

Module on Addition and Subtraction for Grades 1 and 2

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Learning Goals

Understanding the meanings of simple addition and subtraction along with related concepts of place value, properties of operations, and relationships between operations

Understand and use a variety of strategies to compute simple addition and subtraction problems.

Addition and Subtraction with Gecko Math

This unit will be continuing and ongoing after initial presentation. The math manipulatives, games and inquiry skills will be used independently and assessed throughout the year. The pretest will determine prior knowledge but will not eliminate any activities as each activity can be used as an enhancement and/or intervention. Posttest will be administered at the conclusion of Gecko Math implementation.

In my split 1st/2nd grade classroom, the Gecko Math strategies will be introduced to the entire class. One Gecko Math activity will be introduced each day, modeled, practiced as a group, with partners and then, finally, with self-selected partners, if applicable. Teacher will monitor, conference, instruct, and reteach, as necessary.

Addition and Subtraction
Pretest/ Post Test
A

1. Use circles. Show these numbers.

6 _____ 8 _____ 2 _____

Then, write the numbers above in order from least to greatest.

2. Draw a picture to show this problem.

4 trucks are at the stop light. 3 more trucks join them.

How many trucks are there in all? _____ trucks

3. Write a number sentence for this story.

Joe has 3 goldfish. He also has 2 hamsters. How many pets does he have in all?

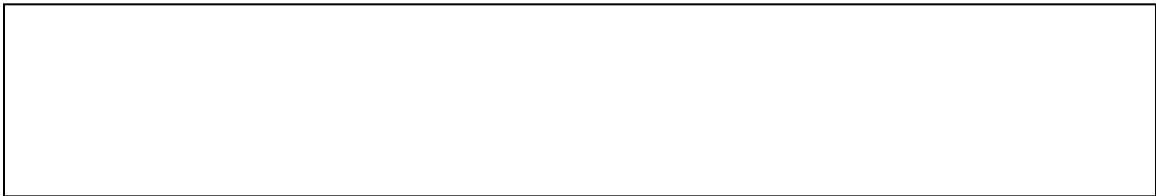
_____ + _____ = _____ pets

4. Complete these number sentences.

$$\underline{\hspace{2cm}} + \underline{\hspace{2cm}} = 10 \quad \underline{\hspace{2cm}} + \underline{\hspace{2cm}} = 10$$

5. Draw a picture to show this story.

There are 5 bees. Two fly away. How many bees did not fly away? bees



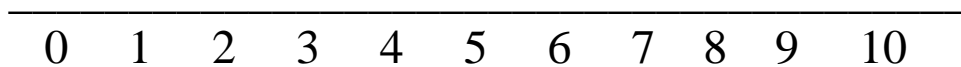
6. Write a number sentence for this story.

There are 6 bears in a cave. 2 bears go away. How many are left?

$$\underline{\hspace{2cm}} - \underline{\hspace{2cm}} = \underline{\hspace{2cm}} \text{ bears}$$

7. Use a number line to show this problem.

Pat has 8 rings. He gets 1 more ring. How many rings does he have now? rings



Addition and Subtraction
Pretest/Post Test
B

1. Show these numbers using circles.

4 _____ 7 _____ 10 _____

Write the numbers above in order from least to greatest.

2. Draw a picture to show this problem.

6 goldfish were in the tank. Kim put in 3 more goldfish.
How many goldfish were in the tank in all? _____ goldfish

3. Write a number sentence for this story.

Tim has 4 trucks. He also has 6 motorcycles. How many
toy vehicles does he have in all?

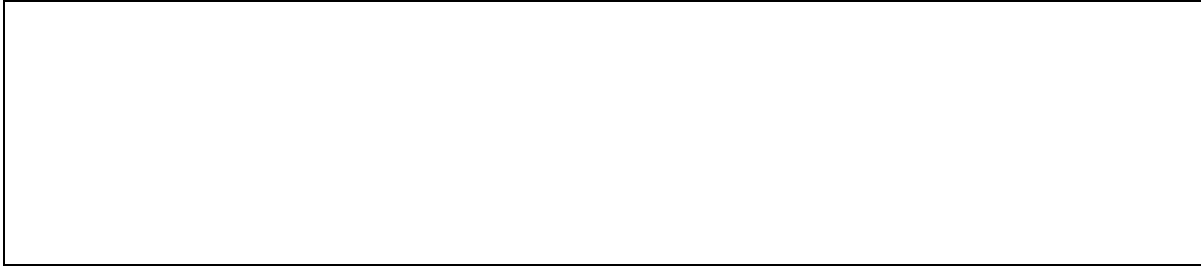
_____ + _____ = _____ vehicles.

4. Complete these number sentences.

_____ + _____ = 10 _____ + _____ = 10

5. Draw a picture to show this story.

There are 8 birds sitting on the branch. Two fly away. How many birds did not fly away? _____ birds



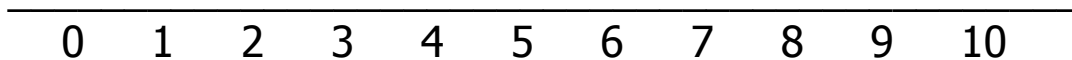
6. Write a number sentence for this story.

There are 4 frogs in the pond. 1 frog hops away. How many are left?

_____ - _____ = _____ frogs.

7. Use a number line to show this problem.

Pam has 4 jars. She gets 4 more jars. How many jars does she have in all? _____ jars



Teacher Instruction and Modeling

Lesson 1

Using Korean Mathematics, the teacher will demonstrate **base ten (decimal place value)** addition.

Students will be expected to memorize facts to 10. They will be exposed to many manipulatives (colored paper clips, Lucky Charms, pom-poms, counting stones, craft sticks, colored tiles, etc.) and opportunities to experience sums up to 10.

Lesson 1B

The teacher will also model the communicative property of addition by using manipulatives. Given a number sentence, students will use their manipulatives to show a picture of the number sentence. Then teacher will ask them to switch positions of the manipulatives and write the number sentence that tells about the picture the manipulatives make now. In this way, students will see the communicative property of addition.

Lesson 1C

Building on facts to 10, the teacher will model decomposing a number, building a fact of 10 and adding on or counting up. $6+7$, decompose the 7 to $(6+4)+3$, taken to $10+3=13$. $3+9$, decompose the 3 to $2+(1+9)$, taken to $2+10=12$. Either addend may be decomposed, the idea is to make a sum of 10 and understand there is an amount "remaining" that must be added to 10.

Lesson 2

Using Korean Mathematics, the teacher will demonstrate the **inverse property of addition and subtraction**.

Beginning with small numbers (1-10); easily represented by plastic lizards, counting bears, beans, stacking cubes, pencils, etc., the teacher will model an addition problem with a sum less than or equal to 10. The teacher will then represent the story problem, demonstrated with manipulatives, with a number sentence. Using the same manipulatives the teacher will demonstrate the inverse problem and write a number sentence. The teacher will demonstrate this method several times and then stop for classroom reflection, observation, discussion. The teacher will then involve the students by asking them for math stories, manipulating the objects, and writing the number sentences. Enrich activity by using numbers 0-20.

Lesson 3

Using Korean Mathematics, the teacher will demonstrate the **subtraction-addition method**. Using bundles of craft sticks (grouped in 10's), teacher will take apart a bundle, count the sticks and group again. A story problem will be presented. E.g.: There were 11 cars in the lot. 7 cars left. How many cars are in the lot now? Teacher will demonstrate that 11 is 10 and 1. $10-7+1$. $3+1=4$. When using the subtraction-addition method, the minuend is always decomposed.

Lesson 4

Using Korean Mathematics, the teacher will demonstrate the **subtraction-subtraction method**. Using bundles of sticks the teacher will decompose the subtrahend into parts that will allow student to take away enough to make the minuend equal 10, then, continue subtracting the remainder of the subtrahend. E.g.: $11-7$. $(11-1) (-6)$. $10-6=4$.

Lesson 5

Using Korean Mathematics, the teacher will demonstrate the **inverse property of addition and subtraction**. Beginning with small numbers (1-10); easily represented by plastic lizards, counting bears, beans, stacking cubes, pencils, etc., the teacher will model an addition problem with a sum less than or equal to 10. The teacher will then represent the story problem, demonstrated with manipulatives, with a number sentence. Using the same manipulatives the teacher will demonstrate the inverse problem and write a number sentence. The teacher will demonstrate this method several times and then stop for classroom reflection, observation, discussion. The teacher will then involve the students by asking them for math stories, manipulating the objects, and writing the number sentences. Enrich activity by using numbers 0-20.

Lesson 6

Using Korean Mathematics the teacher will use a number line to model **"take away" subtraction**. $10-4$ can be shown on the number line by beginning at 0 and counting the spaces to 10 or starting a 0 and drawing an arched line to the number 10 on the number line. To show the

subtrahend, the teacher will count to the left 4 spaces, landing on the difference.

Lesson 7

Using Korean Mathematics the teacher will use a number line to model "**comparison**" **subtraction**. The story problem could be: Tom has 9 cats. Pat has 3 cats. How many more cats does Tom have than Pat. Chart the number of cats Tom has with an arch above the number line. Chart how many cats Pat has with an arch on the bottom of the number line. The difference will be denoted by the spaces between the 9 and 3.

Activities

Students will apply the use of GeckKo Math strategies to solve problems.

Counting On Game

Supplies: plastic rulers, dry erase fine line markers

Students will use rulers to explore the counting-on strategies for addition. As teacher writes addition problem on board, she will model the count-on strategy for addition using a ruler and then a number line. Students will use dry erase markers to show the addition problem.

Count and Back-up

Supplies: plastic rulers, dry erase fine line markers

Students will use rulers to explore the count-and-reverse strategies for subtraction. As teacher writes subtraction problem on board, she will model the count-and-back-up strategy for subtraction using a ruler and then a number line. Students will use dry erase markers to show the subtraction problem.

Red Box, Blue Box

Supplies: graph paper, red and blue crayon

Students will write an addition problem on their graph paper, and then use a red crayon to color in the graph boxes to represent the first addend; a blue crayon to represent the second addend. The sum may be written in the student's choice of color.

Pig

Supplies: die, pencil and paper

Given a die, students will roll the die and add on the next number they roll. They may continue rolling and die and adding the next number. If they roll a one, their turn ends and they lose all the accumulated points for that turn. The idea is to stop before they roll a one. They will keep all points accumulated during that roll. The students will keep their accumulated points recorded on a paper and add to it on their next roll. The first student to accumulated 100 points is the winner.

Students will make connections using representations to explain addition and subtraction situations.

Picture Picture

Supplies: Markers, colored pencils, crayons, copy paper, card stock, cardboard, poster board (other paper/pencil media), stapler

Students will use a variety of paper/pencil media to draw diagrams or pictures to represent addition and subtraction situations.

Do It Again

Supplies: a set of concrete manipulatives, pencil, paper

By using the manipulatives, the student will explore all the ways to use the set number to make number sentences. How many can they make with 6 manipulatives? $0+6=6$, $6-0=6$, $5+1=6$, $3+3=6$ etc. Students will record number sentences.

Apply and justify the use of strategies involving derived facts (making ten).

Magic 10

Supplies: playing cards: ace through 9

Students will place cards face down on a playing surface. Students will take turns, turning over two cards. If the sum of the cards adds up to 10, they may keep the cards.

Show Me 10

Supplies: bundles of 10 craft sticks, paper, and pencil

Students will manipulate sticks to represent 10. They may use 2 or more addends. Students will record number sentences on paper and share with group. Communicative property of addition may be a topic to address.

On and Off

Supplies: 10 counters per group, mat, pencil and paper

Students will toss 10 counters into the air above the mat. Number sentences will be derived from counters on the rug + counters off the rug = 10.

10 is the Magic Number

Supplies: 10 manipulatives (marbles, flat stones, tiles, craft sticks, buttons)

For several days distribute a particular manipulatives (always 10 per student). Students will make two piles with their manipulatives, exploring facts (both addition and subtraction) to 10. Teacher will record them on board. A discussion of the inverse property can be initiated at this time. Chart will be left to view.

Apply and justify inverse relationships between addition and subtraction.

Flipping Families

Supplies: pre-made facts and the inverse facts cards on index cards, 4 colored pancake turners.

Students will play a game similar to GO FISH. They will use pancake turners to turn over a card and then try to locate another card with a "Fact Family" match. The match could be addition to addition or addition to subtraction.

Create and solve simple contextual problems involving addition and/or subtraction for a variety of mathematical situations.

Roll `Em

Supplies: 2 dice per participant (white-out the six side to represent zero), paper and pencil. (May want to consider writing the numbers 1-6 on the dice in lieu of dots.)

Students will roll the dice, write a number sentence and solve.

Toss and Spin

Supplies: one paper plate spinners per group (divide paper plate into 6 sections, number the sections 3 through 7, using the number 3 twice, make a spinner from a brass fastener and a strip of card stock) , one die per group, paper and pencil

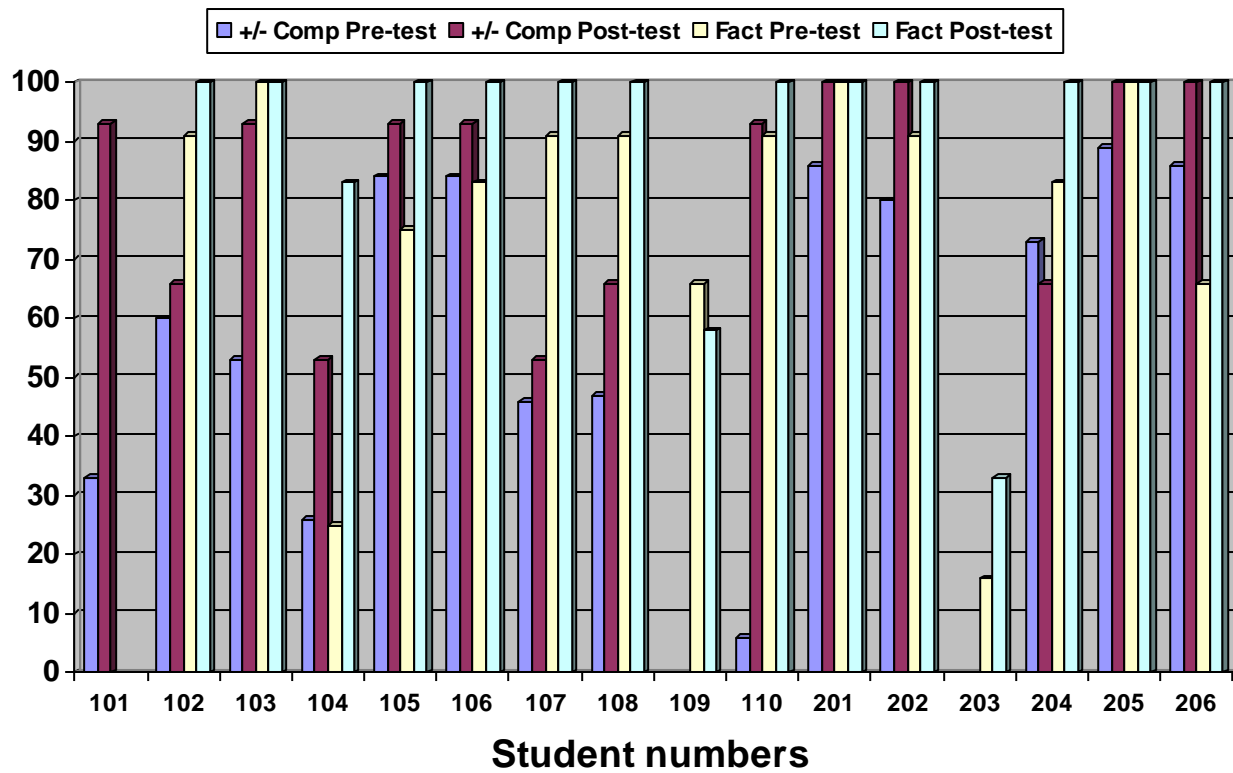
Students will spin the spinner first time for first addend, spin again for second addend; then students will roll the die for a number to subtract from the sum.

Graph It

Supplies: graph template, crayons, and items to be graphed

Students will view several completed graphs. Data will be discussed and analyzed. Students will then be given items to graph. These may be Smarties, M&Ms, linking cubes, jelly beans, etc. A title must be made for the graph; if it is a survey graph, plan ahead to accumulate data from outside the classroom. Discuss appropriated survey techniques by modeling in the classroom. Record data. Discuss completed graphs.

Gecko Math Pre and Post Test Results



Gecko Math Analysis

April 29, 2009

Description of Application: Each day before my first and second graders launched into a Saxon Math lesson, I delegated 15-20 minutes to *explore* Gecko math methods. We used manipulatives. We looked at problems from a real-world position. We decomposed numbers, focusing on decomposing to mastery all numbers between 2 and 10. We used *many* math strategies to solve *one* problem. We graphed, we surveyed and charted data, we worked in groups and with partners and independently. We made charts of math facts, identifying communicative, associative, inverse properties. Students were encouraged to use the charts to solve math problems outside of Gecko math.

Results: Addition/Subtraction pretest average: 60%

Addition/Subtraction post-test average: 83%

*Gain of 13 percentage points

Facts (with variable) pretest average: 77%

Facts (with variable) post-test average: 91%

*Gain of 14 percentage points

Pre and Post tests indicated that there was an increase in math applications. I found myself imbedding Gecko Math strategies into Saxon Math lesson on a daily basis. I observe my kiddos using Gecko strategies doing independent work and using the language of Gecko Math. I realize that it is impossible to determine how much of an impact Gecko Math actually played in the increased scores because Gecko Math was used in conjunction with Saxon Math but I know that the kiddos gained a much deeper knowledge of the subject matter by using the Gecko Math strategies.

Reflections: I am pleased with the math strategies that my kiddos gained through my use of Gecko Math. I know that this module is just the beginning of my use of Gecko Math. Some of my kiddos fell in love with math because we were thinking outside the box, having fun with math and they saw that there were many different approaches to be learned to solve one problem. I gave them the freedom to apply those many strategies. This module addressed individualized math instruction at a whole new level. I observed my kiddos talking about strategies with their peers and becoming excited about "Gecko Math" time. Sometimes I actually felt that they were being entertained with new information and knowledge.

