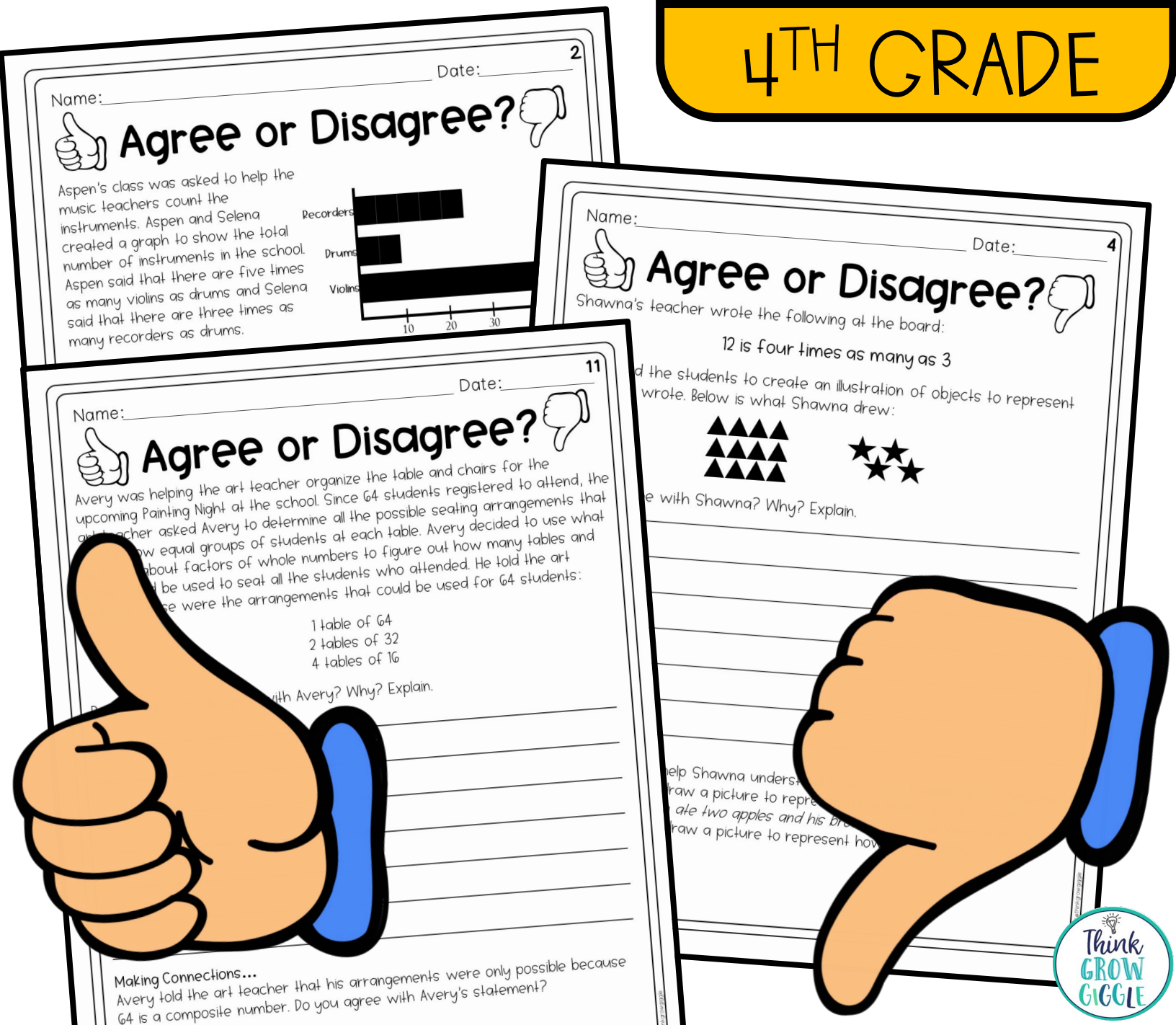
AGREE or DISAGREE?

OPERATIONS & ALGEBRAIC THINKING

Analyzing & Critiquing Math Problems

4TH GRADE



Think GROW GIGGLE

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Jeanine

About the Teacher-Author

Hi, I'm Jeanine from Think Grow Giggle! I have loved spending the past 17 years in the classroom teaching! I graduated with a bachelor degree in Elementary Education and American Studies. I hold two master's degrees; one in educational technology and one in reading instruction. I am currently teaching 5th graders after spending 16 years teaching 3rd graders. I am certified to be both a classroom teacher and reading specialist. I enjoy living by the beach on Long Island and spending free time with my husband and children.

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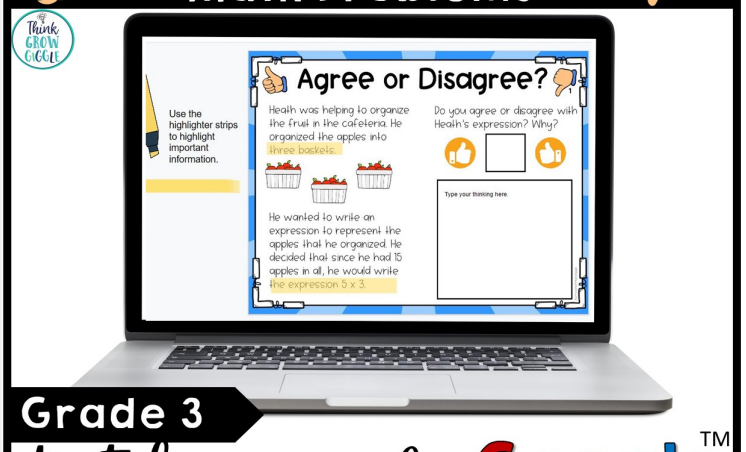

Grade 3

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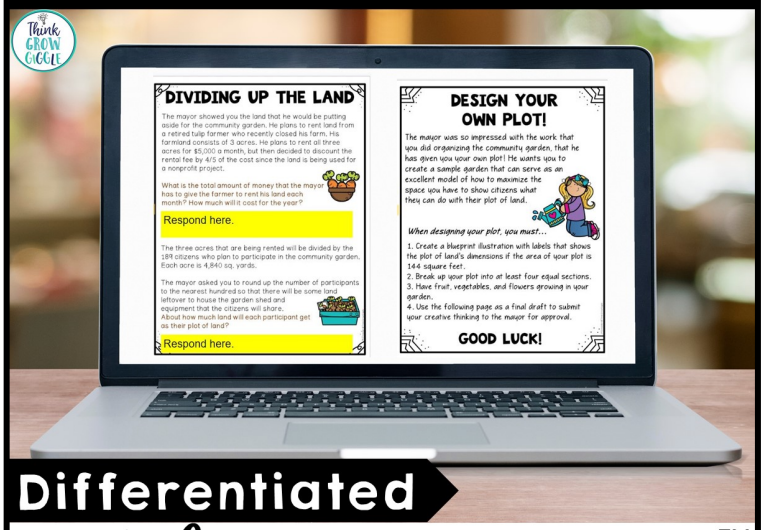
MATH PERFORMANCE TASK
Organize a Community Garden



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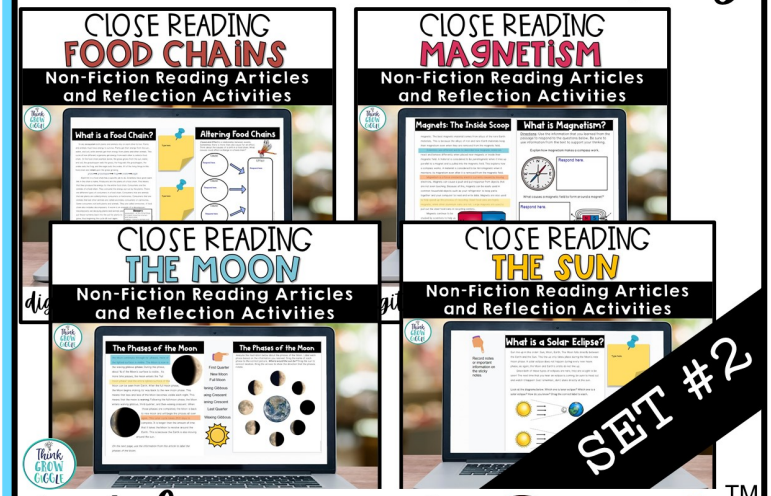

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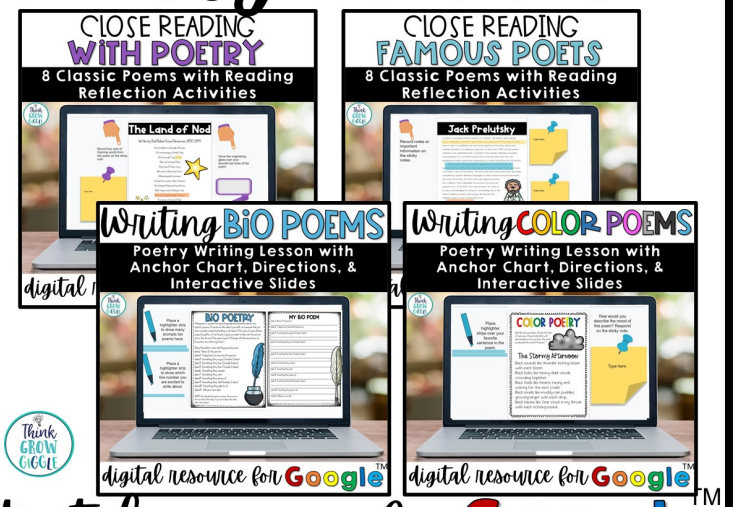

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Teacher Suggestions

These mathematical critiquing problems were created to use with fourth grade students. These problem-solving activities require the students to problem solve, make decisions, and critique the work of others. Students must also defend their mathematical thinking with words, numbers and any other format that they choose.

These problems reinforce student reading, writing, and debating skills. Included are agree/disagree cards, as well as math discussion stems and questions to help students engage in meaningful discourse in whole group, small group, or partner settings focused around these problems.

Included are 15 problems in Google Slide Format.

When introducing students to these type of problems complete one or two together. This will allow you to set the example of what you expect in the written response section. I encourage my students to work out the problems on the back, labeling each step as they work. Their labeled mathematical work serves as a great reference for them, when they go to complete the written component of each problem.

Here are some ways I have used these activities in my classroom:

- ✓ Digital and Distance Learning Activities
- ✓ Math centers or stations
- ✓ Small group work and partnership activities
- ✓ Formal or informal assessments
- ✓ Independent practice/Reinforcement
- ✓ Homework or Classwork Review
- ✓ Test Prep
- ✓ Whole Class Bell Ringers

Think GROW GIGGLE

How to Access Digital Math Error Analysis

Getting Started:

- Make sure that you are logged in to the desired Google account that you will be using when sharing with your students.
- When you click the link, you will be asked to make a copy. Once you have made a copy, you have your own copy of this activity in your Google Drive.
- Make sure you check all the pages to make sure you assign the correct pages for your own students.

Math Error Analysis Algebraic Thinking

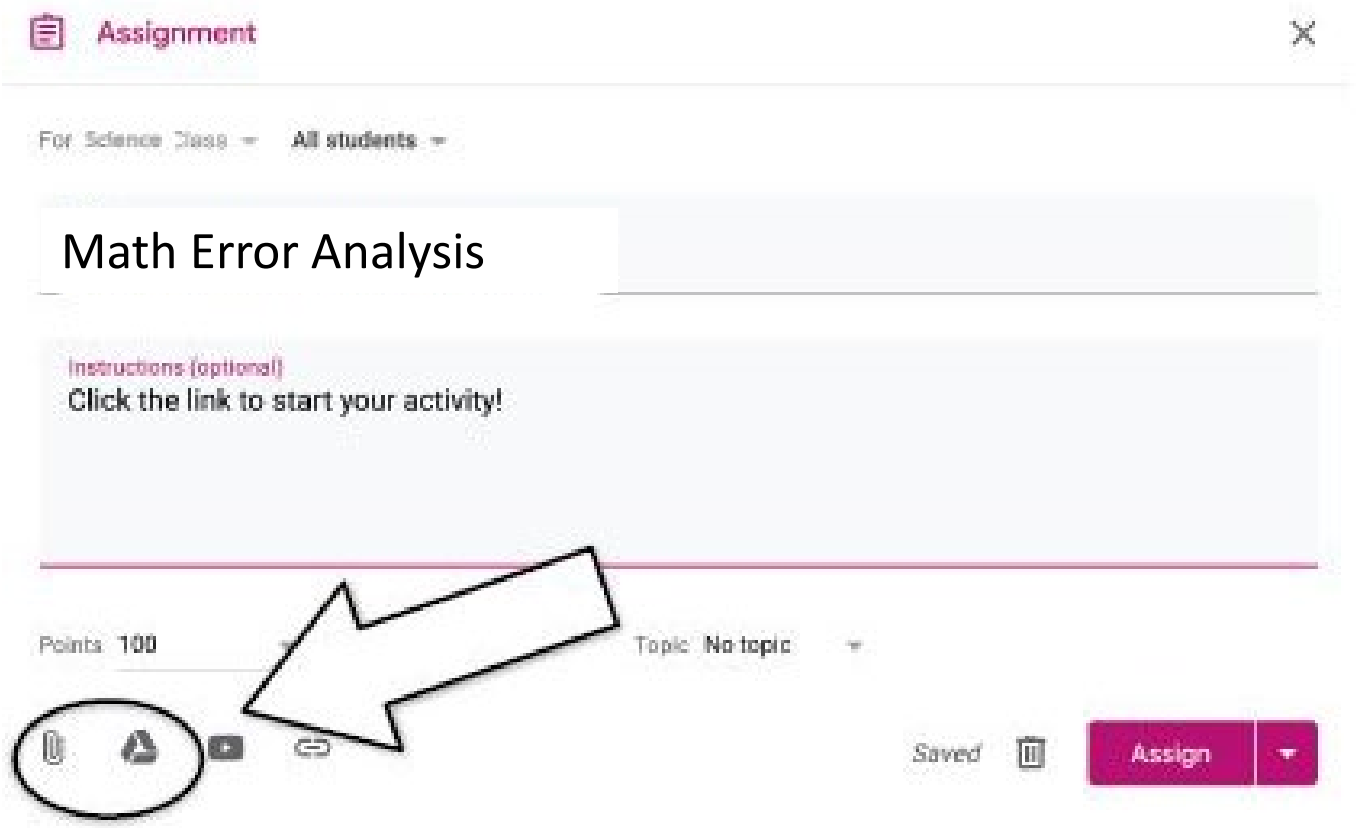
Assigning to Your Students

In Google Classroom:

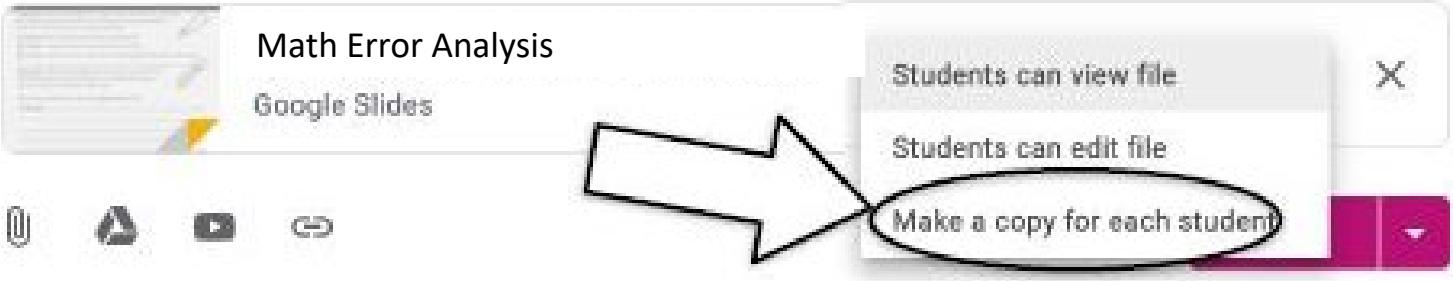
Go to your Google Classroom for your students and go to "Classwork."

Click the "Create" dropdown menu and choose "Assignment."

Insert the activity by clicking the attachment or Google Drive button and choose any part of the Math Error Analysis from where you have it saved. Be sure to include a title and instructions for your students.



Choose the "Make a copy for each student" option. This allows each student to receive their own copy of the activity to type their work on, and it saves each one into a Google Drive folder just for you! When they're finished, all they have to do is click "turn in!"



Math Discussion Stems

- ✓ First let's...
- ✓ I can solve it by...
- ✓ Another way to solve it is...
- ✓ I think...
- ✓ Here is another idea...
- ✓ When I first saw the problem, I thought...
- ✓ I did it this way, because...
- ✓ I agree because...
- ✓ I disagree because...
- ✓ My work shows that I...
- ✓ Let's challenge ourselves to...

Math Discussion Questions

- ✓ What should our plan be to solve this?
- ✓ How did you reach that answer?
- ✓ What strategy did you use?
- ✓ Can you think of another strategy to solve this?
- ✓ Can you explain how you organized your work?
- ✓ Can you explain your thinking with math drawings?
- ✓ What strategy do you think works best?

Name: ANSWER KEY Date:_____

Agree or Disagree?

The fourth grade students were asked to help organize the fresh fruit served in the cafeteria. Jannella organized the apples and noted that today there were four times as many apples left over after lunch today than yesterday. Here is what was left over:

Janella tried to figure out how many apples were left over yesterday using this equation: 4 x n = 20

Do you agree or disagree with Janella? Why or why not?

Agree with Janella. Since there are 20 leftover today, and it is four times as many as yesterday, the unknown is to figure out how many were left over yesterday.

Since four times 5 = 20, five were left over yesterday.

Going Further...

Janella volunteers her time to help sell desserts at the cafeteria. She sold 12 fruit ice pops and four times as many berry bowls. Maria said that meant that she sold three berry bowls. Janella disagreed and said the sold more than 40. Who is correct?

Janella is correct. To solve set up the unknown as the total amount of berry bowls that were sold:

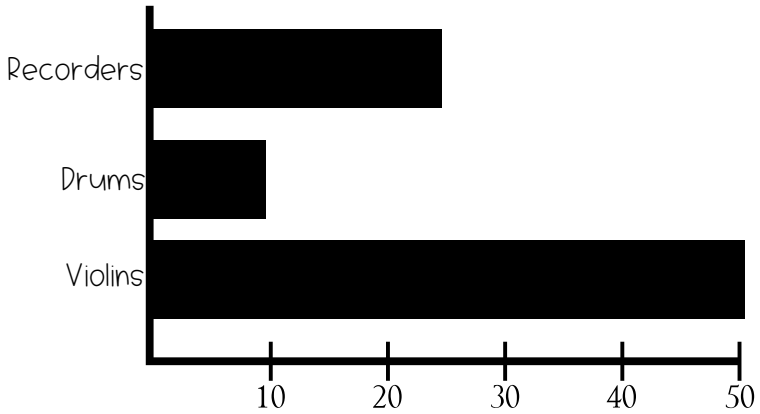
12 x 4 = n

n = 48

Name: ANSWER KEY Date:_____ 2

Agree or Disagree?

Aspen's class was asked to help the music teachers count the instruments. Aspen and Selena created a graph to show the total number of instruments in the school. Aspen said that there are five times as many violins as drums and Selena said that there are three times as many recorders as drums.



Do you agree with Aspen or Selena? Why? Explain.

Agree with Aspen. Since there are 10 drums and 50 violins, than there are five times as many violins as drums.

There are only recorders, so Selena is incorrect.

Making Connections...

Marcus decided to help in the music room, too. He said that there were 7 trombones and 4 times as many triangles. He wrote down both 7 + 4 and 7 x 4 to help him show how many triangles were in the music room. Which expression should he use to show the instruments he counted?

He should use 7x4, since there were four times as many. This would multiplicative comparison.

Name: ANSWER KEY Date:_____

Agree or Disagree?

Mrs. Edwards focused her math lesson around the amount of pencils that were in the classroom. She had four buckets of 12 pencils and had two times as many pencils in her secret pencil closet for emergency use. She asked the students to write an expression to represent how many pencils she had in all. Deanna wrote the following in her math journal:

$$(12 + 12 + 12) \times 2 = n$$

Do you agree or disagree with her expression? Why? Explain.

Disagree with Deanna.

Her expression should include four sets of 12 in either multiplication or addition inside the parenthesis. The total amount would then be multiplied by 2 to find the unknown of how many pencils are in all.

$$(12 \times 4) \times 2 = n \text{ OR } (12 + 12 + 12 + 12) \times 2 = n$$

Going Further...

Deanna wanted to practice solving more math problems. She counted the class buckets of colored pencils. She counted 10 colored pencils in each of the four buckets and found three times as many in the art center. She wrote the following to represent how many colored pencils there were:

$$(10 \times 4) \times 3$$

How many colored pencils are in Deanna's classroom?

$40 \times 3 = 120$

Name: ANSWER KEY _____ Date:_____

Agree or Disagree?

Shawna's teacher wrote the following at the board:

12 is four times as many as 3

She asked the students to create an illustration of objects to represent what she wrote. Below is what Shawna drew:

Do you agree with Shawna? Why? Explain.

Disagree with Shawn.

Responses and illustrations will vary.

Going Further...

Marisol wanted to help Shawna understand how to use multiplicative comparison. So she planned to draw a picture to represent how many apples Steven's brother ate: *Steven ate two apples and his brother ate four time as many apples.* Help Marisol draw a picture to represent how many apples Steven's brother ate.

Answers will vary.

Name: ANSWER KEY Date:_____

Agree or Disagree?

It was time for PE and William's class headed to the gym. When they got there, they saw that the PE teacher placed rope for a race on the floor. William measured each of the 8 pieces of rope and found each piece to be 4 feet long.

William wrote down 8 x 4 = n to help him solve how many feet of rope was on the gym floor.

Do you agree with William's work? Why? Explain.

Yes, agree with William.

Solving for n in this equation will help him figure out how many feet there are in all.

8 x 4 = 32 feet in all.

Going Further...

The PE teacher also took out the colored flags to decorate for the obstacle course. She had 7 bunches of 8 flags. How many flags did she have for the obstacle course?

7 x 8 = 56 flags

Name: ANSWER KEY Date:_____

Agree or Disagree?

During the race in PE class, Mike ran 35 feet and Laneena ran three times that amount. Since she beat Mike, he wanted to calculate how many feet she ran. He wrote the following to help him solve:

$$35 + 3 = n$$

Do you agree or disagree with Mike? Why? Explain.

Disagree with Mike. Laneena ran three times that amount, so he needs to multiply by 3, or add 35 three more times.

35 x 3 = 105 feet

Making Connections...

Laneena and Mike raced again. This time it was a scavenger hunt race. They had to find as many flags on the soccer field as possible while running around its perimeter. Laneena ran around first and found 17 flags. Mike ran around second and found four more. What number sentence can be used to figure out how many flags they found?

17 + 4 = 21 Mike's flag total
17 +21 = 38 flags in all

Name: ANSWER KEY Date:_____

Agree or Disagree?

Sioban volunteered to make cookies for the upcoming Math Fair at the school. She baked three dozen chocolate chip cookies and 24 oatmeal raisin cookies. Since she told her teacher that she would be bringing in 75 cookies, she needed to figure out if she needed to make any more cookies. Sioban created this equation to help her figure out if she needed to bake anymore cookies:

$$(10 \times 3) + 24 = n$$

Do you agree or disagree with Sioban? Explain why.

Disagree with Sioban.

A dozen of cookies = 12.

(12 x 3) + 24 = n (total amount of cookies)

She baked 20 cookies, needs 75, so she still needs to bake 75 cookies.

Making Connections...

Sioban's uncle said he would help her by baking cookies for the math fair, too. He made 10 marshmallow cookies and 12 jam cookies. Write an expression to show if they have enough cookies. Be sure to use "n" to represent the unknown in your equation.

10 + 12 = n
n = 22
60 + 22 = 72
They did not make enough cookies.

Name: ANSWER KEY Date:_____

Agree or Disagree?

Mrs. Jeffers was excited to host the Math Challenge at the school's Math Fair. To complete the challenge, students had to work in teams of four to build and measure the tallest tower constructed from cups. She set up stations in the library, but only had large tables. Three tables can seat7 students and four tables can seat 6 students. 24 students signed up for the challenge so she told the custodians she did not need anymore tables. The custodians disagreed and said they would bring her more tables.

Do you agree with Mrs. Jeffers or the custodians? Why? Explain.

Agree with Mrs. Jeffers.

Since 24 students are attending and they work in groups of 4, there will be six groups competing in the challenge.

Three tables hold 7 students = 3 groups (one at each table)

Four tables that hold 6 students = 4 groups (one at each table)

There are enough spots for 7 groups of students at the tables that she has.

Going Further...

Mrs. Jeffers purchased 35 packs of 100 cups for this event. She planned on giving each group 150 cups for the challenge and at least two dozen cups left over for the snack table. Did she buy enough cups?

Yes, she has enough.
35 x 100 = 3500
6 groups registered x 150 = 900 cups
2 dozen = 24
900 +24 = 924 cups < 3500 she purchased

Name: ANSWER KEY Date:_____

Agree or Disagree?

John's class was collecting money to buy books to donate to the library as a part of their class kindness project. Since there are 27 students in John's class (including him) he asked each student to donate $12 to be able to buy the $320 worth of books he plans to buy. John's friend Declan said that each student needs to donate more money in order to reach $320.

Use estimation to decide if you agree with John or Declan. Explain your reasoning.

Agree with John.

$27 rounds to $30

$30 x $12 = about $360 which is more than he wants to collect

Going Further...

John went to the bookstore to buy the books he needed. He took the exact amount of money he collected from the 27 students in his class who each donated $12. The bills totaled $319. Did he have enough money to buy all the books?

27 x $12 = 324

He has enough money.

Name: ANSWER KEY Date:

Agree or Disagree?

For the class kindness project, Kenya decided to collect used books from the students in class and donate them to the kindergarten and first grade classrooms. She couldn't believe that she collected 786 books! She planned to divide them among the 6 kindergarten and first grade classrooms at the school. Kenya estimated that each classroom will get about 110 books.

Do you agree or disagree with Kenya's estimation? Why or why not?

Disagree.

786 rounds to 800

800 divided by 6 = about 133 books in each classroom

Going Further...
Since Kenya collected 786 books from the 27 students in her class (including herself) she estimated that each student brought in about 29 books. How did Kenya reach this estimate?

Kenya rounded 786 to 800 and divided by the 27 students in the class who donated.

Name: ANSWER KEY Date:_____

Agree or Disagree?

Avery was helping the art teacher organize the table and chairs for the upcoming Painting Night at the school. Since 64 students registered to attend, the art teacher asked Avery to determine all the possible seating arrangements that would allow equal groups of students at each table. Avery decided to use what he knew about factors of whole numbers to figure out how many tables and seats could be used to seat all the students who attended. He told the art teacher these were the arrangements that could be used for 64 students:

1 table of 64
2 tables of 32
4 tables of 16

Do you agree or disagree with Avery? Why? Explain.

Disagree with Avery.

Although these seating arrangements are correct for 64 students, another one should be listed: 8 groups of 8

Making Connections...
Avery told the art teacher that his arrangements were only possible because 64 is a composite number. Do you agree with Avery's statement?

Agree 64 is a composite number.

Name: ANSWER KEY Date:_____

Agree or Disagree?

Principal Brown asked Nate's class to set up the tables and chairs for the fourth grade lunch. She told Nate that there were 98 students in fourth grade that needed to eat lunch and asked Nate to make sure that 98 was a multiple of 12 since each cafeteria table seats 12. Nate right away told her that 98 was not a multiple of twelve.

Do you agree or disagree with Nate? Why? Explain.

Agree with Nate.

Multiples of 12 are:

12, 24, 36, 47, 60, 72, 84, 96, 108

No whole number can be multiplied by 12 to equal 98.

Making Connections...
Nate told Principal Brown that knowing multiplication facts helps him decide which numbers are multiples of a given number and which are not. How can knowing multiplication facts help with understanding multiples of a given number?

Answers will vary.

Name: ANSWER KEY Date:

Agree or Disagree?

Dom's class was playing a game during math class called, Prime It, to Win It! In order to earn a point, students had to name a two-digit prime number using numbers that they rolled using the game dice. Dom was playing against his friend Marco and rolled a 2, a 5, and 3. Dom used the 2 and 5 and said that 25 was a prime number and Marco used the 2 and 3 and said 23 was a prime number.

Do you agree with Dom or Marco? Why? Explain.

Agree with Marco.

23 is a prime number and 25 is not.

Marco gets the points.

Going Further...

Now Marco was playing the same game against Dwayne. They rolled 1, 2, 6. Marco said it was impossible to make a prime numbers with the digits that they rolled and Dwayne disagreed. He said that the number two was a prime number. Do you agree with Marco or Dwayne? Why?

Although 2 is a prime number, the rules of the game say that you have to make a two-digit prime number. 2 is only one digit.

Name: ANSWER KEY Date:

Agree or Disagree?

Malina's teacher shared the following data table with the class:

#1	2	5	8	11	14	17
#2	15	27	39	51		75

She asked Malina to compare the number sequences to find the missing number. Malina said the missing number was 63 because each number in sequence two increased by 14.

Do you agree or disagree with Malina's work? Why? Explain.

Disagree with Malina. Each number in sequence 2 increases by 12. The missing number is:

51 + 12 = n

n = 63

Going Further...
What is the rule for sequence #2? If the pattern continued, would the next three boxes also be odd numbers? Would the next five boxes? How do you know?

Rule = increases by 12
The next three numbers would be 87, 99, 111 then 123, 135
They will always be odd because you are adding even and odd numbers together to follow the rule of this pattern.

Name: ANSWER KEY Date:

Agree or Disagree?

Roberto's teacher asked the class to create a number sequence using this rule:

Start with 7 and multiply 3

Roberto said the first three numbers in the sequence to follow this rule would be 7, 21, and 63

Do you agree or disagree with Roberto's work? Why? Explain.

Disagree with Roberto.

Starting with 7, does not mean 7 is in the sequence.

7 x 3 = 21

21 x 3 = 63

63 x 3 = 189

Going Further...
Roberto said that no matter how far this pattern continued, every number would always be odd. Do you agree with Roberto? Why or why not?

Agree. When multiplying odd number by odd number the product is always odd.