

Curriculum Connections

An American Story: Ann Butler's Copybook

- Background information for the educator

Learning by Doing: Math and Measurement – Then and Now

- Classroom activities based on the object

Interdisciplinary Content Standards

- WR 3 - use critical thinking and problem-solving skills
- WR 4 - demonstrate self-management skills
- VPA 1.3 - utilize arts elements to produce artistic products
- LA 3.1 - speak in a variety of contexts
- LA 3.2 - active listening, interpreting, responding
- LA 3.5 - view, understand, use non-textual information
- M 4.1 - develop ability to pose/solve mathematical problems in everyday life
- M 4.2 - develop ability to communicate mathematically
- M 4.3 - develop ability to connect mathematics to other learning
- M 4.6 - develop number sense
- M 4.9 - develop understanding of measurement
- M 4.11 - develop understanding of patterns, relationships, function
- S 5.4 - develop understanding of technology as application of scientific principles
- S 5.5 - integrate mathematics as a tool for problem-solving
- SS 6.4 - acquire historical understanding of societal ideas/forces
- SS 6.6 - acquire historical understanding of economic ideas/forces

Learning Styles & Multiple Intelligences

auditory
visual
linguistic
logical-mathematical
interpersonal
intrapersonal

Related Subject Areas

measurement
economics
handmade vs. machine-made
colonial trades and businesses
handwriting
mathematical operations
math in everyday life

An American Story



The Copybook explained

This Copybook belonged to Ann Butler and is dated 1797. No information is available about Ann Butler herself – her age or where she lived, for example but she has written “New Jersey” in the Copybook under her signature on more than one page, indicating that this is probably where she lived. Ann’s copybook was a cipher book, a book in which arithmetic problems were copied and computed. The verb to cipher means to “use figures in a mathematical process.”

Copybooks were a very important part of colonial schooling, and they provide a great deal of information about the values schools instilled during the late 18th century, as well as about the techniques and materials used at the time. One of the most noticeable things here is the emphasis on perfect penmanship and the overall neatness of the pages. These two pages show measurements copied from a book or from information on a blackboard written by the schoolmaster. These pages are not just practice pages; they are reference pages that students would probably return to in the future. Other pages in her copybook look more like our math notebooks – with the basic definitions and mathematical rules written at the top of the page, and examples of problems computed (not necessarily too neatly) underneath them.

What does the copybook tell us about the importance of literacy?

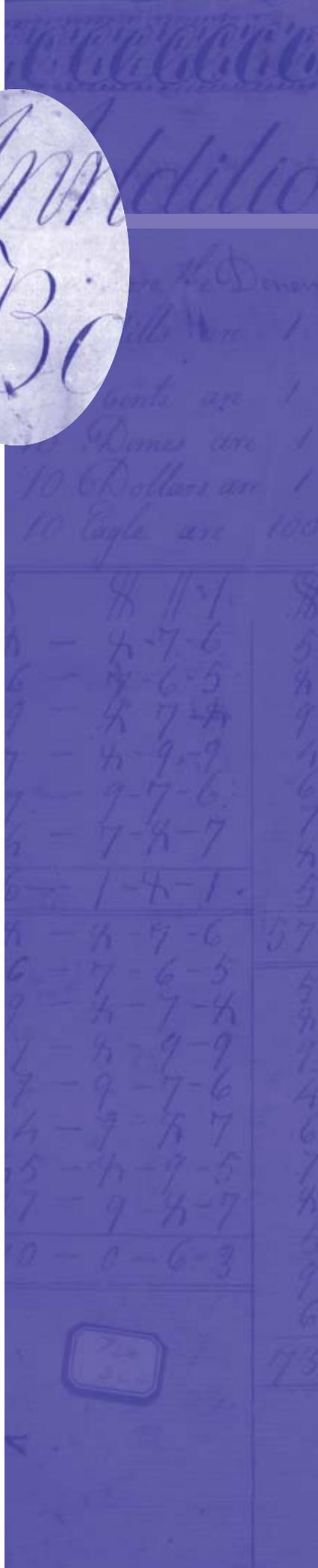
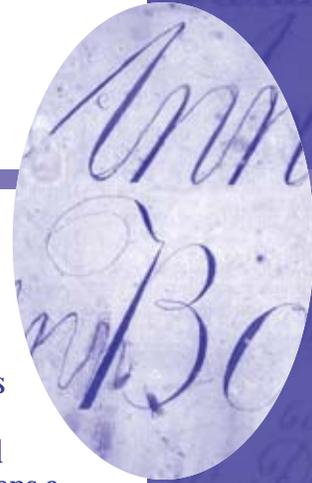
These pages give us an idea of the kind of information that was considered valuable to students of the day. The developing economies of the newly-independent United States were creating a demand for skilled young people who could help their parents and employers in keeping financial records and inventories. Such items as “Wine Measure,” “Cloth Measure,” “Long Measure,” and “Apothecaries Weight” might be of use in such instances. The need for this kind of information indicates a shift in definitions of being educated and of literacy itself. Many people of this period did achieve a certain level of literacy by learning to recite Bible verses and reading the Scriptures, which they repeated and memorized. Yet, they often faltered when they were faced with an unfamiliar text, and, often, they were unable to write. Therefore, in school great emphasis was put on learning to write and on the quality of the penmanship itself. Children needed these skills in order to face the challenges of a quickly changing world. In New Jersey, although most people lived on farms at the time, small towns and industrial centers were beginning to emerge.

Why was a copybook a precious item?

During the colonial period, paper was not abundantly available as it is today, and most of it was made by hand, rather than in factories. Inexpensive printing was also not available. Books were expensive and rare. It was not uncommon for a family to own only a Bible and perhaps a primer (see section on Schoolhouse, page 56), or for school children to share books.

Students made their own copybooks, or notebooks, as we would call them today. While we simply walk to the nearest stationery store to select from a wide variety of notebooks – plain paper, ruled paper, graph paper, etc. – students of colonial America had to buy their own paper and then sew the pages together, often with a coarse binding of wood or rough paper, to create their notebooks. Paper was so scarce a commodity that often birch bark was used for “scratch paper.” Because of the time and money that went into securing the basic supplies needed for school, each page was carefully used so as not to waste any space. On some of the pages of Ann Butler’s copybook, a line is drawn down the middle: one half of the page will contain arithmetic rules, and the other half will contain another subject altogether.

But paper was far from the only scarce commodity at the time. Being able to attend school was, in itself, a luxury that only few could afford. In addition, the majority of students at the time were boys because girls were needed at home to help with housework. Therefore, Ann was doubly lucky to be in school. Today, the situation is different. All children, regardless of gender, are required to attend school.



Learning by Doing

Math and Measurement – Then and Now

OBJECT: *Ann Butler's Copybook*

SUMMARY:

Students explore aspects of colonial schooling in New Jersey through a series of discovery activities based on the object – a child's copybook (also known as a cipher book – a book for arithmetic problems). Students read, observe, and analyze the copybook; compare and contrast colonial measurement tables to today's tables; and make their own copybook for math lessons.

Through these activities, students gain an understanding of some of the teaching methods and values taught in colonial schools as well as the school materials used by students of the period. In addition, by exploring the math and measurement lessons of the colonial schools, students gain insight into some of the skills, trades, businesses, and economy of colonial America.

LEARNING OBJECTIVES:

Students will:

- Explore aspects of colonial schooling in New Jersey, such as school values and teaching methods, by analyzing a copybook from the time period.
- Sharpen math and problem-solving skills.
- Practice bookmaking and creative thinking skills.
- Compare and contrast mathematical calculations and measurements used today and long ago.
- Gain insight into some of the trades and businesses of colonial America, some of the valuable skills needed for these trades, and the economy of the colonists through the study of the measurement tables and math lessons of the period.

MATERIALS:

Paper

Photocopy of Ann Butler's Copybook

Pencils

Photocopy of "The Arithmetical Table Book: First Lessons in Arithmetic"

Heavy paper or construction paper for the cover, 9" x 12", brown, beige, or tan

(one per student) Lightweight paper for the pages of the book (butcher paper or

Kraft paper) yellow, beige, or brown, precut into 8¹/₂" x 11" sheets (five to

ten sheets per student) Thin yarn, string, cord, or heavyweight thread (1 yard

per student) Fine line markers, or ink pens (black, brown, or blue) Markers,

crayons, and/or colored pencils,

Large needles, Rulers

Learning by Doing

Math and Measurement – Then and Now

PROCEDURE

INTRODUCTION

LA 3.2 - active listening, interpreting, responding

LA 3.5 - view, understand, use non-textual information

SS 6.6- acquire historical understanding of economic ideas/forces

Begin this activity with a discussion of the copybooks or notebooks the students use and know. Discuss, also, the use and availability of paper and books in school today. These questions will prepare the students for their subsequent discussion of the object – Ann Butler’s copybook.

SUGGESTED QUESTIONS:

- **What types of books or supplies do you use in school today?**
(Notebooks or copybooks, three-ring binders, computers, workbooks, textbooks, pens, pencils, crayons, glue, paper, folders)
- **Where do you write your lessons, home assignments, and notes?**
- **Where do the paper, notebooks, and workbooks come from?**
(Purchased at a store, made in a factory)

READING AN OBJECT

WR 3 - use critical thinking and problem-solving skills

LA 3.1 - speak in a variety of contexts

LA 3.5 - view, understand, use non-textual information

M 4.1 - develop ability to pose/solve mathematical problems in everyday life

M 4.2 - develop ability to communicate mathematically

M 4.3 - develop ability to connect mathematics to other learning

M 4.6 - develop number sense

M 4.9 - develop understanding of measurement

M 4.11 - develop understanding of patterns, relationships, functions

S 5.5 - integrate mathematics as a tool for problem solving

SS 6.1 - learn citizenship through participating in government

SS 6.4 - acquire historical understanding of societal ideas/forces

SS 6.6 - acquire historical understanding of economic ideas/forces

The following series of discussion questions will help your students “read” (observe and analyze) the object – the copybook. These questions will help your students discover and understand some aspects of colonial schooling in New Jersey by analyzing pages from a copybook of the time period. Students will explore some of the values schools instilled during the late 18th century, as well as the techniques and materials used in schools.

The copybook description and function

Students examine, observe, and analyze the two pages from the copybook to find clues to their function and their reflection of school values.

SUGGESTED QUESTIONS:

- **What are some of the things you see on these two pages?** (*Numbers, letters, words, measurements, calculations, lines, subtraction, abbreviations, minus signs, cloth, time, solid measure, etc.*)
- **These pages were written before typewriters or computers. What are the clues that tell us they were written by hand?** (*Looks like script, thick and thin lines, lines are not perfectly straight*)
- **What do you think these two pages were used for?** (*Measurements, practice math problems*)
How can you tell?
- **What’s different between your math book and these two pages from Ann’s book?** (*Handwritten, different types of problems, format, language, no pictures, the titles are written at the top of the pages and examples of problems computed underneath them*)
- **Ann’s book was a cipher book, a copybook for arithmetic or math lessons. Why do you think it was called a copybook?** (*To copy or make notes*)
- **What do we call a copybook or a book where we write our lessons today?** (*Notebook*)
- **One of the most noticeable things here is the emphasis put on perfect penmanship and overall neatness of the pages. How can we tell Ann was careful with writing and was concerned with neatness?** (*Careful lettering with the pen and ink, precise and neat lettering*)
- **These two pages show what probably were measurements copied from material in a book or from information written on a blackboard by the schoolmaster. How might Ann use these pages in the future?** (*These pages are not just practice pages; they are clean reference pages that students would probably return to in the future*)

Availability of books and paper

Copybooks were precious items in colonial New Jersey. Students had to buy their own paper, make their own copybooks, and then sew the pages together. Because of the time and money that went into securing the basic supplies needed for school, each page was carefully used so as not to waste any space.

SUGGESTED QUESTIONS:

- **Where do you get a notebook when you need one? How many different types of notebooks can you find?**
- **What would you do if you were a colonial student and you needed a copybook and it was not available to buy?** (*Make a book*)
- **What would you use to make a copybook?**
- **How do you divide your notebook for different subjects?**
How do you conserve paper?
- **How did Ann make the best use of space on her pages?**

Learning by Doing

Math and Measurement – Then and Now

MATH AND MEASUREMENT – Discussion Activity

Students use the pages of Ann Butler’s Copybook to find out information about colonial trades and businesses and also some of the valuable math and measurement skills needed for these trades. The questions will help students explore these ideas along with comparing and contrasting the mathematical calculations and measurements used today and long ago.

Look at Ann Butler’s Copybook and analyze the specific measurements and mathematical problems used by schoolchildren during colonial times. Some measurements may be familiar. To understand others, we will need to look at measuring tables used during this time period. Refer to the “The Arithmetical Table Book: First Lessons in Arithmetic.”

SUGGESTED QUESTIONS:

- **Why do we need to have standard measurements?** *(So people have a common reference and can communicate or work together in business and in everyday life. Examples may include need for the same use of time and money calculations)*
- **Look at the Arithmetical tables. What material goods did people use? How do you think people used these goods?** *(Cloth to sew clothes; liquids, including beer, wine, ale, and milk; homemade medicine and drugs to treat illnesses; land measurements to build homes and manage places of business such as stores and farms; wood for building; coal for heating homes; salt for preserving food)*
- **Based on these activities, what types of businesses and trades existed during colonial times?**
(Stores and merchants, farms, seamstresses, druggists, real estate salespeople, astronomers and navigators, surveyors, jewelers, fisherpeople, miners)
- **Colonial families who owned businesses and trades needed to keep inventories and records. Why was it important to have the children know measurement tables and know how to do math?** *(The family business might have depended on children to know record keeping and have math skills)*
- **Why was it important for children to use their copybooks for their family businesses?**
(Books were expensive so students needed to write the math, measurement, rules, and problems in the books and refer to them later)

MAKING A COPYBOOK – Bookmaking Activity

WR 3 - use critical thinking and problem-solving skills

WR 4 - demonstrate self-management skills

VPA 1.3 - utilize arts elements to produce artistic products

M 4.1 - develop ability to pose/solve mathematical problems in everyday life

M 4.2 - develop ability to communicate mathematically

M 4.3 - develop ability to connect mathematics to other learning

S 5.4 - develop understanding of technology as application of scientific principles

S 5.5 - integrate mathematics as tool for problem-solving

SS 6.4 - acquire historical understanding of societal ideas/forces

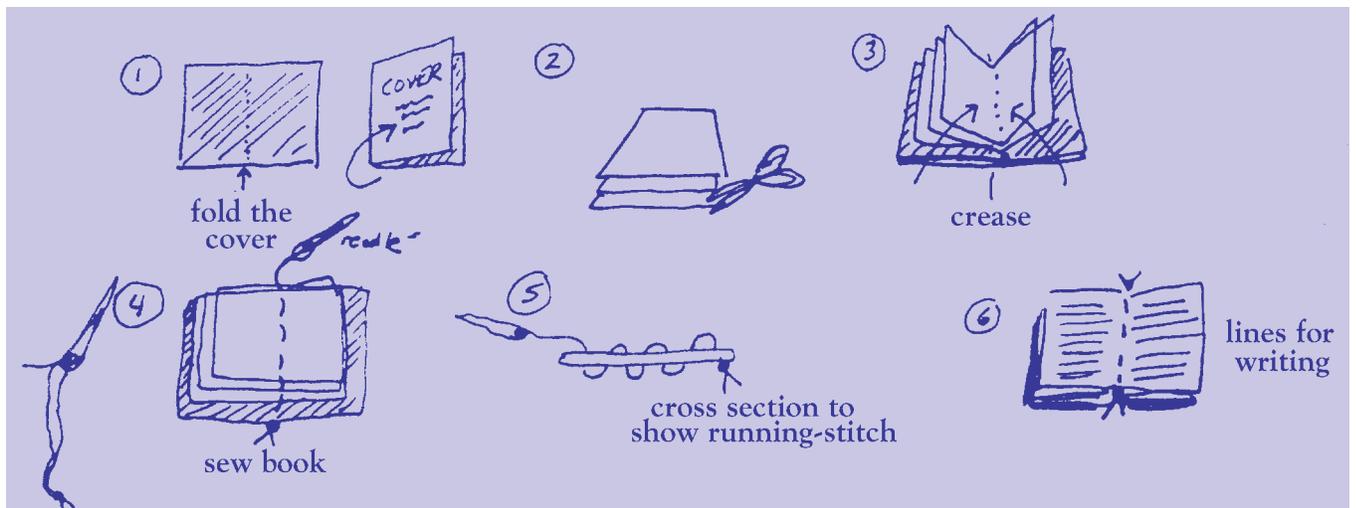
SS 6.6 - acquire historical understanding of economic ideas/forces

Making a copybook:

- 1 Create the cover of the copybook. Fold the cover paper in half. Each student puts name, school, town, and New Jersey on the cover using markers, crayons, or colored pencils.
- 2 Cut brown Kraft paper or any other smooth paper (yellow, beige, or brown) into $8\frac{1}{2}$ " x 11" sheets of paper.
- 3 Fold five to ten pieces of the brown Kraft paper in half and put these pages inside the cover. Crease the pages.
- 4 Open the book to sew the pages to the cover. Use thin yarn, string, cord, or heavyweight thread with a large needle to sew the pages. Put a knot on the end of the thread before you sew.
- 5 Sew the book down the center in the crease, going from inside to outside of the book with the needle, using a running stitch. Make a knot on the book when you finish.
- 6 Using pencils and a ruler, create the lines for writing on each page, by drawing horizontal lines, from top to bottom, $\frac{1}{4}$ " apart.

Using the copybooks:

- 7 Students are now ready to use the copybooks for their measurement and other arithmetic lessons. The class chooses the math lessons to put inside the copybook.
- 8 Using fine line markers, or ink pens, students write the basic definitions and mathematical rules at the top of the pages and examples of these math problems underneath them. As in colonial days, the entire page is filled to conserve space.



Learning by Doing

Math and Measurement – Then and Now

MATH AND MEASUREMENT – THEN AND NOW – Presentation

WR 3 - use critical thinking and problem-solving skills

WR 4 - demonstrate self-management skills

LA 3.1 - speak in a variety of contexts

LA 3.2 - active listening, interpreting, responding

M 4.3 - develop ability to connect mathematics to other learning

S 5.4 - develop understanding of technology as application of scientific principles

S 5.5 - integrate mathematics as tool for problem-solving

SS 6.4 - acquire historical understanding of societal ideas/forces

SS 6.6 - acquire historical understanding of economic ideas/forces

Students share their copybooks at a final presentation. To conclude the presentation and summarize this series of activities, the class has a discussion about the copybooks and measurement tables – both those used today and used during colonial times.

SUGGESTED QUESTIONS:

- **How are copybooks or notebooks made today?**
- **What measurement tables do we use today for school, work, and home?**
- **How do the measurement tables today differ from tables used during colonial times?**

ACTIVITY EXTENSIONS:

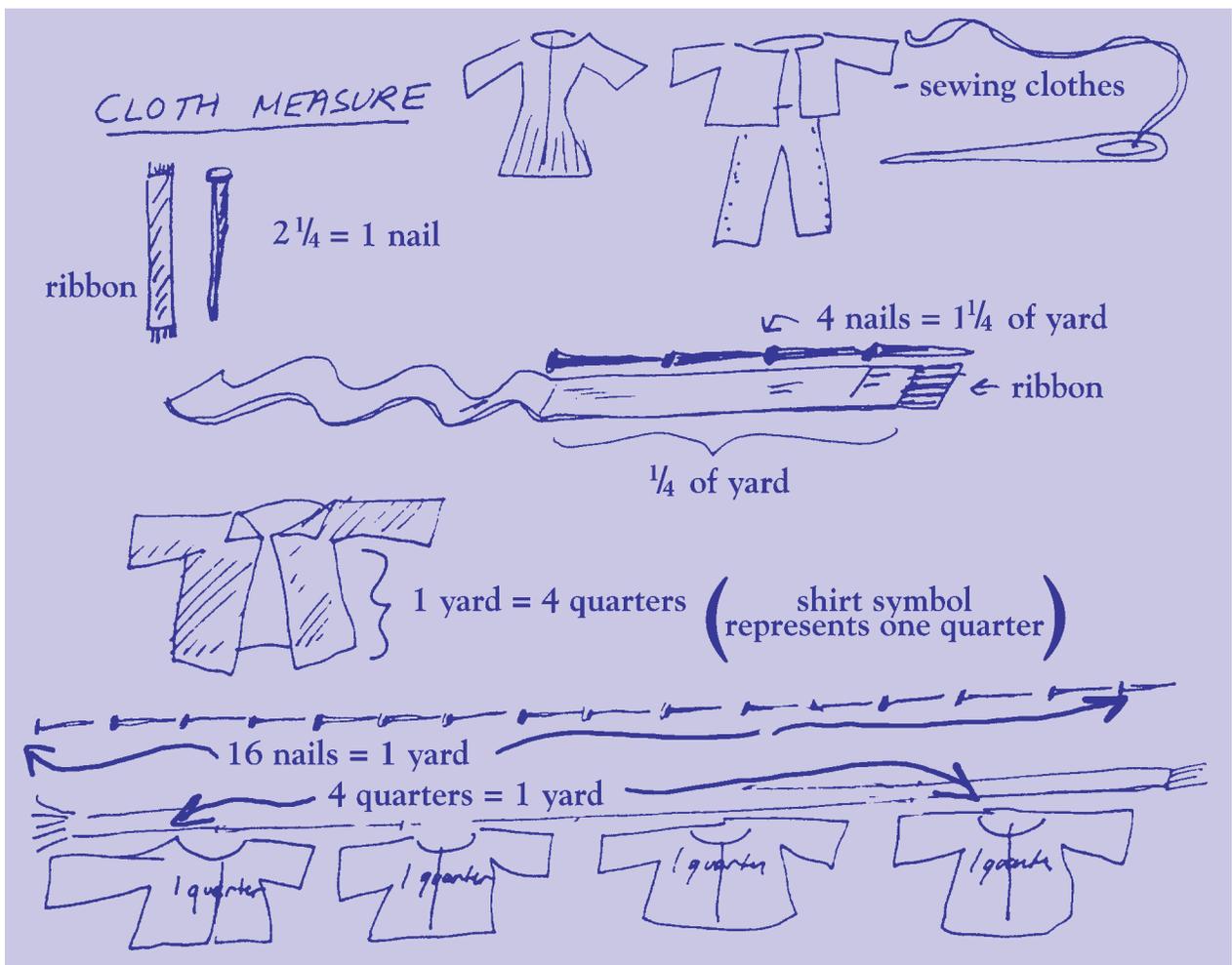
- Create a class collection of the objects and tools used for different types of measurements in the home, at school, and at work. (A sample list of tools is provided below.) Write a short description of the tools; what are they used for; who uses them; and how are they used. Create a class display of the collection.

Home and personal: clock, watch, stopwatch, food scale, meat thermometer, a stove's temperature gauge, microwave timer, bathroom weight scale, measuring cups and spoons, egg timer, 12" ruler, yardstick, medicine dropper, level, cloth measuring tape.

Work, business, and professional: an architect's scale ruler, carpenter's ruler, doctor's thermometer, and cashier's register.

School: nurse's scale, the teacher's time clock, student rulers, and the school bell's timer.

- Students illustrate the measurement tables used during colonial times. For a complete table, refer to the object – Ann Butler’s Copybook or “The Arithmetical Table Book: First Lessons in Arithmetic.”
- 1 Have students choose their favorite measurement tables.
 - 2 Discuss and make a list of five or more words or images that are related to each chosen measurement table. For example: for cloth measure-ribbons; pieces of fabric, shirt or dress; for land measure-farmland; for solid measure-a table and chair; for dry measure-a sack of grains or flour.
 - 3 The list may include activities associated with the measurement tables such as making wine, measuring farmland, sewing a shirt, building a table, or cooking with a sack of grains.
 - 4 Think of common objects as measurement tools. For example: barrels were used for wine measure and for beer measure; and nails were used to measure cloth.
 - 5 Illustrate the measurement tables using the lists of images and words. Illustrations are drawn on 8¹/₂" x 11" paper using markers, crayons, or colored pencils.



Learning by Doing

Math and Measurement – Then and Now

- Students create their own units of measurement using an object or body part.
 - 1 Students divide into groups of two to four.
 - 2 Each group chooses an object or a body part as a unit of measure. Examples include a pencil, a book, a hand, or a foot.
 - 3 Each student uses the chosen object or body part to measure the height, width, and depth of the following objects and parts of the classroom: the walls, floor, windows, door, desks, chairs, and assorted objects such as computers, pieces of paper, and backpacks. Students write the measurements on paper.
 - 4 Students compare the results with the other members of their group.
 - 5 The entire class discusses the accuracy of the measurements and the differences and similarities within each group using the same unit of measure. Also, discuss which objects or body parts were easier or more difficult to use.