

beauty & truth
MATH

Mathematics in a
Charlotte Mason Education

ARITHMETIC

SAMPLE

YEAR 5 BUNDLE

SAMPLE

Beauty & Truth Math

- Mathematics in a Charlotte Mason Education -

ARITHMETIC YEAR 5 • BUNDLE

Used in conjunction with

STRAYER-UPTON PRACTICAL ARITHMETICS, SECOND BOOK

by George Drayton Strayer and Clifford Brewster Upton

ARITHMETIC • YEAR 5 • BUNDLE

Copyright ©2025 by Beauty & Truth Math. All rights reserved.

This document is for personal home schoolroom use only. Permission must be granted by the author for any other usage. Its content cannot be copied, reproduced, repackaged, altered, modified, or publicly displayed except for personal, noncommercial use. This file may be printed by an online service for immediate family use only.

You may post pictures of your family using this product on social media and blogs as long as Beauty & Truth Math is properly attributed.

No Redistribution: This product may not be reproduced, repackaged, or redistributed, in whole or in part, for any reason.

Modification of Terms: Beauty & Truth Math reserves the right to modify the terms of usage at any time. Any modification shall be effective immediately and shall replace all prior terms of usage.

beautyandtruthmath.com

“Never are the operations of Reason more perfect and more delightful than in mathematics. Here, men do not begin to reason with a notion that causes them to lean to this side or to that. By degrees, absolute truth unfolds itself. We are so made that truth, absolute and certain truth, is a perfect joy to us; and that is the joy that mathematics affords.”

(Charlotte Mason, Vol. 4, pp. 62-63)

“How sad that this subject, ethereal as faery and powerful beyond telling, should find no other adjective than ‘useful’ to justify us in imparting it to our children. Number to the philosophers of old was a touchstone of learning; it was worthy of their greatest respect and deepest thought. Let us take this gift with the others they have given us; this thought of Number as worthy of our best, aesthetically satisfying as an art, beckoning onward as a science, and luring us ever forward towards increasingly enchanting prospects ahead.”

(Stephens, Number. A Figure and a Step Onward, p. 4)

“And if our boys and girls can be brought to feel that arithmetic is a game—a noble game—one of the noblest though not one of the most spectacular that the human race has played—and that it is an honour and a privilege to play at it; and if we can keep that feeling alive by the right exercise and the apt stimulus, cunningly applied with a smile and a jest, as becomes so noble a game, the arithmetic lesson will cease to be a dismal grind and become a grand pursuit full of glamour and excitement.”

(Ballard, Teaching the Essentials of Arithmetic, p. 34)

SAMPLE

WELCOME

Thank you for purchasing this full-year guide! We are humbled and honored by your support. Please read through this introduction carefully. Understanding our approach is vital to maximizing the benefits of each guide.

THE VISION

Beauty & Truth Math exists to assist students AND teachers in the realm of mathematics in a Charlotte Mason education. Reading the scripted lessons and checking your students' answers is possible. However, this keeps the teacher from being an engaged and involved partner in the learning process.

These lessons are designed with the assumption that the teacher will work *with* the students, ask questions, facilitate discussions, and monitor their progress. Each lesson is an opportunity for building relationships between you, your students, and the Lord. Please make the most of this time together, walking alongside your students as they explore and understand mathematical ideas.

We thoroughly believe that math done completely in isolation misses opportunities to make deep connections. Just like a foreign language needs to be communicated and spoken to make connections, math is its own language with its own big ideas. Discussing these ideas is the best way for students to learn these living ideas.

We aim to provide a *living* education as we work with living, born persons. *Living* involves changes and adaptations. These lessons are guides and servants, not masters you must follow. Please use the Spirit's wisdom when discerning what you should modify, skip altogether, push forward on, or slow down on as you and your students are on this journey.

MAKING FORWARD PROGRESS

The Beauty and Truth Math curriculum is a blend of spiral and mastery learning. The weekly review enables students to continue working on challenging ideas without hitting a plateau. We also teach the reasonableness of each math concept and then recap it each year to help build conceptual understanding.

We never want students to get bogged down in an idea they have not fully mastered. **Please continue moving forward**, even if memorization has not yet occurred. Your student's relationships with the Lord, you, and math are more important than memorizing a formula!

CONTACTING US

We welcome feedback and questions! For general inquiries, please email us at contact@beautyandtruthmath.com.

For questions about this guide's content, please email Emily Al-Khatib at emily@beautyandtruthmath.com.

COPYRIGHT

These guides have been a labor of love. Please respect our hard work and do not share any content and links that are not publicly available on our site.

CORRECTIONS

We have done our best to remove all typos from these guides. If you find any mistakes, please forgive us and let us know *after* checking the [Corrections](#) document in the Important Teacher Helps folder.



STREAMS OF MATH

The Arithmetic, Year 5 Guide provides four weekly arithmetic lessons. We also recommend a geometry lesson. See [Our Guides](#) page for more information about our guides' math streams.



WEBSITE LINKS DISCLAIMER

PLEASE PREVIEW LINKS BEFORE USING! While we have done our best to ensure that all sites we link to are appropriate, we do not have control over their content or changes.

We are grateful for the free resources offered by other sites and want to support them whenever possible. We link directly to their pages as they generate revenue through traffic on their sites.

In many cases, the linked pages will provide multiple worksheet options. Most of the time, we will specify which worksheet you will need in the guide. Sometimes, you must choose the worksheet that the guide will also say.

Ensuring the content is age-appropriate for lessons is the teacher's final responsibility. Please email us at contact@beautyandtruthmath.com to report broken links.

READY, SET, GO!

"Putting in the work up front to make the school days run easy."

We have created three folders in this guide to make it easy to access the teacher help documents and printables. Their unique QR codes and links are included in multiple places in this introduction and are shown here for easy identification.

We will walk you through using these linked folders in the following few pages, so please don't worry about viewing them now. This page is simply an introduction to them.

Important Teacher Helps – This folder contains helpful resources to assist and support you as you implement math in a Charlotte Mason education. It includes the following documents:

- A CHARLOTTE MASON MATH EDUCATION outlines a vision for a Charlotte Mason math education.
- THE ARITHMETIC PROGRESSION provides an overview of arithmetic in the Beauty & Truth Math Guides using Charlotte Mason's philosophy. Sources include PR articles & books recommended in the PUS Programmes.
- ALL ABOUT THE GUIDES is everything you need to know about the guide's setup.
- FORMS 1&2 REVIEW ACTIVITIES is a treasure trove of various review activities organized by topic. Use these to keep review time lively and engaging.
- SUPPORT VIDEOS LIST is a compiled, linked list of support videos in this guide.
- ARITHMETIC, YEAR 5 CORRECTIONS is an ongoing list of guide corrections, beginning with the 2023 edition.
- ADDITIONAL SUPPLEMENTAL RESOURCES provide extra teacher support.



Cardstock Printables – This folder contains all resources that require printing on cardstock, as the student will use these documents frequently.



Printables – This folder contains all of the consumable printables for your student.



GET READY!

- **SEE** the **Materials Needed** section in this guide to determine what materials you have and still need to purchase.
- **BUY** Strayer-Upton, Book 2 in physical and/or digital form. **Our Favorites** page links to the Strayer-Upton Book Series and other recommendations we have compiled to help you prepare and organize your materials. 
- **PRINT** the FORMS 1&2 REVIEW ACTIVITIES document in the **Important Teacher Helps** folder.
 - We recommend printing it on colored paper to make it easy to find. *You only need to print this document once for all your Form 1&2 students.*
- **PRINT ALL OF THE DOCUMENTS** in the **Cardstock Printables** folder. We recommend using cardstock, as the student will be using these documents frequently. Sometimes, these will include cut-apart cards. 
- **PRINT ALL OF THE DOCUMENTS** in the **Printables** folder. 
- **DECIDE** if you will print the guide or use it on a screen.

GET SET!

READ THROUGH THE FOLLOWING IMPORTANT TEACHER HELPS:

1. A CHARLOTTE MASON MATH EDUCATION
2. THE ARITHMETIC PROGRESSION
3. ALL ABOUT THE GUIDES



Learn how to implement the guides in daily life. Read through the Putting It Altogether section of this guide.

Prepare your materials. There is no one right way to do this! The following list is simply a compilation of ideas Beauty & Truth Math users have found helpful.

- **Create a student math notebook for each student.**
 - Fill it with both graph and unlined, blank paper. We generally recommend $\frac{1}{2}$ " squares, though some students may need larger squares depending on their writing ability.
 - Create sections in the notebook for daily assignments and reference pages. Decide with your student how to organize the notebook. If applicable, create different sections for each stream of math.
 - Determine whether you will have your student write headings for each assignment; including information, such as the date and page number, is a great idea. Writing the problem number and showing the final answer, either with a box or a circle around it, is also strongly encouraged.
- **Put together a teacher math notebook for yourself.**
 - Create sections for your calendar, lessons from the guides, printable and supplementary resources, exams, notes, and other relevant materials.
- **Find a place for the Cardstock Printables.**
 - Store these in a folder or pocket of your teacher's notebook or inside an accordion file folder. The goal is to keep them accessible and in good condition, as you will use them frequently.
- **Use tabs to label and easily find what you need!**
 - Tab each topic in the FORMS 1&2 REVIEW ACTIVITIES document (from the Important Teacher Helps folder).
 - In the Strayer-Upton books, tab the following:
 - Your place for the current lesson, and the corresponding answer key section in the back
 - Review & mental math pages
- **Have individual containers for each of your student's supplies.** We recommend storing card sets in plastic bags inside an index card holder or binder pouch.

GO!

Any author of math textbooks or guides will tell you that we write to accommodate as many students as possible and provide more than is needed. You have complete freedom to modify the lessons and adjust the number of problems assigned to meet your students' needs.

First, take the Beauty & Truth Math Guide Vow – I do solemnly promise that I will remember and implement the following statements:

- I have permission from Charlotte Mason and the authors of these lessons to adjust or modify any lesson, at any time, to provide a living education to my unique, born persons.
- I have permission from Charlotte Mason and the authors of these lessons to assign fewer problems than what is written in the lessons, providing a living education tailored to my unique, born persons.
- I have permission from Charlotte Mason and the authors of these lessons to assign additional problems beyond those written in the lessons, providing a living education tailored to my unique, born students.

“...the educator has to deal with a self-acting, self-developing being, and his business is to guide, and assist in, the production of the latent good in that being, the dissipation of the latent evil, the preparation of the child to take his place in the world at his best, with every capacity for good that is in him developed into a power.” (Mason, Vol. 1, p. 9)

Then, review the Week Resource page each week and complete the following.

1. Read the Overview so you know what you will be doing next.
2. Complete any Teacher Prep listed.
3. Ensure you have all the Special Materials Needed.
4. Choose an assignment from the Suggested Review to use with your students. These assignments build depth in highlighting and understanding different number relationships. When choosing what to review, consider three things:
 - What areas do my students require more practice to solidify concepts?
 - What topics have we not reviewed in a while?
 - What assignments would give my students a reprieve and an easier lesson to build their confidence and enjoyment of math?
5. Finally, choose mental math problems to use throughout the week.

Now, pray for joy and wisdom as you explore mathematical truths with your students daily. Then dive right into using the lessons, confident that the Lord is with you and for you!

ALL ABOUT THE YEAR

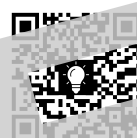
SEEING THE BIG PICTURE

There is no one-size-fits-all way to teach math using the Charlotte Mason method. Our guides are one option for teachers to use. We have created them to be adaptable to each unique student, both in the big picture and in the guides' details.

We have designed our curriculum to imitate the math streams used in Charlotte Mason's schools. Students have several options for the tracks and combinations of these streams. For more information, see our [Scope & Sequence](#) page on our website.



Our [Guides' Big Ideas](#) page also shows the main ideas throughout the years.



YEAR OVERVIEW

In Arithmetic, Year 5, students focus on understanding fractions and decimals more deeply than in previous years. Extensive time is spent on understanding multiplication and division of fractions and decimals. Activities are included to allow students to investigate these ideas with manipulatives and drawings and explore patterns. We also lay a foundation for algebra by introducing the order of operations, the distributive property, factoring, and variables.

We want students to develop the habit of clearly labeling their work. We recommend that students include the date and page number of all assignments completed in their math notebooks. While completing assignments, encourage students to write each problem number and mark each answer by drawing a circle or a box around it.

STREAMS OF MATH

The Arithmetic Year 5 Guide provides four weekly arithmetic lessons. We recommend including practical geometry for the fifth day of math lessons starting this year. Please see [Our Guides](#) page for more information about how our guides present the math streams.



EVERYDAY & SPECIAL MATERIALS

We assume students will always have their pencil, math notebook with grid paper, grid dry-erase board, and dry-erase marker handy for lesson time. The “Special Materials Needed” sections list any additional materials beyond these items.

CARDSTOCK PRINTABLES VS. PRINTABLES

The teacher must prepare all cardstock printables before the term begins. The “Special Materials Needed” sections will list the cardstock printables without links. Meanwhile, printable links are in the special materials section of the Weekly Resources page.

There are more printables this year than in other years because the *Strayer-Upton* books do not cover all the national math standards. Several pages of Ballard’s *Fundamental Arithmetic Series* and other online resources are included to fill these gaps.

INDEPENDENT STUDENT WORK

The Printables folder includes Independent Student Work. This document contains all the Student Response sections that can be completed without the teacher’s help, excluding the answers. We recommend printing it for the student to use at the beginning of the year.



THINGS TO LOOK FORWARD TO THIS YEAR

This list highlights the special features and noteworthy things throughout the year. Each term introduction will expound on these ideas.

- All About Pages
- Creating Measurement Tools
- Exercises from *Fundamental Arithmetic*, Books II, III, & IV by Philip Ballard
- Exploring the Ideas of Fractions with Manipulatives and Patterns
- Independent Student Work
- Introduction to Variables using Perimeter and Area
- Math Jeopardy
- Math Vocabulary Page
- Subtracting Fractions and Decimals using the Equal Additions Method
- The Details Matter

MATERIALS NEEDED FOR THE ENTIRE YEAR

Our Favorites page links to the Strayer-Upton Book Series and other recommendations to help you prepare and organize your materials.



Textbook

Strayer-Upton, Book 2

Everyday Materials

- Dry-Erase Marker
- Grid Dry-Erase Board
- Notebook (with $\frac{1}{2}$ " grid paper)
- Pencil

Cardstock Printables

AR.Y5.Bundle Cut-Apart Cards
AR.Y5.Bundle Reference Pages



Printables

AR.Y5.Bundle Independent Student Work (optional)
AR.Y5.Bundle Printables
AR.Y5.Bundle Printable Answer Keys



SPECIAL MATERIALS

- Apple
- Beads (8 blue, 16 white)
- Bowls (1 medium-sized, 8+ small)
- Brownie Recipe and Ingredients
- Calculator
- Cardboard or Cardstock (2 strips, 1 about $1\frac{1}{2}$ ft. long and 6" wide, 1 at least 4" by 2 $\frac{1}{2}$ ")
- Cardstock (3)
- Chair or Stair (to safely stand on)
- Colored Paper (7, different colors)
- Colored Pencils
- Factors and Multiples Worksheet (Factors and Multiples Worksheet 4:3)
- Food Items (20 water bottles, 12 cans of food)



- Combo Meal Project (printed)
- Cookie
- Counters (40)
- Cubes (30, sugar, wood, plastic, etc.)
- Cutting Board
- Dice (5)
- Dictionary
- Distributive Property Worksheet
- Dividing Fractions Word Problems (Create a free account to access this.)
- Factor Tree Worksheet (Worksheet 5)
- Factoring Worksheet 1
- Factoring Worksheet 2



- Fraction-Decimal Game
(Scroll down to find the game. Download and print the game board.)
- Highlighters (5, different colors)
- Internet Access
- Knife
- Lego Blocks (36, same size):
 - 18 Blocks of Color A
 - 8 Blocks of Color B
 - 4 Blocks of Color C
 - 2 Blocks of Color D
 - 1 Block EACH of Colors E, F, G, & H
- Line Graphs Worksheet
(Print 5B: Baltimore Weather [Term 1] and one from the Plotting and Interpreting Section [Term 2].)
- Markers
- Masking or Painter's Tape
- Measuring Cups ($1\frac{3}{4}$, $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$)
- Measuring Tape
- Meter Stick (homemade option)
- Metric Length Practice
- Money (5 pennies, 2 dimes, 10 quarters)
- Multiplying Fractions Word Problems
(Download and print Worksheet #1.)
- Order of Operations Maze
- Perimeter Worksheet
- Pipe Cleaner
- Plastic, Resealable Bag (small)



- Playing Cards
- Prime Factors Riddles
(Prime Factorization Riddles Sheet 1 and one more worksheet of the teacher's choice for review)
- Recipe (a favorite or one from here)
- Rice (or another ingredient to use for measuring)
- Ruler
- Ruler (with inches in tenths, homemade option)
- Scissors
- Scrap Paper
- Scrapbook Paper (20)
- Sidewalk and Sidewalk Chalk
- Sidewalk or Yard
- Spaghetti Noodles (11)
- Square Crackers (20, or some other square-shaped item)
- Staircase
- Sticky Notes (3 of one color, 6 of a second color, 10 of a third color)
- Stopwatch or Clock
- Straight Edge (ruler, the edge of a book, etc.)
- Unlined Paper
- Various Books, Newspapers, or Magazines
- Volume Riddle Sheet 5A
(Scroll down on the site to find the worksheet.)
- Wastebasket
- Yard or Large Space
- Yardstick (homemade option)



beauty & truth
MATH

Mathematics in a
Charlotte Mason Education

ARITHMETIC

SAMPLE

YEAR 5 • TERM 1

• WEEK 3 RESOURCES •

ARITHMETIC. YEAR 5. TERM 1. WEEK 3

OVERVIEW

We will look at a new subtraction algorithm this week. Students have used “decomposition” or, more familiarly, borrowing or regrouping, to subtract until now. The regrouping method is a great way to introduce the students to more complex subtraction because it is easily shown concretely. However, as students grow in their understanding of subtraction, the Equal Addition method has been proven by multiple research studies that students make fewer mistakes, work faster, and understand the algorithm better. We will use this method in the Beauty & Truth Math curriculum in all topics, including fractions and decimals.

During lessons this week, please spend a few minutes reviewing multiplying larger numbers, short division (1-digit divisor), and finding the average of a set of numbers if you haven't already. We will be working on these ideas next week.

TEACHER PREP

To familiarize yourself with subtracting using Equal Additions, please take a few minutes to watch [Method of Equal Additions, Part 1](#) and [Part 2](#). Then, complete several examples before starting these lessons with your student.



Some tips for teaching Equal Additions -

- Be sure to require your student to say, “Add ten here, add ten there,” and, “And one hundred here, add one hundred there,” as the student works out the problem and writes the little ones. We want to ensure the idea is solid, not just the algorithm.
- If your student struggles to see what is happening to the numbers, have him write the numbers in the expanded form beside the original problem.

BIG IDEAS NEEDED BEFORE BEGINNING

- Addition
- Subtraction
- Number Line

SUGGESTED PACE

Day 1: Equal Additions, Pt. 1

Day 2: Equal Additions, Pt. 2

Day 3: Equal Additions, Pt. 3

Day 4: Review/Catch-Up

SPECIAL MATERIALS NEEDED

- Chair or Stair (that could be used to stand on safely)
- Measuring Tape
- Stopwatch or Clock

ONGOING REFERENCE PAGES

- All About Place Value

MENTAL MATH IDEAS

- 112

SUGGESTED REVIEW

- Improvement Test: 33
- Place Value (AR.Y5.T1.W2): 60
- Measuring Length (AR.Y4.T3.W3): 185
- Problem-Solving: 172 (omit #1, 4)

SAMPLE

• Equal Additions, Pt. 1 •

AR. Y5. T1. W3. L1

STREAM

Arithmetic



RESOURCES USED

Teaching the Essentials of Arithmetic
(Ballard)

OBJECTIVES

Students will be able to subtract two-digit numbers using the method of equal additions.

SPECIAL MATERIALS NEEDED

Measuring Tape, Chair or Stair (that could be used to stand on safely)

SPECIAL NOTE

Please watch the [Method of Equal Additions videos](#) before completing this lesson with your student.



THE PLAN

1. To start, remember that we looked at subtraction differently last week. What can you tell me about that? *Draw out the idea of subtraction as finding distance.*
2. What can you tell me about the distance between the following numbers? 1 and 5, 2 and 6, 5 and 9? (They are all four units apart.) What can we do to numbers to keep them the same distance apart? (If we do something to one number, we must do it to the other.)
3. With this in mind, grab a measuring tape and find your height in inches. Write it down on a dry-erase board.
4. Let's see how tall I am (the teacher). Write down my height in inches.
5. Who is taller? What is the difference between our heights?
6. Now, let's make you taller. Stand on a stair (or chair). Measure your height now (from the floor to the top of your head), and write that number down.
7. Who is taller - you on the chair or me on the floor? Is that an accurate representation of our heights? (No) What would I have to do to make it fair? (Stand on the same stair/chair of the same height.)
8. Now, measure my height while I stand on the stair or chair you were standing on. Be sure to measure from the floor to the top of my head. Find the difference between our heights on the stair/chair. Are our heights the same difference as they are when we are standing on the floor? (Yes)

9. If you stood on two stairs/chairs, what would I have to do to keep the difference between our heights the same? (You would also have to stand on two stairs/chairs.) What about if you were standing on the roof of our house? (You would also have to stand on the roof of the house.)
10. We see this same idea in math. The difference between two numbers stays the same if we increase two numbers by the same amount.
11. Let's practice a new way of subtracting using this idea. Remember that just as we had to add a chair or a step under both of us to keep our heights the same distance apart, what you do to one number, you must do to the other number to keep the distance between the numbers the same.
12. Look at the following problem.

$$\begin{array}{r} 51 \\ - 25 \\ \hline \end{array}$$

- a. First, let's estimate our answer. What do you think your answer will be close to? (30) You probably know the answer to this problem in your head, but we will start easy.
- b. Next, let's look at the units column. Do we have enough units to take away 5? (No) In the past, we would "borrow" from the 5 tens by making it 4 tens and putting that ten with the 1 unit to make 11 units. This time, let's add the same number to both to keep them the same distance apart but make them easier to subtract.
- c. So, write a little 1 beside the 1 unit in the 51. How many did we add? (10)
- d. We need to add whatever we add to the top and bottom numbers, so add a 1 to the tens column. How many did we add? (10)
- e. Are the numbers the same numbers we started with? (No) Are they the same distance apart? (Yes) How do you know? (We added ten to both numbers.)
- f. Take a minute and write the numbers in the original problem and then the numbers after you changed them in expanded form. *It should look like this.*

$$\begin{array}{rcl} 51 & = & 50 + 1 \\ - 25 & = & 20 + 5 \\ & & 10 \\ & & \underline{20 + 5} \end{array}$$

- g. How did you keep the two original numbers the same distance apart? (I added a ten here and a ten there.) Circle the tens you added.
- h. Now, do we have enough units to take away 5 from 11? (Yes, that is 6.)
- i. In the tens columns, you have 5 tens minus 1 ten minus 2 tens. How many tens are there? (2 tens)
- j. What is the final answer? (26)

13. This was a super easy problem. We made it more complicated by doing it this way, but we need to start with the easy ones to make it easy to see what is going on with the numbers.

14. Let's try another one. Write this on your dry-erase board.

$$\begin{array}{r} 63 \\ - 25 \\ \hline \end{array}$$

- The first step is to estimate. What do you think the difference will be close to? (Maybe around 40)
 - Start with your units column. Do you have enough units to subtract 5 from 3? (No) Do you remember what you can do? (Add 10 units) So, what does the 3 become? (13 units)
 - Then whatever you do to one number...(you must do to the other.) Write an extra 1 in the tens column. Now, can you subtract in the units column? (Yes, it's 8 units.)
 - And now in the tens column. (6 tens minus 1 ten minus 2 tens is 3 tens)
 - What is the final answer? (38) 🗨️
15. Try one more and see how much of it you can do on your own. Be sure to explain each step as you write it down. (36)

$$\begin{array}{r} 85 \\ - 49 \\ \hline \end{array}$$

16. This method of subtraction is called the method of equal additions. Why do you think it is called that? (We are adding equal things to both numbers.) We will work more with this method this week. It may seem slower right now, but you will get there. And you may like this way better than the old way of subtracting!

STUDENT RESPONSE

- In your math notebook, complete the following.
 - Copy one of the subtraction problems we completed together.
 - Explain in your own words what you are doing in each step.
 - Write the problem in expanded form out to the side and circle the tens you added to each number. For now, write the problems in expanded form to make sure you can see what is happening. Once you are more familiar with subtracting this way, you will not have to complete this step.

• Equal Additions, Pt. 2 •

AR. Y5. T1. W3. L2

STREAM

Arithmetic



RESOURCES USED

Strayer-Upton, Book 2 (p. 10), *Teaching the Essentials of Arithmetic* (Ballard)

OBJECTIVES

Students will be able to subtract numbers in the hundreds and thousands using the equal additions method.

SPECIAL MATERIALS NEEDED

None

SPECIAL NOTE

All the steps for each problem have been provided if you need to help your student. If your student understands, let him talk through the steps independently. Be sure to require him to say something like, “Add ten here, add ten there,” and, “And one hundred here, add one hundred there,” as the student works the problem and writes the little ones to explain what is happening. We want to ensure the idea is solid, not just the algorithm. If the student needs to write any of these problems in expanded form, please have him do that.

THE PLAN

1. We have been reviewing many ideas about whole numbers lately and are learning a neat subtraction method. What do you remember about our new subtraction method? *Draw out the idea of subtraction as distance. Distance stays the same if what you do to one number, you do to the other.*
2. Look at the example you copied in the math notebook yesterday. Does it make sense so far? What questions do you have?
3. Let's continue to work with more examples. Try this one on your dry-erase board.
 - a. First, can you look at the problem and say what your answer will be close to? (If we say 484 is close to 475, and 127 is close to 125, then our answer will be about 350.)
 - b. Do you remember what number we start with? (Units)
 - c. Do we have enough units to subtract 7 from 4? (No)
 - d. Do you remember what we can do to the 4 units in 484? (Add 10 units)
 - e. So, instead of 4 units, what will we have? (14 units)

$$\begin{array}{r} 484 \\ - 127 \\ \hline \end{array}$$

- f. Then, because we added 10 units, what do we have to add? (One ten in the tens column)
 - g. Right, we have to make everything fair. So, let's subtract in the units column. 14 units minus 7 units is? (7 units)
 - h. Then, in the tens column, we have 8 tens minus 1 ten minus 2 tens. (5 tens.)
 - i. Then the hundreds column is? (4 hundreds minus 1 hundred is 3 hundred.)
 - j. What is your final answer? (357)
 - k. Check with your initial estimation. Does your final answer make sense with your estimation? (Yes)
4. Try this one on your dry-erase board.
- a. First, we estimate. (Close to 632)
 - b. Units column: Add 10 units to the 2 units, making 12 units. Add 1 ten to the tens column. Subtract 9 units from 12 units. (3 units)
 - c. Tens column: Add 10 tens to the 3 tens, making 13 units. Add 1 hundred to the hundreds column. Subtract the tens (13 tens minus 1 ten minus 9 tens is 3 tens.)
 - d. Hundreds column: (8 hundreds minus 1 hundred minus 1 hundred is 6 hundreds)
 - e. What is your final answer? (633)
 - f. Check with your initial estimation.
5. What do you think? Do you have any questions?
6. Now that you have solved several examples using this new method, can you see any shortcuts? Remember that mathematicians look for patterns and shortcuts to help make figuring out a problem easier. The hardest part about solving these problems is when the student has to subtract two numbers from the top number. Draw out the idea that he could combine the extra little one with the existing bottom number to subtract only one number instead of two.
7. Try one more on your dry-erase board. Let's try out this new shortcut.
- a. First, let's estimate. (3,500)
 - b. Units column: Add 10 units to the 1 unit, making 11 units. Add 1 ten to the tens column, so instead of 3 tens on the bottom, we can change that to 4 tens. Subtract the units. (9 units)
 - c. Tens column: Add 10 tens to the 1, making 11 tens. Add 1 hundred to the hundreds column, so instead of 4 hundreds on the bottom, change it to 5 hundreds. Subtract the tens. (11 tens minus 4 tens is 7 tens.)
 - d. Hundreds column: 9 hundreds minus 5 hundreds is 4 hundreds.
 - e. Thousands column: 3 thousands
 - f. What is your final answer? (3,479)
 - g. Check with your initial estimate. 

$$\begin{array}{r} 832 \\ - 199 \\ \hline \end{array}$$

$$\begin{array}{r} 3911 \\ - 432 \\ \hline \end{array}$$

8. Try p. 10: 1 and 2 on your dry-erase board. Explain each step as you go, and use the new shortcut!
9. Is subtracting using the equal additions method getting easier?

STUDENT RESPONSE

1. In your math notebook, complete the following.
 - a. p. 10: 5 using the Equal Additions Method.
 - b. Explain the idea of subtracting using the equal additions method. You will add to your notes in future lessons, so don't feel you have to explain it all.

SAMPLE

• Equal Additions, Pt. 3 •

AR. Y5. T1. W3. L3

STREAM

Arithmetic



RESOURCES USED

Strayer-Upton, Book 2 (pp. 10, 259),
Teaching the Essentials of Arithmetic
(Ballard)

OBJECTIVES

Students will be able to use the equal additions method to subtract.

SPECIAL MATERIALS NEEDED

Stopwatch or Clock

THE PLAN

1. Can you tell me how to use the equal additions method to solve subtraction problems? The more you practice with it, the faster you can solve these problems.
2. We will practice using this method today. It doesn't get harder than the problems we worked on yesterday. Just remember that you just add the same to both numbers.
3. Complete p. 10: 21-24 on your dry-erase board. Don't forget to estimate before beginning each problem and explain each step.
4. Now, are you up to timing yourself while you work on a problem using the old regrouping method and then doing the same problem using the equal additions method? You don't have to if you don't want to, but if you do, let's do it. If you don't want to be timed, just work on the same problem using both methods and see what you think.
5. Complete p. 10: 12 in two different ways. The first time, use the regrouping way. The second time, use the Equal Addition method. Which way is easier for you? What do you like about regrouping? What do you like about Equal Additions?
6. Excellent work this week! Sometimes, it can be harder to learn how to do something you already know how to do in a different way than learning something completely new. I'm proud of you! 🚚
7. Are you up for the challenge round? Try p. 259: 1 using the Equal Additions Method.

STUDENT RESPONSE

1. In your math notebook, complete the following.
 - a. p. 259: 11 and 12 using the Equal Additions Method
 - b. Add to your explanation of the Equal Additions Method.