and subtraction. The students may work as a large group or with partners as the number of computers allows. Begin with addition problems, then move to subtraction problems. The students should draw what they think the number lines will look like and discuss their number lines and their answers. Then have the computer show the correct answer. This could even be used as a game or competition with prizes appropriate for your class. The game could be repeated on multiple days to reinforce this concept. This website requires the use of Java.
- Interactive number lines are available at www.ictgames.com/numberlineJumpMaker/index.html and https://apps.mathlearningcenter.org/number-line/
- Students can practice using a jump strategy to find the distance between two numbers. The starting place on the number line can be changed.
- Create larger formatted number chart so students can place a color counter in each number as they count.
- Students may use number mat from Task One to see decomposing numbers and adding benchmarks.

Return to Intervention Table

TECHNOLOGY:

- Interactive number lines are available at www.ictgames.com/numberlineJumpMaker/index.html and https://apps.mathlearningcenter.org/number-line/

Blank 0-99 Chart



Blank 100-199 Chart

FAL: Caterpillars and Leaves Return to Task List

See link below to access this assessment:

http://www.jennyray.net/uploads/1/2/9/7/12975776/k-3_caterpillars_and_leaves.pdf

PERFORMANCE TASK: Fishy Math

Return to Task List

Approximately 1-2 days

STANDARDS FOR MATHEMATICAL CONTENT

MGSE1.NBT.2 Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:

a. 10 can be thought of as a bundle of ten ones — called a "ten."
b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).

MGSE1.NBT.4 Add within 100, including adding a two-digit number and a one-digit number and adding a two-digit number and a multiple of ten (e.g., 24 + 9, 13 + 10, 27 + 40), using concrete models or drawings and strategies based on place value, properties of operations, and/or relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them. *Students engage in mathematical conversations to solve math problems.*
2. Reason abstractly and quantitatively.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision. *Students communicate about each task using the prescribed problem solving steps.*
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE/COMMON MISCONCEPTIONS

Students should have had prior experience with the steps involved in problem solving and a variety of problem solving situations. At this point, the students should be utilizing and explaining their reasoning for using various problem solving strategies. This is an excellent opportunity to integrate the speaking and listening standards for first grade. Students should be familiar with how to use a variety of manipulatives to help with representations in problem solving.

ESSENTIAL QUESTIONS

- How can large quantities be counted efficiently?
- How can making equal groups of objects deepen your understanding of the base-ten number system?
- How can words be used to illustrate the comparison of numbers?

- How are problem-solving strategies alike and different?
- How can problem situations and problem-solving strategies be represented?

MATERIALS

- "Fishy Math" student task sheet
- "Pet Store" student task sheet
- Small manipulatives (counters, base ten blocks, unifix cubes, etc.)
- highlighters
- Small fish cut outs for intervention or as needed

GROUPING

Whole Group, Individual

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

(problem solving steps are adapted from Exemplars)

Part I

Part I of this task will be completed as a whole group activity. The class will work through the problem-solving steps below and engage in mathematical conversations to solve this task. Conversations about the individual problem-solving steps may need to be revisited for clarification. Pass out a task sheet, fish cut outs and highlighter to each student. Allow the students to cut out the fish before starting the task. Read the task aloud and then have students read it silently. Proceed through the following steps, allowing the class to work together in each stage. The teacher may also complete a task sheet using an overhead projector or document camera to allow guidance for students.

40 fish have arrived at the aquarium. You need to put the fish into fish tanks.
Each fish tank must have the same number of fish. How many fish tanks do you need?
Show at least 2 different ways the fish can be put into fish tanks. Use pictures, words, and numbers to show your math thinking.

During the *Understand* step of problem solving the students will develop an understanding of what the problem is asking. They will use a highlighter to identify the question to be answered and locate any additional information that is important in solving the problem. *Why do you think this information is important? How will it help you solve the problem?* Do not allow students to highlight the entire problem, the highlighted portions should be the "important" information only. The students will then write an "I have to…" statement. This statement is redefining the understanding of the question. Example: I need to figure out how many fish tanks I need to keep 40 fish.

During the *Think and Plan* step of problem solving the students will brainstorm and develop a plan to solve the task. During this stage the students will identify strategies that will help them solve the problems. It may be necessary to provide students with suggested strategies and let them choose

which will work best for them. (draw a picture, act it out, make a list, guess and check, find a pattern, create a chart, work backwards, etc.) Students will then create an "I will…" statement. This statement will identify "how" the student intends to solve the problem. Example: I will draw a picture of the tanks and fish to solve this problem.

During the *Solve* step of problem solving, the students will use the strategy chosen to solve the problem. Students should work through the problems using the fish cut outs or manipulatives first. It is important to encourage students to work with manipulatives prior to pencil paper because they can easily rearrange the manipulatives to develop a solution. Students may become frustrated easily after too many attempts on paper. After a solution has been found using manipulatives, have them record the solution with a picture. Students may use an easy representation such as a square to represent a tank and a circle to represent a fish.

During the *Math Words* step of problem solving, the students will use math language to explain their thinking. The students should be encouraged to explain their thinking, along with the solution. Encourage students to write several sentences and keep in mind that someone reading their paper should know exactly what they were thinking. Example: I drew four squares to show my tanks. Next I drew 10 fish in each tank. I knew that ten fish would fit in each tank because I handed them out one by one and ran out of fish.

During the *Connections* step of problem solving, the students will make connections or identify relationships to other mathematical ideas and check their solution. Students may like to think of this stage as "thinking outside the box". Example: After I drew the fish in the tanks, I noticed that they were in groups of tens. I can add groups of tens because they are an easy benchmark number for me. 10 fish plus 10 fish plus 10 fish plus 10 fish equals 40 fish. 10+10+10+10=40

Part II
Students will now work independently to create their own problem to solve. Each student will roll two dice to create a 2-digit number and choose an animal to use. The 2-digit number identifies how many animals for the problem. Example: A student rolls 62 and chooses a mouse. Their problem will have 62 mice. Each student will write a story about their animal being delivered to the pet store. They will have to decide how to separate the animals into cages making sure no more than ten go into one cage. The teacher may allow students to write their own problem using the above information as a guide or a template has been provided if needed. Be sure to discuss and review the steps of problem solving and how these problems can be solved (using blocks to represent an animal and circles or boxes to represent cages, making drawings etc.) Share strategies that might be appropriate for a similar problem if needed.

Guide and observe students as they work independently on their own problem. The teacher should remind the students to use pictures, words, and numbers to explain their solutions and justify their thinking.

After ample work time, have students share their ideas. Discuss the similar plans and the unique plans. This is an open-ended question and will have different combinations of responses.

FORMATIVE ASSESSMENT QUESTIONS

- How did drawing pictures help you solve this problem?
- Can you explain how you solved the problem?
- Can you identify the amount of tens and ones in your 2-digit number?

DIFFERENTIATION

Extension

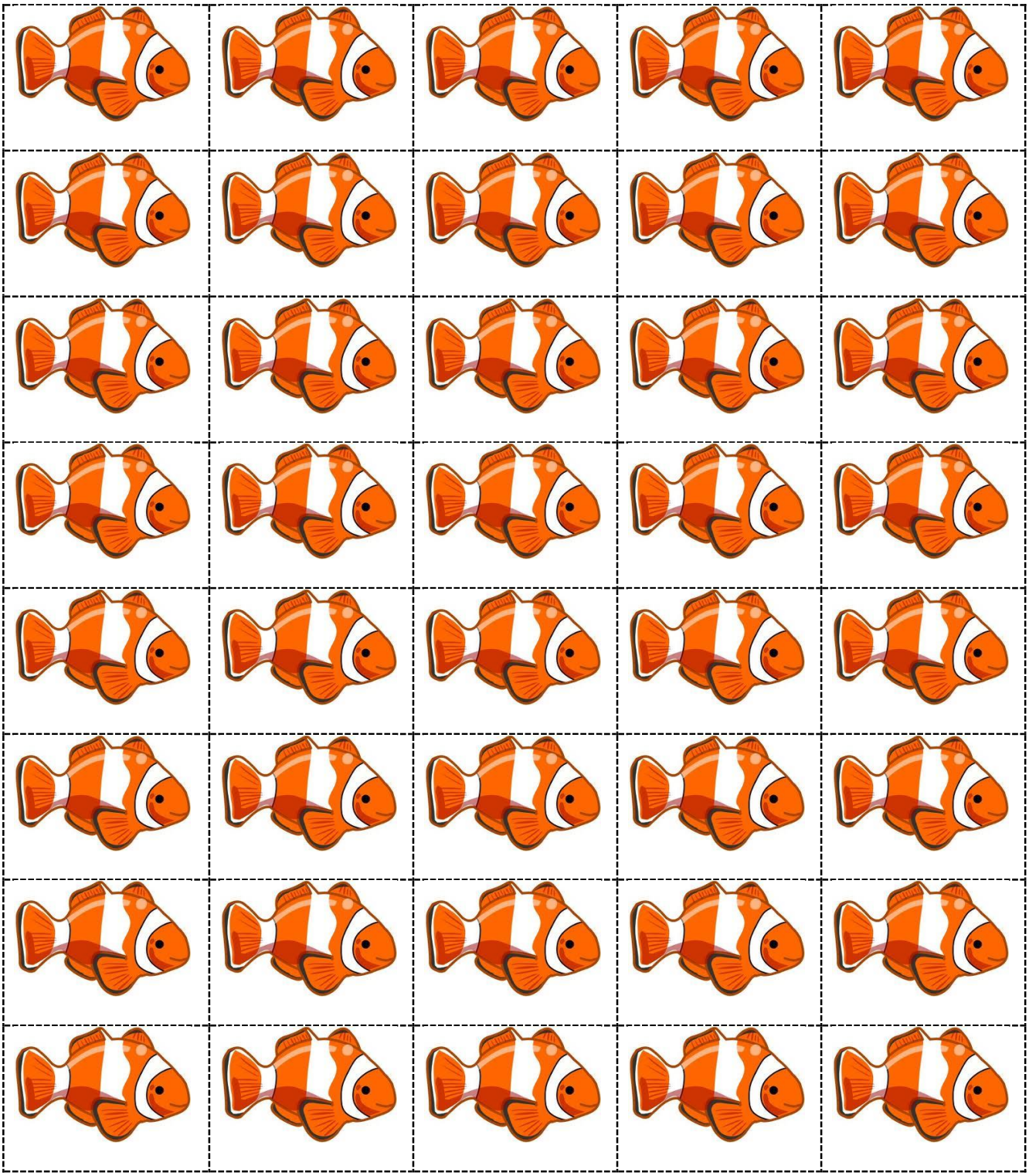
- Present this problem to the students:

  You have 54 starfish. How many different ways can you arrange these creatures and always have the same number of starfish in each aquarium?
- Students can create their own scenarios for others to solve.

Intervention

- Provide students with paper fish and rectangles to represent the aquariums. Allow students to work with a partner.
- Create a cloze activity work-mat giving students a structure to complete his/her word problem.

Return to Intervention Table



Name _____

Fishy Math

40 fish have arrived at the aquarium. You need to put the fish into fish tanks. Each fish tank must have the same number of fish. How many fish tanks do you need?
Show at least 2 different ways the fish can be put into fish tanks. Use pictures, words, and numbers to show your math thinking.

Name _____

Pet Store

_____ _____ have arrived at the pet store. You
number *animal*
need to put the animals into cages. Each cage must have the same number of animals. How many cages do you need? Show 2 different ways the animals can be put into cages. Use pictures, words, and numbers to show your math thinking.

PERFORMANCE TASK: Monkeys at the Zoo

Return to Task List

Approximately 1 day

STANDARDS FOR MATHEMATICAL CONTENT

MGSE1.NBT.2 Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:

a. 10 can be thought of as a bundle of ten ones — called a "ten."
b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).

MGSE1.NBT.4 Add within 100, including adding a two-digit number and a one-digit number and adding a two-digit number and a multiple of ten (e.g., 24 + 9, 13 + 10, 27 + 40), using concrete models or drawings and strategies based on place value, properties of operations, and/or relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them. *Students engage in mathematical conversations to solve this task.*
2. Reason abstractly and quantitatively.
4. Model with mathematics. *Students select a manipulative or modeling strategy to solve this task.*
5. Use appropriate tools strategically. *Students select a manipulative or modeling strategy to solve this task.*
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE/COMMON MISCONCEPTIONS

Students should have had prior experience with the steps involved in problem solving and a variety of problem solving situations. Students should be familiar with how to use a variety of manipulatives to help with representations in problem solving.

ESSENTIAL QUESTIONS

- How can large quantities be counted efficiently?
- How can words be used to illustrate the comparison of numbers?
- How can benchmark numbers build our understanding of numbers?
- How are problem-solving strategies alike and different?
- How can problem situations and problem-solving strategies be represented?

MATERIALS

- "Monkeys at the Zoo" student task sheet
- Monkey cut outs, if needed
- Small manipulatives (counters, base ten blocks, unifix cubes, etc.)
- Chart paper
- highlighters

GROUPING

Individual or partner

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Gather students together in a common area. Review the steps of problem-solving and present the following on the board or chart paper:

Forty-eight new monkeys arrive at the zoo.
The zookeeper, Katy, needs to put them into cages.
Each cage can hold any number of monkeys up to 10. How many cages does she need?
Show at least 2 different ways the zoo keeper can put the 48 monkeys in cages.

Discuss how this problem can be solved (using blocks to represent monkeys and circles or boxes to represent cages, making drawings etc.) Discuss different plans for solving the problems. Allow students to share strategies such as draw a picture, act it out, make a list, guess and check, find a pattern, create a chart, work backwards, etc.

Have students work with a partner to complete the problem-solving steps. Pass out the student task sheet and the monkey page if needed. Students may want to use the monkeys as their choice representation. Refer to the previous task if the students are not familiar with the steps of problem-solving. The teacher should walk around and observe students while they work. Ask student pairs about their plan, including if the plans make sense, etc. Ask questions such as: What led you to choose this particular plan? How do you know your plan makes sense? Tell me about these numbers, are they odd or even? How many tens are in this number? Ones?

Guide and observe students as they work in partners. The teacher should remind the students to use pictures, words, and numbers to explain their solutions and justify their thinking. After

ample work time, call students back to a common area. Allow students volunteers to share their steps in problem solving. Discuss the similar plans and the unique plans. This is an open-ended question and will have different combinations of responses. Include discussion of how each solution works.

FORMATIVE ASSESSMENT QUESTIONS

- Can drawing pictures help you solve this problem?
- Can you write a number sentence or use words to communicate your thinking?
- Can you identify the amount of tens and ones in a given number?

DIFFERENTIATION

Extension

- Present this problem to the students:

  You have 72 rabbits. You need to put the rabbits into cages. Each cage can hold any number of rabbits up to 8. How many cages do you need?

Intervention

- Provide students with manipulatives to represent the animals and paper rectangles to represent the cages and present this problem to the students:

  24 tigers have arrived at the zoo. The zoo keeper needs to put them into cages. Each cage can hold any number of tigers up to 6. How many cages does the zoo keeper need? Use pictures, words, and numbers to prove your math thinking.

Return to Intervention Table

TECHNOLOGY CONNECTION:

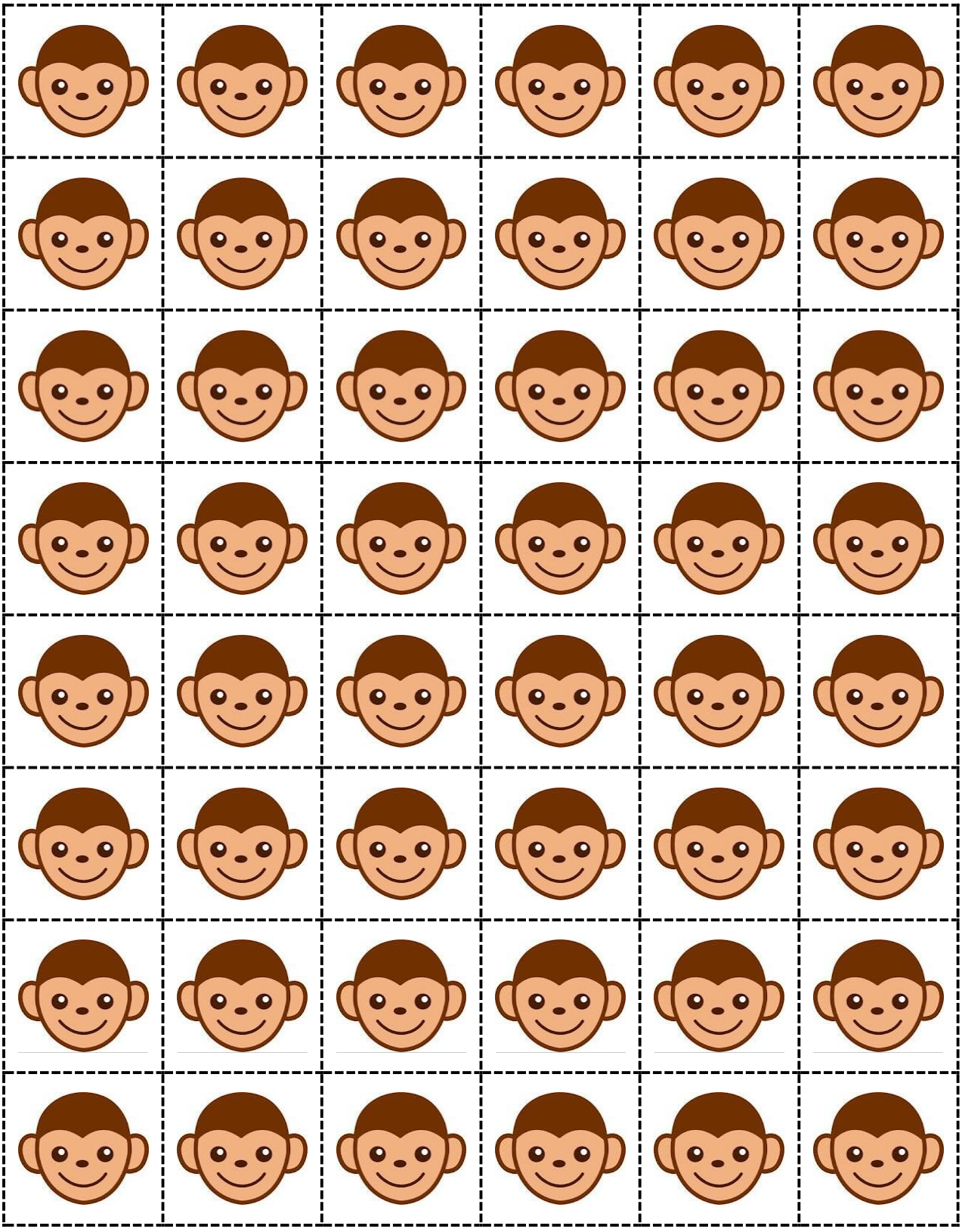
- https://www.nctm.org/Classroom-Resources/Illuminations/Interactives/Grouping-and-Grazing/ Help the alien spaceship move cows into corrals by counting, adding, and subtracting. This activity helps children learn grouping, tally marks, and place value. **This interactive is optimized for your desktop and tablet.**

Name _____

Monkeys at the Zoo

Forty-eight new monkeys arrive at the zoo. The zookeeper, Katy, needs to put them into cages. Each cage must have the same number of monkeys.

Show different ways the zoo keeper can put the 48 monkeys in cages.



SCAFFOLDING TASK: What's Around Me?

Return to Task List

Approximately 3 days

STANDARDS FOR MATHEMATICAL CONTENT

MGSE1.NBT.2 Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:

a. 10 can be thought of as a bundle of ten ones — called a "ten."
b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).

MGSE1.NBT.3 Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.

MGSE1.NBT.4 Add within 100, including adding a two-digit number and a one-digit number and adding a two-digit number and a multiple of ten (e.g., 24 + 9, 13 + 10, 27 + 40), using concrete models or drawings and strategies based on place value, properties of operations, and/or relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

MGSE1.NBT.5 Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively. *Students explore addition and subtraction of tens and ones*
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically. *Students select a mathematical tool or modeling strategy to solve this task.*
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE/COMMON MISCONCEPTIONS

Students should be familiar with representing and comparing numbers with words and symbols. They should be able to build numbers with an understanding of place value in tens and ones and locate the numbers on a 99 chart.

ESSENTIAL QUESTIONS

- What strategies can we use to locate numbers on a 99 chart?
- How can number benchmarks build our understanding of numbers?
- How can I easily locate 10 more or 10 less on a 99 chart?
- How can I easily locate 1 more or 1 less on a 99 chart?

MATERIALS

- 99 Chart
- More/Less transparency sheet (each student will need one 5 square reader)
- More/Less recording sheet
- Clear counters
- 0-9 spinner or 0-9 dice
- More than/Less than spinner
- Paper clip
- Deck of cards (Ace through 9, A=1)

GROUPING

Large group, Individual

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Part I
Provide students with a 99 chart and a clear counter. Ask the students to cover the number 17. How can we identify a number that is one more than 17? Allow the students to share ways to find a number that is one more than a given number. The discussion should include the visual of using the 99 chart and where a number that is one more can be located. Students should also make the connection to count on one number. Provide the addition equation and ask the students if they see a connection with one more. *17+1=18*. Practice writing equations for numbers that are one more than a given number. Have students place a counter on 69. Write the addition equation for one more than 69. *69+1=70*. Next, have the students cover the number 34. How can we identify a number that is one less than 84? Students will share ways to find a number that is one less than a given number. Connect counting back one to subtraction and show how the equation represents this idea. Have students place the counter on 50. Count back one number on the 99 chart and develop the equation *50-1=49*. Throughout the discussion, ensure that the same strategies students discussed for one more are being discussed for one less. Sliding the counter to the left and right on the 99 chart can provide additional practice experiences.

Part II
Using the 99 chart, discuss different ways to locate 10 more and 10 less. Explore all the strategies that students give. Specifically concentrate on the counting on and counting back strategy. Place a clear counter at the starting number and ending number. What do we notice

about the placement of the two counters? Explore this concept with several numbers. Repeat the same process with 1 more and 1 less. Ask the students if we can relate addition and subtraction to more and less. What do these number sentences look like? Complete multiple examples and have the student create the number sentences that follow. Example: given number 67. Find: 10 more = 77, 67+10=77; 10 less = 57, 67-10=57.

Part III

Pass out one 5 square reader, copied on clear transparency paper and a 99-chart to each student. (There are 6 on a page. Copy on transparency paper and cut to give one to each student.) Model for students how you choose a number and place the middle square on the 5 square reader. Explain how you can use this reader to help with locating 10 more, 10 less, 1 more and 1 less. Model and allow students to explore with these readers using several different numbers. Ask the students what happens when your reader is on the edge. Model and explore this concept with your students.

Give each student a 0-9 spinner or dice, 99 chart, one 5 square reader and a copy of the 10 More/Less 1 More/Less recording sheet. Students will work independently for this activity. The student will need to spin the spinner twice to create a 2-digit number. Write this number in the middle of the 5 square reader on the recording sheet.

Students will then use the 5 square reader on transparency paper to find the numbers that are 10 more, 10 less, 1 more and 1 less on the 99-chart. Complete all ten problems on the recording sheet. Although students are working independently, it is beneficial to allow students to have conversations while completing this activity. The conversations surrounding the concept of more and less can be very helpful in building a deeper understanding. While students are working, walk around and ask students to give the related addition or subtraction sentence to a number on their recording sheet.

Part IV

Students will complete the More than/less than activity. Each student will need a more/less spinner, paper clip (for the spinner), pencil, deck of cards (A-9, A=1), 99 or hundreds chart. Students will complete this activity with a partner. Shuffle the cards and place them face down. Player one picks two cards and lays them down in the order in which they were drawn. (Students should not rearrange the order.) Find the number on the 99-chart and cover with a counter. The player then spins the spinner and moves the counter to change the number on the 99-chart according to what the spinner lands on. Record the results on paper. (Ex: Place the counter on 23. Spin and land on 10 more. Move the counter to 33). If a player spins and the result moves him/her off the board, then they lose a turn. The other player then verifies the answer. If the answer is correct the player gets 1 point. If the player is incorrect they lose 1 point. The cards go on the bottom of the pile. The other players repeat to continue the game. Play continues until a player gets a predetermined number of points (example: 10 points). This activity can be used in a variety of ways to reinforce this skill. Provide manipulatives for students that may need assistance in understanding the larger numbers.

Part V

Play the game "99 Chart Tic-Tac-Toe". This is a partner review game on place value and will allow students to become more fluent with understanding the tens and ones that make up a number. The directions are on the handout following the recording sheets.

FORMATIVE ASSESSMENT QUESTIONS

- How can you locate a number on a 99 chart?
- How do benchmark numbers help you use the 99 chart?
- Given the number _____ can you locate 10 more or 10 less on a 99 chart?
- Given the number _____ can you locate 1 more or 1 less on a 99 chart?
- What is the addition/subtraction sentence that is related to 10 more/less?
- What is the addition/subtraction sentence that is related to 1 more/less?

DIFFERENTIATION

Extension

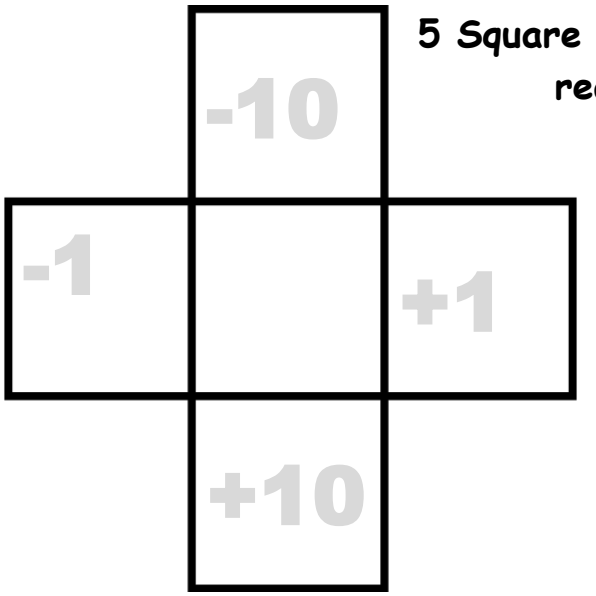
- Allow students to write a note to kindergarten students, in their math journal, explaining the concept of 1 more/less and 10 more/less. Remind students to be very specific with creating directions for this idea.
- Students will explore the idea of 20 more/less on the 99 chart. Have students use a counter to demonstrate what happens when we find ten less than a number. Use this same strategy to find 20 more/less.

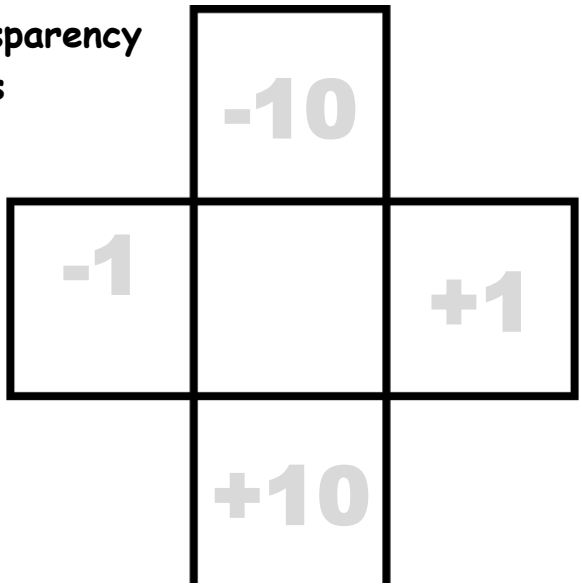
Intervention

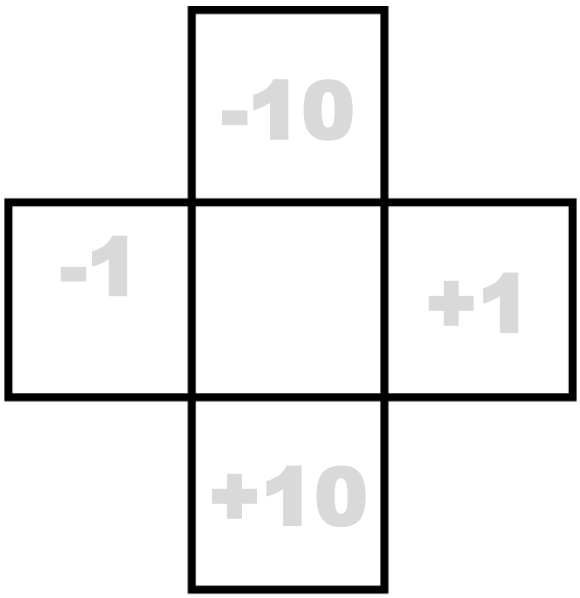
- Students can work with smaller numbers on the 99 chart using a 6 sided dice. Use the 5 card reader to aid in finding 1 more/less or 10 more/less.

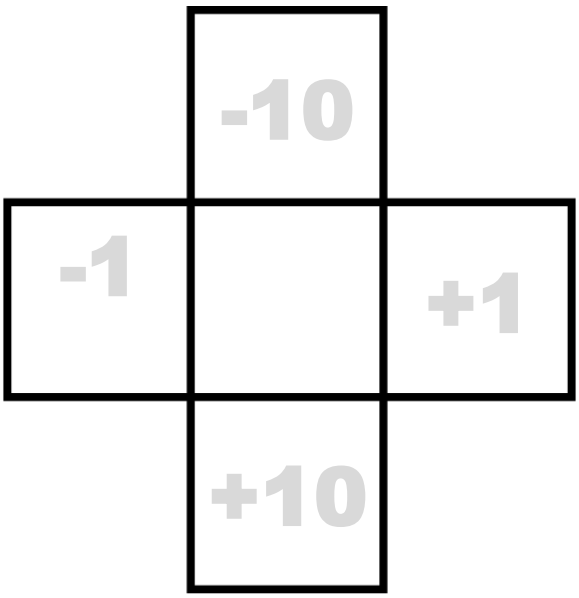
Return to Intervention Table

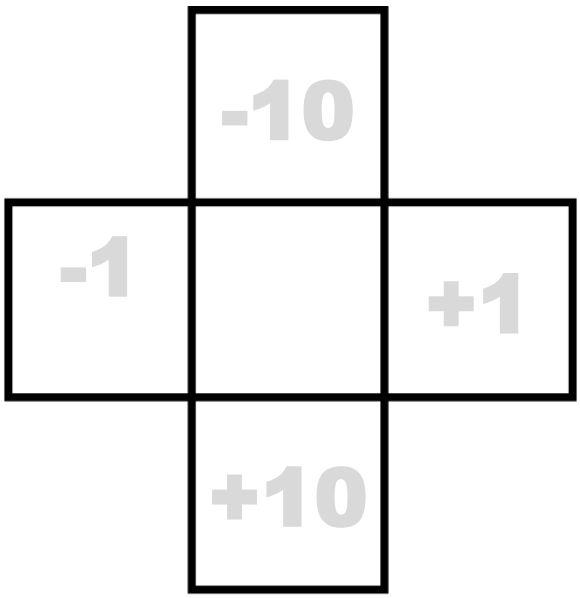
5 Square transparency readers

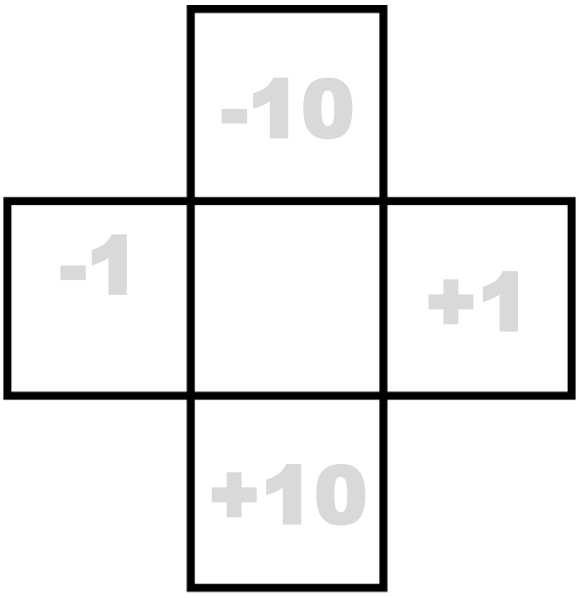




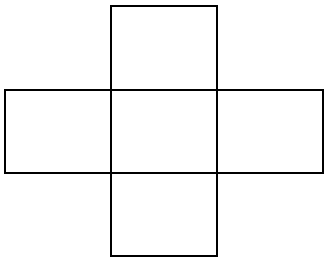
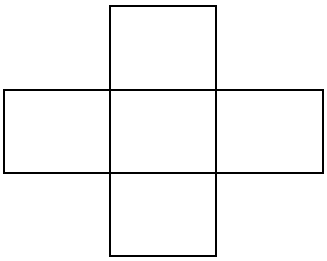
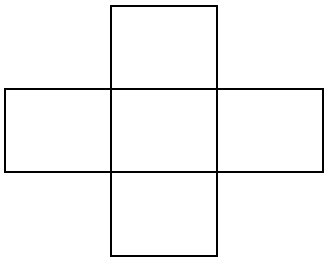
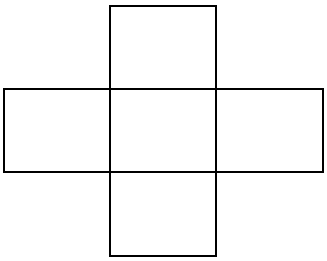
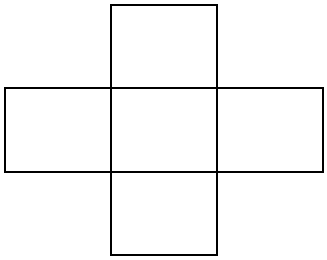
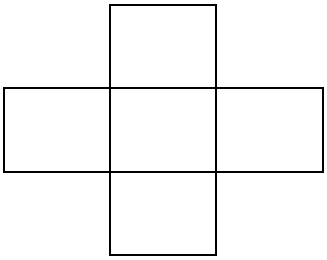
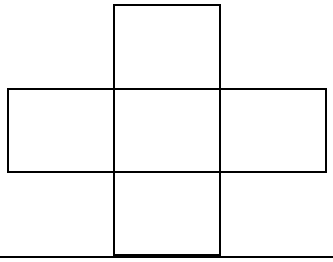
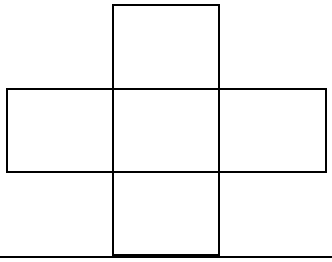
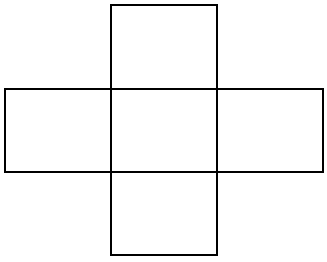
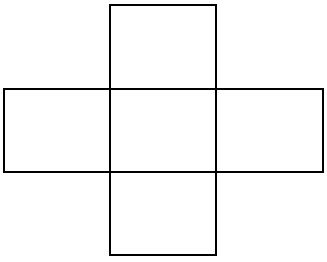








Name_____ **10 More/Less 1 More/Less Recording Sheet**

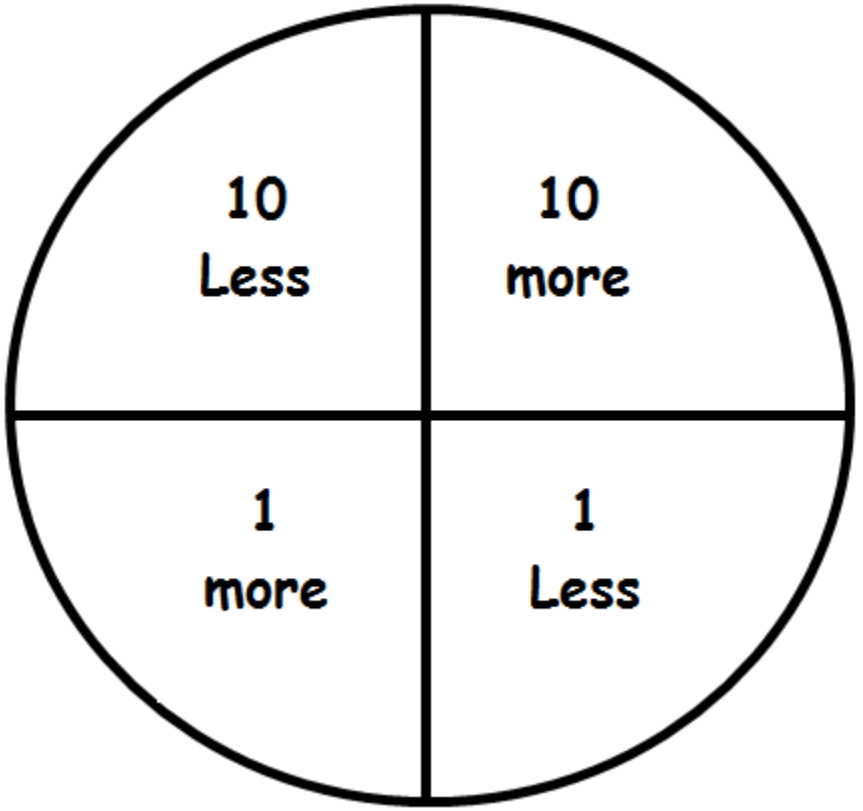
1. 	2. 
3. 	4. 
5. 	6. 
7. 	8. 
9. 	10. 

More Than / Less Than

Materials: More than/less than spinner, paper clip, pencil, deck of cards (A-9, A=1), 99 or hundreds chart

Directions:

1. Shuffle the cards and place them face down.
2. Player one picks two cards and lays them down in the order in which they were drawn. *(Students are not rearranging the order.)* Find the number on the 99 chart and cover with a manipulative.
3. The player then spins the spinner and moves the counter to change the number on the 99 chart according to what the spinner lands on. Record the results on paper. (ex: place the counter on 23, spin and land on 10 more, move the counter to 33)
4. The other player then verifies the answer. If the answer is correct, the player gets 1 point. If the player is incorrect, they lose 1 point.
5. The cards go on the bottom of the pile.
6. The other players repeat to continue the game. Play continues until a player gets a predetermined number of points (example: 10 points).



99 Chart Tic-Tac-Toe

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

Skill: Place value 0-99

Players: 2 students

Materials: one 99 chart, ten sided dice, paper, pencil, chip/markers (2 different colors)

Directions: Players select a color chip/marker to use. The goal of the game is for a player to get three or more of their markers in a row either vertically, horizontally or diagonally. Player number one begins by rolling the ten sided dice twice and making a number to their partner. Ex: roll 6, 3 and say "six tens and three ones equals sixty-three" or "three tens and six ones equals thirty-six". Player number one covers this number with their marker. Player two then takes a turn, rolling the dice twice and covering the number rolled, remembering to verbalize the tens and ones place value to the other player. Play continues until one player gets three or more of their markers in a row. This player scores two points for each marker in a row.

*Players can also steal an opponent's space. When a player makes a number already occupied by their opponent, they can replace it with their own marker. For each stolen number, they receive five points.

*If a player rolls double zero they lose a turn.

*Players can play until set time limit is reached or they reach a certain number of points.

SCAFFOLDING TASK: Different Paths, Same Destination

Approximately 2-3 days

Return to Task List

STANDARDS FOR MATHEMATICAL CONTENT

MGSE1.NBT.2 Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:

a. 10 can be thought of as a bundle of ten ones — called a "ten."
b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).

MGSE1.NBT.5 Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.

MGSE1.NBT.6 Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range of 10-90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. (e.g.,70 – 30, 30 – 10, 60 – 60)

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
6. Attend to precision. *Students specify directions for partners to navigate on a number chart.*
7. Look for and make use of structure. *Students utilize patterns to add and subtract tens and ones.*
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE/COMMON MISCONCEPTIONS

This game will address many different standards and involve listening and problem-solving strategies. Students will apply skills and concepts they have learned throughout the year involving number sense and place value. Students should demonstrate an understanding that the digits 0-9 are used to express or represent an amount or number and the placement of these digits determines the value or size of the number. They should be able to build numbers with an understanding of place value in tens and ones and locate the numbers on a 99-chart.

ESSENTIAL QUESTIONS

- How can different combinations of numbers and operations be used to represent the same quantity?
- How can we use skip counting to help us solve problems?
- How does using ten as a benchmark number help us add or subtract?

MATERIALS

- 99 chart per student
- Class 99 Chart
- Paper/math journals
- Transparent counters or highlighters

GROUPING

Large Group, Partners

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Part I
Gather students together in a common area. Display class 99 chart. Give each student a 99 chart. Select a starting number. Have students place a transparent counter on it. Give students directions one at a time using the terms add 10, subtract 10, add 1, subtract 1, 10 more, 10 less, 1 more, and 1 less. After each clue, students move their transparent counter to the new number. Model this with the class, using only 3 or 4 directions. When the last direction has been given, ask students what number their transparent counter is on.

Sample direction set:

- Place your counter on 16.
- Add 10. (students should move their counter to 26)
- Subtract 1. (students should move their counter to 25)
- Move ahead 10 more. (students should move their counter to 35)
- What number is the counter covering? (35)

Repeat this activity several times as a class making sure to vary directions to include subtracting, moving back 1 or 10, 10 more, 10 less etc. Once students are comfortable with following the given directions, proceed to part II of the task.

Part II
Tell the students the game directions have now changed. Explain to the students that you need their help to create the directions to get to the number 45 from the number 14. Use the large class 99 chart to model the directions offered by students. Ask students to suggest directions. Possible scenario may include "Add 10 to 14." Now where are we? (24) "Add another group of ten." Where are we now? (34) Add 10 once more. (44) We are almost there, what should I add now? (1 more) "Where did we end?" (45)

Some students may have other possible directions. Encourage conversations about the difference in addition strategies presented. It is important to discuss how adding and subtracting 10 is more efficient. This also allows students to practice using 10 as a **benchmark number**, helping students to see that adding 12 is done faster by adding 10 and then 2 more. Working with groups of 10 in this task gives students more practice with understanding benchmarks of 10.

Continue with several classroom examples until students appear comfortable with creating directions. Include examples with numbers that have a larger starting point than ending point, so that subtraction is involved.

Allow students to work with a partner to create their own set of directions for a specific number. The teacher will provide the ending point, but will allow students to select their own starting point. For instance, 27 may be the end point the teacher designates. One set of partners may choose to start at 48 and another at 7; however, they will all end at 27. Allow time for several partners to share their different pathways to 27. Make comments about various ways to get to the number 27, encouraging students to use benchmark numbers to navigate the numbers.

Part III
Allow students to select any number they choose as their final destination. Then instruct the students to create 3 different paths to the same destination (same number). Students should include subtraction in at least one of the paths.

FORMATIVE ASSESSMENT QUESTIONS

- How can you give accurate directions that lead to your designated number?
- What addition/subtraction strategies did you use to give directions?
- How can skip counting help you create directions to your designated number?
- What benchmark numbers allow you to be more efficient when you add or subtract?

DIFFERENTIATION

Extension
- Play the "I Have, Who Has?" games. Examples and direction cards are available at http://math.about.com/od/mathlessonplans/ss/ihave.htm These games can be printed on cardstock and laminated for extended use.

Intervention
- Teacher can select numbers which would allow students to focus on using directions, "I am 1 or 10 less than_____, I am 1 or 10 more than____. What is the number?" This could be done with a sentence frame for students.
- Use the interactive number grid at: http://www.abcya.com/interactive_100_number_chart.htm Students can use this tool to explore concepts of ten more/less and 1 more/less.

Return to Intervention Table

TECHNOLOGY:
- This activity allows students to investigate all kinds of number relationships, including 10 more and 10 less. https://www.nctm.org/Classroom-Resources/Illuminations/Interactives/Learning-about-Number-Relationships/

Name _____ Date_____

99 Chart

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

SCAFFOLDING TASK: Number Destinations

Return to Task List

Approximately 2 days

STANDARDS FOR MATHEMATICAL CONTENT

MGSE1.NBT.2 Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:

a. 10 can be thought of as a bundle of ten ones — called a "ten."
b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).

MGSE1.NBT.5 Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.

MGSE1.NBT.6 Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range of 10-90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. (e.g.,70 – 30, 30 – 10, 60 – 60)

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision. *Students give specific instructions on how to navigate the number chart (=10, +7, -1, -20).*
7. Look for and make use of structure. *Students will recognize patterns when adding and subtracting tens and ones.*
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE/COMMON MISCONCEPTIONS

Students will apply skills and concepts they have learned throughout the year involving number sense and place value. Students should demonstrate an understanding that the digits 0-9 are used to express or represent an amount or number and the placement of these digits determines the value or size of the number. They should be able to build numbers with an understanding of place value in tens and ones and locate the numbers on a 99 chart. Multiple and varied experiences with the 99 chart will help students with flexible thinking throughout this activity.

ESSENTIAL QUESTIONS

- How can different combinations of numbers and operations be used to represent the same quantity?
- How can we use skip counting to help us solve problems?
- How does using ten as a benchmark number help us add or subtract?

MATERIALS

- 99 chart per student
- paper
- 3 different color crayons

GROUPING

Large Group, Individual

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Part I
Gather the students in a common area. Use a large 99 chart so that all the students can see the numbers. Choose 3 numbers as a class and model how you would create a path for each number. Shade each path a different color on the 99 chart. Create one path using addition, one path using subtraction and one path using both. As a group, decide on the number sentences needed to give the directions to take these paths. Model this with all three numbers. Example below:

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

Number chosen: 54 Path is shaded to the right. This path included addition and subtraction.

Start with the number 1.
1+10=11
11+10=21
21+10=31
31+7=38
38+10=48
48+10=58
58+10=68
68-4=64
64-10=54

Part II
Students work individually to design 3 different number paths. Each student will need a 99 chart and 3 different color crayons. Students will choose 3 paths and color each path a different color. For example, a student may choose the numbers 29, 48 and 71. One path must include addition strategies and one path must include subtraction strategies and the last path should be a

combination of both addition and subtraction strategies. These should include the use of 10 as a benchmark number. Each number will only be represented by one path. On the recording sheet students will use addition and subtraction sentences to identify all three patterns. The teacher should observe as they students are working and ask the following questions: *Do your directions lead to your designated number? How did you write directions for your numbers? Did you use the skip counting strategy for this activity? If so, how?* After students have created their 3 paths on one 99 chart, the teacher should assemble them into a class book to be used as a center.

FORMATIVE ASSESSMENT QUESTIONS

- How do benchmark numbers help you use the 99 chart?
- What addition/subtraction strategies did you use to give directions?
- How can skip counting help you create directions to your designated number?
- What benchmark numbers allow you to be more efficient when you add or subtract?
- What is the addition/subtraction sentence that is related to 10 more/less?
- What is the addition/subtraction sentence that is related to 1 more/less?

DIFFERENTIATION

Extension

- Create Number Destinations directions that require addition and subtraction for 1 number destination. For example, if the number destination is 74, the student could say, "Begin at 80 and subtract 10 (70) and then add 4 (74).

Intervention

- Teacher selects starting and ending destination. Then allow student to create directions.
- Use the interactive number grid at:
  http://www.abcya.com/interactive_100_number_chart.htm
  Students can use this tool to explore concepts of ten more/less and 1 more/less.
- Provide students with a number chart and crayons. Have them create a visual number path then match the colored number path with written directions.

Return to Intervention Table

TECHNOLOGY:

- This activity allows students to investigate all kinds of number relationships, including 10 more and 10 less. https://www.nctm.org/Classroom-Resources/Illuminations/Interactives/Learning-about-Number-Relationships/

Addition and Subtraction Path	
Subtraction Path	
Addition Path	

PERFORMANCE TASK: What's The Value of Your Name?

Approximately 2-3 days

Return to Task List

STANDARDS FOR MATHEMATICAL CONTENT

MGSE1.NBT.2 Understand that the two digits of a two-digit number represent amo and ones. Understand the following as special cases:

a. 10 can be thought of as a bundle of ten ones — called a "ten."
b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).

MGSE1.NBT.3 Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.

MGSE1.NBT.4 Add within 100, including adding a two-digit number and a one-digit number and adding a two-digit number and a multiple of ten (e.g., 24 + 9, 13 + 10, 27 + 40), using concrete models or drawings and strategies based on place value, properties of operations, and/or relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

MGSE1.NBT.7 Identify dimes, and understand ten pennies can be thought of as a dime. (Use dimes as manipulatives in multiple mathematical contexts.)

MGSE1.MD4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically. *Students utilize a variety of tools including estimation to solve this task.*
6. Attend to precision. *Students communicate the value of their names and comparisons amongst the class.*
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE/COMMON MISCONCEPTIONS

Teachers should use money and time as models and contexts for counting. Using pennies allows the connection of counting by one's and the concept of one more and one less. Using dimes allows the connection of counting by 10's and the concept of ten more and ten less.

ESSENTIAL QUESTIONS

- How can large quantities be counted efficiently?
- How can benchmark numbers build my understanding of numbers?

MATERIALS

- ABC Value Chart
- "What's the Value of My Name?" Recording sheet
- *Chrysanthemum* by Kevin Henkes or similar book
- Manipulatives such as paper money, coins, and/or base 10 blocks to support different learning styles
- Name Value Data Collection Chart
- Math Story Organizer
- Chart paper

GROUPING

Individual, Large Group and Partner

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Part I

Gather students together in a common area. Read the book *Chrysanthemum* by Kevin Henkes, or a similar text. Make a list of the names from the book. These will be used as part of the extension of the task. Display the ABC Value chart and discuss how each letter represents a value. Ask students, "How can you determine the total value for your name? "Once they suggest adding values for each letter together, model a "Think Aloud." Model for students how you can find the value of your name using base 10 blocks or any other small manipulative. Discuss that the chart has money amounts but they can also represent these amounts using small manipulatives. Use the recording sheet to write your first name. Show students how to read the chart to find the value of each letter in your name.

After recording the values for each letter in your name, orally model your thinking about an estimation of the value of your name. Discuss how you are using your knowledge of numbers to make your estimation. For example, if your name was Juli (note the name Juli without an "e"), you would record 10, 21, 12 and 9, for the values of the letters in your name.

Then demonstrate how to use the closest ten to determine an estimate. Say, "I can already use 10 easily; I will think of 21 as 20, 12 as 10 and 9 as 10, this will make it much easier to mentally determine the estimated value of my name. 10 and 20 is 30 and another 10 makes 40, and more ten makes 50. So my estimate for my name is 50¢." Write this estimate on the recording sheet. "Now that I have an estimate to guide my thinking, I will figure out the actual value of my name. J is my first letter and it's worth 10 ¢, U is my second letter and is worth 21¢. I will combine these two amounts for a new total." *(The teacher should use base 10 blocks or other small counters to represent these two amounts)* Then say, "I have 41 now, but I still have 2 more letters in my name. My next letter is L and it is worth 12¢, so I need to add 41¢ to 12¢ to get my new total. *(The teacher again models adding 41¢ to 12¢ with base 10 blocks or other small counters and a place value mat.)* Teacher continues by saying, "I have one more letter to add to my name value. My last letter is I and is worth 9 ¢." (*The teacher again models adding 53¢ to 9¢ with base 10 blocks or other small counters and a place value mat. This would be a good opportunity to model adding by using ten as a benchmark number and then subtracting one because 9 is one less than 10*.) Conclude the example by saying, "I used base 10 blocks to model adding the values in my name. What other models could you use to add the values? *(Give students an opportunity to share their ideas which include: coins, base ten pictures, tally marks, drawing pictures or another strategy)*

Part II
Have students calculate the value of their names. Once all students have determined the value of their name, display the "Name Value Data Collection Chart" and have students record their findings on the chart for later discussions.

- As students are working, walk around the room to offer assistance and observe the strategies selected to determine their name value.
- After recording data on the chart, use the Data Collection Sheet to promote discussions. Guide students through completion of comparisons – Each student will have different answers depending on their individual name value.
- Tell students to look at the value of their name. How could they use currency (bills and change) to show the value of their name? Have them use the money in the classroom to count out the combinations and create a drawing on the recording sheet.

Part III
With the completed "Name Value Data Collection Chart", model a word problem using the Math Story Organizer on chart paper. Make sure students understand what to put in each section. Then pose a story problem to the entire class. Allow the students to work with a partner and have manipulatives available. Students may fill out the Math Story Organizer independently or with a partner.

Example Story Problem: Heath and Megan are worth 82 cents together. Find 3 students whose combined value is less than Heath and Megan's.

FORMATIVE ASSESSMENT QUESTIONS

- How can you make a comparison using the terms greater than, less than, and equal to?
- How can you use coins to help you count or add numbers?
- Can you represent the number ____ with a collection of objects using tens and ones?

- How can you add two larger numbers efficiently and accurately?
- How can you compare two amounts using words and symbols?

DIFFERENTIATION

Extension

- Have students use the same chart to discover the value of a state name. Allow them to explore the United States Map and compare the value of two states. Students could also find the value of five states and then put them in order from the least value to the highest value.
- Allow students to determine the value of different teacher's names within the building. Make estimations about whose name might have the highest and lowest value.

Intervention

- This lesson could be modified by using single digit numbers in lieu of the larger numbers (see attached chart below for the remediation idea) or the teacher could provide students with some names that are only three letters long, such as Bob, Tim, Zoe, Fay, Kay while using the chart with the larger digits. They would make comparisons with the names given in lieu of their name. It might also be helpful for students with long names who are overwhelmed to work with parts of their name at a time. Or try the same intervention as above, with vowels worth 5¢ and consonants 2¢.

Return to Intervention Table

Intervention Chart

A	**0**
B	**1**
C	**2**
D	**3**
E	**4**
F	**5**

G	**6**
H	**7**
I	**8**
J	**9**
K	**10**
L	**0**

M	**1**
N	**2**
O	**3**
P	**4**
Q	**5**
R	**6**

S	**7**
T	**8**
U	**9**
V	**10**
W	**0**
X	**1**

Y	**2**
Z	**3**

ABC Value Chart

A	1¢
B	2¢
C	3¢
D	4¢
E	5¢
F	6¢
G	7¢
H	8¢
I	9¢
J	10¢
K	11¢
L	12¢
M	13¢

N	14¢
O	15¢
P	16¢
Q	17¢
R	18¢
S	19¢
T	20¢
U	21¢
V	22¢
W	23¢
X	24¢
Y	25¢
Z	26¢

Whose Name is Worth the Most, the Least, the Same?

My name: _____

Letters:									
Values:									

My Estimated Value:	My Actual Value:

My name is worth _____. I know this because _____

_____

_____.

I can show the total value of my name in two different ways:

1.	2.

My Name_____	Partner's Name_____
Value _____	Value _____

1. My partner's name is worth _____.

2. **Check one of the boxes below and complete the sentence.**

   ☐ The value of my name is _____ more than my partner's name.
   ☐ The value of my name is _____ less than my partner's name.
   ☐ My partner's name has the same value as my name.

3. How many students in the class have names of lesser value than your name? _____

   Name two of these students: _____

4. How many students in the class have name of greater value than your name? _____

   Name two of these students: _____

5. Who has a name with the same value as your name? _____

6. Complete the following table below.

Name	**Choose one:** less than greater than equal to	**Name**

Name Value Data Collection Chart

Student Name	Total Name Value

Math Story Organizer

Story Problem
Pictures
Number Sentence
Solution in Words