Grade 1 Mathematics
Key Concepts and Skills
A Parents' Guide

Below are the key mathematics concepts that we hope your child will master by the end of Grade 1.

Number Concepts

Counting Sequence

1. Your child should understand that there is a pattern to counting within each decade. For example, when counting within the 20s we say 21, 22, 23, 24, 25, and so on. When counting within the 50s we say the same sequence, 51, 52, 53, 54, 55, and so on. Your child should be able to start at any decade (10, 20, 30, 40, 50, 60, 70, 80, or 90) and count on from the starting number and extend this pattern across 100 to 120.

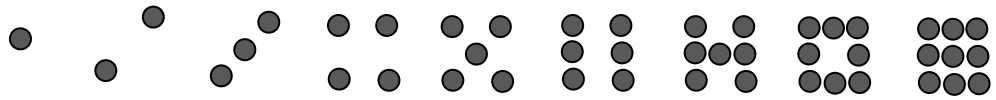
Counting Objects

2. Your child needs to be able to accurately count up to 120 objects and represent with the appropriate written numeral. He or she should be able to accurately count smaller collections of objects if placed in a single row, in several rows, in a circle or in a scattered arrangement. He or she should be able to accurately count the objects by moving them or without moving them.

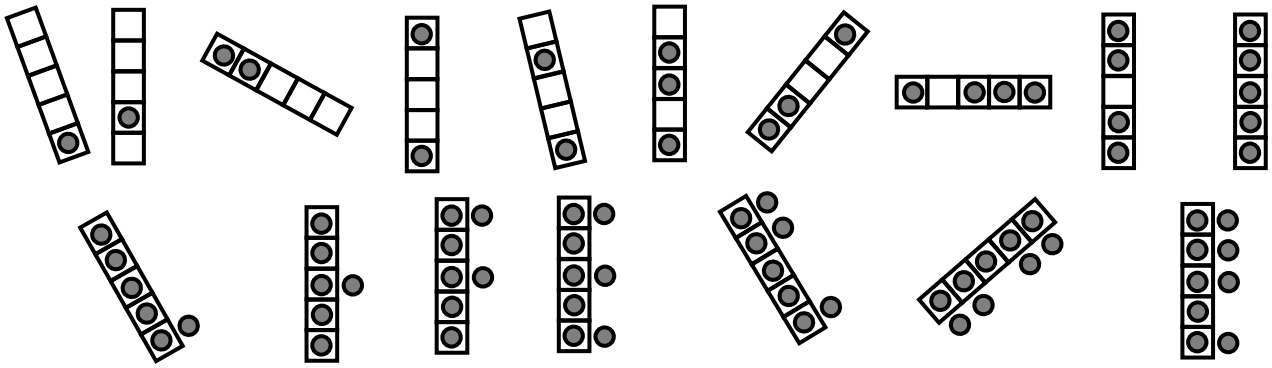
Subitize Numbers

Subitize may be an unfamiliar term but many of us do this without knowing its name. For example, when you play a game involving dice, do you recognize a 6 without counting the pips? That is subitizing. Recognizing and naming a quantity without counting the individual objects.

3. Your child should be able to subitize all of the domino dot images from 1 to 9.

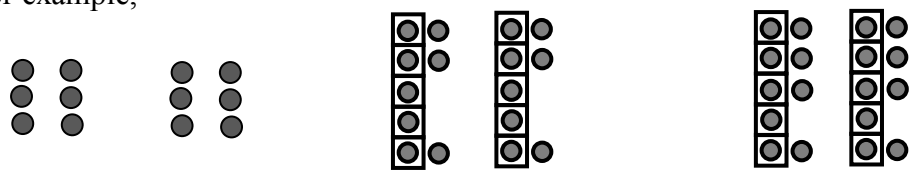


4. Your child should be able to subitize 5-frame images from 1 to 9 (in any arrangement and turned in a variety of ways). For example,



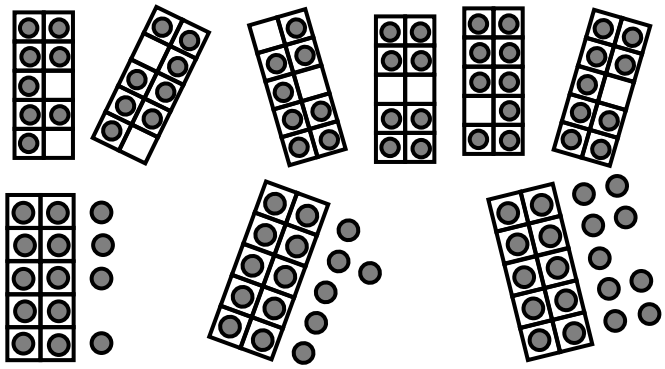
Your child should be able to identify how many more to make 5 or how many more than 5 a number is (such as 8, 8 is 3 more than 5).

5. Your child should be able to subitize double domino images and double 5-frame images. For example,



The double 5-frame images help children quickly find the total by doubling the fives to get 10 and then doubling the "extras". With the double 8 image above, double 5 is 10 and double 3 is 6, 10 and 6 is 16. In grade 1 we use these images to introduce the addition doubling strategy. In grade 3 we use them to help children learn the Distributive Property for Multiplication.

6. Your child should be able to subitize 10-frame images from 1 to 19 in any arrangement and turned in a variety of ways. For example,



Your child should be able to identify how many more are needed to make 10, combinations to make 10, and how many more than 10. In grades 1 and 2 we use these images to build the Bridge to 10 addition strategy (Associative Property). In grade 2 we also use these images to help your child learn how to count back change. In grade 3 we use them to build images for the multiplication facts. In grades 3-5 we use similar images to build the Distributive Property for multiplication. In grades 4 and 5 we modify the images slightly for work with decimals.

Comparing Quantities

7. Given 2 numbers, your child should be able to tell which is larger, smaller, or the same.
8. Many children think that the "=" sign means, "now write the answer." Your child needs to understand that equality, "=", means "same as." We can write 2 + 3 = 5 and 5 = 2 + 3. It is important that your child reads the equations using words such as "join" and "put together" for the "+" sign and "same as" or "is" for the "=" sign. (e.g., 2 joined with 3 is the same as 5. 5 is the same as 2 put together with 3.)

Place Value

9. Your child should be able to show that a teen number has a group of 10 and some "extras." For example, if given 16 beans your child should be able to make a group of 10 beans and show the 6 extras. He or she should be able to state that there is one 10 and 6 extras (ones).
10. Correctly writing teen numbers is very challenging for many children. Hearing the four first when saying fourteen leads children to write fourteen as 41 instead of 14. Some children still struggle with this in 1st grade. Your child should be able to correctly write teen number numerals by the time he or she leaves grade 1.

11. Your child should be able to show that a 2-digit number has groups of 10s and some "extras." They need to understand that the way in which we write a 2-digit number (e.g., 36) shows the greatest number of tens we can make with a number. For example, we can make 36 with 3 tens and 6 ones. Later we expect your child to understand that 36 can also be made with 2 tens and 16 ones (think of dimes and pennies, 2 dimes and 16 pennies). We can make 36 with 36 ones (36 pennies). We can make 36 with 1 ten and 26 ones.
12. Given any number, your child should be able to name the number that is 1 more, 10 more, and 1 fewer. Given any 2-digit number your child should be able to name the number that is 10 fewer.

Addition and Subtraction

Addition Concepts

1. Your child should be able to illustrate and solve math stories involving putting things together and adding to a starting quantity where the unknown is in different positions. Your child should be able to illustrate with simple drawings and objects and use a blank, box, or some other symbol for the unknown number. He or she should also be able to act out the stories. For example,
    - Result is unknown: *Dylan had 8 toy cars. He got 3 more for his birthday. How many toy cars does Dylan have now?* In this problem your child is determining the result of putting the two groups together. 8 + 3 = ___
    - Start unknown: *Dylan had some toy cars. He got 3 more for his birthday. Now he has 11 toy cars. How many did he have before his birthday?* In this problem we know how Dylan's number of cars changed (He got 3 for his birthday). We know how many he has after his birthday. Your child is to determine how many cars Dylan started with (before his birthday). ___ + 3 = 11
    - Change unknown: *Dylan had 8 toy cars. He got some more for his birthday. Now he has 11 toy cars. How many toy cars did he get for his birthday?* In this problem we know how many cars Dylan started with. We know how many cars he had after his birthday. Your child is to determine how the number of cars changed (how many he got for his birthday). 8 + ___ = 11
2. Your child should be able to tell a putting together or adding to story when given a problem such as 4 + 5 or when given an illustration.
3. Your child should be able to put together two, decade numbers (10, 20, 30, 40, 50, 60, 70, 80, 90) to make sums less than 100 using pictures such as ten frames or rods of 10. For example, your child should be able to combine 20 and 30 to get 50. She or he should understand that if you know that 2 + 3 = 5, you can use this known fact to find 20 + 30.
4. Your child should be able to put together a 2-digit number and a decade number such as 34 and 50. This extends his or her ability to put together two, decade numbers. Your child should begin to understand that when you put quantities together, tens combine with tens.
5. Your child should be able to put together a 2-digit number and a 1-digit number such as 34 and 5. Your child can count up to combine, use pictures such as 10-frames to represent, or use rods of 10 cubes and extra cubes. Your child should begin to understand that when you put quantities together, ones combine with ones.

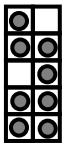
Note: Notice that learning mathematics is not the memorization of facts, rules, and tricks. It is having strong visual images (such as 5-frame, 10-frame, domino, etc.) of number and then looking for patterns when combining and separating these quantities.

Addition Strategies

Your child should know and use a variety of addition strategies for adding.

Combinations for 10

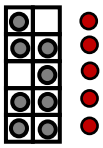
1. Your child should know numbers that go together to make 10. We use a 10-frame to help with this. For example, if shown



your child understands that 2 more are needed to make 10, so 8 and 2 is 10 (8 + 2 = 10).

Bridge to 10

2. The bridge to 10 strategy is a powerful addition strategy for your child to know. In grade 1 your child should know that another way to think of 9 + 4 is as 10 + 3 or 8 + 6 as 10 + 4. We use a 10-frame to help with this. For example, if shown



your child understands that he or she can fill the empty sections within the 10-frame by sliding 2 of the red "chips" over. So, 8 and 5 is the same as 10 and 3, 8 + 5 = 10 + 3.

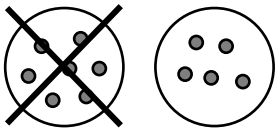
This strategy is important because it introduces your child to prealgebra techniques for computing. Although we hope that your child is fluent with their addition facts (1-digit + 1-digit numbers), we also need them to know this strategy and use with simple computations so that they can later use it with much larger numbers. In grade 2 your child will use this strategy to solve problems such as 38 + 6 knowing that it is the same as 40 + 4. They can link 38 + 16 to 40 + 14. When they reach grade 5 they will use the strategy to solve problems such as 3.8 + 1.6 linking the problem to 4.0 + 1.4. We call it the Bridge to 10 strategy in grade 1. In later grades your child will learn it is the Associative Property. For our example above, we thought of the 5 red dots as the same as 2 and 3. Instead of associating the 2 with the 3, we moved 2 of the dots to associate with the 8.
8 + 5 = 8 + (2 + 3) = (8 + 2) + 3.

Doubles and Near Doubles

3. Doubles and near doubles (doubles plus 1, doubles minus 1, doubles plus 2, doubles minus 2) are also important addition strategies for your child to know. In grade 1 your child will double the numbers 1 to 9 (e.g., double 8 is 16, double 6 is 12). He or she may also double multiples of 10 (e.g., double 40 is 80, double 30 is 60). It is important for your child to name the double (For example, when shown 7 + 7 your child can name it as double 7). A near double is a problem such as 7 + 8. It is important for your child to know that this is double 7 and 1 more or 1 fewer than double 8. As your child moves up through the grades they will use these strategies to quickly solve problems such as 199 + 199 (or 2 x 199). They think of this problem as double 200 minus 2. 56 + 56 (or 2 x 56) is double 50 plus double 6 or 112.

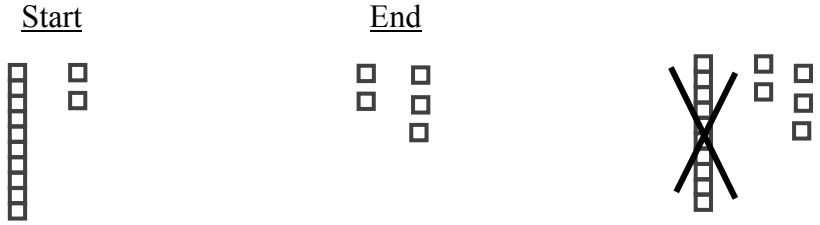
Subtraction Concepts & Strategies

1. Your child should be able to separate up to 20 objects into 2 groups in more than one way. For example, if given 16 objects, your child can separate them into 15 and 1, 6 and 10, 5 and 11, 8 and 8, 9 and 7, 12 and 4 objects. He or she can draw pictures to match.
2. Your child should understand that subtraction can represent removal. He or she should be able to draw pictures to match. For example, 12 – 7 can be represented as,

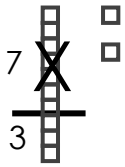


3. Your child should understand that there are many ways to remove a 1-digit number from a 2-digit number. Your child should be flexible in the ways that they remove and represent this removal. For example, suppose we begin with 12 as a rod of 10 and 2 extras. We ask your child to remove 7. Below are 3 different examples of ways that your child might solve 12 remove 7 (12 – 7).

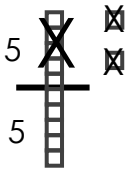
   Example 1: Remove the 10 and give back 3. This is similar to paying for a 7¢ item with a dime. You would get 3¢ back. In grade 2 your child will learn that this is a round and adjust strategy.



   Example 2: Cut the 10 (break the rod of 10) into 3 and 7. Remove the 7.



   Example 3: Remove the 2 ones that you already have. Cut the 10 (break the rod of 10) into 5 and 5. Remove one of the 5s.

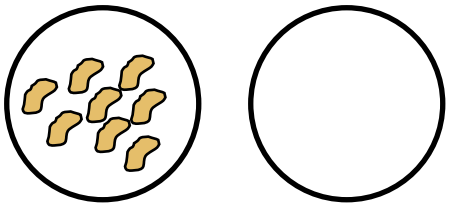


4. Your child should understand that subtraction can be used for comparisons. Suppose your child is asked to solve the following problem.

   Payton collected 17 cans for the food drive. Liam collected 12 cans. How many more cans than Liam did Payton collect?

   He or she can represent this comparison as 17 – 12 or as 17 = 12 + ___.
5. Your child should understand that he or she can use what they know about addition to find the answer to a subtraction problem (think addition).

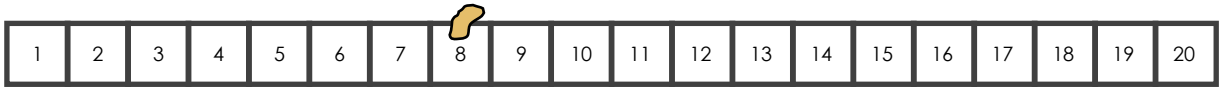
6. Counting on is another strategy for solving subtraction problems. This is sometimes done with finding the missing part. For example, we can think of 12 – 8 as 8 + ___ = 12. We know that one part is 8 (as shown below).



Your child should understand that he or she can add beans to the empty plate counting on from 8 to 12. The amount on the missing plate is the missing part (addend).

$$8 + \boxed{4} = 12$$

7. The counting on strategy can also be represented as jumps on a number track (later on a number line). To find 8 + ___ = 12, your child should understand that he or she would start with a bean on 8 and find the number of jumps it takes to get to 12.



The number of jumps is the missing part (addend).

$$8 + \boxed{4} = 12$$

8. Your child should be able to illustrate math stories involving taking from or taking apart a starting quantity where the unknown is in different positions. Your child should be able to illustrate with simple drawings, using objects, and use a blank, box, or some other symbol for the unknown number. He or she should also be able to act out the stories. For example,
    - Result unknown: *Adriana has a dozen cookies. She gives 3 cookies to her brother. How many cookies are left?* In this problem your child is to determine the result of taking from the starting quantity of 12. 12 – 3 = ___
    - Start unknown: *Adriana has some cookies. She gives 3 cookies to her brother. She now has 9 cookies. How many did she have before giving cookies away?* In this problem we know how the number of cookies changed (she gave 3 to her brother). We know the number of cookies (the result) that she had after giving cookies away. Your child is to determine the number of cookies Adriana started with. ___ – 3 = 9
    - Change unknown: *Adriana has a dozen cookies. She gives some cookies to her brother. She now has 9 cookies. How many did she give to her brother?* In this problem we know how many cookies Adriana started with. We know how many she ended with. Your child is to determine how the number of cookies changed (how many she gives to her brother). 12 – ___ = 9

9. Your child should be able to illustrate math stories involving comparisons where the unknown is in different positions. Your child should be able to illustrate with simple drawings, using objects, and use a blank, box, or some other symbol for the unknown number. These problems are often represented as missing addends. He or she should also be able to act out the stories. For example,
    - Result unknown: *Jayden and Paisley are having a book reading contest. Jayden has read 14 books. Paisley has read 12 books. How many more books has Jayden read?* In this problem your child is to determine the result of comparing two quantities. 14 – 12 = ___ or 14 = 12 + ___
    - Part unknown: *Jayden and Paisley are having a book reading contest. So far, Jayden has read 2 more books than Paisley. If Paisley read 12 books, how many books has Jayden read?* In this problem your child is to determine one of the missing parts of the comparison. ___ = 12 + 2
    - Other part unknown: *Jayden and Paisley are having a book reading contest. So far, Jayden has read 14 books. Paisley has read 2 fewer books. How many books has Paisley read?* In this problem your child is to determine the other missing parts of the comparison. ___ = 14 – 2
10. Your child should be able to tell a taking from, taking apart or comparison story problem when given a problem such as 9-5 or when given an illustration.
11. Your child should be able to remove a decade number (e.g., 10, 20, 30, 40, etc.) from a 2-digit number such as 64 remove 20. Your child should begin to understand that when you remove a decade number from a 2-digit number you're removing multiples of 10.

Measurement

Time

1. It is still important for your child to accurately tell time to the hour and half hour on an analog clock. An analog clock is the clock that is divided into 12 equal sections. Sometimes the sections are numbered 1 to 12, with 12 at the top of the clock. Sometimes only some of the sections are labeled (e.g., 3, 6, 9, and 12). Some important things for your child to notice.
    - We use "o'clock" to name on the hour time. On the hour, the minute hand is pointed to the 12.
    - At half past the hour, the hour hand is halfway between 2 numbers on the clock.

    The more your child practices telling time, the better they will get.

Measuring Length

In grade 1 we build the foundation for measuring objects. We save the use of measurement tools such as rulers for later grades. In grade 1 your child is given enough of the same sized measurement item (e.g., new crayons, markers, square tiles) to measure the length of an object.

1. Your child should be able to compare the length of 2 objects and identify the object that is longer or shorter.
2. Your child should be able to order 3 objects by length. He or she should be able to identify the longest item or the shortest item.
3. Your child should understand that an object can be longer without being long, shorter without being short, taller without being tall, etc.
4. Your child should be able to place the measurement items (e.g., new crayons, markers, square tiles, etc.) length to length without gaps or overlaps to equal the length of the object

being measured. He or she would then state how many units long the object measures, (e.g., 5 crayons long).

5. Your child should begin to understand that the larger the units you measure with, the fewer you need. For example, you need fewer giant steps to cross the room than heel to toe steps.

Simple Graphs

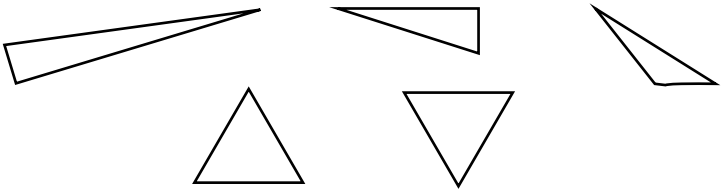
1. Your child should be able to correctly place a picture, block, counter, or another item in a graph that has 2 or 3 categories. For example, if asked to sort 3 colors of blocks onto a grid, your child would be able to correctly place the blocks by color. If asked his or her favorite fruit when given 3 choices, your child would be able to correctly place a picture of the favorite fruit in the correct category.
2. Your child should be able to notice and describe the characteristics of different categories in a simple graph. For example, how many children like apples, how many children like bananas, how many children like grapes, which has more, which has fewer, or if two groups have the same number.

Geometry

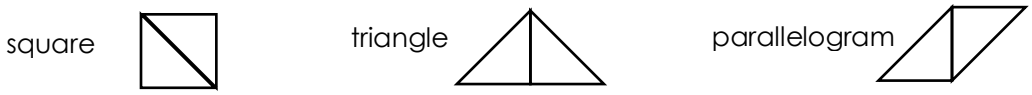
3D & 2D Shapes

1. It is important for your child to understand that the objects we encounter in our world are 3D objects. Sorting grocery items and other real-world objects (balls, cones, etc.) in kindergarten helps children explore the attributes of 3D shapes. In grade 1 we continue to look for these objects in our world. We introduce the terms such as cylinder, cone, sphere, and rectangular prism, and hope your child will use them this year.
2. It is important for children to understand that 2D objects have no thickness. We introduce this concept by having children make "footprints" of 3D shapes in playdoh or as paint prints. We begin to develop this concept in kindergarten. We introduce rectangles before squares so that children understand that squares are special rectangles. They are rectangles with equal sides.
3. It is important for your child to understand attributes that are defining attributes of shapes and those that aren't. For example, we can turn a square in any orientation and it is still called a square. The way in which the shape is turned is not a defining attribute. The fact that it is a rectangle with equal sides is a defining attribute.

Triangles can be turned in any orientation and can have sides with different lengths. They do not have to sit on a side. Orientation and lengths of sides are non-defining attributes. Having 3 sides that meet and don't overlap (closed) is a defining attribute.



4. It is important for your child to be able to make new shapes using 2D shapes or 3D shapes (composite shapes) and then use these composite shapes to make new designs. For example, we can take 2 right triangles and make several new shapes (composite shapes).



5. In grade 1 we have children begin to work with fractions by having them cut a shape into 2 equal pieces or 4 equal pieces. It is important for your child to be able cut a shape into two (or 4) pieces in more than one way as well as draw pictures to match the way that he or she cut the shape.
6. It is important for your child to correctly use terms such as halves, fourths, quarters, half of, fourth of, quarter of.