Diocese of Erie Mathematics First Grade					
Unit of Study	inot ordet	Weeks: 7			
Module 1: Addition and Subtraction of Numbers to 10 and Fluency					
Purpose: Students develop number sense and add, subtract and					
compare numbers within 20.					
Essential Questions:					
<ul> <li>How is mathematics used</li> </ul>	to represent, and model numbers?	?			
<ul> <li>What does it mean to est</li> </ul>	imate or analyze numerical quantiti	ies?			
<ul> <li>How are relationships rep</li> </ul>	resented mathematically?				
For students:					
<ul> <li>What does it mean to add</li> </ul>	1?				
<ul> <li>What does it mean to sub</li> </ul>	tract?				
<ul> <li>What is the purpose of th</li> </ul>	e equal sign?				
<ul> <li>How can you find the difference</li> </ul>	erence between two numbers?				
<ul> <li>1.OA Add and subtract within 20.</li> <li>1.OA.7 Add and subtract within 20, demonstrating fluency for addition and subtraction within 10.</li> <li>1.OA.8 Use strategies such as counting on; making ten; decomposing a number leading to a ten; using the relationship between addition and subtraction; and creating equivalent but easier or known sums.</li> <li>1.OA Work with addition and subtraction equations.</li> <li>1.OA.9 Understand the meaning of the equal sign and determine if equations involving addition and subtraction are true or false.</li> </ul>					
<ul> <li>Standards Reinforced:</li> <li>K.OA Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.</li> <li>5. Add and subtract within 10.</li> <li>6. Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation.</li> <li>7. For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation.8. Fluently add and subtract within 5.</li> <li>K.CC Compare numbers</li> <li>13. Compare two numbers between 1 and 10 presented as written numerals.</li> </ul>					
Vocabulary:	digit				
add	number line				
addends	equals	numeral			
additive identity property of 0 equal sign = related facts					
addition equation subtract					
commutative property of addition fluency subtraction					
count back	making ten	sum			

minus

number

count on

count up

take away

ten-frame

difference	zero

# Authentic Performance Assessment:

Rubrics are provided for the performance tasks. With modifications, rubrics can be used for alternate tasks.

**1.**The student models (draw, use manipulatives, use classroom items) to show all the 2-addend combinations for 10. Explain strategies and analyze model to determine connections and patterns for combinations of 10. <u>Rubric</u>

**2.** On the left are the numbers from 1 to 9. Use eight of these numbers to fill the blank circles in the Big Wheel, so that when you add any two numbers connected by a line, you get 10. Explain your work. <u>Rubric</u>



Given any addition equation (sum up to 10): Draw, model, use a ten-frame, and use a number line to represent the answer. Explain the answer for each method. Compare the methods and describe which one you could teach to another student and why. Pick a student and teach them. <u>Rubric</u>
 You are swimming and you see dinosaur feet in the water. You do not want to let them see you in case they are not kind. Below is a picture of what you see.



How many dinosaurs are by you in the lake? Explain how you know. Use words and mathematical language to explain your solution. <u>Rubric</u>

**5.**Solve the problems. Find as many different combinations as you can. Show your thinking with pictures, numbers, or words. Write a number sentence for each combination. *Pat has 5 seashells. How many can he put in his blue bucket and how many in his green bucket?* 

Samuel has 7 pencils. How many can he put in the red can and how many in his blue can? Rubric

**6.** Level A: On television there is a new Game Show called Take Two. The game is played with two players. There are nine coins lined up in a row.



Each player takes turns. On a turn a player must take two coins away. The game starts with the first player taking away two coins. Then it is the other player's turn. The second player takes two coins away. The game continues with alternate turns. The player who can't pick up exactly two coins loses. If there is only one coin left when it is a player's turn, then the player whose turn it is loses. The other player wins.

Which player do you want to be – the first player or the second player? Explain your choice. Is this a fair game? Why or why not?

For accelerated students: How could you change this game to make it better? Rubric

7. If you can do the following problem, are you able to do it in more than one way?

Here are three different numbers that add up to 8.

1 + 3 + 4 = 8

1. Write three **different** numbers that add up to 10, or tell why it can't be done.



#### **Computation Skills:**

addition subtraction

#### Thinking and Reasoning Skills:

Recognize and explore what it means to add or subtract. Explain how one would know when to add or subtract.

Explore ways of evaluating an answer. How does a student know if someone else's work is correct or incorrect?

Share different strategies for solving problems. Determine if which strategies can consistently lead to correct answers. Determine the advantages to each strategy.

<u>Provide the answer</u> and ask the student to work backwards to create the problem. (For example, Teacher says: The answer is 9 snowballs. What is the problem? Student writes: Katie made 4 snowballs and her cousin made 5 snowballs. How many snowballs did they make for the snowball fight?)

# **Real World Problems & Application/Catholic Identity:**

Ask students what they want to be when they grow up. Engage in a class discussion about how addition and subtraction play a daily role in those careers. For career ideas, you can refer to the linked <u>poster</u>.

Use a new box of 10 markers and show all the 2 addend combinations of 10.

Talk about your family, pets, cousins, etc. using addition and/or subtraction problems.

- Create stories about the apostles to practice word problems with sums or differences to 10.
   For example: On Monday (any day) Jesus (talked, walked, ate breakfast, traveled, etc) with
   <u>apostles</u> in the morning and <u>more apostles</u> in the afternoon. How many apostles did
   Jesus <u>with on Monday</u>?
- Create addition or subtraction stories about the animals on the ark.
- Create addition or subtraction stories about number of prayers prayed in a day or a week.
- Create addition or subtraction stories about the number of people in the pew at church.
- Create addition or subtraction stories about the number of cans of food donated to the parish food pantry or school food drive.
- Addition or subtraction problems about the Hail Marys in a decade of the rosary.
- Discuss ways students could help others by adding or subtracting.
- Discuss ways that people at church use math.

# Reading and Writing in Math:

Books that address addition and subtraction, read aloud on YouTube:

- Mission of Addition by Brian P Cleary
- <u>The Hershey's Kisses Addition Book</u> by Jerry Pallotta
- <u>Quack and Count</u> by Keith Baker (depicts different ways to make 7)
- <u>Ten Flashing Fireflies</u> by P Sturges (depicts ways to make 10)
- Monster Musical Chairs by Stuart J. Murphy

Discuss your strategy for solving your addition or subtraction problems with a partner or in your math journal.

Predict the answer to your problem before you use math tools to help you solve the problem. Write your prediction and reasoning in a math journal.

Book titles and topics for use in math.

- Apple Countdown (addition and subtraction, problem solving)
- Bean Thirteen (odd and even numbers, equations)
- Christopher Counting (counting, place value)
- *Five Creatures* (skip counting, equations)
- Five Little Monkeys Go Shopping (addition and subtraction, equations)
- Five Little Moneys Play Hide and Seek (counting, patterns)
- Handa's Surprise (addition and subtraction, problem solving)
- Hannah's collections (addition, estimation)
- Quack and Count (addition and subtraction, equations)
- A Squash and a Squeeze (addition and subtraction, shapes)
- *Teddy Bear Counting* (addition and subtraction, equations)
- *Two of Everything* (addition and subtraction, equations)

For a list of other books that address mathematical topics, click here.

## **Questions/Discussion Strategies:**

Tell of a time when you have added things.

Tell of a time when you have subtracted things.

Can you create a some, some more story? Can you create a some, some went away story?

Who agrees with the example, why or why not?

Use math talk:

Example – 7 (use any number up to 10)

Show me what 7 means to you using what we have been studying in math. Share the answers and ask class to agree or disagree. Ask who had the same idea. Example answers: 8-1, 2+5, draw 7 items, pictures of 9 items with 2 crossed out, a set joining 4 circles and 3 circles.

Use dominoes to create addition problems (by having the students write an addition equation using the dots on the left side of the domino plus those on the right side of the domino. (If you wish to use only sums to 10, remove dominoes with 10, 11 and 12 pips).

Provide incorrect equations (example 6+2=9) and ask students to determine if the equation is correct or incorrect and explain why.

Ask students to create incorrect and correct equations for sums to 10, share with a partner, have the partner sort into correct and incorrect equations.

What was one (or more) thing you learned?

Why do you think that? Why is that true?

What does it mean to add? (adding on) What does it mean to subtract? (take away, or lose items) How do you know when to add and when to subtract?

Can you look at a problem and a problem someone else did and know that the answer is correct or incorrect? How do you know?

What strategy did you use to solve the problem? Can you share that strategy with the class? Did anyone else use a different strategy? Can both strategies be correct?

Technology/Manipulatives:

<u>Illustrative Math</u> lists deep thinking mathematics tasks that take place in real world contexts and are arranged according to common core standards. Student anchor work is provided for each task. Activities:

- Bowling: Use a 10 pin child's bowling game. Set up the pins. When a child knocks down the pins with the first ball compose a 10 by adding the pins standing and the pins knocked down.
- Ten Frame addition and subtraction: students place counters on a ten frame and use it to solve addition and subtraction problems. For detailed directions, click <u>here</u>.
- Create 10 Game: Using playing cards, students add the face value of the cards to make pairs that add up to ten. Detailed directions found <u>here</u>.
- Cave subtraction: One person hides a portion of ten counters under a cup (cave). The other uses the remaining visible counters to calculate how much treasure is in the cave. He or she states his guess, and it is checked by lifting the cup and revealing the counters hidden in the cave. Detailed directions with examples can be found <u>here</u>.
- Adding with two or three addends: Use snap cubes or link cubes and die to model addition sentences with three addends. See detailed directions <u>here</u>.

## Manipulatives:

- Linking cubes and/or snap cubes
- Counting bears or other counters
- Two color counters
- Small erasers
- Number line
- Cuisenaire rods
- Teacher and student fact cards
- Dominoes
- Playing cards
- White boards

#### Websites:

- Hooda Math
- <u>Addition and Subtraction</u> practice resources and research found here.
- <u>ABCYa</u> Educational Games for Kids includes assorted educational games on a variety of topics that teachers and students can choose from.
- <u>Sailboat Subtraction</u>: Compete in online teams in a sailboat tug of war. Correctly answering subtraction problems will pull the rope between sailboats to your side.
- <u>Math Playground</u> hosts a variety of first grade level mathematics games organized by skill. Browse for games that may be helpful for your students.
- <u>First in Math</u> contains extensive grade-level practice and includes a competitive element. Login required.
- <u>University of Chicago frequent practice</u> includes benchmark and several ideas for building fact fluency. Audience: teachers

<u>Math Secret Codes</u>: Strategies for breaking down addition problems and finding patterns in addition problems. Highly recommended that you introduce these only **after** students have explored patterns on their own and have had a chance to discover rules and tricks to addition problems.

# Accommodations/Acceleration/Differentiation:

For struggling learners: provide modeling, peer/partner opportunities, flash cards, time to practice. Flashcards with the teacher and master and add 1 new card at a time.

Have a number line on their desks and provide manipulatives for use.

Use small groups to work one on one with struggling students.

For accelerated students: allow to work with 3 addends to form ten and other sums and encourage the creation of word problems to fit 2 and 3 addend problems.

Differentiate tasks so that the struggling, average, and advanced students meet with success.

Provide the Answer



Math Secret Codes:

# Math Secret Codes Offer your students these "secret codes" for mastering simple addition problems. "Add one, Next one." Adding one to a number pushes it up to the next, as in 3 + 1 =4, 4+1=5. "Two More, Even or Odd the Score." If you begin with an even number, you get the next even number; if you start with an odd number... e.g., 4 + 2 = 6, or 7 + 2 = 9. . "Double Plus One, Problem's Half Done." Once you know your doubles it's a breeze. Then you can take 3 + 4 and see "Well, it's just two 3s and one more, so that's 7!" "Ten's My Friend." If you know 8 + 2 = 10, 8 + 4 is easy, think "10 plus 2, that's 12." "Same Thing Coming and Going." This keeps students from being thrown off by reversals: 7 + 2 is the same as 2 + 7. Make a Secret Code book. On each page, ask students to write the rule, explain it in their own words, and give examples. -Bob Krech, Dutch Neck School, Princeton Junction, NJ



Books and Topics:

# Title

Apple Countdown	Addition & Subtraction, Problem Solving
The Baseball Counting Book	Graphs, Problem Solving
Bean Thirteen	Odd & Even Numbers, Equations
Big and Small, Room for All	Length, Problem Solving
The Biggest Fish	Length, Problem Solving
Christopher Counting	Counting, Place Value
The Coin Counting Book	Money, Equations
Count by Tens	Place Value, Equations
Five Creatures	Skip Counting, Equations
Five Little Monkeys Go Shopping	Addition & Subtraction, Equations
Five Little Monkeys Play Hide-and-Seek	Counting, Patterns
Handa's Surprise	Addition & Subtraction, Problem Solving
Hannah's Collections	Addition, Estimation
Little Pea	Place Value, Estimation
The Name Jar	Graphs, Patterns
Over in the Ocean	Addition, Graphing
Pattern Fish	Angles & Lines, Patterns
Quack and Count	Addition & Subtraction, Equations
Ready, Set, 100th Day!	Place Value, Addition & Subtraction
A Second Is a Hiccup	Time, Graphs
The Shape of Things	Shapes, Patterns
Shapes That Roll	Shapes, Patterns
A Squash and a Squeeze	Addition & Subtraction, Shapes
Teddy Bear Counting	Addition & Subtraction, Equations
Two of Everything	Addition & Subtraction, Equations

Topics

<u>Back</u>

### Activities:

## Ten Frame Directions:

*Part A:* Give the student a ten frame and 7 counters. Say: Please put these counters on the ten frame. When the student is finished ask\*: How many more counters do you need to make a ten? If you believe the students can solve the problem without counting, add the statement: See if you know without counting. If you are unsure of how the student figured out how many more were needed, ask: How did you figure that out?

Repeat with 4, 9, and 5 counters.

*Part B:* If student can quickly determine the missing part without counting, ask "What If" questions. Say: This time let's see if you know how many more counters you need to make a ten- without using counters or a ten frame. What if you had 8 counters? How many more do you need to make ten? If you are unsure of how the student figured out how many more were needed, ask: "How did you figure that out?

Repeat with 1, 6, and 3.

# Back

## Cave subtraction:

Materials: a cup for each student to represent his/her cave, counters, recording sheet

Actions: The teacher begins by counting out a certain number of counters to find the total. "One, two, three, four, five, six, seven, eight, nine, ten. There are ten counters all together." This number should be small enough that the students have already found sums equal to that number. The teacher then hides some in the cup, calling it a cave. The students are shown how many counters are remaining outside of the cup, but not how many are in the cup. The number outside of the cup is called the part that they know. Next the teacher shows the students an equation like this:  $10 - ____ = 6$  if the teacher is hiding four counters. The students need to find the missing number. By adding, or counting on to six, the students determine that the teacher is hiding four counters. The equation is completed and checked for accuracy by seeing how many counters are hidden under the cup.

The students are then asked to help the teacher find another way to play the game with the same total number and a different part they know. The goal is to find all the subtraction equations for the total they started with. When the teacher determines that the students understand the procedures of the game they may play independently or in partners.

# <u>Back</u>

# Two Addend Equations

Materials: link-cubes or snap-cubes (2 colors for each pair of students), a die, paper and pencil.

Actions: Roll the die. Using a single color, snap together the same number of cubes as is shown on the die. Roll the die again. Using the other color, snap together the same number of cubes as is shown on

the die. Snap the two groups of cubes together. Write an addition equation that uses the number of each color of cube and the total number of cubes. Write as many addition and subtraction equations as possible using the same three numbers.

## Three Addend Equations

Materials: link-cubes or snap-cubes (3 colors for each pair of students), a die, paper and pencil.

Actions: Roll the die. Using a single color, snap together the same number of cubes as is shown on the die. Roll the die again. Using another color, snap together the same number of cubes as is shown on the die. Roll the die a third time. Snap together the same number of cubes as is shown on the die. Snap the three groups of cubes together. Write an addition equation that uses the number of each color of cube and the total number of cubes. Write as many addition and subtraction equations as possible using the same four numbers.

#### **Back**

## Make 10

Primary Version Level A

Materials: The deck of cards (1-9) for each pair.

Discussion on the rug: (Teacher starts a discussion about the number 10) "Why is the number 10 an important number?" (The teacher invites ideas from the class). "We are going to play a fun game today. It is called Make Ten."

(Teacher demonstrates how to play the game with two players). "We play in pairs with a deck of number cards. Each player picks 7 cards from the deck. Look at your cards and find two cards that add-up (count up) to 10. For example: 8 and 2 make 10. If you can make ten, then put those two cards together in a 10-pairs pile and then pick two more cards. If you can't make ten, then say 'pass' and pick a new card. Switch turns with each other until all the cards on the deck are picked and all the pairs that make ten are found. We will examine our 10-pairs pile all together."

In small groups: (Each group plays the game until the deck is used and all pairs of ten made. Have them look over and count up how many 10-pairs they made. After the games, the teacher asks the class to list the 10-pairs that the students made.) (Teacher asks the following questions)

"Suppose you are playing this game with a new friend. Explain to your friend how you play the game and which cards you need to put together to make 10-pairs"

(At the end of the investigation have students either discuss or dictate a response to these summary questions above)

#### **Rubric for Performance Assessment 1**

**Exceeds Standards** Student is able to represent and explain all 2 addend combinations for 10 without the use of manipulatives.

Achieving Standards Student is able to represent the 2 addend combinations for 10 using, drawings objects or numbers.

**Nearly Meets or Making Progress** Student is able to demonstrate all the 2-addend combinations for 10 with limited prompting.

**Not Yet Making Sufficient Progress** Student is able to demonstrate some of the 2-addend combinations for 10 with much prompting.

#### **Back**

#### **Rubric for Performance Assessment 2**

Above Expected Progress Student independently completes the wheel correctly.

**Expected Progress** Student is able to complete the wheel with limited prompting.

Below Expected Progress Student is unable to complete the wheel with prompting or modeling.

<u>Back</u>

#### **Rubric for Performance Assessment 3**

Exceeds Standard Student is able to independently represent and explain addition problems to 10.

Achieving Standard Student is able to represent addition problems to 10 using drawings, objects or number line.

**Nearly Meets Standard** With limited prompting, student demonstrates addition through 10 using drawing, objects, number line.

**Not Yet Making Sufficient Progress** Student is unable to demonstrate addition through 10 without prompting.

**Back** 

#### **Rubric for Performance Assessment 4**

**Exemplary** Student completed the assignment is a timely manner and demonstrated complete comprehension of the task through the explanation given about the solution.

**Proficient** Student completed the assignment in a timely manner by asking a few questions or needed minimal prompting and showed proficient understanding of the task through the explanation given about the solution.

**Progressing** Student completed the assignment with help and/or may have had some confusion about the task. The student needed help in explaining the solution.

**Not There Yet** Student did not complete the task and/or did not comprehend the task. Prompting did not help the student complete the task.

## <u>Back</u>

## **Rubric for Performance Assessment 5**

**Score 4** – The student shows proficiency without computation models and confidently shows more than one solution.

**Score 3** – The student solves the problems and exhibits no major errors or omissions. Student may show more than 1 solution for each problem

Score 2 – The student makes errors or is unable to solve the problems in more than one way.

Score 1 – The student shows partial understanding of the problem with help.

**Score 0** – Even with help, the student demonstrates no understanding or skill with this task.

**Back** 

#### **Rubric for Performance Assessment 6**

**3** All parts of the question are answered accurately and completely. All directions are followed.

**2** Answer deals correctly with most aspects of the question, but something is missing. May deal with all aspects but have minor errors.

**1** Addresses item but only partially correct; something correct related to the question.

**0** Does not address task, unresponsive, unrelated or inappropriate.

**Back** 

# Rubric for Performance Assessment 7

**5** The student completes all important components of the task and communicates ideas clearly.

**4** The student completes most important components of the task and communicates clearly.

**3** The student completes some important components of the task and communicates those clearly.

**2** Student unable to generate strategy or answer may display only recall effect. Answer lacks clear communication.

1 No response

**Back** 

Rubric for Performance Assessment 8

Diocese of Erie Mathematics				
First Grade				
Unit of Study	Weeks: 6			
Module 2: Place Value, Comparison, Addition and Subtraction to 20				
Purpose: Explain place value. Use understanding of place value to				
add and subtract within 20 in algorithms and real-world contexts.				
Essential Questions:				
<ul> <li>How can recognizing repetition or regularity assist in solving</li> </ul>	problems more efficiently?			
<ul> <li>How can expressions, equations and inequalities be used to c</li> </ul>	quantify, solve, model, and/or			
<ul> <li>analyze mathematical situations?</li> </ul>				
<ul> <li>How can patterns be used to describe relationships in mather</li> </ul>	matical situations?			
<ul> <li>How can you represent stories with pictures and use them to</li> </ul>	write mathematical			
equations?				
Standards:				
1.NBT Understand place value.				
<b>1.NBT.9</b> Understand that the 2 digits of a two-digit number represent	t amounts of tens and ones.			
1.NBT.10 Understand the following as special cases:				
1.NBT.10a 10 can be thought of as a bundle of ten				
ones - called a "ten."				
<b>1.NBT.10b</b> The numbers from 11 to 19 are				
composed of a ten and one, two, three,				
four, five, six, seven, eight, or nine ones.				
<b>1.NBI.10c</b> The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90, refer to one	e, two, three, four, five, six,			
seven, eight, or nine tens (and 0 ones).	tons and once digits recording			
<b>1.NB1.11</b> Compare two two-digit numbers based on meanings of the	tens and ones digits, recording			
1 OA Benrosont and solve problems involving addition and subtractic				
<b>1.0A</b> 1 Use addition within 20 to solve word problems involving situa	tions of adding to putting			
together and comparing with unknowns in all positions e.g. by using	g objects drawings and			
equations with a symbol for the unknown number to represent the n	rohlem			
<b>1.0A.2</b> Solve word problems that call for addition of three whole numbers whose sum is less than or				
equal to 20, by using objects, drawings, and equations with a symbol	for the unknown number to			
<b>1 00 3</b> Use subtraction within 20 to solve word problems involving si	tuations of taking from taking			
apart and comparing with unknowns in all positions e.g. by using of	viects drawings and equations			
with a symbol for the unknown number to represent the problem	Jects, drawings, and equations			
<b>1 OA</b> Understand and apply properties of operations and the relation	shin between addition and			
subtraction	ship between addition and			
<b>1.04.4</b> Apply properties of operations as strategies to add and subtra	act			
<b>1.0A.5</b> Understand subtraction as an unknown- addend problem				
1.0A Add and subtract within 20				
<b>1.0A.6</b> Relate counting to addition and subtraction.				
<b>1.0A.7</b> Add and subtract within 20, demonstrating fluency for addition and subtraction within 10				
<b>1.OA</b> Work with addition and subtraction equations.				
<b>1.0A.10</b> Determine the unknown whole number in an addition or subtraction equation relating three				
whole numbers.				

**Standards Reinforced:** 

**K.CC** Count to tell the number of objects.

**K.CC.12** Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group (use matching and counting strategies).

**K.CC.13** Compare two numbers between 1 and 10 presented as written numerals.

**K.NBT** Work with numbers 11-19 to gain foundations for place value.

**K.NBT.1** Compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and record each composition or decomposition by a drawing or equation. Understand that these numbers are composed of one ten and one, two, three, four, five, six, seven, eight, or nine ones.

**1.OA** Add and subtract within 20.

**1.OA.6** Relate counting to addition and subtraction.

**1.OA.7** Add and subtract within 20, demonstrating fluency for addition and subtraction within 10.

**1.OA.8** Use strategies such as counting on; making ten; decomposing a number leading to a ten; using the relationship between addition and subtraction; and creating equivalent but easier or known sums. **1.OA** Work with addition and subtraction equations.

**1.OA.9** Understand the meaning of the equal sign and determine if equations involving addition and subtraction are true or false.

Vocabulary:	doubles minus 1	most
addend	doubles plus 1	ones/unit
addition	equation	order
alike	fewer	place value
associative property of addition	fewest	related addition facts
compare	fluency	related subtraction facts
decompose	greater than	symbols =, >, <
doubles	less than	tens
	more	

# Authentic Performance Assessment:

Rubrics are provided for the performance tasks. With modifications, rubrics can be used for alternate tasks.

**1.**Noah saw 12 legs walk by into the Ark. How many creatures could he have seen? How many different answers can you find? <u>Rubric</u>

**2.** You and your friends love making snowmen. Today you found 21 buttons to use when building your snowmen. You think snowmen look best with 2 or 3 buttons each. How many snowmen could you build on this day? <u>Rubric</u>

**3.**This problem allows the children to choose the two different fruits to use to solve the problem. Grandma has eleven fruits in her basket. Some are one kind of fruit and the rest are another kind. How many of each could you have? Using pictures, numbers and words, come up with as many different solutions as you can and then explain your thinking to your partner. Share your work and together come up with other possibilities. <u>Rubric</u>

4. Kay has 17 pennies. The pennies are in her two coat pockets. How many pennies could be in each pocket? Use pictures, words and numbers to show and explain all the possible answers. <u>Rubric</u>
5. Use the numbers 1-9 to complete the following number sentence.

Do it in as many ways as you can. Pick one way and write a story problem that the number sentence could represent. <u>Rubric</u>

**6.** Your teacher asked Bill the Builder to visit your school to help the class build houses for some Fact Families. Bill brings a bag of dominoes and blueprint paper to help you design the fact family for each house. Use a domino to help you build 2 addition and 2 related subtraction facts on your blueprint paper. As soon as you have completed 3 houses, you can put them up for sale. <u>Rubric</u>



**7.** Bob bought 20 tickets to play games at Family Fun Night at his school. He wants to play each game at least once. He wants to use all his tickets. How many times might he play each game? Find and explain at least 2 ways he could do it. (Provide 20 linking cubes or other counters to the child for this task). <u>Rubric</u>

Game	Number of tickets needed
Ring toss	1
Putt putt golf	2
Soccer kick	3
Moon Walk	5

# **Computation Skills:**

addition and subtraction

Thinking and Reasoning Skills:

Create and share story problems for a predetermined answer. (E.g. The answer is 20. What's the problem?)

Explain why grouping is important.

Why can you only have one digit in the tens place (or hundreds, etc.)? What would happen if there were two digits in a place?

How does place value help make adding, counting, or communicating easier? Introduce algebraic thinking:

- Play the "I'm thinking of a number" game. For example, "I'm thinking of a number that makes 11 when added to 8. What is my number?"
- If you open a new carton of a dozen eggs, and you use four eggs to cook dinner how many eggs are left? Create more problems by changing the numbers. Variations: Talk about cupcakes rather than eggs or have students create the questions.

# Real World Problems & Application/Catholic Identity:

Computation Skills practice:

- Use a deck of playing cards (ace through nine –36 cards remove the face cards). Students chose 2 random cards from the deck and add them together. The student should be able to explain the strategy used to solve the problem.
- Use a deck of playing cards (ace through nine –36 cards remove the face cards). Students chose 2 random cards from the deck and add them together. After each child has gotten the sum of the cards the children determine which sum is greater or less than the other sum.
- Use child sized beach balls. On one ball write addition problems for sums up to 20. On one ball write subtraction problems in the same fact families. On another ball write addition and subtraction problems with sums up to 20. Do not include the answers to the equations. Examples: 6 + 6 = or 14 8 = Toss the ball to the student and ask the child to solve the problem closest to one of his thumbs.

Create number cards for numbers 0-20. Children select two cards. The children use Legos and build a tower to match the numbers selected. Compare the two numbers using words or symbols, =, >, <. <u>Word problems</u> can put addition and subtraction in context. Several with a first-grade context are linked here.

Use real world story/word problems involving student interests. Ex: what they collect, first and last names, sibling names, familiar sports teams.

Create "on the spot word problems" - for example, when pencil cases, crayon boxes, markers from the art supplies fall on the floor, use these times to create and solve real world math problems about the objects.

Use a deck of playing cards (ace through nine –36 cards - remove the face cards). Students chose 2 random cards from the deck and add them together. The student should be able to explain the strategy used to solve the problem. Extension: After each student has calculated the sum of the cards the students determine which sum is greater or less than the other sum.

Use child sized beach balls. On one ball write addition equations for sums up to 20. On one ball write subtraction equations for sums up to 20. On another ball write addition and subtraction equations with sums up to 20. Do not include the answers to the equations. Examples: 6 + 6 = or 4 - 7 = Toss the ball to the student and ask the child to solve the problem closest to one of his thumbs.

## Reading and Writing in Math:

Title	Topics
Apple Countdown	Addition & Subtraction, Problem Solving
Count by Tens	Place Value, Equations
Five Creatures	Skip Counting, Equations
Five Little Monkeys Go Shopping	Addition & Subtraction, Equations
Handa's Surprise	Addition & Subtraction, Problem Solving
Hannah's Collection	Addition, Estimation
Little Pea	Place Value, Estimation
Over in the Ocean	Addition, Graphing
Quack and Count	Addition & Subtraction, Equations
Ready, Set, 100 <sup>th</sup> Day!	Place Value, Addition & Subtraction
A Squash and a Squeeze	Addition & Subtraction, Shapes
Teddy Bear Counting	Addition & Subtraction, Equations
Two of Everything	Addition & Subtraction, Equations

The comparison model for subtraction is demonstrated using the book <u>"One Big Pair of Underwear"</u> by Laura Gehl.

Youtube read-alouds of books that address math topics:

- Even Steven and Odd Todd by Kathryn Cristaldi
- Minus Sign by Tricia B. Shaskan

Use a math journal during class or to complete the following activities

- Primary children investigate different ways that 12 children can line up, using <u>Stay in Line</u> by Teddy Slater.
- <u>Write a story</u> that expresses given math problems and solve them.

# **Questions/Discussion Strategies:**

Can you draw a picture or make a model to show that?

What is the problem about? What can you tell me about it?

Is there something that can be eliminated or that is missing?

Could you explain what your problem is asking?

How could you solve using objects or drawings?

Could you share your method with the class?

Is this the only way to solve this problem? Are there other possible answers?

How could you help someone without telling them the answer?

Is this a reasonable answer?

Can you convince the rest of us that your answer makes sense?

Do you see a pattern?

What have you tried? What steps did you take?

Is the solution reasonable, considering the context?

Will you do it mentally? With pencil and paper? Using a number line?

For the Write Your Own Story Problem above ask: What made you decide to choose that problem and why did you write the story that you did?

# Technology/Manipulatives:

<u>Illustrative Math</u> lists deep thinking mathematics tasks that take place in real world contexts and are arranged according to common core standard. Student anchor work is provided for each task.

#### Manipulatives:

- Linking cubes
- Ten frames
- Bears or other counters
- Two color counters
- Small erasers
- Coins
- Number line
- Cuisenaire rods
- Teacher and student fact cards
- Fact triangles
- Dice
- Dominoes
- Whiteboards
- Playing cards
- <u>Styrofoam cups</u> to demonstrate decomposing numbers
- <u>Greater than and less than monsters</u> for students to use to compare numbers

Activities:

- The <u>American Institutes for Research</u> developed a resource for teachers on place value with multiple hands-on, deep thinking, and minimal setup activities at various levels of scaffolding to engage students in exploring the meaning of place value for two digit and three-digit numbers.
- <u>Roll and Build</u> has students create two-digit numbers and then model them with bundles of rods and individual rods and draw their model.
- This <u>Two Digit Addition Trains</u> resource uses Cuisenaire rods to model two-digit numbers (place value) and two-digit addition methods.

Skills practice:

- <u>Two-Dice Sums</u> game
- <u>Which Number Wins</u> game
- Online games for various skills can be found for free at Hooda Math, Abcya, Cool Math, <u>Funbrain</u> and <u>Math Playground</u>
- Online games for skills practice can also be found at First in Math, Mobymax, Adaptedmind, and Brainzy. Account required.

<u>Math and Learning Videos 4 Kids</u>: Introduction to place value, grouping to count (two-digit numbers) Accommodations/Acceleration/Differentiation:

For struggling learners, provide modeling, peer/partner opportunities, flash cards, time to practice flashcards with the teacher; master and add 1 new card at a time.

Keep a number line at the student desks.

Use of manipulatives

Use small groups to work one on one with struggling students.

For advanced students: begin using the greater than, less than symbols for numbers larger than 20. Write word problems and share with a friend.

Play games involving larger 2-digit numbers with a partner. Such as: Write a two-digit number (58) on your whiteboard. Give your partner hints such as the number of tens is less than 7, the number of ones is greater than 3. These directions could vary.

Differentiate tasks so that the struggling, average, and advanced students meet with success.

#### Math Journal Activities:

## Stay in Line

Materials: Stay in Line by Teddy Slater (Scholastic, 1996), counters

1. Read aloud *Stay in Line*, the story of 12 boys and girls who head off on a field trip to the zoo and find multiple ways of staying in line and sticking together. The story helps build children's number sense by exploring the different ways to organize a dozen children.

2. Give each child a dozen counters and ask students to follow your directions to arrange them in twos, threes, fours, fives, and sixes. Talk about what they learned about even groups and why there were some left over when they counted by fives.

3. Ask students to arrange the tiles in groups of 10. Are there any left over? Could they make that guess based on the numbers in the ones and tens place?

4. Ask the class to figure out how many children are present. Then ask if they would each have a partner if they lined up in twos. Have children line up in pairs to check. Do the same for lining up in threes, fours, fives, and sixes.

# Write a story

Choose one of the following problems or use one of your own. Write a story which includes this problem in it. Then write how it could be solved. After using words, use numbers and symbols to write the problem and solution.

Example problems:

# Greater Than, Less Than Monsters





<u>Back</u>

#### Two-Dice Sums Game

The object: to remove all the counters in the fewest rolls possible.

How to play: Two or more players can play. Each player needs 11 counters, a game strip that lists the numbers from 2 to 12 spaced far enough apart so the counters can fit on top of each number, and a recording sheet.

- 1. Each player arranges 11 counters on the game strip and records the arrangement.
- 2. Once the counters are arranged, players take turns rolling the dice.
- 3. For each roll, all players can remove one counter if it is on the sum rolled. Players keep track of the number of rolls of the dice it takes to clear their game board.

After students have had the chance to play the game for several days or so, have a class discussion about the different ways they arranged the counters and the number of rolls it took. Have them write about the arrangements that are best for removing the counters in the fewest number of rolls.

# Which Number Wins Which Number Wins? (Grades 1-8)

Math concepts: In this individual activity, students roll two dice and record the results. Make a recording sheet that is an 11 x 12 block grid with the numbers 2 through 12 across the top. While children gain practice with addition facts, they can also examine the data, compare results with other classmates, and think about why some sums are more likely than others. To do the activity, students need two dice and a recording sheet.

The object: to roll the dice and record the number fact in the correct column, stopping when one number gets to the finish line.

How to play: Students roll the dice and calculate the total value of the numbers showing on the dice. (For example, a student rolling a 3 and a 4 would calculate the sum of 7). In the column of the sum, the student writes the fact problem that led to the sum and rolls again. Continue recording the winning sum until one sum makes it to the finish line (fills all boxes in the column).

2	3	4	5	6	7	8	9	10	11	12
	1+2			3+3	3+4	4+4				
				2+4	1+6	5+3				
				1+5	2+5	2+6				
				2+4	4+3	5+3				
					6+1					
					5+2					
					4+3					
					3+4					
					6+1					
					5+2					
					3+4					
					1+6					

STOP

Post a class chart that lists the numbers from 2 to 12 and have students make a tally mark to show the winning sum. Have each child do the experiment at least twice.

After you've collected the data, discuss with the class why it seems that some sums "win" more than others. Young children may not be able to explain it, but older students often figure out that there is only one way to get the sums of 2 and 12, and six ways to get a sum of 7.

After discussing the data, return to the game of Two-Dice-Sums and see if students revise their strategies. You may want to ask students to write about the game and the likelihood of two-dice-sums

#### Word Problems

Have the students solve these problems or similar problems.

Write an equation that represents the problem. Solve the problem and show your thinking with pictures, numbers, or words.

- You have 17 pencils. A box holds 10 pencils. Do you have enough pencils to fill a box? Do you have any leftover pencils that do not fit in a box? If so, how many pencils do you have that do not fit in a box?
- I have a vase with 5 flowers. Mom put more flowers in the vase. Now I have 12 flowers in the vase. How many flowers did Mom put in the vase? Write a number sentence that matches this story. Use a symbol for the unknown number.
- I have a vase with 15 flowers. Mom put more flowers in the vase. Now I have 19 flowers in the vase. How many flowers did Mom put in the vase? Write a number sentence that matches this story. Use a symbol for the unknown number.
- 12 pennies were in the piggy bank. Mary put some more pennies in the piggy bank. Now there are 20 pennies in the piggy bank. How many pennies did Mary put in the piggy bank? Write a number sentence that matches this story. Use a symbol for the unknown number.
- 17 flowers are in the vase. 8 are roses and the rest are daisies. How many daises are in the vase? Write a number sentence that matches this story. Use a symbol for the unknown number.
- 20 apples are in the basket. 9 are red and the rest are green. How many green apples are in the basket? Write a number sentence that matches this story. Use a symbol for the unknown number.
- Isabella has 17 coins. 8 are pennies and the rest are quarters. How many quarters does Isabella have? Write a number sentence that matches this story. Use a symbol for the unknown number.
- 9 grapes were on the plate. My brother ate some. Now there are 2 left on the plate. How many grapes did my brother eat? Write a number sentence that matches this story. Use a symbol for the unknown number. Once an equation is written, say: Solve the problem and show your thinking with pictures, numbers, or words.
- The teacher had 9 pencils. She gave some pencils away. She has 1 pencil left. How many pencils did she give away? Write a number sentence that matches this story. Use a symbol for the unknown number. Once an equation is written, say: Solve the problem and show your thinking with pictures, numbers, or words.
- 19 grapes were on the plate. My brother ate some. Now there are 10 left on the plate. How many grapes did my brother eat? Write a number sentence that matches this story. Use a symbol for the unknown number.
- There were 18 pencils. Kate gave some pencils away. She has 10 pencils left. How many pencils did she give away? Write a number sentence that matches this story. Use a symbol for the unknown number.
- Ethan has 4 cookies. Nicholas has 7 cookies. How many more cookies does Nicholas have than Ethan? Write a number sentence that matches this story. Use a symbol for the unknown number.
- Emily has 4 cookies. Madison has 9 cookies. How many more cookies does Madison have than Emily? Write a number sentence that matches this story. Use a symbol for the unknown number.

- The girls found 9 rocks. The boys found 14 rocks. How many more rocks do the boys have than the girls? Write a number sentence that matches this story. Use a symbol for the unknown number.
- Anthony has 13 more French fries than Brianna. Brianna has 5 French fries. How many French fries does Anthony have? Write a number sentence that matches this story. Use a symbol for the unknown number.
- Kate has 4 markers. Jill has 9 markers. How many fewer markers does Kate have than Jill? Write a number sentence that matches this story. Use a symbol for the unknown number.
- Gabriela has 4 fewer markers than Sara. Sara has 8 markers. How many markers does Gabriela have? Write a number sentence that matches this story. Use a symbol for the unknown number.
- Ken finds 8 red leaves, 6 orange leaves, and 2 brown leaves. How many leaves did Ken find? Write a number sentence that matches this story. Use a symbol for the unknown number.
- Lucy has 6 animal stickers, 3 star stickers, and 7 cat stickers. How many stickers does Lucy have? Write a number sentence that matches this story. Use a symbol for the unknown number.

# Styrofoam Cups





### Roll & Build

### Materials

For each pair:

- 2 ten-sided dice with the numbers 0 to 9 or two spinners with the numbers 0 to 9
- Base-10 blocks, linking cubes, or bundled and loose popsicle sticks
- Paper and pencil

Play

- Student A rolls the dice.
- Student B makes a number using the values on the dice as digits and both students write it on the paper. For example, if student A rolled a 3 and a 4, the number can be 34 or 43.
- Student A represents the number with the tens and ones blocks/popsicle sticks.
- Student B counts the blocks to check that they correctly represent the number.
- Both students draw a picture of the tens and ones on the paper.

The students should take turns.

## **Rubric for Performance Task 1**

**Expert** The solution shows a deep understanding of the problem including the ability to identify the appropriate mathematical concepts and the information necessary for its solution. Use of a very efficient or sophisticated strategy that leads directly to a solution.

**Practitioner** The solution shows that the student has a broad understanding of the problem and the major concepts necessary for its solution. Uses a strategy that leads to a solution of the problem.

**Apprentice** The solution is not complete indicating that parts of the problem are not understood and not all the mathematical components are presented in the task. Some evidence of mathematical reasoning or a partially useful strategy is employed.

**Novice** There is no solution, or the solution has no relationship to the task. Inappropriate concepts are applied. No evidence of mathematical reasoning.

## **Back**

## **Rubric for Performance Task 2**

4 The student completes all important components of the task and communicates ideas

clearly. The student demonstrates in-depth understanding of the relevant concepts and/or processes.

**3** The student completes most important components of the task and communicates clearly.

The student demonstrates understanding of major concepts even though he/she overlooks or misunderstands less important ideas or details.

**2** The student completes some important components of the task and communicates those clearly. The student demonstrates that there are gaps in his/her conceptual understanding.

**1** Student shows minimal understanding. Student unable to generate strategy or answer may display only recall. Answer lacks clear communication. Answer may be totally incorrect or irrelevant.

**0** Off topic or blank

**Back** 

#### **Rubric for Performance Task 3**

**Distinguished** Student uses a representation that is unusual in its aesthetic value or mathematical precision. Shows rigorous understanding of the problem

**Proficient** Students uses a representation that clearly depicts the problem. Shows substantial understanding of the problem.

**Apprentice** Student uses a representation that gives some important information about the problem. Shows limited understanding of the problem.

**Novice** Student uses a representation that gives little or no significant information about the problem. Shows little or no understanding of the problem.

## **Rubric for Performance Task 4**

**3** All parts of the question are answered accurately and completely. All directions are followed.

**2** Answer deals correctly with most aspects of the question. May deal with all aspects but have minor errors.

1 Addresses item partially; significant errors.

**0** Does not address task, unresponsive, unrelated or inappropriate.

## **Rubric for Performance Task 5**

2 Answer is complete and correct; all parts of the question are addressed.1 Student gives a partially correct answer, or task is incomplete (i.e., one of two parts answered correctly.

**0** Does not address task, unresponsive, unrelated or inappropriate.

## **Rubric for Performance Task 6**

**Exceeds Mastery** Student can write the number sentences in at least 4 fact families. Students can justify how addition and subtraction are related.

**Mastery** Student demonstrates an understanding of how addition and subtraction are related. Student can write the number sentences in 3 fact families.

**Partial Mastery** Student demonstrates some understanding of how addition and subtraction are related. Student can write some number sentences in either 2 or 1 fact families.

**Novice** Student demonstrates poor or incorrect understanding of how addition and subtraction are related. Student is unable to write number sentences for any fact families.

# **Rubric for Performance Task 7**

**6 Exemplary response**. Gives a complete response with a clear, coherent, unambiguous and elegant explanation; includes a clear and simplified diagram; communicates effectively to the identified audience; shows understanding of the open-ended problem's mathematical ideas and processes; identifies all the important elements of the problem; may include examples and counterexamples; presents strong supporting arguments.

**5 Competent response**. Addresses all aspects of the problem with reasonably clear explanations; may include an appropriate diagram; communicates effectively to the identified audience; shows understanding of the problem's mathematical ideas and processes; identifies the most important elements of the problem; presents solid supporting arguments.

**4 Minor Flaws but Satisfactory.** Completes the problem satisfactorily, but the explanation may be muddled; argumentation may be incomplete; diagram may be inappropriate or unclear; understands the underlying mathematical ideas; uses mathematical ideas effectively.

**3 Serious Flaws but Nearly Satisfactory.** Begins the problem appropriately but may fail to complete or may omit significant parts of the problem; may fail to show full understanding of mathematical ideas

and processes; may make major computational errors; may misuse or fail to use mathematical terms; response may reflect an inappropriate strategy for solving the problem.

**2** Begins, but Fails to Complete Problem. Explanation is not understandable; diagram may be unclear; shows no understanding of the problem situation; may make major computational errors.

**1 Unable to Begin Effectively.** Words do not reflect the problem; drawings misrepresent the problem situation; copies parts of the problem but without attempting a solution; fails to indicate which information is appropriate to the problem.

Diocese of Erie					
Mathematics					
Linit of Study	Weeks: 4				
Unit 3: Ordering and Expressing Length Measurements as Numbers.	Weeks. +				
Telling Time. Money					
Purpose: Students will be able to express and compare units of					
length. They will be able to express quantities using common units					
of time and money.					
Essential Questions:					
<ul> <li>Why does "what" we measure influence "how" we measure?</li> </ul>	)				
<ul> <li>What makes a tool and/or strategy appropriate for a given ta</li> </ul>	isk?				
– When is it is appropriate to estimate versus calculate?					
<ul> <li>How precise do measurements and calculations need to be?</li> </ul>					
Student Questions					
– How can you measure the length of objects?					
<ul> <li>What are some non-standard units that can be sued to meas</li> </ul>	ure length?				
<ul> <li>What are ways to tell time?</li> </ul>					
<ul> <li>How can you compare and find values of coins up to one doll</li> </ul>	ar?				
Standards:					
<b>1.MD</b> Measure lengths indirectly and by iterating length units.					
<b>1.MD.1</b> Order three objects by length.					
<b>1.MD.2</b> Compare the lengths of two objects indirectly by using a third	d object.				
1.MD.3 Express the length of an object as a whole number of length	units, by laying multiple copies of				
a shorter object (the length unit) end to end.	a shorter object (the length unit) end to end.				
1.MD.4 Understand that the length measurement of an object is the number of same-size length					
units that span the object with no gaps or overlaps. All measurement	s should equal only whole				
numbers.					
<b>1.MD.5</b> Distinguish between customary and metric units of measure.					
1.MD Tell and write time.					
<b>1.MD.6</b> Tell and write time in hours and half- hours using analog and	digital clocks.				
<b>1.NBT</b> Extend the counting sequence.					
<b>1.NBT.4</b> Recognize, identify, and count coins (pennies, nickels, dimes	, and quarters).				
<b>1.NBT.</b> 5 Determine value of coins up to 99 cents.					
<b>1.NBT 7</b> Determine equal asia values					
<b>1.NBI.7</b> Determine equal coin values.					
Standards Reinforced:					
K.CC Know number names and count sequence.					
K.CC.2 Rote count to 100 by 10's.					
<b>K.MD</b> Describe and compare measurable attributes.					
<b>K.MD.1</b> Describe measurable attributes of objects, such as length or weight. Describe several					
measurable attributes of a single object.					
<b>K.MD.2</b> Directly compare two objects with a measurable attribute in common to see which object has					
more of / less of the attribute and describe the difference.	0.774				
<b>KIND Classify objects and count the number of objects in each categ</b>	υι γ.				
<b>K.IVID.4</b> Tell time to the nour and half hour.					

K.MD.5 Identify coins: penny, nickel, and dime.				
K.MD.6 Count coins using the cent sign.				
Vocabulary:	hour hand	quarter		
analog clock	inch	ruler		
cents	iterating	shorter		
cents sign	length	shortest		
digital clock	longer	skip counting by 5, 10		
dime	longest	taller		
dollar sign, \$	measure	tallest		
half hour	minute	tally mark		
half past	minute hand	tally chart		
hour	nickel			

# Authentic Performance Assessment:

Rubrics are provided for the performance tasks. With modifications, rubrics can be used for alternate tasks.

You have a bank of pennies, nickels, dimes and quarters. You would like to purchase a gift for your friend's birthday and you are in luck. It is on a huge sale – only 67 cents! There's only one problem: The bank you use is really hard to get the money out of. You have to shake and shake and shake. It takes forever for coins to come out the bottom. Three different coins come out the bottom first. Name the coins and then tell if you can purchase your friend's gift. Show how you know.
 Show another way three coins could have come out. Is there any way that you could purchase your friend's gift without having to shake out more than three coins? Explain your answer. Rubric
 Time Book: Create a sheet like the linked. Send multiple copies home as a book and ask children to complete several pages during Saturday and Sunday. Stipulate that the times should be at the hour or half hour. After the weekend students share completed books. Then compile them into a class book that has pages going from AM to PM and the various activities done. Rubric

#### **Computation Skills:**

Counting

Addition, subtraction

Skip counting (5s, 10s, 25s)

#### Thinking and Reasoning Skills:

Why do we measure things? Why can't we just guess about the size of things? Does it matter if we measure ingredients when we cook or bake? Why or why not? Show pictures of a bathtub, watering can, milk carton, and tea cup. (Or choose pictures that you have) Ask students to compare the objects. Ask, "Does the milk carton hold more than the teacup?" or "Does the watering can hold less than the bathtub?" Why do you think that? Is there a way to prove that you are right or wrong. Now make it hands-on by using a teaspoon, a cup, a quart, a gallon etc. Now you could ask, which tool would be best to measure water in the sink, a bathtub, a watering can, etc.

# Real World Problems & Application/Catholic Identity:

Pre-cut straws into equal sized pieces. You could have substantial amounts of equal sized half straws, thirds of straws and quarter straws. Have students predict the number of units needed to measure the length. Then, have children use the half straws to measure an item in the classroom. Measure that item again using thirds of straws. Measure again using the quarter straw pieces. If the item being

measured is large enough you could also measure with whole straws. Compare and analyze why the items were all measured with straws, but the measurements were different.

Go to the gym and measure one of the lines – for example, the foul line – with different units. Or have different students measure the same line with the same unit to see if the length measured is the same by all. Discuss findings.

Examine grocery ads or ads from Walmart, Target, or Drug stores and have children identify items that are less than 99 cents. Have children show the monetary amount using models or drawings of coins that match the advertised item's price. For items priced over \$1 you could have the child find the cents part of the price. For example: \$2.50 the child finds 50 cents/ \$4.79 the child finds 79 cents. This <u>older add</u> would work well for amounts less than a dollar.

Explain that you would like to get and move a new bench (chair, desk, piece of furniture, plant, etc.) into the classroom, or move an existing item to a new place. How will the class know that it will fit or where it will go best? Encourage students to think through choosing a tool to measure (snap cubes, ruler, straws, etc.) the item, and then measure the proposed space to make sure that it will fit. Test the class hypothesis by putting the item in its new space.

Set up a classroom store for practice counting out coins. Use as a center.

Use plastic measuring containers to compare volumes of liquids. Using food coloring in the water makes the activity more fun.

Each student has 3 blank clock faces. During the school day ring a bell at half hour and hour times. All students stop and record the time. Use both analog and digital.

Create word problems using time including scenarios such as:

- Bob made cookies for his friend who was sick. He left home at 1:00 to deliver the cookies and got back home at 3:00. How long was he gone?
- The students went to Stations of the Cross at \_\_\_\_\_ o'clock and returned to class at \_\_\_\_\_ o'clock. Draw digital and analog clocks for both times. How long were the students at Stations of the Cross? Use hours or half hours
- Ann went to Mass at \_\_\_\_\_ o'clock. Mass lasted 1 hour. What time was it when Mass was over?
- Which item from the collection for the food pantry (or event at your school that students can identify with) is the longest- the box of <u>spaghetti</u> or the can <u>of corn</u>. Have sample boxes of items and cans so that students can measure the lengths.
- Create stories about measurement that allow students to measure items that the children have been asked to donate to school or church projects.
- Create stories about service to others that involve time, measurement, or money for the students to solve when you are practicing each concept in class.

#### **Skills Practice**

- Use plastic Easter eggs (medium size works well). On the larger part draw clocks to show time to the hour and half hour. On the smaller part write the times that will match the upper halves. Do not make the matches on the same color eggs to avoid guessing by the children. Mix tops and bottoms and have students sort and match the proper top and bottom.
Give students an amount of money. Have the children show all the ways that they can use coins to show that amount. Use any amount up to 99 cents. Children may model with plastic coins or draw diagrams of coins. Example: 15 cents [15 pennies, 5 pennies and 1 dime, 5 pennies and 2 nickels, 10 pennies and 1 nickel, 3 nickels]

### Reading and Writing in Math:

Literature

- The Penny Pot by Stuart Murphy
- The Coin Counting Book (Money, equations)
- A Second is a Hiccup (time, graphs)

Write a story about the heights of the people in your family. Be sure to use the words shorter and taller

Write a story about a trip you took. Include details about how far you traveled, the size of objects you encountered and how you measured their size/knew the distance of your travel.

Use a journal to: practice drawing clocks to match given times; drawing pictures of some of the measuring activities done in the unit: drawing coins to match given amounts of money.

### **Questions/Discussion Strategies:**

Is there another model you could use to solve the problem?

How would it look if you used these materials?

What was your estimate or prediction?

Have we ever solved a problem like this before?

Is there a real-life situation where this could be used?

Give me another related problem. Is there an easier problem?

How would you explain what you know right now?

How might a person living in the past solve this problem?

### Technology/Manipulatives:

Manipulatives:

- any classroom items to measure with (small paper clips, large paper clips, linking cubes, toothpicks, equal pieces of straws for small lengths, unsharpened pencils, markers, new crayons, index cards, Cuisenaire rods)
- individual student clocks
- coins (pennies, nickels, dimes, quarters)
- whiteboards

Activities:

- Order, Order: Rank the following from smallest to largest
- <u>Giraffe Measuring</u>: using paper strips, compare the height of three giraffes

Websites:

- Hooda Math
- <u>ABCYa</u> Educational Games for Kids includes assorted educational games on a variety of topics that teachers and students can choose from.
- <u>Math Playground</u> hosts a variety of first grade level mathematics games organized by skill. Browse for games that may be helpful for your students.
- <u>First in Math</u> contains extensive grade-level practice and includes a competitive element. Login required.

### Accommodations/Acceleration/Differentiation:

Assist struggling students as needed with the following:

- laying multiple copies of objects correctly next to each other to measure length
- using a student clock to be sure hour and minute hands are understood
- counting coins one on one, especially when counting a set of coins with more than one type
- of coin in the set
- providing a capable or an advanced student as a partner to work on activities together
- providing time to the hour and half hour flash cards.
- providing counting by 5, 10, and 25 number sheets for the child to use during class.
   Accelerated students could:
  - be the cashier at the class store.
    - add and subtract money amounts and show the answer with coins.
    - measure large items with smaller units; be introduced to new units of measure.

Ν	а	m	е
N	а	m	е

Time of day: Fill in the clock to show the time. Write the time beside the clock.



Write sentences and draw a picture to show the activity that you were doing at this time of day.

<u>Back</u>

2. Order, Order: Rank the following in order from smallest to largest:



Time: Taken to travel to school For mustard and grass to grow from seeds Taken to eat a cookie Between your 6<sup>th</sup> and 7<sup>th</sup> birthdays Distance You could jump up in the air You can kick a football You can run in half a minute Length of a bug Weight Of a blown up balloon Of a bar of chocolate Of a loaf of bread Of your teacher <u>Giraffe Measuring</u>: Paper strips are provided for students to use when determining which giraffe is taller than another. Students can compare by marking height on different strips or by marking height in different colors on the same strip. They are asked how they know one giraffe is taller and to show how their solution was determined. For a printout of Giraffes, visit Inside Mathematics link here "problem of the month measuring mammals"

# Level A:

 Examine the two giraffes named George and Geoff. Determine which giraffe is taller than the other. Explain the difference in the size of the giraffes. How did you determine your answer?





 This is young Gerry. How much taller is George than Gerry?
 Explain how you found your answer.



**Back** 



**Back** 

#### Rubric for Performance Task 1

**Advanced** Student can show more than 2 combinations of three coins that could come out of the bank and describe or show how she/he figured it out.

**Proficient** Student can show 2 combinations of three coins that could come out of the bank and describe or show how she/he figured it out.

**Basic** Student can show 1 combination of three coins that could come out of the bank and describe or show how she/he figured it out.

**Below Basic** Student cannot show any combinations of three coins that could come out of the bank nor describe or show how to figure it out.

### Rubric for Performance Task 2

**Fully Understands** Student correctly orders the items for time, distance and mass and can explain his/her reasoning.

**Partially Understands** Student correctly orders the at least 2 of the following: time, distance, mass and can explain his/her reasoning.

**Not Yet Understanding** Student correctly orders the items for less than 2 of the following: time, distance, and mass or is unable to explain his/her reasoning.

Diocese of Frie				
Mathematics				
Grade/Course: First Grade				
Unit of Study	Weeks: 4			
Unit 4: Extend the Counting Sequence, Represent and Interpret				
Data				
Purpose: Students can fluently read write and count numbers				
from $0.120$ They can make quantifiable observations (take data)				
and make meaningful statements about the information they				
collected				
Essential Questions:				
What makes a tool and/or strategy appropriate for a given ta	c42			
- What makes a tool and/or strategy appropriate for a given ta	ISK :			
<ul> <li>How does the type of data influence the choice of display?</li> </ul>				
<ul> <li>How can data be organized and represented to provide insign and the provide insign</li> </ul>	nt into the relationship between			
quantities?				
– How can mathematics support effective communication?				
<ul> <li>How can mathematics be used to provide models that help u predictions?</li> </ul>	s interpret data and make			
<ul> <li>What are the patterns in the information we collect and how</li> </ul>	are they useful?			
Questions for Students				
<ul> <li>How can you use tally charts and nicture graphs to display date</li> </ul>	ta?			
<ul> <li>What strategy can you use to count beyond 40, beyond 1002</li> </ul>				
How can knowing tons and ones and patterns help you count	+0 1202			
- How call knowing tens and ones and patterns help you count				
<ul> <li>How could you use a graph (picture graph) to create question</li> </ul>	<ul> <li>How could you use a graph (picture graph) to create questions about data? How could you</li> </ul>			
use a picture graph to compare data?				
Standards:				
1.NBT Extend the counting sequence.				
1.NBT.1 Count to 120, starting at any number less than 120. In this ra	inge, read and write numerals			
and represent a number of objects with a written numeral.				
1.NBT.2 For numbers up to 120, read and write numerals and represe	ent a number of objects with a			
written numeral.				
1.NBT.3 Identify ordinal positions through 12.				
<b>1.NBT.4</b> Recognize, copy, and continue patterns.				
1.MD Represent and interpret data.				
1.MD.7 Organize, represent, and interpret data with up to three cate	gories.			
<b>1.MD.8</b> 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 Reinforced:				
K.CC Know number names and count the sequence.				
K.CC.3 Count forward beginning from a given number within the know	wn sequence (instead of having			
to begin at 1).				
<b>K.CC</b> Count to tell the number of objects.				
K.CC.7 When counting objects, say the number names in the standard order, pairing each object with				
one and only one number name and each number name with one and only one object.				

K.CC.9 Understand that each successive number name refers to a quantity that is one larger.K.MD Classify objects and count the number of objects in each category.K.MD.7 Recognize, create, and interpret data from a simple bar graph and pictograph.

Vocabulary:	hundred	quantity
bar graph	hundred number chart	row
compare	more	tally chart
data	most	tally mark
fewer	picture graph/pictograph	
fewest		

#### Authentic Performance Assessment:

Rubrics are provided for the performance tasks. With modifications, rubrics can be used for alternate tasks.

**1.** Materials: Sets of plastic food or color blocks.

Discussion on the rug: The teacher asks the class, "Who knows the story of Stone Soup?" The teacher invites a student to tell about the story or she reads the story to the class. The teacher says to the class, "Suppose we wanted to fix stone soup for two people. Let's think about how many vegetables we will need." The teacher invites students to share their ideas. The teacher asks the class, "How many carrots would we need?" Students share their ideas. They may act it out, using the plastic food or color blocks to show the ingredient amounts. The teacher repeats the discussion and reasoning to make stone soup for three people.

In small groups, students have counters available. The teacher says, "If you want to make stone soup for 10 people, how many carrots, green onions, and chunks of meat do you need?" Students work together to find a solution. After the students are finished, the teacher asks students to share their answers and methods of calculation.

At the end of the investigation: Students either discuss or dictate a response to this summary question: "Explain and show how you know how many of each of the vegetables you need to make soup for 10 people." <u>Rubric</u>

**2.** Begin at any number less than 50. Write that number and the next 5 numbers.

How many different numbers can you begin at and successfully write the next 5 numbers. Show your work. Would you be able to do the task if the directions were changed to: choose a number between 51 and 100; write your number and the next 5 numbers. How many different ways could you do this task? Show them. Would you be able to do the task if the directions were: choose a number greater than 100 and less than 120; write your number and the next 3 numbers. How many different ways could you complete this task? Rubric

**3.** Present a pile of lima beans. (you can determine the greatest amount you wish the student to work with) or other manipulatives that are available to the child. Tell the child to separate the objects used into 2 piles and create a math problem to show the total. Is there another way to divide the objects? Draw your solution and use numbers. <u>Rubric</u>

**4.** Think of 3 colors, three toys, three seasons, three games you have played in gym class, 3 foods, 3 stores, 3 animals, etc.

Survey your class members asking them which of your 3 items is their favorite.

Create a graph to show your results. Survey a different class (the other section of your grade or another grade level). Create a graph to show the new results. Compare the 2 graphs with your teacher and classmates. <u>Rubric</u>

5. Beach Day

The Smith family is planning to go to the beach sometime this week, but is not sure which day would be the best. Willy Smith has a soccer game on Tuesday, and his sister is going to get an award for Math Camp on Friday.

Below is a chart of the weather forecast for this week.



1. Using the story and the chart, choose the best beach day for the Smith family. Explain why you chose that day, including a description of the weather.

2. Explain your reasons for NOT choosing the other days.

3. Graph the class's first choice. Which day was most popular? How many more people chose the most popular day? <u>Rubric</u>

6.We Scream for Ice Cream

Students in Mr. Max's class are planning an ice cream party. Each student voted for their favorite flavor, and the students made a chart of the results:

Chocolate				
Vanilla				
Strawberry				
Orange Sherbet				

How many students were in Mr. Max's class?

If the class can only buy two different flavors, which two flavors should they buy? Why? How many students will not get their favorite flavor? Explain how you know this. Suppose this chart represents the votes from a class where students voted for their **two** favorite flavors of ice cream. How many students are in this class? Explain how you know. <u>Rubric linked</u>. **Computation Skills:** Counting Addition Subtraction

#### Thinking and Reasoning Skills:

Discuss and explain your answer to statements similar to the following.

How can you compare the lengths of two objects when they are in different places?

How can you explain how the length of the unit of measure affects the number of units needed to measure an object?

What questions can you ask and answer by looking at a real-object graph?

What questions can you ask and answer by looking at a picture graph?

What questions can you ask and answer by looking at a bar graph?

How can you use tally marks to record information? How can you use information in a tally chart to make a bar graph and answer questions?

How can you use connecting cubes to make a real-graph?

How can you create a picture graph to show information and to answer questions? 7. How can you use data to tell how many, how many more or how many less?

Write 5 numbers between 60 and 100. Determine the lowest and highest number and ask the children to name numbers between those numbers. (Provide any beginning number.) How do you know these numbers are in between?

### **Real World Problems & Application/Catholic Identity:**

Discuss various jobs that use math to promote using numbers and/or collecting data. Recognize patterns as God's designs in the world.

Include ideas like the following examples to help the students create and discuss graphs related to our Catholic life.

- For the clothing drive our school collected \_\_\_\_\_coats for girls, \_\_\_\_\_ coats for boys, and \_\_\_\_\_ coats for babies. Show each of these with tally marks. Use smaller numbers and have students create a picture graph of the information.
- During the food drive kindergarten collected \_\_\_\_\_ cans of soup, \_\_\_\_\_ cans of vegetables and \_\_\_\_\_ jars of jelly. Use tally marks to represent these numbers. Create a picture graph of this information (control the numbers so that this project is not overwhelming).
- We kept track of the random acts of kindness for the week. PreK had \_\_\_\_\_ acts. Kindergarten had \_\_\_\_\_ acts and first grade had \_\_\_\_\_ acts. Show this information with tally marks and/or a picture graph. (You could vary the grade levels in your example.)
- In our class the students bought \_\_\_\_\_ toothbrushes, \_\_\_\_\_ pairs of socks, and \_\_\_\_\_ pairs of mittens for the homeless. Create a picture graph to show this information. (you could use any items that would mimic what your school collects).
- One day in the crowd that was listening to Jesus, there were \_\_\_\_\_ little girls, \_\_\_\_\_ little boys, and \_\_\_\_\_ moms. Display this information in a picture graph or using tally marks.
- There were \_\_\_\_\_\_ shepherds, \_\_\_\_\_ angels, and \_\_\_\_\_ mice at the stable in Bethlehem to celebrate the birth of Jesus. Display the information with tally marks and/or a picture graph.
- One of the baskets filled with crumbs after Jesus fed the people with the loaves and fish had crumbs. Write that number and the next 5 numbers.
- people came to the mountain to hear Jesus preach. Write that number and the next 5 numbers.

 \_\_\_\_\_ children came to Jesus when Jesus said, "Let the children come to me." Write that number and the next \_\_\_\_\_ numbers.

Try Illustrative Mathematics' Crossing the Decade activity

Use food labels that children collect to read large numbers by reading the calories per serving and smaller numbers by reading the amount of servings in the box, bag, etc.

Examine newspapers and have the children look for numbers. Perhaps many will be too big for the children to read but they will be aware that numbers are all around them.

Encourage students to write sentences about their homes that would involve counting items and writing numbers. A few examples:

- My house has \_\_\_\_\_ rooms.
- My house has \_\_\_\_\_ windows.
- There are \_\_\_\_\_ forks, knives, and spoons in the kitchen drawer.
- There are \_\_\_\_\_ pages in my favorite book.
- I have \_\_\_\_\_ videos.

Count, compare and/or graph the number of items in 100 calorie individual snack bags.

Use ordinal numbers to talk about students' places in line or persons places in line as they enter a gym for a school event/stadium for a professional football event.

Graph ways students get to school (bus, car, etc.). Discuss using comparative language such as more, less, least, most, same as, etc.

Play BINGO

### Reading and Writing in Math:

M&Ms Count to 100 Book

100th Day Worries by Margery Cuyler

I'll Teach My Dog 100 Words by Michael Firth

100 Hungry Ants by Elinor J. Pinczes

The Great Graph Contest by Loreen Leedy

Use a math journal to: practice counting and/or writing about graphs or other displays of data that are created or used in class. Write sentences about the graphs discussing the data. (There are more, there are less, the item liked the most is, the item liked the least is, etc.) Practice making tally marks for various numbers.

#### **Questions/Discussion Strategies:**

How could you solve this using tables, lists, pictures, diagrams, etc.? How did you organize the information? Do you have a record? How did you organize your information? Your thinking? How would it look if you used this model or these materials? Do you agree with the representation of data? Could you represent the data in another way? How were you sure that your answer was right? Why did you decide to organize your results like that? How might a person living in the past solve this problem?

### Technology/Manipulatives:

Manipulatives

- 100 number charts and 120 number charts
- graphing templates for bars graphs

- pocket charts for graphing
- linking cubes for graphing
- various types of paper for use to make pictographs
- pattern blocks
- white boards
- dice (6 sided, 10 sided, etc.)
- spinners
- foam dominoes

### Activities

- Counting Clap: Students take turns providing the next number in a sequence. Each hopes not to be the "last number" and to win the game. Directions <u>here</u>.
- Crossing the Decade Concentration is a memory game that asks students to match cards that cross the decade (e.g. 19-20 or 49-50.) Complete directions <u>here</u>.
- <u>100 Chart</u>: Students draw digit cards to create two digit numbers, name them, and cover them on a 100 chart, competing to fill the chart with his/her counters first.

### Websites:

- Hooda Math
- <u>ABCYa</u> Educational Games for Kids includes assorted educational games on a variety of topics that teachers and students can choose from.
- <u>Math Playground</u> hosts a variety of first grade level mathematics games organized by skill. Browse for games that may be helpful for your students.
- <u>First in Math</u> contains extensive grade-level practice and includes a competitive element. Login required.

### Accommodations/Acceleration/Differentiation:

Struggling students may need to work on number formation and may reverse the digits for numbers in the teens. Provide a number line and hundred-number chart.

Accelerated students may explore and discuss graphs in other texts or materials in the classroom or materials provided by the teacher. They can apply what they have learned to interpret other types of data. Provide opportunities to create their own displays of information.

Differentiate tasks so that the struggling, average, and accelerated students meet with success.

### Ice Cream Rubric

	Partial level (1 or 2)	Full level 3
Modeling/ Formulating (weight: 0)		
Transforming/ Manipulating (weight: 1)	Student performs some of the required additions and/or subtractions correctly.	Students performs all of the required additions and subtractions correctly.
Inferring/ Drawing Conclusions (weight: 2)	Student is able to interpret some of the data presented in the pictograph, and arrives at a reasonable conclusion for questions <b>1</b> , <b>2</b> , or <b>3</b> .	Student is able to interpret all of the data presented in the pictograph, and arrives at reasonable conclusions for questions <b>1</b> , <b>2</b> , and <b>3</b> .
Communicating (weight: 3)	Explanations for the numerical answers in questions 1, 2 and 3 are either unclear, incomplete, or incorrect.	Explanations for all numerical answers are clear and complete and make use of appropriate mathematics vocabulary and comparison words.

<u>Back</u>

#### **Counting Clap**

### Setup

Have students stand and form a circle facing in toward each other. Select a counting sequence to be practiced with no more than 6-10 numbers in the sequence, for example 97-104.

### Actions

Have the students start counting around the circle one by one until the last number in the sequence is reached. When the last number is reached all students clap and that student is out and sits down on the floor in the middle of the circle. Start the counting sequence over again until another student reaches the number at the end of the sequence, everyone claps, and that student sits in the center with the first student. Continue repeating the sequence until only one child is left standing and the rest are seated in the center of the circle. For example: for the counting sequence 97-104; the first child says "ninety-seven," the next child says "ninety-eight" and so on.

With a larger class this activity can be modified by splitting into two groups and practicing different counting sequences or by stopping after 5-10 students are sitting down. It can also be modified to allow students who have sat down to come back in when another student misses a number in the sequence if they can state the correct number, in which case, the teacher can just stop the activity after about 10 minutes.



**Back** 

### Hundreds Chart

### Materials

- A 100 chart per pair of students
- A set of digit cards per pair of students (four each of cards 0-9
- Two different colors of counting chips, one for each student

### Action

- Player One draws two cards and then makes and reads aloud both of the numbers that can be made with those digits. Player One then chooses which of the two numbers to cover on their 100 chart.
- Player Two draws two cards and then makes and reads aloud both of his/her numbers and choose which number to cover on the 100 chart.
- Players cannot cover a number that has already been covered, but they may have more than one counter in each row.
- If a player cannot make a number that is uncovered/available with the cards they drew, they lose their turn for that round.
- Play continues until one player has at least one number covered in each row of the 100 chart.
- If a student runs out of cards they should re-shuffle the cards and continue play.
- For a shorter version, students work together to cover at least one number in each row on the 100 chart.
- This can be extended by asking students to record the numbers they create.

#### **Rubric for Performance Assessment 1**

#### Advanced

Student can explain and show how many carrots, green onions and chunks of meat are needed to make soup for 10 people and can do this without counters **OR** students not only determine how much is needed for 10 people, they correctly determine how much is needed to feed a number more than 10.

#### Mastery

Student can explain and show how many carrots, green onions and chunks of meat are needed to make soup for 10 people.

#### Developing

Student can identify how many carrots, green onions and chunks of meat are needed but cannot explain their answer OR student can perform some aspects of the task but makes mistakes that lead to incorrect completion.

#### Emerging

With help the student demonstrates partial understanding.

#### **Rubric for Performance Assessment 2**

- 4 Student shows proficiency with numbers beyond 100.
- 3 The student exhibits no major errors or omissions.
- 2 The student can major aspects of the task but makes minor errors.
- 1 With help, the student demonstrates partial understanding.
- **0** Even with help, the student demonstrates no understanding or skill.

#### **Rubric for Performance Assessment 3**

- Score 4 Student shows proficiency without using number lines, fingers, or counters.
- Score 3 Student exhibits no major errors or omissions.
- Score 2 Student can perform the task but makes major errors.
- **Score 1** With help the student demonstrates partial understanding.
- Score 0 Even with help, the student demonstrates no understanding or skill.

#### **Rubric for Performance Assessment 4**

Score 4 – Student shows proficiency by collecting and organizing data independently.

Score 3 – Student collects and represents data with no major errors or omissions.

Score 2 – The student makes errors with data collection or representing simple data.

Score 1 – The student needs prompting to collect or represent simple data.

**Score 0** – The student, even with prompting, provides a response that is off task or is incorrect in significant elements of data collection and representation.

#### **Rubric for Performance Assessment 5**

#### Full level of understanding

Student gives a complete justification for choosing a certain day including a description of the weather. The unsuitability of the other days is described clearly and completely.

#### Partial level of understanding

Student does not give justification for choice in question 1 and/or does not explain why each of the other days was unsuitable in question 2.

#### Not Yet Understanding

Student is unable to choose a day or justify his/her answer in question 1. Student cannot explain why any of the days are or are not suitable for swimming as asked in question 2.

Diocese of Erie				
Mathematics				
First Grade				
Unit of Study:	Weeks: 5			
Unit 5 Addition and Subtraction of Numbers to 40				
Purpose: Fluently add and subtract within 40 using models and				
algorithms.				
Essential Questions:				
<ul> <li>How do I know which computational method (mental math, estimation, paper and pencil, and calculator) to use?</li> </ul>				
<ul> <li>How do I know when a result is reasonable?</li> </ul>				
<ul> <li>How does explaining my process help me to understand a pr</li> </ul>	oblem's solution better?			
Questions for Students:				
<ul> <li>What number patterns could I explain to a friend? One more or one less, repeating digits or 10 more or 10 less?</li> </ul>				
<ul> <li>How can I think about the answer to a problem and see if it</li> </ul>	makes sense?			
<ul> <li>Can I explain how I solved a problem to my teacher or a frier</li> </ul>	nd?			
Standards:				
1.NBT Understand place value.				
1.NBT.9 Understand that the 2 digits of a two-digit number represer	it amounts of tens and ones.			
<b>1.NBT.11</b> Compare two two-digit numbers based on meanings of the	e tens and ones digits, recording			
the results of comparisons with the symbols >, =, or <.				
<b>1.NBT</b> Use Place value understanding and properties of operations to	o add and subtract.			
<b>1.NBT.12</b> Add within 100, including adding a two-digit number and a	one-digit number, using			
concrete models or drawings and strategies based on place value, pr	operties of operations, and/or			
the relationship between addition and subtraction. Relate the strategy to a written method and				
explain the reasoning used.				
1.NBT.13 Add a two-digit number and a multiple of 10 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.				
Standards Reinforced:				

**1.OA** Represent and solve problems involving addition and subtraction.

**1.OA.1** Use addition within 20 to solve word problems involving situations of adding to, putting together and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

**1.OA.2** Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

**1.OA.3** Use subtraction within 20 to solve word problems involving situations of taking from, taking apart and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

**1.OA** Add and subtract within 20.

**1.OA.6** Relate counting to addition and subtraction.

**1.OA.8** Use strategies such as counting on; making ten; decomposing a number leading to a ten; using the relationship between addition and subtraction; and creating equivalent but easier or known sums.

Vocabulary:	greater than >	subtraction
addition	less than <	tens
compare	multiples of 10	two-digit number
equation	ones	

### Authentic Performance Assessment:

Rubrics are provided for most performance tasks. With modifications, rubrics can be used for alternate tasks.

**1.** Prove different ways the pets add up to twenty-five.

My sister has a pet store and she just got 25 new pets to sell to people who will love and take care of them. Some of the pets are kittens, some are puppies, and some are snakes. I'm wondering how many of each she could have. She has 25 pets in all. Using pictures, numbers and words, come up with as many different solutions as you can and then explain your thinking to your partner. Share your work and together come up with other possibilities.

**2.**There are 32 people on the bus. There are some adults and some children. Show as many combinations as you can to show the adult and children passengers on the bus that equal 32 riders. Draw pictures or use objects to help you. Are there more answers than the ones you have shown? Explain your answer.

**3.**You will need to limit the values of the numbers to fit into this unit of addition and subtraction to 40.

The teacher is sick in the other first grade, and the principal has asked you to please help the substitute teacher explain place value to the first graders so they can compare two digit numbers more easily. Plan a five-minute presentation to teach a classmate about place value and comparing numbers. Be sure to explain what the tens place and ones place are, and to use at least one visual representation (drawings, Cuisenaire rods, sticks/bundles, ten charts, etc.) in your explanation. Then use your representation to explain how to compare numbers.

**4.** Now do a problem from your world.

(person) (number) (things) The next day gave me more (person) (number) (same things)
The next daygave me more (person) (number) (same things)
(person) (number) (same tnings)
How many do I have now? (same things)
Picture:
Equation:+=
5 Roll 2 dice
What 2 digits did you roll? and
Make a 2-digit number. What is it?
Make another 2-digit number. What is it?
write your two numbers and circle the correct symbol to compare them correctly.
Rubric
Computation Skills:
Thinking and Reasoning Skills:
Using numbers from 21-40, provide the answer and have students write the addition or subtraction
problem. (E.g. Teacher provides: The answer is 36 tacos. The question could have been: Student
provides. The girls in class are 10 facos and the boys in class are 20 facos. How many facos did the
Have a daily math talk using numbers up to 40 like <u>this example</u> . You could use any number of steps
Tell students that you are going to dump a large quantity of pennies that you have been collecting in
them work in groups of 2-3 to formulate a plan for how they could work together as a class to count
the pennies. Share the plans aloud. Allow groups to count pennies according to their plan, and time
each group. Discuss why some groups took longer than others. Did everyone come to the same
amount of money? Is there a plan that allows all members in the group to more consistently come up with the same answer?

Have your students count larger quantities of manipulatives by ones. Next have them group the same items into tens and ones and count again by tens and extra ones. Ask the children which way to count a large quantity of items is faster.

When working on counting a group of items, remind student to organize quantities into groups of tens and then the leftover ones to represent a number. It would assist the students if you would design <u>a work mat</u> that has sections for organizing small manipulatives into tens and ones. Have students count quantities such as the following:(preparation for multiplication in the future) You have 4 boxes with ten pencils in each. How many pencils is that altogether? You have 3 baskets with five apples in each. How many apples is that? You have 2 packs of markers with ten markers in each. How many markers is that? Use a place value chart to record and name tens/ones within a 2-digit number up to 40.

### Real World Problems & Application/Catholic Identity:

Have 2 children jump rope and count their jumps. Add the number of jumps of the two children together.

Relate word problems to Catholic life or topics covered in Religion class:

- people at Mass or people in sections or pews at Mass;
- animals on the ark (front and back of ark, for example)
- animals in the garden with Adam and Eve
- angels in the heavens at Jesus birth
- fish created by God to fill the water
- birds created by God to fill the sky
- stars created by God to give light
- families helped by donations that took place at school or Church
- prayers in a spiritual bouquet
- children who contributed money on jeans day for a certain cause
- babies baptized in one month added to those baptized in a different month

Count and add classroom items such as:

- separate a box of 24 crayons into two parts and add the numbers together
- create classroom bags of manipulatives for students to count and join or count and subtract from
- subtract the number of absent students from the total number of students in class
- combine the number of students in two classrooms and subtract the number of absent students

#### Reading and Writing in Math:

Books:

- If You Were a Minus Sign by Patricia Bade Parkin
- *Two of Everything* (addition and subtraction, equations)
- Teddy Bear Counting (addition and subtraction, equations)
- A Squash and a Squeeze (addition and subtraction, shapes)
- *Ready, Set, 100<sup>th</sup> Day!* (place value, addition and subtraction)
- Quack and Count (addition and subtraction, equations)
- Over in the Ocean (addition, graphing)
- Hannah's Collections (addition, estimation)
- Handa's Surprise (addition and subtraction, problem solving)
- Five Little Monkeys Play Hide and Seek (counting patterns)
- Five Little Moneys Go Shopping (addition and subtraction, equations)

- Five Creatures (skip counting, equations)
- *Christopher Counting* (counting, place value)
- Apple Countdown (addition and subtraction, problem solving)

Use a math journal.

#### **Questions/Discussion Strategies:**

Do you agree or disagree with the answer?

Did anyone get a different answer?

What strategy did you use?

Does that always work?

Is there another way to solve the problem?

How confident are you in your answer?

How would you describe the problem in your own words?

How did you tackle similar problems?

### Technology/Manipulatives:

Manipulatives:

- Counters/rods
- White boards
- Number lines
- Work mats with spaces for tens and ones
- Hundred number charts
- Greater than/less than clothes pin monsters

#### Websites:

- <u>Hooda Math</u>
- <u>ABCYa</u> Educational Games for Kids includes assorted educational games on a variety of topics that teachers and students can choose from.
- <u>Math Playground</u> hosts a variety of first grade level mathematics games organized by skill. Browse for games that may be helpful for your students.
- <u>First in Math</u> contains extensive grade-level practice and includes a competitive element. Login required.

<u>Illustrative Math</u> lists deep thinking mathematics tasks that take place in real world contexts and are arranged according to common core standard. Student anchor work is provided for each task.

### Accommodations/Acceleration/Differentiation:

Struggling students should have access to a number line on their desk or readily available. These students would benefit from a hundred number chart at their desk. Might be necessary to pair a struggling student with a partner to assist with counting larger quantities.

Accelerated students may be ready to work with numbers above 40. Plan for number cards that are above 40 to enable them to practice. These students could create their own greater than and less than problems. They could work with a capable partner and discuss each problem.

Math Talk

Discuss the concepts of less than and greater than. You could say, "If I add 3 to this number does it make it less than or greater than my original number?" And likewise, "If I subtract 5 from this number, does it make it less than or greater than my original number?"

1. Write it. 2. Draw it 3 Add 5 5 6. Subtract Next 3 even numbers Next 3 odd numbers

Work Mat Sample





Greater Than/ Less Than Clothes Pin Monsters



#### **Rubric for Performance Task 1**

### **Excellent: Full Accomplishment**

Strategy and execution meet the content, process, and qualitative demands of the task or concept. Student can communicate ideas. May have minor errors that do not impact the mathematics.

### **Proficient: Substantial Accomplishment**

Student could work to full accomplishment with minimal feedback from teacher. Errors are minor. Teacher is confident that understanding is adequate to accomplish the objective with minimal assistance.

### **Marginal: Partial Accomplishment**

Part of the task is accomplished, but there is lack of evidence of understanding or evidence of not understanding. Further teaching is required.

### **Beginning: Little Accomplishment**

The task is attempted, and some mathematical effort is made. There may be fragments of accomplishment but little or no success. Further teaching is required.

### Rubric for Performance Task 2

**3** All parts of the question are answered accurately and completely. All directions are followed.

**2** Answer deals correctly with most aspects of the question, but something is missing. May deal with all aspects but have minor errors.

**1** Addresses item but only partially correct; something correct related to the question.

**0** Does not address task, unresponsive, unrelated or inappropriate.

### **Rubric for Performance Task 4**

2 Correct solution

1 Copying error; computational error, partial answer for problem with multiple answers; no answer statement; answer labeled incorrectly

**0** No answer or wrong answer based upon an inappropriate plan

### **Rubric for Performance Task 5**

**Full understanding** Answer is complete and correct; all parts of the question are addressed. **Partial understanding** Student gives a partially correct answer, or task is incomplete (i.e., one of two parts answered correctly.

Not Yet Understanding Student does not address task, unresponsive, unrelated or inappropriate.

Diocese of Frie				
Mathematics				
First Grade				
Unit of Study	Weeks: 4			
Module 6: Identify, compose, partition shapes				
Purpose: Use defining attributes to compose 2 and 3D shapes to				
create a composite shape. Partition shapes and understand				
relationships between the shares.				
Essential Questions:				
- How can patterns be used to describe relationships in mathe	ematical situations?			
- How are spatial relationships, including shape and dimension	n, used to draw, construct,			
model, and represent real situations or solve problems?				
- How can the application of the attributes of geometric shape	es support mathematical			
reasoning and problem solving?				
- What are the mathematical attributes of objects or processe	es and how are they measured or			
calculated?				
For Students				
<ul> <li>How would you describe equal shares?</li> </ul>				
- How can you describe two- and three-dimensional shapes? I	How are two-dimensional and			
three-dimensional shapes similar? Different?				
- What types of items/things can you divide into equal shares?				
- How can you partition shapes into halves or (equal shares) and fourths and compare the				
shares?				
Standards:				
1.G Reason with shapes and their attributes				
1.G.1 Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-				
defining attributes (e.g., color, orientation, overall size).				
1.G.2 Build and draw shapes to possess defining attributes.				
<b>1.G.3</b> Compose two-dimensional shapes (rectangles, square, trapezoids, triangles, half-circles and				
quarter-circles) to create a composite shape and compose new shapes from the composite shape.				
1.G.4 Compose three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and				
right circular cylinders) to create a composite shape and compose new shapes from the composite				
shape.				
1.G.5 Partition circles and rectangles into two and four equal shares, describe the				
shares using the words halves, fourths, and quarter, and use the phrases half of, fourth of, and				
quarter of.				
<b>1.G.6</b> Describe the whole as two of, or four of the shares.				
1.G.7 Understand for "half of" and "fourth of" that decomposing into more equal shares creates				
smaller shares.				

## Standards Reinforced:

**K.G** Identify and describe shapes. (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres)

**K.G.1** Describe objects in the environment using names of shapes and describe the relative positions of these objects using terms such as above, below, beside, in front of, behind, and next to.

**K.G.2** Correctly name shapes regardless of their orientation or overall size.

**K.G.3** Identify shapes as two-dimensional (lying in a plane, "flat") or three- dimensional ("solid"). **K.G** Analyze, compare, create, and compose shapes.

K.G.4 Analyze two- and three-dimensional shapes using informal language to describe parts (e.g., number of sides and vertices/"corners") and other attributes (e.g., having sides of equal length).
K.G.5 Compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, and differences.

**K.G.6** Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.

**K.G.7** Compose simple shapes to form larger shapes.

Vocabulary:		
attribute	face	rhombus
category	flat surface	right angle
circle	fourth of	side
closed figure	fourth/fourths	sort
compose	geometric solid	sphere
cone	half circle	square
congruent	half of	symmetry
cube	half/halves	three dimensional
curved surface	hexagon	trapezoid
cylinder	quarter of	triangle
decompose	quarter	two dimensional
different	rectangle	vertex
equal parts	rectangular prism	whole

#### Authentic Performance Assessment:

Rubrics are provided for the performance tasks. With modifications, rubrics can be used for alternate tasks.

1. Create a test for a classmate for halves and fourths.

You will draw some correct and incorrect pictures of food or other items that you can draw - then divide into halves and fourths. Be sure to have some of the pictures divided correctly and some of them divided incorrectly. Share the test with your teacher and describe each picture that you drew explaining why it is divided correctly or incorrectly.

Give the test to a classmate. Rubric

**2.**Supply small pretzel sticks, toothpicks, or paper strips so that the children will be able to form the following shapes: squares, rectangles, triangles, hexagons, trapezoids. Ask the student to describe the attributes of each shape. (e.g. This *is a triangle made of toothpicks; it has 3 sides, is a closed shape, and has 3 corners (vertices) and angles.)* Alternative: You are an artist working in 3D media. You have pretzel sticks/toothpicks, rubber bands, and marshmallows. Create a picture that is composed of other, smaller shapes, such as circles, half circles, squares, rectangles, triangles, hexagons, or trapezoids. When you are finished, present your art at the local museum (class). Be sure to tell the story behind the picture you made, and to point out and name the smaller shapes contained within your picture. Successful students list the attributes of the smaller shapes (pointing out and counting vertices, sides, open/closed shape, etc.) within their museum presentation. <u>Rubric</u>

**3.** Using building blocks (sphere, cone, pyramid, cube, and rectangular prism) create a model landscape (i.e. rectangular prism for a building or cone for a pine tree, etc.). Name the shapes used in

your landscape and describe why you chose them. (Advanced students can create nets to cover their blocks and color them). Rubric

#### **Computation Skills:**

addition, subtraction

### Thinking and Reasoning Skills:

How can you identify which attributes are always true about certain shapes and which are not always true?

Some people talk about 15 minutes being a quarter of an hour. Looking at an analog clock, why do you suppose they say that? Discuss the terms "quarter to" and "quarter after." Do you think the pattern holds true for a half hour?

Explore the difference between partitioning an image into four parts and partitioning it into fourths. The linked <u>exercise</u> in which students select the items that have been partitioned into fourths could be helpful.

Assist students in creating composite figures by providing two dimensional shapes (ideas include cutting out <u>blackline masters</u>, <u>translucent shapes</u>, tangrams, <u>plastic pattern blocks</u>, making felt or foam shapes) and having them compile the shapes to create composite shapes, try to make the outline of a new object, or create a picture.

Is there more than one way to solve the following? Explain your answer?

Given a circle or rectangle, ask students to show how they would cut the "pizza" or "candy bar" to share with 2 people or four people.

### Real World Problems & Application/Catholic Identity:

Consult with the art teacher to make cross-curricular links.

Problems such as the following:

There are two sandwiches that are the same size. Each sandwich is divided into fourths, but the sandwiches are cut differently. How might the two sandwiches be cut? You could substitute halves for fourths. You could also substitute pie, pizza, rectangular sheet cake, a dozen cupcakes, for the sandwich.

Relate composite shapes to the work of <u>architects</u> or <u>ancient buildings</u>. Design one's own building using simple 3D shapes.

What does cutting things in half have to do with sharing?

You and a friend would like to draw a poster with a nice circle on it. You are looking around for something to trace. What object would you pick? Why? Is there an object that would be a bad idea because if you traced it you would get a different shape? Why would that be? What about an object that would give the wrong *sized* circle for your poster?

Cut apples, oranges, kiwis, grapes, celery sticks, graham crackers, buns, bagels, and other foods into halves and quarters. Discuss whether students would rather eat a quarter, half or whole of each.

Include other foods in the discussion, such as watermelon, bowl of soup, banana, etc.

Use play-dough or clay to make two-dimensional and three-dimensional shapes.

Legos can be used to teach fractions since there are many combinations of smaller pieces that can cover larger pieces.

Use classroom wooden blocks or borrow from kindergarten or preschool. The children could also use the corrugated board blocks. Trace various blocks on paper; then divide the traced shape into halves and or fourths.

Class takes a "discovery" walk around the school. Students draw, label, and compare the shapes they find.

Ask students to sort boxes and cans of various sizes and explain their rule for sorting.

Use content from Scripture or religious pictures to discuss shapes and fractions. Some examples include:

- Should Jesus and each of the Apostles eat a loaf, half loaf, or quarter loaf of bread at one meal? What would each of these parts of a loaf look like?
- If you were at the Last Supper, would you want Jesus to give you a quarter loaf, a half loaf, or a whole loaf of bread when you were eating? What would each of these parts of a loaf look like?
- What would have happened if Noah told one-fourth of the animals that they had to get off the ark? Same question referring to one-half of the animals on the ark.
- When Jesus told the Apostles to let the children come to him, how would it have been different if he had said let half of the children come to me or let one-fourth of the children come to me.
- What are some things back in Jesus's time that might have been in the shape of a circle, square, triangle? Take your religion book and look for pictures of various shapes in the chapters.
- Show how Jesus could divide a fish in half to share with someone else at the table.
- Draw a church using as many shapes as you can. OR Use construction paper shapes to make a church on a large sheet of paper. OR Use classroom manipulative shapes to design a church.
- Using any choice of shape or shapes, design a table that might be in a home that Jesus visited back in Nazareth.

#### Reading and Writing in Math:

The Greedy Triangle by Marliyn Burns (<u>Version 1</u> or <u>Version 2</u>)

Before using have children think of where they have seen shapes in the real world.

Grandfather Tang's Story by Ann Tompert

Three Pigs, One Wolf, and Seven Magic Shapes by Grace Maccarone

Seeing Symmetry by Loreen Leedy

Tally O'Malley by Stuart Murphy

Use a math journal to practice drawing shapes.

### **Questions/Discussion Strategies:**

How did you reach that conclusion?

How would you interpret that?

How would you draw a diagram or make a sketch to solve the problem?

Is there another model you could use to solve the problem?

Is there a pattern?

Is there another way to draw, explain, or say that?

Would another method work as well or better?

How would you explain what you know right now?

Is there a general rule?

### Technology/Manipulatives:

Manipulatives:

- pattern blocks
- pattern block pictures to cover
- fraction puzzle pieces or fraction pieces
- tangrams
- 3D geometric solid blocks

- Folding geometric solids
- Translucent 2D shapes (like these ones found on Amazon)

### Websites:

- <u>Combining three dimensional shapes</u>: instructional
- Hooda Math
- <u>ABCYa</u> Educational Games for Kids includes assorted educational games on a variety of topics that teachers and students can choose from.
- <u>Math Playground</u> hosts a variety of first grade level mathematics games organized by skill. Browse for games that may be helpful for your students.
- <u>First in Math</u> contains extensive grade-level practice and includes a competitive element. Login required.

<u>Illustrative Math</u> lists deep thinking mathematics tasks that take place in real world contexts and are arranged according to common core standard. Student anchor work is provided for each task.

#### Accommodations/Acceleration/Differentiation:

For struggling students provide drawings of shapes to be partitioned into halves or fourths if drawing or composing their own shape causes frustration.

Provide struggling students visual depictions of one-half and one-fourth/halves and fourths for individual use.

Advanced students can be given the opportunity to work with thirds and sixths. These students can be encouraged to partition shapes other than circles and rectangles. These students will likely enjoy working with fraction bars or other fraction manipulatives that utilize fractions other than one-half and one-fourth.

# Four pieces v. Fourths

Explain why you chose or eliminated each picture.

Circle all of the pictures that are correctly partitioned into fourths.



**Back** 

# Blackline


## Rubric for Performance Task 1

**2 Fully Understood** Student draws at least 6 items and divides the 6 or more pictures into halves and fourths (correctly and incorrectly)/student correctly explains <u>each</u> divided picture to the teacher/other students can discuss this test with the student who created it.

**1 Partially Understood** Student drew less than 6 items and divided the pictures into halves and fourths (correctly and incorrectly)/student was able to correctly describe some or all the divided pictures to the teacher/other students are able to understand some or all of the pictures on the test

**0** Not Yet Understood Student is able to draw 1 or 0 items and divide into halves and fourths/student is unable to discuss the drawing with the teacher/other students are unable to understand the drawing

## **Rubric for Performance Task 2**

**4 Exemplary** Student can model and describe attributes of all 5 shapes.

- **3 Good Quality** Student can model and describe attributes of 3 or 4 shapes.
- 2 Satisfactory Student can model and describe attributes of 1 or 2 shapes.
- 1 Not There Yet Student cannot model or describe the attributes of any of the shapes

## **Rubric for Performance Task 3**

**4 Exemplary** Student can model and describe the attributes for cubes and rectangular prisms.

**3 Good Quality** Students can model and describe the attributes for one of the 3 dimensional figures.

2 Satisfactory Students can model 1 figure or describe the attributes of one or both figures.

**1** Not There Yet Student is unable to model either figure and is unable to describe the attributes of either figure.