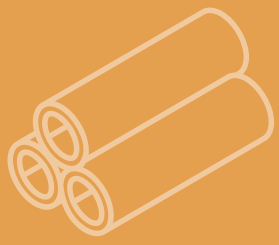
Materials Guidance for Numeracy Programs



PART 2: Purpose and Use of Common Materials – A Deep Dive

INTRODUCTION

As described in the Science of Teaching structured pedagogy how-to series, teaching and learning materials play an important role in supporting children's learning. At the same time, materials can represent a significant resource investment, so making decisions about what materials to use and how to ensure that they are used appropriately is an important part of designing a numeracy program.

This guidance is intended to help decision-makers understand and make decisions about adopting and incorporating materials for early grade math programs. It also provides information for curriculum and materials developers and teacher trainers, who play a role in ensuring that materials are used appropriately to support children's learning.

In keeping with this dual purpose, the guidance is presented in two parts. Part 1 provides general information on the selection and use of materials, including print materials and math manipulatives. This Part 2 provides more in-depth information about manipulatives and pictorial models that are commonly used in math programs.

This guide—intended for implementers, curriculum developers, and teacher trainers or coaches—offers detailed descriptions of some common materials that may be selected by programs to support math teaching and learning in the early grades. These include concrete materials (e.g., counters, fingers, place value sticks) and pictorial materials (e.g., number line, 100 chart). The guide can be used to support decision-making and content development when developing teaching and learning materials or when planning teacher training.

The guide can be contextualized by referencing locally available materials and common practices. Programs may examine how each material is already used by local teachers and use the relevant section to highlight effective practices that teachers already demonstrate, to discourage poor practices, or to provide specific support where teachers demonstrate a skills or knowledge gap. Programs should also note that the guidance may not be inclusive of all domains and competencies in the local curriculum; they should examine the curriculum and consider directly aligning the guidance to it.

The sections below, each dedicated to a specific material, include a description of what the material is, why it is used, how to find or make it, and how it is generally used.

Contents

Counters

What they are

Counters are objects that can be held and counted. They are used to physically represent a quantity.

Why they are used

Students need to touch and sometimes move objects when they count. Counters are helpful because they can be used to represent a quantity and to compose or decompose a quantity. They also allow students to perform operations physically by adding, joining, separating, or taking away objects. This helps students develop number sense and prepares them to work with abstract math symbols.

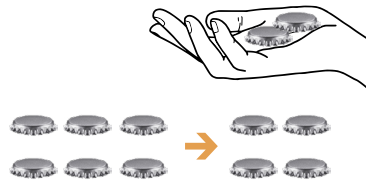
How to find them or make them

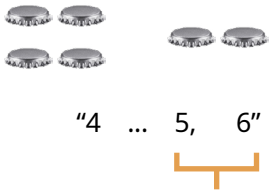
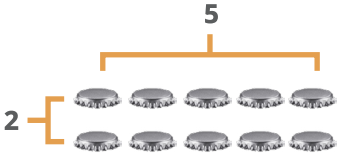
Counters can be any small objects that are common and available in the community, such as bottle caps or stones. All of the counters in a given set should be the same approximate size. They should be small enough to store and manipulate easily. Counters can be provided or collected by teachers. Students can also be asked to collect counters from their surroundings.

Teacher tip: Use objects that are easy and safe to manipulate. Do not use objects that are sticky, difficult to handle, or might hurt students. Avoid using food (such as dry beans), especially in places where children are affected by food insecurity.

What they are used for

Domain	Competency	Description	Example
Numbers and quantities	**Count to answer the question "How many?"**	Count objects or pictures accurately to answer the question "How many?"	 "1, 2, 3, 4, 5"
	Compare numbers	Identify the relative size of numbers (more than/less than).	 2 is less than 5.
	Identify "one more" and "one less"	Identify the number that is "one more" or "one less" than a given number.	 4 is one more than 3. 3 is one less than 4.
	Understand zero	Understand that zero is "none" or the lack of any quantity.	0 1  2  3 

Domain	Competency	Description	Example
Addition and subtraction	**Compose a number**	Put a number together using its parts.	 Composing a group of 4 and a group of 2 makes 6.
	Decompose a number	Break a number down into its parts.	 5 can be decomposed into a group of 2 and a group of 3.
	Add numbers by counting all	Add by putting two groups together and counting the total.	4 + 3 = What is the sum of 4 and 3? *Count out a group of 4 and a group of 3, then count the total:*  "1, 2, 3, 4, 5, 6, 7"
	Add numbers by counting on	Add by "counting on" from one number by another number to find the total.	4 + 3 = What is 3 more than 4? *Count out 4 objects, and count on 3 more:*  "4 ... 5, 6, 7"
	Subtract by taking away	Subtract by taking away one group from another.	6 – 2 = What is 6 take away 2? *Count out 6 objects, take away 2, and count how many are left:*  "1, 2, 3, 4"
	Subtract by counting backward	Subtract by counting back from a number.	6 – 2 = What is 2 less than 6? *Count out 6 objects. Pick up two, counting back as you pick up each one:*  "6 ... 5, 4"

Domain	Competency	Description	Example
	Identify unknown numbers	Find the missing number in an addition or subtraction sentence.	4 + ___ = 6 4 plus what number makes 6? *Count out a group of 4, then count on until you reach 6:*  "4 ... 5, 6" missing number: **2**
Multiplication and division	**Multiply by skip counting**	Multiply by skip counting the same quantity repeatedly.	5 × 2 = How many in 5 groups of 2? *Make 5 groups of 2, and skip count:*  "2" "4" "6" "8" "10"
	Multiply using repeated addition	Identify that multiplication of whole numbers is repeated addition, and multiply by adding a number to itself repeatedly.	5 × 2 = 2 + 2 + 2 + 2 + 2 = How much is 2 added to itself 5 times? *Add by putting all together or counting on:*  2 + 2 + 2 + 2 + 2 = 10
	Multiply using an array	Multiply the number of columns and rows in an array to find the quantity.	How many are in 2 rows of 5?  2 × 5 = 10
	Divide by separating into equal groups	Divide a quantity into a given number of equal groups, usually by sorting them one by one.	8 ÷ 2 = If 8 is shared equally into 2 groups, how many are in each group? *Sort 8 counters into 2 groups:* 

Domain	Competency	Description	Example
	Divide using repeated subtraction	Divide a quantity by subtracting groups of the same size repeatedly until zero remain.	8 ÷ 2 = How many times does 2 go into 8? *Start with 8 and subtract 2 repeatedly:*  8  8 – 2 = 6  6 – 2 = 4  4 – 2 = 2 2 – 2 = 0 2 goes into 8 four times. 8 ÷ 2 = 4
	Divide using an array	Divide the total quantity by the number of rows or columns to find how many objects are in each.	How many in each column?  10 ÷ 5 = 2 How many in each row?  10 ÷ 2 = 5

Fingers

What they are

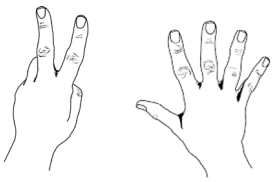
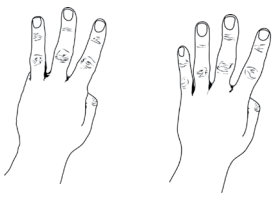
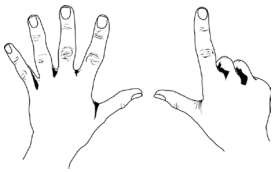
Fingers are used like counters to physically represent a quantity.

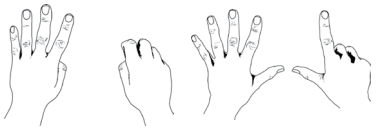
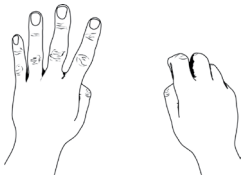
Why they are used

Fingers can be used in a math classroom in a similar way to counters. Children have access to them at any time, and they can easily be used to count, represent quantities, compare, and add or subtract.

Teacher tip: Different cultures use fingers for counting in different ways. Most people start with closed fists. Some raise the thumb first, while others raise the index finger or pinky first. Identify the most common way used in your community, and be consistent in the way you count and represent numbers.

What they are used for

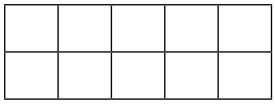
Domain	Competency	Description	Example
Numbers and quantities	**Count to answer the question "How many?"**	Count objects or pictures accurately to answer the question "How many?"	"1, 2, 3, 4, 5" 
	Compare numbers	Identify the relative size of numbers (more than/less than).	2 is less than 5. 
	Identify one more and one less	Identify the number that is "one more" or "one less" than a given number.	4 is one more than 3. 3 is one less than 4. 
Addition and subtraction	**Add numbers by counting all together**	Add by putting two groups together and counting the total.	4 + 3 = What is the sum of 4 and 3? *Count and raise 4 fingers, then 3 more, then count the total:*  "1, 2, 3, 4, 5, 6, 7"

Domain	Competency	Description	Example
	Add numbers by counting on	Add by "counting on" from one number by another number to find the total.	4 + 3 = What is 3 more than 4? *Raise 4 fingers and count on 3 (raising 1 finger with each count):*  "4 … 5, 6, 7"
	Subtract by taking away	Subtract by taking away one group from another.	6 – 2 = What is 6 take away 2? *Raise 6 fingers, put down 2, and count how many are left:*  "1, 2, 3, 4"
	Subtract by counting backward	Subtract by counting back from a number.	6 – 2 = What is 2 less than 6? *Raise 6 fingers and count back 2 (putting 1 finger down with each count):*  "6 … 5, 4"

Ten Frame

What it is

A ten frame is a rectangle with 2 rows of 5 squares. Physical objects like counters can be placed in each square, or circles can be drawn in a ten frame on paper or the board. It is best to use ten frames with counters before using drawings of circles.



Why it is used

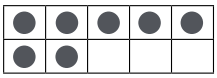
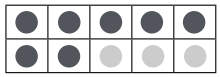
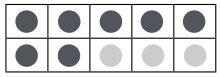
A ten frame allows students to develop an understanding of the quantity 10 by representing it in a way that can be done without counting. It can be used to build children's subitizing skills because they learn to identify how many objects are in groups (for example, each row of 5). It can also be used to compose and decompose numbers within 10.

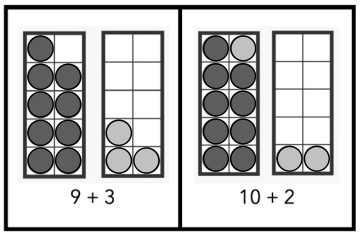
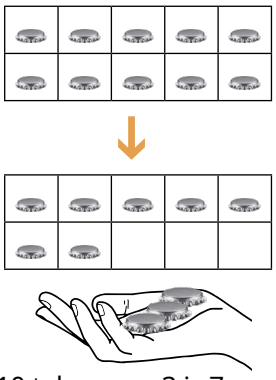
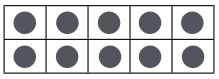
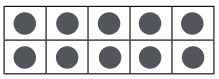
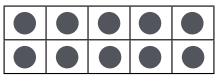
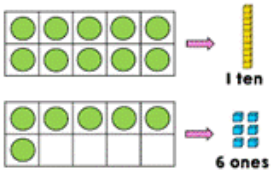
How to find it or make it

A ten frame is easy to draw on the blackboard or paper, or to draw or paste onto cardboard so that it can be reused.

Teacher tip: Students can also draw a ten frame on paper or a slate, and use counters on it.

What is it used for

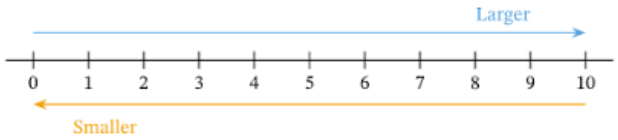
Domain	Competency	Description	Example
Numbers and quantities	**Count to answer the question "How many?"**	Count objects or pictures accurately to answer the question "How many?"	
	Subitize	Identify a small number quickly and visually, without counting.	"How many dots?"  "4 and 3 make 7" or "5 and 2 make 7"
	Compare numbers	Identify the relative size of numbers (more than/less than).	 5 is greater than 2. 2 is less than 5.
Addition and subtraction	**Compose a number**	Put a number together using its parts.	 10 can be composed of a group of 7 and a group of 3.
	Decompose a number	Break a number down into its parts.	 10 can be decomposed into a group of 7 and a group of 3.

Domain	Competency	Description	Example
	Add numbers by counting all together	Add by putting two groups together and counting the total.	 9 and 3 is the same as 10 and 2, which is 12.
	Subtract by taking away	Subtract by taking away one group from another.	 10 take away 3 is 7.
Place value	**Count tens**	Use multiple ten-frames to count by tens.	10  20  30 
	Compose a number using place value	Compose a number based on the place value of its digits.	16 is 1 ten and 6 units: 

Number Line

What it is

A number line is a line that is marked with numbers that are all the same distance apart. The value of the numbers increases from left to right. In lower primary, the number line should start with zero (it should not include negative numbers).



Why it is used

A number line is a representational aid for students to count and skip count, to compare numbers, to do operations, and to understand the number system. Using a number line regularly can help students form a mental number line, which helps them with mental math.

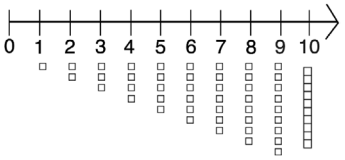
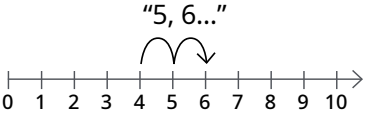
How to find it or make it

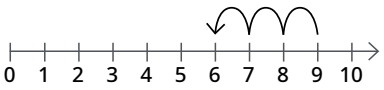
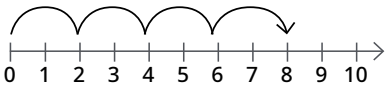
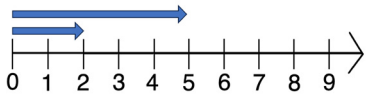
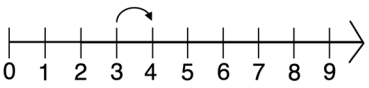
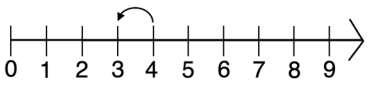
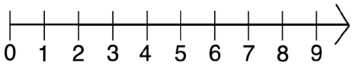
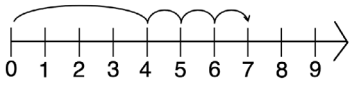
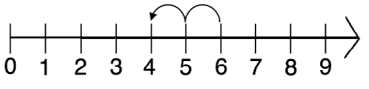
Teachers can make a number line to post on the walls of the classroom, or they can draw one on the blackboard. Number lines can also be created on the floor with chalk or by placing number cards in a line on the ground.

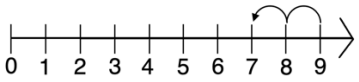
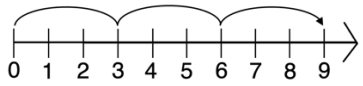
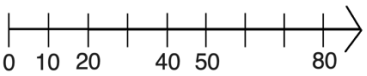
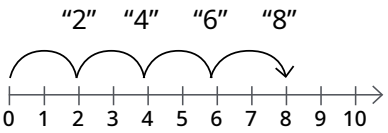
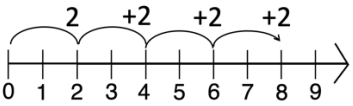
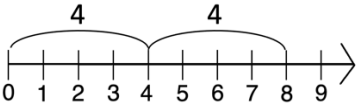
All of the marks on the number line should be drawn the same distance apart. In lower primary grades, a number line should start from zero (no negative numbers). Teachers may make different number lines for different purposes. They may draw short number lines that go up to only 9 or 10 at first, and new number lines with larger numbers later on. They may also draw number lines that skip count (for example, showing tens: 10, 20, 30, ...).

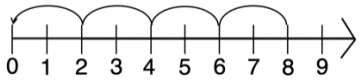
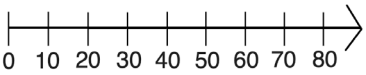
Teacher tip: Make number line activities interactive. Have students touch a number line on the board to help them count and perform operations. Using the number line on the floor, students can walk forward or backward (e.g., to count on, count back, add, or subtract) or jump (to skip count).

What is it used for

Domain	Competency	Description	Example
Numbers and quantities	**Count to answer the question "How many?"**	Count objects or pictures accurately to answer the question "How many?"	
	Count on	Count starting from a number other than 0 or 1.	"Count on from 4" 

Domain	Competency	Description	Example
	Count backward	Count backward from a greater number to a smaller number.	"Count backward from 9" "8, 7, 6..." 
	Skip count	Count by a number other than 1.	"Count by 2" "0, 2, 4, 6, 8, ..." 
	Compare numbers	Identify the relative size of numbers (more than/less than).	5 is greater than 2 because it is farther from 0. 
	Identify one more and one less	Identify the number that is "one more" or "one less" than a given number.	4 is one more than 3.  3 is one less than 4. 
	Understand, read, and write numbers, including 0	Read and write the number symbol for each quantity.	
Addition and subtraction	**Add numbers by counting on**	Add by "counting on" from one number by another number to find the total.	4 + 3 = What is 3 more than 4? *Start at 4 and count on 3:* 
	Subtract by counting backward	Subtract by counting back from a number.	6 – 2 = What is 2 less than 6? *Start at 6 and count back 2:* 

Domain	Competency	Description	Example
	Identify unknown numbers	Find the missing number in an addition or subtraction sentence.	9 – ___ = 7 9 minus what number leaves 7? *Start at 9 and count back until you reach 7:*  Missing number: 2
Patterns	**Identify the rule of a number pattern**	Use an understanding of quantity and operations to identify number patterns.	The pattern counts up by 3. 
	Identify missing numbers	Find missing numbers after identifying the rule of a pattern.	The pattern counts up by 10. The missing numbers are 30, 60, 70. 
Multiplication and division	**Multiply by skip counting**	Multiply by skip counting the same quantity repeatedly.	4 × 2 = How many in 4 groups of 2? 
	Multiply using repeated addition	Identify that multiplication of whole numbers is repeated addition, and multiply by adding a number to itself repeatedly.	4 × 2 = 2 + 2 + 2 + 2 = How much is 2 added to itself 4 times? 
	Divide by separating into equal groups	Divide a quantity into a given number of equal groups, usually by sorting them one by one.	8 ÷ 2 = If 8 is shared equally into 2 groups, how many are in each group?  There are 4 in each group. 8 ÷ 2 = 4

Domain	Competency	Description	Example
	Divide using repeated subtraction	Divide a quantity by subtracting groups of the same size repeatedly until zero remain.	8 ÷ 2 = How many times does 2 go into 8?  2 goes into 8 four times. 8 ÷ 2 = 4
Place value	**Count tens**	Use a pattern of 10s to practice counting by 10	

Bead Strings

What they are

Bead strings are a set of beads on a string, which can be counted and manipulated by children.

Why they are used

Bead strings help children develop a sense of number order and pattern and help them form a mental number line. They can be used before or alongside the pictorial number line.

How to find them or make them

The beads may be real beads made from a material such as plastic, or they can be created by making a hole in another material. It is a good idea to use at least two different colors or types of beads so that they can be used to form patterns. Any type of string can be used. The beads should fit loosely on the string so that they can slide around easily.

What they are used for

Domain	Competency	Description	Example
Numbers and quantities	**Count to answer the question "How many?"**	Count objects or pictures accurately to answer the question "How many?"	—ooooo— "1, 2, 3, 4, 5"
	Skip count	Count by a number other than 1.	—ooooo-ooooo-ooooo— "5" "10" "15"
	Compare numbers	Identify the relative size of numbers (more than/less than).	—oooo—— —ooooooo— 7 is more than 4.
	Identify "one more" and "one less"	Identify the number that is "one more" or "one less" than a given number.	—oooo— —ooo— 4 is one more than 3. 3 is one less than 4.
Patterns	**Identify the rule of a number pattern**	Use an understanding of quantity and operations to identify number patterns.	With one bead type: —ooo-oo-o-ooo-oo-o— With beads of different types or colors: —oooxxxoooxxx— —ooxooxooox—
Addition and subtraction	**Compose a number**	Put a number together using its parts.	6 can be composed of a group of 4 and a group of 2. —oooo-oo—
	Decompose a number	Break a number down into its parts.	5 can be decomposed into a group of 2 and a group of 3. —oo-ooo—

Domain	Competency	Description	Example
	Add numbers by counting all together	Add by putting two groups together and counting the total.	4 + 3 = What is the sum of 4 and 3? *Count out a group of 4 and a group of 3, then count the total:* —oooo-ooo— "1, 2, 3, 4, 5, 6, 7"
	Add numbers by counting on	Add by "counting on" from one number by another number to find the total.	4 + 2 = What is 2 more than 4? *Count out 4 beads, and count on 2 more:* —oooo-o-o— "4 ... 5, 6"
	Subtract by taking away	Subtract by taking away one group from another.	6 – 2 = What is 6 take away 2? *Count out 6 beads, take away 2, and count how many are left:* —oooo——o-o— "1, 2, 3, 4"
	Subtract by counting back	Subtract by counting back from a number.	6 – 2 = What is 2 less than 6? *Count out 6 beads. Take away 2, counting back as you move each one:* —oooooo— "6" —ooooo—o— "5" —oooo—o-o— "4"
	Identify unknown numbers	Find the missing number in an addition or subtraction sentence.	6 – ___ = 4 6 minus what number makes 4? *Count out a group of 6, then subtract until you reach 4:* —oooooo— —oooo—o-o— Missing number: 2
Multiplication and division	**Multiply by skip counting**	Multiply by skip counting the same quantity repeatedly.	5 × 2 = How many in 5 groups of 2? *Make 5 groups of 2, and skip count:* —oo-oo-oo-oo-oo— "2, 4, 6, 8, 10"

Domain	Competency	Description	Example
	Multiply using repeated addition	Identify that multiplication is repeated addition, and multiply by adding a number to itself repeatedly.	5 × 2 = 2 + 2 + 2 + 2 + 2 = How much is 2 added to itself 5 times? *Add by putting all together or counting on:* —oo-oo-oo-oo-oo— 2 + 2 + 2 + 2 + 2 = 10
	Divide by separating into equal groups	Divide a quantity into a given number of equal groups, usually by sorting them one by one.	8 ÷ 2 = If 8 is shared equally into 2 groups, how many are in each group? *Sort 8 beads into 2 groups:* —oooo—oooo— 8 ÷ 2 = 4
	Divide using repeated subtraction	Divide a quantity by subtracting groups of the same size repeatedly until zero remain.	8 ÷ 2 = How many times does 2 go into 8? *Start with 8 and subtract 2 repeatedly:* —oooooooo— 8 —oooooo— 8 – 2 = 6 —oooo—— 6 – 2 = 4 —oo——— 4 – 2 = 2 —————— 2 – 2 = 0 2 goes into 8 four times. 8 ÷ 2 = 4
Place value	**Count tens**	Count by tens by grouping beads in groups of ten.	—oooooooooo oooooooooo oooooooooo—
	Compose a number using place value	Compose a number based on the place value of its digits.	Show me 23. —oooooooooo oooooooooo ooo ———————
Measurement	**Measure length using non-standard units**	Use a small object as a unit to measure the length of larger objects.	The pencil is 11 beads long. —oooooooooooo—

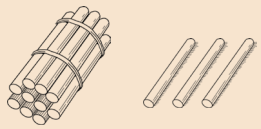
Sticks, Base 10 Blocks, and Place Value Chart

What they are

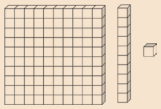
Sticks are a common manipulative for place value used to introduce 1s and 10s. Each stick represents 1 unit and can be bundled together in groups of 10.

Base 10 blocks can be used to introduce 1s, 10s, and 100s. These are small cubes that children can connect to make sticks of 10 and squares of 100.

A **place value chart** has a column for each digit. Numbers can be represented in a place value chart using manipulatives or written numerals.



Sticks



Base 10 blocks

Tens	Units
2	3

Place value chart

Why they are used

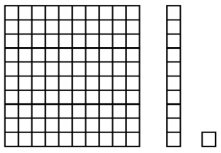
Place value refers to the value that a digit has based on its position in a number. The value of each digit grows 10 times larger as we move from right to left. This is an abstract idea that children grasp more easily by working with manipulatives that represent the value of units (1s), tens (10s), and hundreds (100s). Place value manipulatives can also help children understand other abstract ideas, such as regrouping of tens and units when performing 2-digit addition and subtraction.

How to find them or make them

Sticks can be any long objects that are available in the community. They might be sticks from trees, or other materials such as pencils or straws. They can be bundled together with a rubber band or string.

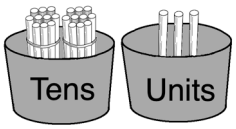
➔ **Teacher tip:** Students can be asked to collect materials to use as place value sticks, but clear instructions should be provided. For example, ask them to collect sticks the size of a pencil. The sticks in a set should all be approximately the same size.

Base 10 blocks are often not available, but alternative versions can be used. For example, paper squares and strips can be cut out and arranged by children on their desks to form numbers.

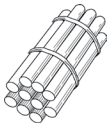


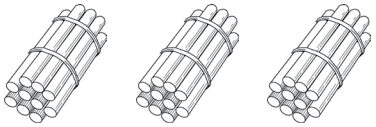
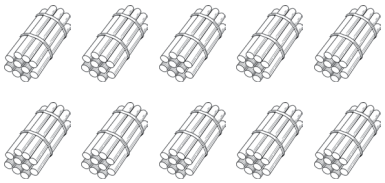
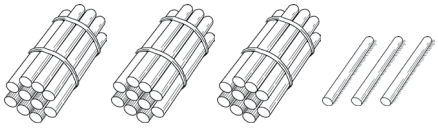
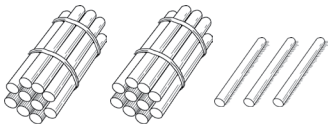
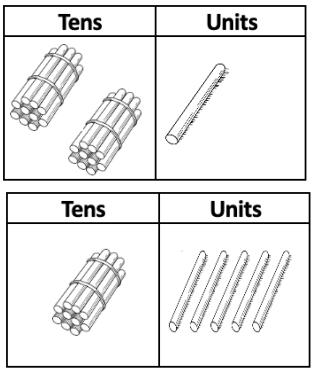
➔ **Teacher tip:** Grid paper can be cut into squares and strips to make base 10 blocks.

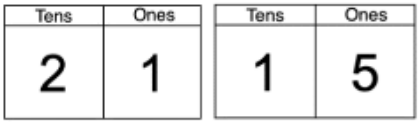
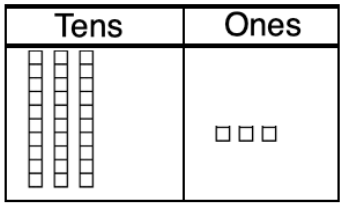
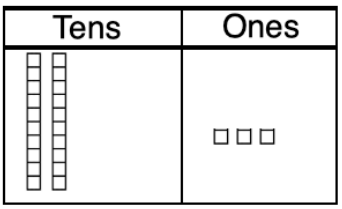
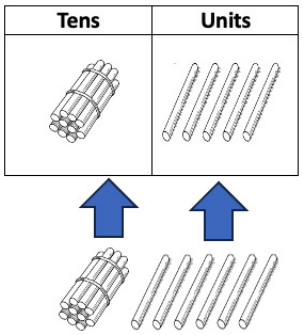
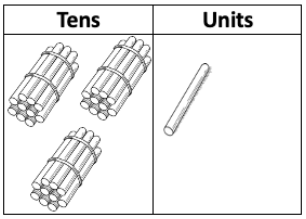
A **place value chart** can be drawn on paper and placed on a table or desk, or posted on the wall. It can be drawn directly into exercise books or the board. It can also be created out of cups or other containers.

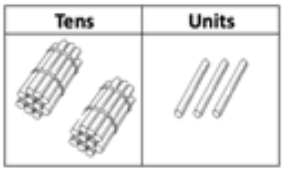
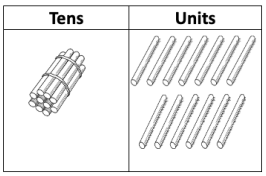
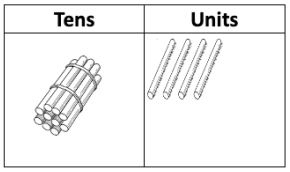


What they are used for

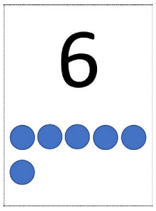
Domain	Competency	Description	Example
Place value	**Identify 10 as a group of ten units**	Form the quantity 10 by a group of ten units.	Count 10 sticks (“1, 2, 3, 4, 5, 6, 7, 8, 9, 10”) and tie them together to make a bundle of 10. 

Domain	Competency	Description	Example
	Count tens	Count by 10s using bundles.	Count bundles of 10 sticks:  "10" "20" "30"
	Identify 100 as a group of ten 10s	Form the number 100 by making a group of ten 10s.	Count 10 bundles of sticks into a group of 100:  "10, 20, 30, 40, 50, 60, 70, 80, 90, 100"
	Compose a number using place value	Compose a number using groups of tens and ones.	Which number is composed of 3 groups of tens and 3 ones?  "33"
	Decompose a number using place value	Decompose a number based on the place value of its digits.	Show me 23.  "10" "20" "21, 22, 23"
	Compare quantities using materials	Identify the relative size of two numbers (greater than/ less than) using materials to represent the digits.	21 is greater than 15 because it has more tens. 

Domain	Competency	Description	Example
	Compare numbers	Identify the relative size of two numbers (greater than/less than) using the place value of their digits.	21 is greater than 15 because the tens digit is greater. 
	Identify 10 more / 10 less / 100 more / 100 less	Identify the number that is 10 more / 10 less / 100 more / 100 less than a given number using the place value of digits.	33 is 10 more than 23 because it has 1 more group of 10.  23 is 10 less than 33 because it has 1 fewer group of 10. 
Addition and subtraction of 2-digit numbers	**Add 2-digit numbers**	Use an understanding of place value to add 2-digit numbers.	*Place one number in the chart, then the other number. If there are 10 or more in the units column, regroup 10 in a bundle.* Add: 15 + 16 =  Regroup 10 units into 1 bundle: 

Domain	Competency	Description	Example
	Subtract from 2-digit numbers	Use an understanding of place value to subtract from 2-digit numbers.	*Place the first number in the chart, then remove the second number. If there are not enough units, regroup a bundle into 10 units.* Subtract: 23 – 9 = Place 23 in the chart:  Regroup 1 bundle into 10 units:  Remove 9: 

Number Cards



What they are

Number cards can take different forms. They may contain only a numeral, or they may contain the spelled word and/or a picture.

Why they are used

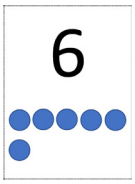
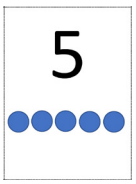
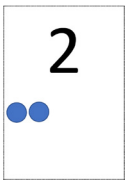
Number cards can be used in many ways to practice number skills, including number recognition, comparing, and operations. They can be used as flash cards to assess children's ability to identify numbers. They can also be used by children in games and other interactive classroom activities.

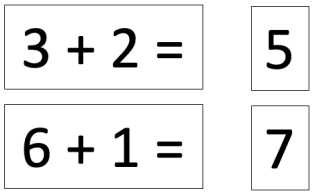
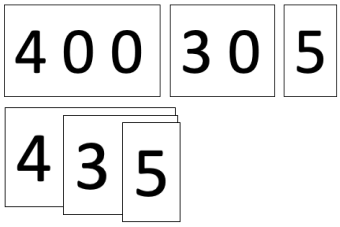
How to find them or make them

Number cards can be drawn on paper and cut out by teachers.

➔ **Teacher tip:** When making a set of number cards, try to make them all the same size. This can be done by folding paper into equal sections and cutting them out before writing numbers on the cards.

What they are used for

Domain	Competency	Description	Example
Numbers and quantities	**Count to answer the question "How many?"**	Count objects or pictures accurately to answer the question "How many?"	Identify the number by counting the dots: 
	Compare numbers	Identify the relative size of numbers (more than/less than).	5 is greater than 2.  
	Understand, read, and write numbers, including 0	Read and write the number symbol for each quantity.	"What number is this?" "Nine" 

Domain	Competency	Description	Example
Addition and subtraction; multiplication and division	**Recall operations facts**	Store and recall addition, subtraction, multiplication, and division facts through practice.	Create an addition sentence:  Match addition sentences with their sums: 
Place value	**Compose a number using place value**	Compose a number based on the place value of its digits.	Compose 435 using overlay cards: 

100 Chart

What it is

A 100 chart is a chart with numbers up to 100 in 10 columns and 10 rows. Some 100 charts start at 1, and others start at 0. Programs should adopt one type to use, and this decision can be made based on teachers' existing familiarity with the 100 chart. If one type is already widely used, that should be selected because charts may already exist in classrooms and teachers would require less training.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

0	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29
30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49
50	51	52	53	54	55	56	57	58	59
60	61	62	63	64	65	66	67	68	69
70	71	72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87	88	89
90	91	92	93	94	95	96	97	98	99
100									

Why it is used

The 100 chart provides a visual support for students to count and skip count, to compare, to do operations, to identify patterns, and to develop an understanding of place value. It can be used to visualize groups of 10 and identify number patterns.

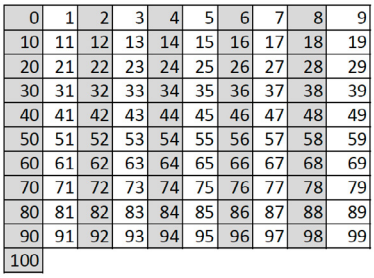
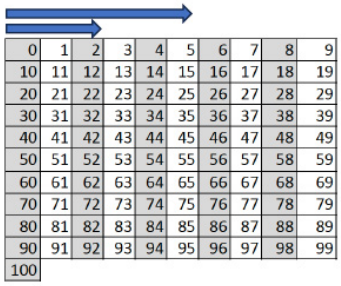
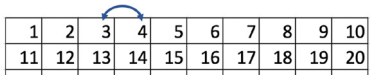
How to find it or make it

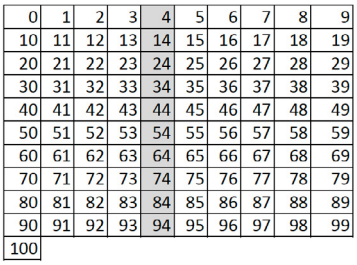
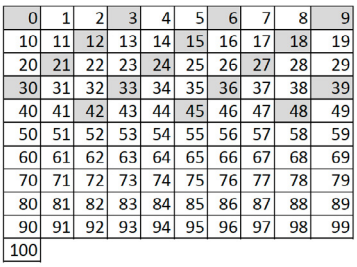
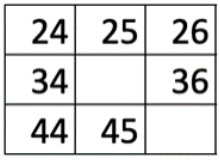
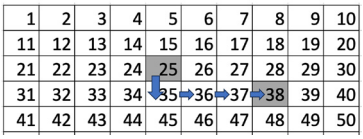
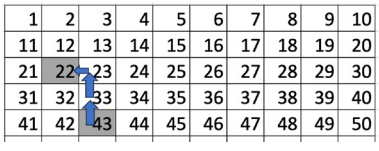
The 100 chart can be drawn on a flip chart or poster for the walls of the classroom. It can also be drawn on the blackboard, but it is time-consuming to draw. It is best to use a ruler to draw straight lines the same distance apart. Numbers should be written large enough for all students in the classroom to see.

Teacher tip: Having students find patterns helps prepare them for problem solving and for more complex mathematics, like algebra.

What is it used for

Domain	Competency	Description	Example
Numbers and quantities	**Count to answer the question "How many?"**	Count objects or pictures accurately to answer the question "How many?"	Point to numbers in the 100 chart while counting.
	Count on	Count starting from a number other than 0 or 1.	"Count on 2 from 4" Point at 4, then point and count on by the next 2 numbers: "5, 6"

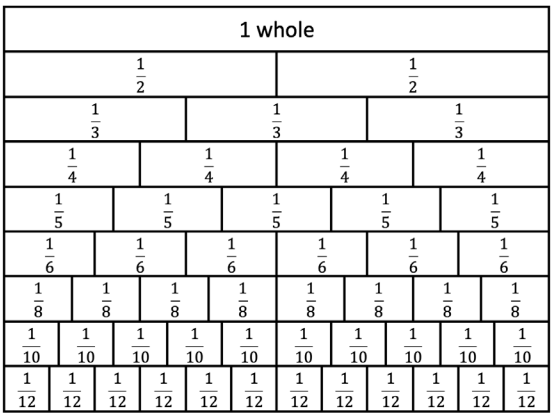
Domain	Competency	Description	Example
	Count backward	Count backward from a greater number to a smaller number.	"Count back 3 from 9" Point at 9, then point and count back by 3: "8, 7, 6"
	Skip count	Count by a number other than 1.	"Count by 2" "0, 2, 4, 6, 8, ..." 
	Compare numbers	Identify the relative size of numbers (more than/less than).	5 is greater than 2. 
	Identify one more and one less	Identify the number that is "one more" or "one less" than a given number.	4 is one more than 3. 3 is one less than 4. 
	Understand, read, and write numbers, including 0	Read and write the number symbol for each quantity.	Point to a number and have students say it. Say a number and have students point to it. Write missing numbers in a 100 chart.
Addition and subtraction	**Add numbers by counting on**	Add by "counting on" from one number by another number to find the total.	4 + 3 = Point to 4 and count on 3: "5, 6, 7"
	Subtract by counting backward	Subtract by counting back from a number.	6 – 2 = Point to 6 and count back 2: "5, 4"

Domain	Competency	Description	Example
Place value	**Skip count by 10**	Use place value to identify number patterns that count by 10.	Count by 10: "4, 14, 24, ..."  0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100
Patterns	**Identify the rule of a number pattern**	Use an understanding of quantity and operations to identify number patterns.	The rule of the pattern is "plus 3":  0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100
	Identify missing numbers	Find missing numbers after identifying the rule of a pattern.	Identify missing numbers by using patterns of 1 and 10:  24 25 26 34 36 44 45
Addition and subtraction of 2-digit numbers	**Add 2-digit numbers**	Use an understanding of place value to add 2-digit numbers.	*To add 10, move down 1 row. To add units, count on.* Add: 25 + 13 = Point to 25. Note that 13 is 10 + 3. Add 10 and then 3:  1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50
	Subtract from 2-digit numbers	Use an understanding of place value to subtract from 2-digit numbers.	*To subtract 10, move up 1 row. To subtract units, count back.* Subtract: 43 – 21 = Point to 43. Note that 21 is 20 + 1. Subtract 20 (2 tens) and then 1:  1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50

Fraction Strips

What they are

Fraction strips are rectangular pieces that represent parts of a whole. One whole is divided into strips of equal size to represent fractions. They can be cut apart and manipulated by students.



Why they are used

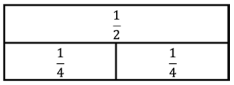
Fraction strips help students see how one whole object can be broken down into different equal-sized parts. They can be used to identify and represent fractions, to compare fractions, to identify equivalent fractions, and to perform operations.

How to find them or make them

Fraction strips can be made from cardboard or paper by cutting or folding the material into pieces. The fraction can then be written on each piece. All fraction strips should be the same height. The widths should all be in the correct proportions to one another (e.g., five $\frac{1}{5}$ strips fit exactly in one whole; two $\frac{1}{4}$ strips fit exactly in one $\frac{1}{2}$ strip). The simplest way to make fraction strips is by printing and cutting them out.

A set of fraction strips (like the large image shown on this page) can be displayed on a poster on the wall and referenced during lessons.

Fraction strips can also be drawn on the board as needed. For example, one $\frac{1}{2}$ strip and two $\frac{1}{4}$ strips can be drawn to demonstrate their relationship.

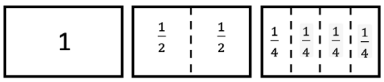
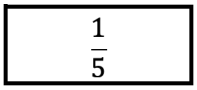
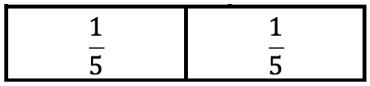
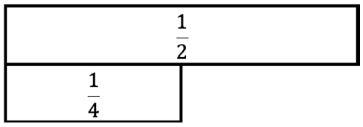
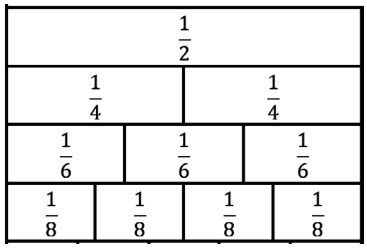
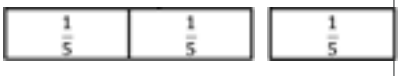


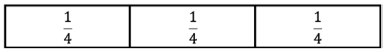
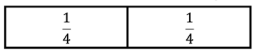
➔ **Teacher tip:** It is best for all students to have the chance to manipulate fraction strips. Students can discover the relationships between different fractions by arranging them next to or on top of each other.

A note for implementers

It can be challenging for teachers to make concrete fraction strips and fraction shapes themselves, because the shapes need to be cleanly cut into specific sizes. The shape and sizes of the pieces relative to one another is important because it ensures that students can accurately compare and identify equivalent fractions. To demonstrate equivalence, the pieces should align when placed on top of one another. For this reason, it is best for programs to develop and provide fraction materials to teachers using sturdy material.

What they are used for

Domain	Competency	Description	Example
Fractions	**Divide an object into equal parts**	Divide an object into fraction parts of equal size.	Represent 1 whole with 1 piece of paper. Fold the paper once to make halves. Fold it again to make fourths. 
	Identify unit fractions	Identify unit fractions (e.g., $\frac{1}{5}$, $\frac{1}{5}$) represented as pictures or in fractional notation.	Represent $\frac{1}{5}$ using a fraction strip. 
	Identify non-unit fractions	Identify non-unit fractions (e.g., $\frac{2}{3}$, $\frac{4}{5}$) represented as pictures or in fractional notation.	Represent using two fraction strips: 
	Compare fractions	Identify the relative size of fractions (more than/less than)	Overlay fraction strips or place them side by side to discover $\frac{1}{2} > \frac{1}{4}$. 
	Identify equivalent fractions	Identify fractions that have the same value as a given fraction.	Overlay fraction strips or place them side by side to discover that $\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8}$. 
	Add fractions with the same denominator	Add fractions with the same denominator using objects, pictures, and fractional notation.	To add $\frac{2}{5} + \frac{1}{5}$ using fraction strips, place them together:  $\frac{2}{5} + \frac{1}{5} = \frac{3}{5}$

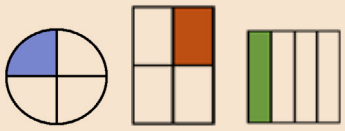
Domain	Competency	Description	Example
	Subtract fractions with the same denominator	Subtract fractions with the same denominator using objects, pictures, and fractional notation.	To subtract $\frac{3}{4} - \frac{1}{4}$ using fraction strips, first show $\frac{3}{4}$:  Then, take away $\frac{1}{4}$:  $\frac{3}{4} - \frac{1}{4} = \frac{4}{4}$

Fraction Shapes

What they are

Fractions can be shown with many different shapes, including circles, squares, and rectangles. Fraction shapes are always divided into equal parts, and the parts can be shaded to represent a given fraction. Consider the pictures below. The shapes divided into equal parts show $\frac{1}{4}$. The others do *not* show $\frac{1}{4}$, because the parts are unequal.

Fraction shapes:



Not fraction shapes:

Why they are used

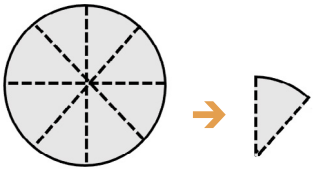
Fraction shapes help students see how one whole object can be broken down into different equal-sized parts. They can be used to identify and represent fractions, to compare fractions, to identify equivalent fractions, and to perform operations.

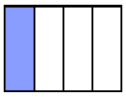
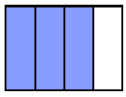
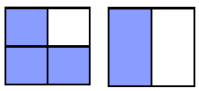
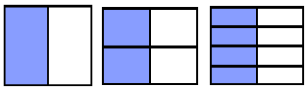
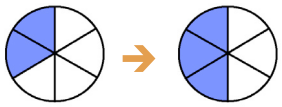
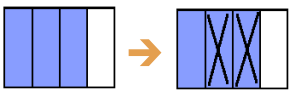
How to find them or make them

Whole fraction shapes can be drawn on the board or on paper. Whole fraction shapes and their parts can also be cut out from paper or cardboard. The shapes and their parts should be drawn or cut neatly so that the parts are the same size. When drawing on the board, it is okay if drawings are not exact, as long as the parts appear to be the same size.

Teacher tip: Shapes with unequal parts, like those shown above, can be used in a math classroom to help children understand fractions. You may show students a group of different shapes that are divided, and have them identify which ones represent fractions. They should identify that only those divided into equal parts are fraction shapes.

What they are used for

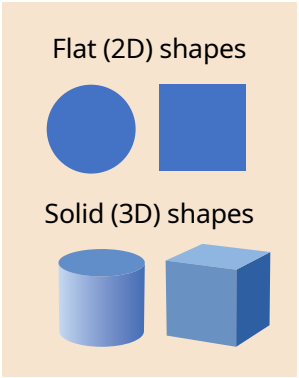
Domain	Competency	Description	Example
Fractions	**Divide an object into equal parts**	Divide an object into fraction parts of equal size.	Represent 1 whole with a paper shape. Fold it into equal parts by folding it in half several times, then cut the folds. The parts can be stacked to show that they are equal. Shape: Stacked parts: 

Domain	Competency	Description	Example
	Identify unit fractions	Identify unit fractions (e.g., $\frac{1}{2}$, $\frac{1}{5}$) represented as pictures or in fractional notation.	Shade 1 part of a shape to show $\frac{1}{4}$. 
	Identify non-unit fractions	Identify non-unit fractions (e.g., $\frac{2}{3}$, $\frac{4}{5}$) represented as pictures or in fractional notation.	Shade 3 parts of a shape to show $\frac{3}{4}$. 
	Compare fractions	Identify the relative size of fractions (more than/less than).	Compare the shaded parts of 2 fraction shapes to identify which is greater:  $\frac{3}{4} > \frac{1}{2}$
	Identify equivalent fractions	Identify fractions that have the same value as a given fraction.	Shade equivalent fractions in fraction shapes that have the same size, to identify that the shaded parts are equal in size:  $\frac{1}{2} = \frac{2}{4} = \frac{4}{8}$
	Add fractions with the same denominator	Add fractions with the same denominator using objects, pictures, and fractional notation.	To add $\frac{2}{6} + \frac{1}{6}$ using a fraction shape, shade 2 parts ($\frac{2}{6}$) and then shade 1 more ($\frac{1}{6}$):  $\frac{2}{6} + \frac{1}{6} = \frac{3}{6}$
	Subtract fractions with the same denominator	Subtract fractions with the same denominator using objects, pictures, and fractional notation.	To subtract $\frac{3}{4} - \frac{2}{4}$ using a fraction shape, shade 3 parts ($\frac{3}{4}$) and then "take away" 2 parts ($\frac{2}{4}$) by crossing them out:  $\frac{3}{4} - \frac{2}{4} = \frac{1}{4}$

Geometric Shapes

What they are

Shapes can be flat, two-dimensional (2D) figures or solid, three-dimensional (3D) figures. They may be concrete manipulatives, such as flat shapes cut from paper, or solid shapes found in the environment or created by teachers. Flat and solid shapes can also be pictures that are printed or drawn on the board or paper.



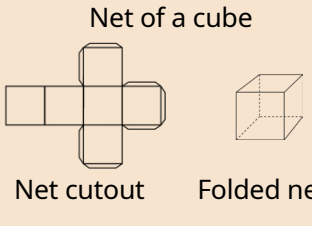
Why they are used

Working with geometric shapes helps children develop spatial reasoning skills and make sense of the world around them.

How to find them or make them

Flat shapes can be drawn on paper and cut out by teachers. They can then be held, flipped, and folded. Depending on the intended use, flat shapes may be made out of paper (to be folded) or cardboard (to last longer). They can also be identified in the environment. For example, students may identify that the flat face of a blackboard is a rectangle. Flat shapes can be drawn on paper or the board by teacher and students.

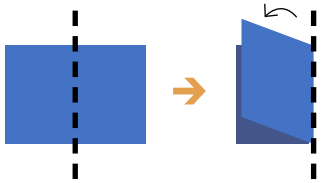
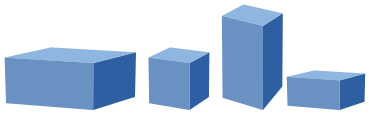
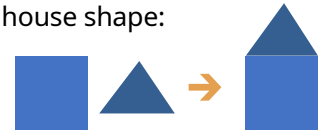
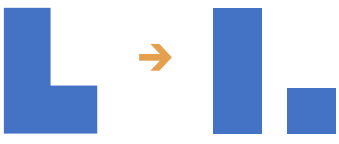
Solid shapes can be everyday objects found in the community. For example, a box or book could be a cuboid, and a tin can could be a cylinder. They can also be created using a net. This is done by cutting out the outline of the net, folding it along the inner lines, and taping or gluing it to hold its form.

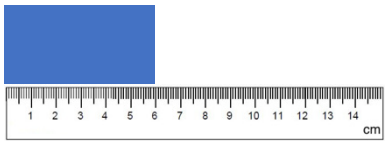


→ **Teacher tip:** Solid shapes can be challenging to draw, and their features are not clear. Students cannot easily see and identify the faces and edges of a solid shape in a drawing. It is best to introduce solid shapes using manipulatives found in the environment so the features can easily be identified.

What they are used for

Domain	Competency	Description	Example
2D shapes	**Sort 2D shapes according to their shape**	Group 2D shapes based on their characteristics (e.g., number of sides, squares).	A group of shapes with 4 sides: 
	Name shapes	Identify 2D shapes by name.	This is a square: 
	Draw 2D shapes	Draw a 2D shape according to its characteristics.	Draw this shape:  The child draws a shape with 3 sides and 3 angles.

Domain	Competency	Description	Example
	Describe the characteristics of 2D shapes	Describe 2D shapes based on features such as number of sides, lengths of sides, and number of angles.	How do you know this is a square?  It has 4 corners and 4 sides all the same length.
	Identify lines of symmetry	Identify lines of symmetry in 2D shapes, which divide the shape into two mirror images.	Fold a shape in half on a line of symmetry, showing that the 2 sides overlap: 
3D shapes	**Sort 3D shapes according to their shape**	Group 3D shapes based on their characteristics (e.g., number of faces, shapes of faces).	A group of shapes with rectangular faces: 
	Identify 3D shapes	Identify 3D shapes by name.	This is a cylinder: 
	Describe the features of 3D shapes	Describe 3D shapes based on features such as number of faces and shape of faces.	How do you know this is a sphere?  It is smooth and perfectly round, with no edges or points.
Spatial reasoning	**Compose shapes**	Compose larger 2D shapes from smaller shapes.	This square and triangle can be placed together to make a house shape: 
	Decompose shapes	Decompose a larger shape into smaller shapes.	This L shape can be cut into a rectangle and a square: 

Domain	Competency	Description	Example
Position and direction	**Describe the relative position of shapes**	Use positional terms (e.g., on top of, left/right) to describe the location of 2D or 3D shapes.	The ball is on top of the box. 
Measurement	**Measure length using non-standard units**	Use real objects (e.g., hands, beads) to measure a shape.	Measure the sides of a shape with a bead string:  –oooooooooo– The rectangle is 8 beads long.
	Measure length using standard units	Use a ruler to measure a shape in centimeters.	Use a ruler to measure sides of the rectangle:  The rectangle is 6 cm long.
	Find the perimeter of a shape using addition	Add the lengths of the sides of a shape to find its perimeter.	6 cm 3 cm  3 cm 6 cm P = 6 + 6 + 3 + 3 = 18 cm
	Compare the areas of two 2D shapes	Compare the areas of two 2D shapes to identify which is larger (or has more space inside).	Stack paper shapes on top of one another to compare their areas.  The square is larger.
	Compare the volumes/ capacities of two 3D shapes	Compare the capacities of two 3D shapes to identify which is larger (or holds more).	The box has a greater capacity. It is larger and can hold more than the can. 

Ruler

What it is

A ruler is a flat tool used to measure length, usually in centimeters. In some countries (including Liberia and Myanmar), length is measured in inches, which can also be shown on rulers.

Why it is used

Measurement of length is an important skill for everyday life. Children learn how to measure small objects using centimeters, for which a ruler is the most useful tool.

How to find it or make it

Real rulers should be used if possible. If they are not available, model rulers can be created using paper.

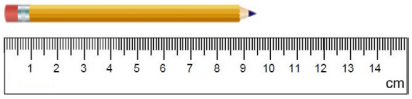
Teacher tip: When children begin to measure length, it is important that they place the object against the ruler starting at zero.

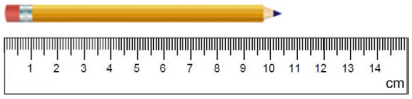
Placed correctly:

Not placed correctly:

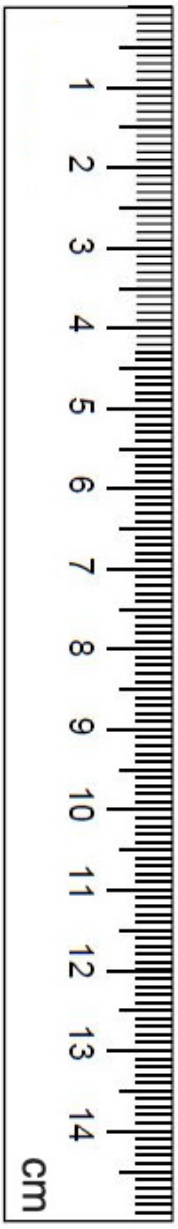
Teacher tip: In the early grades, children should measure to the nearest centimeter (1 cm, 2 cm, ...). Objects often measure in between these units (for example, 1.8 cm or 2.4 cm). Guide students to find the nearest unit.

These pencils are not exactly 10 cm, but they are both around 10 cm. Children should measure them as 10 cm.





Teacher tip: Length can also be measured using other tools, such as the measuring tapes used by tailors. Students may benefit from also learning to measure length with these tools, especially if they are familiar with them from their everyday life.



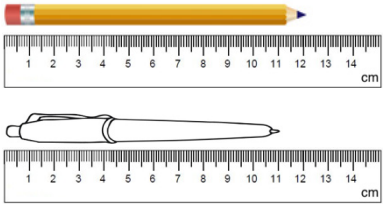
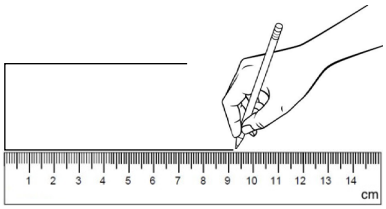
This ruler is printed approximately to scale.

A note for implementers

Programs should provide real rulers if possible. If it is not possible, rulers may be created using paper. They may be provided in teacher's guides or handouts, which can be printed or photocopied and cut out. These should be designed and printed to scale as best as possible. Given paper size, this means they will be shorter than standard rulers (which are 30 cm). Rulers can also be printed in student books. Students may place a small object along the ruler in their book to measure it.

If printing is not available, teachers can cut strips of paper and draw marks 1 centimeter apart. It is better to avoid having children create rulers, as it may be difficult for them to ensure the markings are equal distance apart, which is an important characteristic of a ruler.

What is it used for

Domain	Competency	Description	Example
Measurement	**Measure length using standard units**	Use a ruler to measure an object in centimeters.	 The pencil is 10 cm long.
	Compare the lengths of objects	Use a ruler to measure two objects and identify which is longer (or shorter).	 The pencil is 12 cm and the pen is 11 cm. The pencil is longer than the pen.
Geometry	**Draw 2D shapes**	Use a ruler to draw shapes accurately (e.g., make straight lines, make lines of a specific length).	A student uses a ruler to draw a rectangle neatly: 

Model Clock

What it is

A model clock (also called a clock chart) is a clock face with adjustable hands that can be made from paper materials.

Why it is used

Using a clock face will allow students to practice telling time with an analogue clock, an important skill for everyday life. They also become familiar with time concepts that are used in everyday life and conversation, such as half hours and quarter hours.

How to find it or make it

Making a model clock requires:

- A cardboard circle with the numbers 1–12
- A short arrow and a long arrow (hands) cut from thick paper or cardboard
- A method of attaching the hands (such as a pin, tack, or toothpick)
- Tape

The hands are attached by pushing a tack, pin, or similar object through the center of the face and both hands. Make sure that the hands can rotate. Any pointed ends should be secured so that they cannot poke and injure children. This can be done by attaching something (such as a ball of tape or piece of cardboard) onto the sharp point and taping over it.

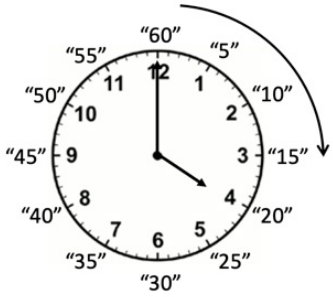
It is better to have a model clock with hands that resemble a real clock and can be manipulated. However, there are other options if this is not possible:

- Draw a model clock face on the board. Draw the hands with chalk to show a time; erase and repeat.
- Use a real analogue clock by rotating the dial to show a time.

Teacher tip: In the early grades, the second hand is usually not taught or needed on a model clock.

What is it used for

Domain	Competency	Description	Example
Time (measurement)	**Read a clock to the hour**	Read an analogue clock to the hour, and say the time or write it with numbers.	What time is it? 3:00 or "three o'clock" 
	Read a clock to the half hour	Read an analogue clock to the half hour, and say the time or write it with numbers.	What time is it? 4:30 or "four thirty" 

Domain	Competency	Description	Example
	Read a clock to the quarter hour	Read an analogue clock to the quarter hour, and say the time or write it with numbers.	What time is it? 1:15 or "one fifteen" or "a quarter after one" 
	Read a clock using groups of 5 minutes	Read an analogue clock to a 5-minute interval, and say the time or write it with numbers.	What time is it? 5:20 or "five twenty" 
	Read a clock to the minute	Read an analogue clock to the minute, and say the time or write it with numbers.	What time is it? 12:17 or "twelve seventeen" 
	Identify that 1 hour is 60 minutes	Recognize that 1 hour is composed of 60 minutes.	Count the 60 minutes on a clock by 5. 
	Solve real-world problems that involve elapsed hours	Identify the number of hours that have elapsed between two given times, or identify the time after a given number of hours has elapsed.	*Michael started working at 8:00 and finished at 11:00. How long did he spend working?* Show 8:00 on the clock and move the hour hand forward to 11:00 while counting: 1, 2, 3 hours.
	Solve real-world problems that involve elapsed minutes.	Identify the number of minutes that have elapsed between two given times, or identify the time after a given number of minutes has elapsed.	*Musa started working at 9:15 and worked for 20 minutes. At what time did he finish?* Show 9:15 on the clock and move the minute hand forward 20 minutes while counting (5, 10, 15, 20), until it reaches 9:35.

Calendar

What it is

A calendar may show one month, an entire year, or part of a year. It is generally labeled with the year (e.g., 2024), months (January, February, ...), dates (1, 2, ..., 31), and days of the week (Monday, Tuesday, ...).

October 2024

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
30	01	02	03	04	05	06
07	08	09	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	01	02	03

Why it is used

Using a calendar allows students to practice identifying the date and understanding how time passes and is measured. Students also become familiar with time concepts that are used in everyday life and conversation, such as date, month, and day of the week.

How to find it or make it

A calendar can be purchased, created, or accessed electronically. A calendar for only one month can be easily drawn on the board or a poster.

2024

JANUARY

Su	Mo	Tu	We	Th	Fr	Sa
31	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	1	2	3
4	5	6	7	8	9	10

FEBRUARY

Su	Mo	Tu	We	Th	Fr	Sa
28	29	30	31	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	1	2
3	4	5	6	7	8	9

MARCH

Su	Mo	Tu	We	Th	Fr	Sa
25	26	27	28	29	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	1	2	3	4	5	6

APRIL

Su	Mo	Tu	We	Th	Fr	Sa
31	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	1	2	3	4
5	6	7	8	9	10	11

MAY

Su	Mo	Tu	We	Th	Fr	Sa
28	29	30	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	1
2	3	4	5	6	7	8

JUNE

Su	Mo	Tu	We	Th	Fr	Sa
26	27	28	29	30	31	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	1	2	3	4	5	6

JULY

Su	Mo	Tu	We	Th	Fr	Sa
30	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	1	2	3
4	5	6	7	8	9	10

AUGUST

Su	Mo	Tu	We	Th	Fr	Sa
28	29	30	31	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
1	2	3	4	5	6	7

SEPTEMBER

Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	1	2	3	4	5
6	7	8	9	10	11	12

OCTOBER

Su	Mo	Tu	We	Th	Fr	Sa
29	30	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	1	2
3	4	5	6	7	8	9

NOVEMBER

Su	Mo	Tu	We	Th	Fr	Sa
27	28	29	30	31	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
1	2	3	4	5	6	7

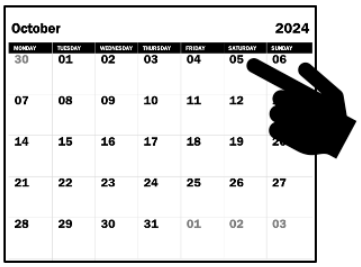
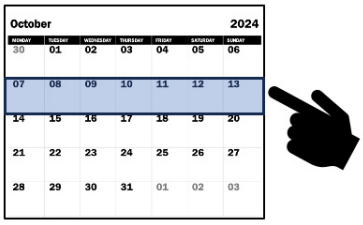
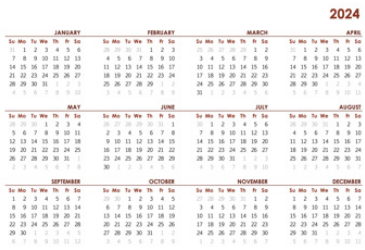
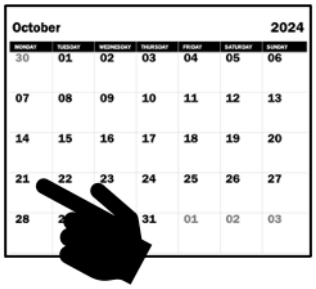
DECEMBER

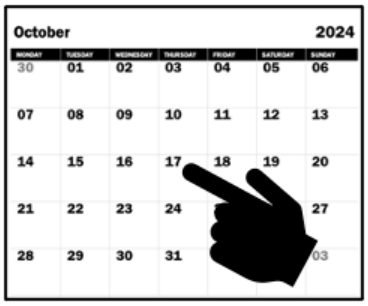
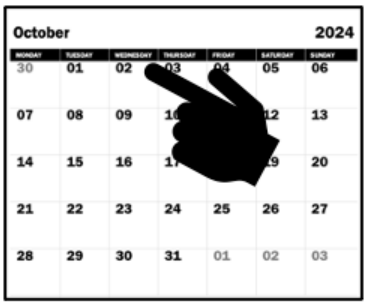
Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	1	2	3	4
5	6	7	8	9	10	11

Make sure that the calendar used is appropriate for the local context. For example, depending on the country, Sunday or Monday may be considered the first day of the week.

Teacher tip: Consider different calendars that you may find in your community and share them with students. Sometimes they are included in students' exercise books. Electronic calendars can often be found on a phone or tablet.

What is it used for

Domain	Competency	Description	Example
Time (measurement)	**Identify the days of the week**	Identify and read the days of the week in a calendar.	 "Saturday"
	Identify that there are 7 days in one week	Count the 7 days in various weeks on the calendar.	 "1, 2, 3, 4, 5, 6, 7 days"
	Identify the months of the year	Identify and read the months of the year in a calendar.	 "February"
	Identify that there are 12 months in 1 year	Count the 12 months of the year on the calendar.	 "1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 months"
	Read calendar dates	Identify the year, month, and day for a given date.	"What day is this?"  "October 21st 2024."

Domain	Competency	Description	Example
	Find a given date in a calendar	Identify the date on a calendar when given a month and day.	"Find October 17th on the calendar."  "Here it is."
	Identify the day of the week for a given date	Identify the day of the week on a calendar when given a month and day.	"October 2nd falls on what day of the week?"  "Wednesday"

Model Money

What it is

Model money (also called "fake money" or "play money') is printed or drawn on pieces of paper to represent real money.

Why it is used

Model money can be used to teach money topics in the curriculum, as well as other topics in numbers and operations. Many children are already familiar with counting or performing operations with money, and model money links the math that children learn in the classroom to their informal learning in the community.

How to find it or make it

Draw rectangles for paper notes and circles for coins. Label each note or coin with a value. The numbers and currency symbols (e.g., $, ₦, £) should match the local currency. Cut the pieces of paper out so that they can be stacked and counted like real money.

Note: In some countries, it is illegal to photocopy or print pictures of money. In these contexts, it is better to create a "cartoon" version or simply type/write the value of each note.

Example:
5 Liberian dollars

5 LD

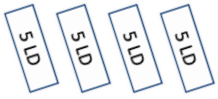
Teacher tip: When working with model money, have students role-play situations from everyday life and perform actions that same way they would in the community (e.g., counting money, giving change).

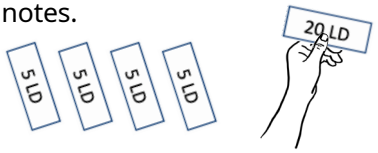
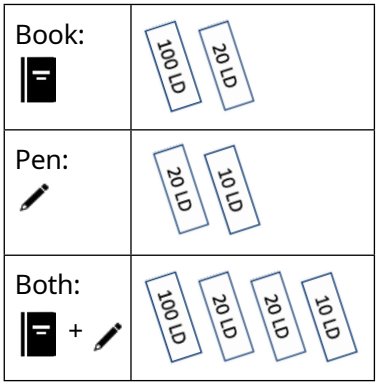
A note for implementers

Most curricula include money as a specific topic and list money values that children should learn at each level. In some cases, money may be used to teach other topics as well.

The decision whether to use money to teach other math topics should be made based on the values of the local currency. For example, if the local currency has a note worth 5 shillings, it can be used to teach skip counting (e.g., 5, 10, 15, ...). However, sometimes the currency does not have small notes, and the notes are worth large amounts such as 500 or 10,000. In that case, money should not be used to teach math topics until children have reached an appropriate level.

What is it used for

Domain	Competency	Description	Example
Money (measurement)	**Identify values of the local currency**	Identify and state the value of each note or coin.	"How much is this?" 10 LD "10 LD" 50 LD "50 LD"
	Count currency of the same value	Skip count notes or coins of the same value to find the total value of a set.	 "5, 10, 15, 20"

Domain	Competency	Description	Example
Money (measurement) *continued*	**Count currency of different values**	Count on by the value of each note or coin (generally from largest to smallest) to find the total value of a set.	 "20, 30, 40, 50, 55"
	Identify equivalent amounts	Identify equivalent amounts of currency using notes or coins of different values.	Show me this much using 5 LD notes. 
	Find total cost in a transaction	Find the total cost of multiple items by counting out a set of money for each item and then combining and counting them.	One book costs 120 LD and one pen costs 30 LD. Find the total cost of buying both.  The total cost is 150 LD.
	Find change in a transaction	Find the change in a transaction by identifying equivalent amounts of currency and "taking away" the cost of the item.	Hawa bought a drink for 50 LD. If she gave the seller 100 LD, how much change did she receive?  Hawa's 100 LD note is equal to two 50s. The value of the cola is 50, and the change is 50.

Everyday Objects for Measurement

What they are

Everyday objects from the school or community can be used to teach measurement competencies, such as length, weight, and capacity.

Why they are used

Everyday objects can be used to measure and compare length, weight, and capacity/volume. They bring math topics to life, helping activate and formalize children's informal learning from their homes and the community. Using everyday objects can also make lessons more engaging and memorable.

How to find them or make them

The materials that are used in the math classroom will depend on the local community. Many children will be familiar with some methods of measurement from their everyday lives. These methods can be referenced, and the materials brought to class, to demonstrate measurement and link the content of the curriculum to everyday life.

These are some examples of ways that measurement is used in the community, and of the materials that might be used:

- A market seller uses empty containers (e.g., tin cans) to measure the volume of dry goods (e.g., flour, beans).
- Sellers use empty containers (e.g., water bottles, mayonnaise jars) to measure the volume of liquid (e.g., petrol, palm oil).
- A tailor uses a measuring tape to measure a person's body and fabric in centimeters.
- A butcher uses a scale to measure the weight of meat in grams or kilograms.

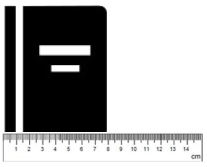
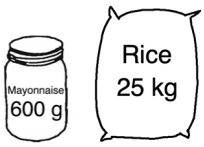
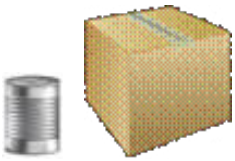
Children may not be familiar with standard units for measuring weight (e.g., grams, kilograms) or capacity (e.g., milliliters, liters). However, these units can often be found on the labels of empty containers in the community. Teachers or students can bring these containers to class to demonstrate and explain each unit of measurement and to compare the volumes and weights of different goods.

These are some examples of units of weight and capacity that might be found in the community:

- Rice bags with weight labeled 25 kg
- Juice bottles with 1 L capacity
- Water bottles with 500 mL or 1.5 L capacity

Teacher tip: In the early grades, children should measure to the nearest unit (1 cm, 2 cm, ...). This is true for non-standards units too. For example, children may be asked to measure a notebook using beads, or find how many cups of water a bucket can hold. Guide students to find the nearest whole unit (for example, 10 beads or 7 cups of water).

What they are used for

Domain	Competency	Description	Example
Length (measurement)	**Measure length using non-standard units**	Use real objects (e.g., hands, beads) to measure an object.	Measure a notebook with a bead string:  –oooooooooo– The notebook is 10 beads long.
	Measure length using standard units	Use a ruler to measure an object in centimeters.	Use a ruler to measure a notebook:  The notebook is 8 cm wide.
Weight (measurement)	**Compare weights of objects**	Lift different objects to identify which is heavier.	Which do you think is heavier, this notebook or this stack of books? Pick them up to find out. 
	Identify units of weight	Identify units of weight (e.g., grams, kilograms) on labels found in the community.	How much do these products weigh? 
Capacity (measurement)	**Compare the volumes/ capacities of containers**	Compare the capacities of two containers to identify which is larger (or holds more).	The box has a greater capacity. It is larger and can hold more than the can. 
	Use non-standard units to measure capacity	Measure the capacity of a container using a smaller container as a unit of measurement.	How many cans of water can this pot hold? Let's find out using water.  Fill the pot with cans of water, while counting, until it is full.

Domain	Competency	Description	Example
	Use standard units to measure capacity	Measure the capacity of a container using a smaller container that has a known capacity with standard units (e.g., a 1-liter container).	How many liters of water can this pot hold? Let's find out using a 1-liter container.  Fill the pot with liters of water, while counting, until it is full.

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