



Ohio's Learning Standards-Clear Learning Targets

Math Kindergarten

K.CC.1

Count to 100 by ones and by tens.

Essential Understandings

- Know number names and the count sequence.
- Know there is a standard order to counting.

Common Misconceptions

Because of the lack of patterns in the numbers one through twelve, some students struggle when they get to the “teen” numbers. Students will say things such as “three-teen” for thirteen. Counting out loud often with students helps them develop the sequence for the words and see the patterns in the numbers. Use books, songs and counting chants to help the development of counting skills.

Academic Vocabulary/Language

- count
- number
- *number words 1 - 20*
- ones
- tens

Learning Targets

I know the number names and count sequence and can count to 100 by ones starting at 1
I can count to 100 by tens starting at 10.

Assessment of Learning

- Students will count a wide variety of objects.
- Students will count to answer the question, “How many?”
- Students will touch or move objects as they count to develop one-to-one correspondence.
- Students will have the counting sequence memorized before they understand cardinality, or that the last number said indicates the total amount in the set.
- Counting itself is a rote procedure. Students may have the counting sequence memorized without an understanding of the meaning of counting.

Sample Questions/Activities

1. Give students a pile of math tools (e.g., counters, snap cubes, centimeter cubes, etc.). Say to students, “Grab a handful of math tools. How many math tools did you grab?”
2. 5 kids are sitting at the Blue Table in Miss Smith’s kindergarten class. If Miss Smith gives each kid at the Blue Table 1 eraser, how many erasers did Miss Smith pass out to the Blue Table? Why do you think so?
3. The students in Mrs. Graham’s kindergarten class each held up their 10 fingers and Mrs. Graham asked how many fingers were held up in all. Emma said she could count the fingers by counting 1, 2, 3, and so on until she counted them all. Maddie said she could count the fingers 10, 20, 30 and so on until she counted them all. Who is correct? Why do you think so?

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

Students view counting as a mechanism used to land on a number. Young students mimic counting often with initial lack of purpose or meaning. Coordinating the number words, touching or moving objects in a one-to-one correspondence may be little more than a matching activity. However, saying number words as a chant or a rote procedure plays a part in students constructing meaning for the conceptual idea of counting. They will learn how to count before they understand cardinality, i.e. that the last count word is the amount of the set.

Students will have the counting sequence memorized before they have meaning attached to the numbers they say as they count. Memorization of this sequence will help students as they begin to understand number relationships and develop a strong number sense. Provide students with many opportunities to count objects by asking them to determine how many objects are in a set. Make connections for students between counting and examples in the real world. Encourage students to touch or move objects as they count, if possible, to help build the idea of one-to-one correspondence.

Connections Across Standards

Apply counting to addition and subtraction (K.OA.1-2, 5).

Pre K (Prior Grade Standard)

Count to 20 by ones with increasing accuracy.

1.NBT.1 (Future Grade Standard)

Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.



Ohio's Learning Standards-Clear Learning Targets

Math Kindergarten

K.CC.2

Count forward within 100 beginning from any given number other than 1.

Common Misconceptions

Some students might not see that you can start counting at any number. By having students count beginning at any number, they develop the understanding of counting and make connections with counting patterns.

Academic Vocabulary/Language

- count
- number
- forward

Essential Understandings

- Know number names and the count sequence.
- Counting can begin at any given number.

Learning Target

I can count forward starting at any number that is given to me from 1 to 100.

Assessment of Learning

- Students will understand that the counting sequence does not have to begin at 1.
- Students will understand that the counting sequence does not change.
- Students will have many opportunities to start counting at a number other than 1.

Sample Questions/Activities

1. Using a number cube or number generator, determine a starting number and have students begin counting
2. Put students into groups of 2-3. Give each group a set of number cards from 1-100. Have one student randomly select a number and begin counting until the other students say stop. Have another student in the group select a number and repeat.
3. Choose a number between 1 and 20 and display the number. Count out math tools (e.g., centimeter cubes, snap cubes, counters, etc.) to match the number and place the math tools in a cup. Then grab a handful of math tools and place them next to the number. Ask students, “How many math tools do we have in all?” Ask students to share their strategies for determining the total. Model for students how to count on to find the total (e.g., if 10 is the number written, students would count on “10...11, 12, 13, 14, 15, 16”). Repeat with other starting numbers and math tools.
4. Mr. Howard showed his student the following 5 frames and asked students how many circles they saw in all:



Oliver counted “1, 2, 3, 4, 5, 6, 7, 8” and said there were 8 circles in all. Jack counted “5...6, 7, 8” and said there were 8 circles in all. How could the two kids count in different ways but still get the same answer? Explain your thinking.

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

Counting on or counting from a given number conflicts with the learned strategy of counting from the beginning. In order to be successful in counting on, students must understand cardinality. Students often merge or separate two groups of objects and then recount from the beginning to determine the final number of objects represented. For these students, counting is still a rote skill or the benefits of counting on have not been realized. Games and activities that require students to add on to a previous count to reach a goal number encourage developing this concept. Activities where counting on is shown to be more efficient can help students to see why learning to count on is helpful. Frequent and brief opportunities utilizing counting on and counting back are recommended. These concepts emerge over time and cannot be forced.

Pre-K (Prior Grade Standard)

Count to 20 by ones with increasing accuracy.

1.NBT.1(Future Grade Standard)

Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.



Ohio's Learning Standards-Clear Learning Targets

Math Kindergarten

K.CC.3

Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).

Common Misconceptions
Some students might not see zero as a number. Ask students to write 0 and say zero to represent the number of items left when all items have been taken away. Avoid using the word none to represent this situation.

Academic Vocabulary/Language

- count
- number
- numeral
- *number words 0 - 20*
- how many
- zero

Tier 2

- show
- explain
- represent

Essential Understandings

- Know number names and the count sequence.
- The numeral symbol represents a quantity (including zero).

Learning Targets

I can write the numbers from 0 to 20.
I can identify the number of objects 0 to 20 by writing a numeral to represent the amount.
I can show/explain what a group of zero looks like.

Assessment of Learning

- Students will write numerals 0-20.
- Students will represent a set of objects by writing the corresponding numeral.
- Students will understand that a set of no objects can be represented with the number 0.
- Students will have many opportunities to write numerals, including writing numerals outside of the counting sequence.

Sample Questions/Activities

1. Give students a wide variety of writing tools (e.g., crayons, pens, markers, paint) and ask students to write different numbers from 0-20.
2. Give students a pile of math tools (e.g., counters, snap cubes, centimeter cubes, etc.). Say to students, “Grab a handful of math tools. How many math tools did you grab? Can you represent the total number by writing a numeral?”
3. Give students a whiteboard, dry erase marker and math tools. Say to students, “Write down any number from 1-20. Then create a set of math tools to match the number you wrote down.” After repeating a few times, ask students to grab no math tools and write the number to represent the total math tools in the set.
4. Mrs. Griffin counted the number of pencils in her desk drawer and wrote “4”. Then she found 2 more pencils hidden in the back of the drawer. What new number did Mrs. Griffin write to represent the total number of pencils she found in her drawer? Explain your thinking.

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

Like counting to 100 by either ones or tens, writing numbers from 0 to 20 is a rote process. Initially, students mimic the actual formation of the written numerals while also assigning it a name. Over time, children create the understanding that number symbols signify the meaning of counting. Numerals are used to communicate a quantity. Numbers have meaning when children can see mental images of the number symbols and use those images with which to think. Provide students opportunities to work with written numerals paired with pictures, representations of objects, and objects that represent quantities within the context of life experiences for kindergarteners. For example, dot cards, dominoes and number cubes all create different mental images for relating quantity to number words and numerals. These representations should include 0. Students need to know that 0 is the number of items left after all items in a set are taken away. Do not accept “none” as the answer to “How many items are left?” for this situation.

Connections Across Standards

Apply to the teen numbers (K.NBT.1).

Pre-K (Prior Grade Standard)

Identify and name numerals 1-9.

1.NBT.1 (Future Grade Standard)

Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.



Ohio's Learning Standards-Clear Learning Targets

Math Kindergarten

K.CC.4

Understand the relationship between numbers and quantities; connect counting to cardinality using a variety of objects including pennies.

- When counting objects, establish a one-to-one relationship by saying the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object.
- Understand that the last number name said tells the number of objects counted and that the number of objects is the same regardless of their arrangement or the order in which they were counted.
- Understand that each successive number name refers to a quantity that is one larger.

Essential Understandings

- A one-to-one relationship connects one object with one number name and one numeral.
- Each counted number stated includes all of the previous numbers in a counted set.
- The last number stated identifies the quantity in a set.
- When counting by ones, the next number in the sequence increases the quantity by one.

Common Misconceptions

Some students might think that the count word used to tag an item is permanently connected to that item. So when the item is used again for counting and should be tagged with a different count word, the student uses the original count word. For example, a student counts four geometric figures: triangle, square, circle and rectangle with the count words: one, two, three, four. If these items are rearranged as rectangle, triangle, circle and square and counted, the student says these count words: four, one, three, two.

Academic Vocabulary/Language

- number
 - number words
- 0 - 20

Tier 2

- count
- name
- find

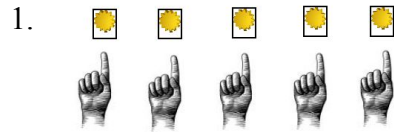
Learning Targets

I can count objects by saying the number names in the correct order.
I can connect one object in the count to only one number name and one numeral in the count.
I can illustrate that the last number name said is the total number of objects counted.
I can describe how changing the order of objects in a set does not change the total number of objects in a set.
I can apply my understanding of the counting sequence to reasoning that the next number in the sequence is 1 bigger than the number before it. I can use a model to explain my thinking.

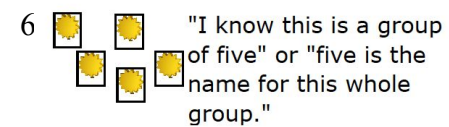
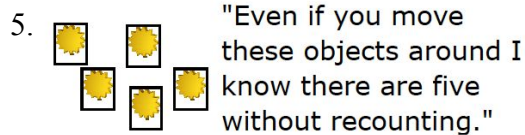
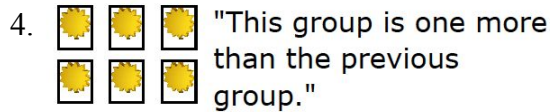
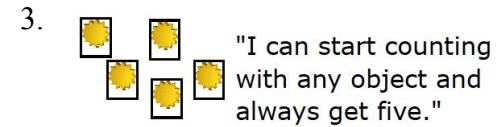
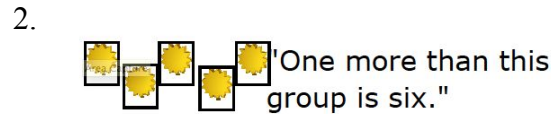
Assessment of Learning

- Students will count by saying the number names in the correct order.
- Students will model one to one correspondence by assigning one object to one number name while counting.
- After counting, students will understand that the total number of objects counted is the last number name said.
- Students will prove that changing the arrangement of objects or counting the objects in a different order does not change the total number of objects.
- Students will prove that as they say the counting sequence, the next number name represents 1 more than the number name said before.

Sample Question/Activities



"one", "two", "three", "four", "five"



7. Wayne counted the snap cubes on his desk and said there were 8 math tools in all. Wayne accidentally knocked all of the math tools off his desk and had to clean them all up and put them back on his desk. How many math tools are on Wayne's desk now? Explain your thinking.

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

One of the first major concepts in a student's mathematical development is cardinality. Cardinality is knowing that the number word that is said tells the quantity you have and that the number name you end on when counting represents the entire amount counted. The big idea is that a number represents an amount. This amount remains the same even if you rearrange the items or count the items in a different order. Until this concept is developed, counting is merely a rote procedure done when a number is needed. To determine if students have the cardinality rule, listen to their responses when you discuss counting tasks with them. For example, ask, "How many are here?" The student counts correctly and says that there are seven. Then ask, "Are there seven?" Students may count or hesitate if they have not developed cardinality. Students with cardinality may emphasize the last count or explain that there are seven because they counted them. These students can now use counting to find a matching set.

Connections Across Standards

Count a collection by ones (K.CC.1).

Count a collection of pennies (K.MD.3).

Pre-K (Prior Grade Standard)

Demonstrate one-to-one correspondence when counting objects up to 10.

1.NBT.1 (Future Grade Standard)

Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.



Ohio's Learning Standards-Clear Learning Targets

Math Kindergarten

K.CC.5

Count to answer "how many?" questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1-20, count out that many objects.

Essential Understandings

- Count to tell the number of objects.
- The quantity of a set does not change based on the arrangement, size, or type of objects (conservation).

Common Misconceptions

Some students might think that the count word used to tag an item is permanently connected to that item. So when the item is used again for counting and should be tagged with a different count word, the student uses the original count word. For example, a student counts four geometric figures: triangle, square, circle and rectangle with the count words: one, two, three, four. If these items are rearranged as rectangle, triangle, circle and square and counted, the student says these count words: four, one, three, two.

Academic Vocabulary/Language

- count
- number
- number words 0 - 20

Learning Targets

I can count a set of objects up to 20 in an organized arrangement.
I can count a set of objects up to 10 that are in a scattered arrangement.
I can count out the correct number of objects to make a group (up to 20).

Assessment of Learning

- Students will answer the question “How many?” by counting up to 20 objects arranged in a line, an array, or in a circle.
- Students will answer the question “How many?” by counting up to 10 objects that are scattered.
- When given a number, students will count out objects to match the number.

Sample Question/Activities

1. Give students math tools, such as counters, snap cubes, centimeter cubes, etc. Use a number cube or number generator to determine a target number between 0-20. Ask students to represent the target number using math tools.
2. Create sets of 0-10 objects and place them in small cups or bags. Have students dump out the set onto their desk and count to find out how many objects are in the set. Have students pair up with a partner and have students check each other’s counting.
3. Mr. Kline arranged chairs in an array for his violin students to practice. He made 3 rows of chairs with 5 chairs in each row. How many chairs did Mr. Kline use? Explain. (NOTE: Allow students to use math tools, such as snap cubes, color tiles, etc. to model this problem and count.)
4. Give each student 8 counters (or other math tools) and ask them to count to find out how many counters you gave them. Then ask students to pick up the counters, shake them and drop them back onto their desks. Ask students, “How many counters do you have now? How do you know?”

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

Students develop the understanding of counting and cardinality from experience. Almost any activity or game that engages children in counting and comparing quantities, such as board games, will encourage the development of cardinality. Frequent opportunities to use and discuss counting as a means of solving problems relevant to kindergarteners is more beneficial than repeating the same routine day after day. For example, ask students questions that can be answered by counting up to 20 items in multiple situations.

Connections Across Standards

Count a collection by ones (K.CC.1).

Count a collection of pennies (K.MD.3).

Pre-K (Prior Grade Standard)

Understand that the last number spoken tells the number of objects counted.

1.NBT.1 (Future Grade Standard)

Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.



Ohio's Learning Standards-Clear Learning Targets

Math Kindergarten

K.CC.6

Orally identify (without using inequality symbols) whether the number of objects in one group is greater/more than, less/fewer than, or the same as the number of objects in another group, not to exceed 10 objects in each group.

Essential Understandings

- The terms greater/more than, less/fewer than, and same as can be used when comparing objects and numerals.
- The quantity of a set does not change based on the arrangement, size, or type of object (conservation).

Common Misconceptions

Students may look at objects and focus on their size, arrangement, or area when making comparisons between groups and not the number.

Academic Vocabulary/Language

- equal to
- same as
- greater than
- more than
- less than
- fewer than

Tier 2

- identify
- compare

Learning Target

I can compare two groups and tell which has the greater number, which has lesser number, or if they are the same.

Assessment of Learning

- Students will compare two groups of 0-10 objects. Students will determine which group is more, which group is less or if both groups are the same.
- Students will compare two groups of 0-10 objects by looking at the objects or by counting.
- Students will prove that even if the arrangement of the objects in the two groups changes, the comparison of the objects does not.

Sample Questions/Activities

1. Display a group of 0-10 math tools (such as counters, color tiles, etc.). Give students math tools. Ask students to make a set of objects that is more than the set you made. Have students prove their set is more. Repeat with a set that is less than and equal to the set you made.
2. Joey has 5 cookies. Jessie has less cookies than Joey. How many cookies could Jessie have? How do you know?
3. Desean is 7 years old. Quentin is younger than Desean. Omar is the same age as Desean. How old is Quentin? How old is Omar? Explain your reasoning.

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

As children develop meaning for numerals, they also compare these numerals to the quantities represented. Children can look for similarities and differences in these different representations. They can use strategies such as matching or counting to determine which group is more, less, or the same as another group. Children are often very comfortable with the concept of “more” but do not have as many experiences with the concept of “less”. When asking students to compare two groups, focus on which group is “more” AND which group is “less”. Encourage students to explain their reasoning for how the groups compare.

Connections Across Standards

Count to determine the number of objects (K.CC.4-5).

Count the number in each category (K.MD.3).

Compare two objects to see which object has “more of” or “less of” a unit (K.MD.2)

Pre-K (Prior Grade Standard)

Identify whether the number of objects in one group is greater than, less than or equal to the number of objects in another group up to 10.

1.NBT.3 (Future Grade Standard)

Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols $>$, $=$, and $<$.



Ohio's Learning Standards-Clear Learning Targets

Math Kindergarten

K.CC.7

Compare (without using inequality symbols) two numbers between 0 and 10 when presented as written numerals.

Essential Understanding

- Compare numbers.

Common Misconceptions

Students possibly have misconceptions about comparing the numbers between 1 and 10 when only using written numerals because the numeral is an abstract representation of a quantity.

Students must have mastery of the concrete representations of written numerals and quantities long before they would be asked to compare the written numerals alone.

Adapted from Homestead County

Academic Vocabulary/Language

- more
- less
- greater than
- more than
- less than
- fewer than

Tier 2

- compare
- tell

Learning Target

I can compare two written numerals 0-10 and determine which number is greater, which number is less or if the two numbers are equal.

Assessment of Learning

- Students will compare two written numerals 0-10.
- Students will explain their reasoning for how two numbers compare.

Sample Questions/Activities

1. Bob has 7 stickers. Leo has 5 stickers. Who has more stickers? How many more? How do you know?
2. Matthew has 3 pencils. Lilly says she has less pencils than Matthew. Jenna says she has less pencils than Matthew too. Lilly has a different number of pencils than Jenna. Can they both have less pencils than Matthew? Explain your thinking.
3. The target number is 9. Can you write down a number that is less than the target number, a number that is more than the target number and a number that is equal to the target number? How can you prove each number you wrote is correct?

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

Students begin to compare sets of objects from a very young age. Students can often look at two sets of objects and quickly determine which set is more or less. Comparing two written numerals can be more difficult. Numerals are an abstract representation of a quantity and can therefore be more difficult for students to compare. Students need to explain their reasoning when they determine whether a number is greater than, less than, or equal to another number. Teachers need to ask probing questions such as “How do you know?” to elicit their thinking. For students, these comparisons increase in difficulty, from greater than to less than to equal.

Connections Across Standards

Count to determine the number of objects (K.CC.4-5).

Count the number in each category (K.MD.3)

Count two objects to see which object has “more of” or “less of” a unit (K.MD.2)

Pre-K (Prior Grade Standard)

Identify whether the number of objects in one group is greater than, less than or equal to the number of objects in another group up to 10.

1.NBT.3 (Future Grade Standard)

Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols $>$, $=$, and $<$.



Ohio’s Learning Standards-Clear Learning Targets

Math Kindergarten

K.OA.1

Represent addition and subtraction with objects, fingers, mental images, drawings, sounds such as claps, acting out situations, verbal explanations, expressions, or

equations. Drawings need not show details, but should show the mathematics in the problem. (This applies wherever drawings are mentioned in the Standards.)

Essential Understandings

- Addition is putting together.
- Subtraction is taking apart, taking from, or comparing two quantities.
- There is a relationship between addition and subtraction.
- Adding 1 results in the next number in a counting sequence.
- Subtracting 1 results in the previous number in a counting sequence.
- Adding and subtracting 0 results in the same number.
- 0 is the number of items left when all the objects in a set are taken away.

Common Misconceptions

Students may over-generalize the vocabulary in word problems and think that certain words indicate solution strategies that must be used to find an answer. They might think that the word more always means to add and the words take away or left always means to subtract. When students use the words take away to refer to subtraction and its symbol, teachers need to repeat students’ ideas using the words minus or subtract. For example, students use addition to solve this problem: Seth took the 4 stickers he no longer wanted and gave them to Anna. Now Seth has 5 stickers left. How many stickers did Seth have to begin with?

Academic Vocabulary/Language

- add
- subtract
- putting together
- adding to
- taking apart
- taking from

Tier 2

- show
- model
- draw
- act out

Learning Targets

I can create a model, drawing, or action that represents addition as putting together.

I can create a model, drawing, or action that represents subtraction as taking apart, taking from, or comparing two quantities.

I can apply a variety of strategies (including using objects, fingers, mental images, drawings, sounds, etc.) when adding and subtracting numbers.

Assessment of Learning

- Students will represent and solve addition problems using a wide variety of strategies, such as using objects, mental images, drawings, sounds, actions, etc.
- Students will represent and solve subtraction problems using a wide variety of strategies, such as using objects, mental images, drawings, sounds, actions, etc.
- Students will explain their strategy and reasoning for solving addition or subtraction problems.

Sample Questions/Activities

1. Hannah has 5 red blocks and 3 blue blocks. How many blocks does Hannah have in all? (NOTE: Encourage students to use different strategies and share students' strategies.)
2. Jayedon has 10 balloons. 4 of the balloons pop. How many balloons does Jayedon have now? (NOTE: Encourage students to use different strategies and share students' strategies.)
3. Mr. Marvin wrote $3 + 5$ on the board. He asked his students to show two different strategies for solving the problem. What are two strategies Mr. Marvin's students might have shown? Explain your thinking.
4. Ms Johnson asked her kindergarteners to solve $7 - 2$. Kendall drew a picture to solve the problem. Jaela used math tools to solve the problem. Whose strategy do you think is better? Why?

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

Provide contextual situations for addition and subtraction that relate to the everyday lives of kindergarteners. Problems about classroom situations, connections to children's literature and using students' names within the problems, can all make the addition and subtraction work more relevant and meaningful. Students should model the addition and subtraction problems using a variety of representations such as drawings, sounds, acting out situations, verbal explanations and numerical expressions. Manipulatives, like two-color counters, clothespins on hangers, connecting cubes and stickers can also be used for modeling these operations. Allow time for students to share their strategies with their classmates. Encourage students to be flexible in their thinking and to find a strategy for addition and subtraction that is efficient and accurate.

Connections Across Standards

Write numerals in mathematical representations (K.CC.3).

Use counting and cardinality to represent addition and subtraction (K.CC.4-5).

Count the number of objects in each category (K.MD.3).

Pre-K Prior Grade Standard)

Count to solve simple addition and subtraction problems with totals smaller than 8, using concrete objects.

1.OA.1 (Future Grade Standard)

Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem. See Table 1 of the Standards.



Ohio's Learning Standards-Clear Learning Targets

Math Kindergarten

K.OA.2

Solve addition and subtraction problems (written or oral), and add and subtract within 10 by using objects or drawings to represent the problem.

Essential Understandings

- Addition is putting together.
- Subtraction is taking apart, taking from, or comparing two quantities.
- There is a relationship between addition and subtraction.
- There are different problems types: add to (result unknown); take from (results unknown); and put together/take apart (total unknown and both addends unknown) (See Table 1 of the Standard)

Common Misconceptions

Students may over-generalize the vocabulary in word problems and think that certain words indicate solution strategies that must be used to find an answer. They might think that the word more always means to add and the words take away or left always means to subtract. When students use the words take away to refer to subtraction and its symbol, teachers need to repeat students' ideas using the words minus or subtract. For example, students use addition to solve this problem: Seth took the 4 stickers he no longer wanted and gave them to Anna. Now Seth has 5 stickers left. How many stickers did Seth have to begin with?

Academic Vocabulary/Language

- add
- in all
- join
- are left
- subtract
- minus

Tier 2

- solve
- use

Learning Target

I can apply my understanding of addition as putting together to solve problems.
I can apply my understanding of subtraction as taking apart, taking from, or comparing two quantities to solve problems.
I can represent an addition or subtraction problem within 10 using objects or drawings.
I can explain my thinking using my understanding of addition and subtraction.

Assessment of Learning

- Students will solve addition or subtraction problems within 10 by using objects or drawings. The drawings just need to show the mathematics in the problem. Discussions about efficiency can help students to see that the drawings just represent the problem and do not need to be overly detailed. (For example, circles could represent stuffed animals rather than detailed drawings of stuffed teddy bears.)
- Students will understand addition and subtraction are opposites - addition is putting together and subtraction is taking apart.
- Students will use their drawings or objects to explain their thinking and solutions to others.
- Students will solve problems with different problem structures (from the Common Addition and Subtraction Situations Table in the CCSS).

Sample Questions/Activities

1. Billy has 6 hats. Betty has 4 hats. Who has more hats? How many more? Explain your thinking.
2. Mohamed has a bowl with 5 chocolate kisses. Some of the kisses are peppermint and some are caramel. How many kisses could be peppermint and how many could be caramel? Explain.
3. Lisa has 9 crayons. Mindy has 3 fewer crayons than Lisa. How many crayons does Mindy have? How do you know?
4. Amanda solved $3 + 4$ by drawing a picture. Brian solved $3 + 4$ by using math tools. Which strategy do you think is better? Why?

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

Provide contextual situations for addition and subtraction that relate to the everyday lives of kindergarteners. Problems about classroom situations, connections to children's literature and using students' names within the problems, can all make the addition and subtraction work more relevant and meaningful. Students should model the addition and subtraction problems using a variety of representations such as drawings, sounds, acting out situations, verbal explanations and numerical expressions. Manipulatives, like two-color counters, clothespins on hangers, connecting cubes and stickers can also be used for modeling these operations. Allow time for students to share their strategies with their classmates. Encourage students to be flexible in their thinking and to find a strategy for addition and subtraction that is efficient and accurate.

TABLE 1. COMMON ADDITION AND SUBTRACTION SITUATIONS.

	RESULT UNKNOWN	CHANGE UNKNOWN	START UNKNOWN
ADD TO	Two bunnies sat on the grass. Three more bunnies hopped there. How many bunnies are on the grass now? $2 + 3 = ?$	Two bunnies were sitting on the grass. Some more bunnies hopped there. Then there were five bunnies. How many bunnies hopped over to the first two? $2 + ? = 5$	Some bunnies were sitting on the grass. Three more bunnies hopped there. Then there were five bunnies. How many bunnies were on the grass before? $? + 3 = 5$
TAKE FROM	Five apples were on the table. I ate two apples. How many apples are on the table now? $5 - 2 = ?$	Five apples were on the table. I ate some apples. Then there were three apples. How many apples did I eat? $5 - ? = 3$	Some apples were on the table. I ate two apples. Then there were three apples. How many apples were on the table before? $? - 2 = 3$
	TOTAL UNKNOWN	ADDEND UNKNOWN	BOTH ADDENDS UNKNOWN ¹
PULL TOGETHER/ TAKE APART²	Three red apples and two green apples are on the table. How many apples are on the table? $3 + 2 = ?$	Five apples are on the table. Three are red and the rest are green. How many apples are green? $3 + ? = 5, 5 - 3 = ?$	Grandma has five flowers. How many can she put in her red vase and how many in her blue vase? $5 = 0 + 5, 5 = 5 + 0$ $5 = 1 + 4, 5 = 4 + 1$ $5 = 2 + 3, 5 = 3 + 2$
	DIFFERENCE UNKNOWN	BIGGER UNKNOWN	SMALLER UNKNOWN
COMPARE³	("How many more?" version): Lucy has two apples. Julie has five apples. How many more apples does Julie have than Lucy? ("How many fewer?" version): Lucy has two apples. Julie has five apples. How many fewer apples does Lucy have than Julie? $2 + ? = 5, 5 - 2 = ?$	(Version with "more"): Julie has three more apples than Lucy. Lucy has two apples. How many apples does Julie have? (Version with "fewer"): Lucy has 3 fewer apples than Julie. Lucy has two apples. How many apples does Julie have? $2 + 3 = ?, 3 + 2 = ?$	(Version with "more"): Julie has three more apples than Lucy. Julie has five apples. How many apples does Lucy have? (Version with "fewer"): Lucy has 3 fewer apples than Julie. Julie has five apples. How many apples does Lucy have? $5 - 3 = ?, ? + 3 = 5$

¹ These take apart situations can be used to show all the decompositions of a given number. The associated equations, which have the total on the left of the equal sign, help children understand that the = sign does not always mean "makes" or "results in" but always does mean "is the same number as."

Connections Across Standards

- Write numerals in mathematical representations (K.CC.3).
- Use counting and cardinality to represent addition and subtraction (K.CC.4-5).
- Count the number of objects in each category (K.MD.3).

Pre-K (Prior Grade Standard)

Count to solve simple addition and subtraction problems with totals smaller than 8, using concrete objects.

1.OA.1 (Future Grade Standard)

Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem. See Table 1 of the Standards.



Ohio's Learning Standards-Clear Learning Targets

Math Kindergarten

K.OA.3

Decompose numbers and record compositions for numbers less than or equal to 10 into pairs in more than one way by using objects and, when appropriate,

drawings or equations.

Essential Understanding

- There is more than one way to compose or decompose a number.

Common Misconceptions

Students often do not realize that there are many different ways to break a number down into parts. By giving students manipulatives, they can explore the different ways to make a number. Once students are successful using the manipulatives, they can move to pictorial and then numerical representations.

Academic Vocabulary/Language

- add
- in all
- join
- are left
- subtract
- minus
- plus sign +
- minus sign -
- equals sign =
- break apart
- put together
- equation

Tier 2

- decompose
- record

Learning Target

I can break apart a number from 1 to 10 and show it in different ways.
I can compose and decompose numbers from 1-10 to show different combinations for a given number.
I can create a model that represents how I composed and decomposed a number.

Assessment of Learning

- Students will see a given number from 1-10 as a whole that can be broken into two (or more) parts.
- Students will see there are multiple ways to break a number 1-10 into two (or more) parts.
- Students will decompose a given number into two or more parts or create a given number using two or more parts.
- Students will prove their part-part-whole model is accurate.

Sample Questions/Activities

1. Choose a target number between 0 and 10. Count out math tools, such as counters or snap cubes, to equal the target number. Cover up some of the math tools and ask students what part is hidden. Have students state their answer as a part-part-whole. For example, if the whole is 8 and 5 math tools are shown, students would answer “5 and 3 is 8”. Choose another target number and repeat.
2. Parker has 7 cookies. 4 cookies are peanut butter and the rest are chocolate chip. How many chocolate chip cookies does Parker have? How do you know?
3. Samuel has 10 markers. He wants to put his markers into 2 pencil boxes. How many different ways could Samuel put the 10 markers into the 2 pencil boxes? Explain your thinking.
4. Show as many ways as you can to make the number 10.

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

Part-part-whole activities prepare students for work with addition and subtraction. Encourage students to represent the part-part-whole situations in multiple ways, including drawings, number sentences like “3 and 2 is 5”, and eventually equations. Activities where students must find the missing part build a deeper understanding of the part-whole relationship and lay the groundwork for subtraction. Begin by having students decompose numbers less than or equal to 5. Engage students in a variety of experiences to promote their fluency with sums and differences less than or equal to 5 that result from using the numbers 0 to 5. For example, ask students to use different models to decompose 5 and record their work with drawings or equations. Next, have students decompose 6, 7, 8, 9, and 10 in a similar fashion. As they come to understand the role and meaning of arithmetic operations in number systems, students gain computational fluency, using efficient and accurate methods for computing.

Connections Across Standards

Write numerals in mathematical representations (K.CC.3).

Use counting and cardinality to represent addition and subtraction (K.CC.4-5).

Count the number of objects in each category (K.MD.3).

Pre-K (Prior Grade Standard)

Count to solve simple addition and subtraction problems with totals smaller than 8, using concrete objects.

1.OA.3 (Future Grade Standard)

Apply properties of operations as strategies to add and subtract. For example, if $8 + 3 = 11$ is known, then $3 + 8 = 11$ is also known (Commutative Property of Addition); to add $2 + 6 + 4$, the second two numbers can be added to make a ten, so $2 + 6 + 4 = 2 + 10 = 12$ (Associative Property of Addition). Students need not use formal terms for these properties



Ohio's Learning Standards-Clear Learning Targets

Math Kindergarten

K.OA.4

For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or, when appropriate, an equation.

Essential Understanding

- Addition is putting together.
- A whole number can be decomposed into two (or more) parts.
- The part-part-whole relationship can be used to find a missing addend.

Common Misconceptions

Students often do not realize that there are many different ways to break a number down into parts. By giving students manipulatives, they can explore the different ways to make a number. Once students are successful using the manipulatives, they can move to pictorial and then numerical representations.

Academic Vocabulary/Language

- add
- plus sign +
- equals sign =
- ten
- equation

Tier 2

- find
- record

Learning Target

Given a number from 1-9, I can identify the missing number needed to make a whole of 10.
I can represent the part-part-whole relationship of numbers 1-9 to to make a whole of 10 in different ways.

Assessment of Learning

- Students will determine all of the ways to decompose 10 into two parts.
- Students will determine the missing part needed to make 10 if one part is given.
- Students will represent the part-part-whole relationship using objects, drawings, and (possibly) an equation.

Sample Questions/Activities

1. Rayleen has 6 stickers on her sticker chart. She needs 10 stickers to get a reward. How many more stickers does Rayleen need? How do you know?
2. Gather 10 math tools and give students a whiteboard and dry erase marker. Tell students you are going to play “I Gotta Have 10”. Show students a set of math tools that is 10 or less. Ask students to write down how many more are needed to make 10. Repeat with other sets of math tools.
3. Delmar has 10 buttons. Some are blue and some are red. How many blue and red buttons might Delmar have? Explain your thinking.
4. Give students a ten frame and 10 red and yellow two-color counters. Say to students, “How many different ways could you fill this ten frame using red and yellow two-color counters?” Have students record their findings.

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

The numbers 5 and 10 are important benchmark numbers. Time spent decomposing 5 and 10 will help students as they continue to investigate number relationships and develop number sense. The use of manipulatives, five frames and ten frames will help students to build their understanding of the part-part-whole relationship. This will then provide students with accurate, efficient and flexible strategies for addition and subtraction. Create written addition problems with sums equal to 10. It is important to use a problem context that is relevant to kindergarteners. After the teacher reads the problem, students choose their own method to model the problem and find a solution. Students discuss their solution strategies while the teacher represents the situation with an equation written under the problem. The teacher and students should use the words equal and is the same as interchangeably.

Connections Across Standards

Write numerals in mathematical representations (K.CC.3).
 Use counting and cardinality to represent addition and subtraction (K.CC.4-5).
 Count the number of objects in each category (K.MD.3).

Pre-K (Prior Grade Standard)

Count to solve simple addition and subtraction problems with totals smaller than 8, using concrete objects.

1.OA.4 (Future Grade Standard)

Understand subtraction as an unknown-addend problem. For example, subtract $10 - 8$ by finding the number that makes 10 when added to 8.



Ohio's Learning Standards-Clear Learning Targets

Math Kindergarten

K.OA.5

Fluently ^G add and subtract within 5.

Common Misconceptions

Teachers need to provide instructional experiences so that students progress from the concrete level (manipulatives), to the pictorial level, then to the abstract (expressions/equations) level when learning mathematical concepts. Students who skip pictorial thinking are more likely to use finger counting and rote memorization for work with addition and subtraction.

Academic Vocabulary/Language

- add
- subtract

Essential Understandings

- There is a relationship between addition and subtraction.
- Adding 1 results in the next number in a counting sequence.
- Subtracting 1 results in the previous number in a counting sequence.
- Adding or subtracting 0 results in the same number.
- 0 is the number of items left when all the objects in a set are taken away.
- Fluency is the ability to use efficient, accurate, and flexible methods for computing.

Learning Target

I can fluently add and subtract within 5.

Assessment of Learning

- Students will fluently add and subtract within 5.
- Students will have strategies for addition and subtraction within 5 that are accurate, efficient and flexible.

Sample Questions/Activities

1. Give students a whiteboard and dry erase marker. Explain to students that you will roll a number cube to determine the target number. (Numbers should be within 1-5. If a 6 is rolled, roll again.) You will then ask students to quickly perform different operations on the target number to get an answer. For example, if the target number is 4, you might give directions such as “add 2” or “subtract 1”. Have students share their answers and strategies. Determine a different target number and repeat.
2. Play the game “How Did I Get Here?” with students. Explain to students that you will display two numbers: a starting number and an ending number. Their job is to determine how you got there. For example, if the starting number is 4 and the ending number is 2 students should say that to get there you subtracted 2. Have students write the equation to show the solution (e.g., $4 - 2 = 2$). Repeat with addition and subtraction facts within 5.
3. Take time to Share a Strategy. Display an addition or subtraction fact and have students solve the problem. Then have students share their strategies. Encourage students to try different strategies as you continue to display addition and subtraction facts.

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

Have students decompose numbers less than or equal to 5 during a variety of experiences to promote their fluency with sums and differences less than or equal to 5 that result from using the numbers 0 to 5. For example, ask students to use different models to decompose 5 and record their work with drawings or equations. Provide opportunities for students to share their strategies for solving addition and subtraction facts within 5. The goal for students is fluency with these facts. Fluency with math facts means that students are able to determine an answer quickly and accurately. Allowing students to engage with the facts often and hear their classmates’ thinking and strategies will help to develop this fluency.

Connections Across Standards

Write numerals in mathematical representations (K.CC.3).
 Use counting and cardinality to represent addition and subtraction. (K.CC. 4-5).
 Count the number of objects in each category (K.MD.3).

Pre-K (Prior Grade Standard)

Count to solve simple addition and subtraction problems with totals smaller than 8, using concrete objects.

1.OA.6 (Future Grade Standard)

Add and subtract within 20, demonstrating fluency ^G with various strategies for addition and subtraction within 10. Strategies may include counting on; making ten, e.g., $8 + 6 = 8 + 2 + 4 = 10 + 4 = 14$; decomposing a number leading to a ten, e.g., $13 - 4 = 13 - 3 - 1 = 10 - 1 = 9$; using the relationship between addition and subtraction, e.g., knowing that $8 + 4 = 12$, one knows $12 - 8 = 4$; and creating equivalent but easier or known sums, e.g., adding $6 + 7$ by creating the known equivalent $6 + 6 + 1 = 12 + 1 = 13$.



Ohio's Learning Standards-Clear Learning Targets

Math Kindergarten

K.NBT.1

Compose and decompose numbers from 11 to 19 into a group of ten ones and some further ones by using objects and, when appropriate, drawings or equations; understand that these numbers are composed of a group of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.

Essential Understandings

- Work with numbers 11–19 to gain foundations for place value.
- The basic unit of the base-ten system is a one.
- Teen numbers are composed of a group of ten ones and more ones.
- A group of ten consists of ten “ones”.

Common Misconceptions

Students have difficulty with ten as a singular word that means 10 things. For many students, the understanding that a group of 10 things can be replaced by a single object and they both represent 10 is confusing. Help students develop the sense of 10 by first using groupable materials then replacing the group with an object or representing 10. Watch for and address the issue of attaching words to materials and groups without knowing what they represent. If this misconception is not addressed early on it can cause additional issues when working with numbers 11-19 and beyond.

Academic Vocabulary/Language

- ten 10
- number words 11 through 19
- compose
- decompose
- equation
- ones
- tens

Tier 2

- record
- tell
- show

Learning Target

I can apply my understanding of ten ones and some further ones to compose number 11-19.
I can represent a number from 11 to 19 using objects, drawings and/or equations.

Assessment of Learning

- Students will understand that the numbers 11-19 represent ten and some more ones.
- Students will represent the numbers 11-19 as ten and some more ones (e.g. 16 is ten and six more ones).

Sample Questions/Activities

1. Frank is counting a pile of red and yellow two-color counters. He fills a ten frame with the counters and then fills in 4 spaces in the second ten frame. How many total counters does Frank have? Explain.
2. What are all of the ways you can make 17? Share your ways with a partner. What ways do you have in common? What ways are different?
3. Give students a small cup and 11-19 counters. Explain to students that they need to find out how many counters they have. Explain to students that 10 counters can go in the cup and no more. Once students have finished counting, have students share the total as ten and some more ones. For example, if they have 16 counters they would say “16 is ten and 6 more”. Repeat with other numbers of counters 11 - 19.

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

Kindergarteners need to understand the idea of a ten so they can develop the strategy of adding onto 10 to add within 20 in Grade 1. Students need to construct their own base-ten ideas about quantities and their symbols by connecting to counting by ones. They should use a variety of manipulatives to model and connect equivalent representations for the numbers 11 to 19. Five frames and ten frames help to organize the manipulatives into the benchmarks of 5 and 10 and lead students to viewing numbers 11-19 as “ten and some more”. For instance, to represent 13, students can count by ones and show 13 beans. They can anchor to five and show one group of 5 beans and 8 beans or anchor to ten and show one group of 10 beans and 3 beans. Students need to eventually see a ten as different from 10 ones. The vocabulary “a ten” and “a one” is difficult for kindergarteners. Activities that build the understanding of the numbers 11-19 as “ten and some more” will lead to this place value language as they move into first grade.

Connections Across Standards

Decompose numbers (K.OA.3).

Know and write numerals to 20 and count on from any given number (K.CC.2-3).

Pre-K (Prior Grade Standard)

N/A

1.NBT.2 (Future Grade Standard)

Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases: 10 can be thought of as a bundle of ten ones — called a “ten;” the numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones; and the numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).



Ohio's Learning Standards-Clear Learning Targets

Math Kindergarten

<div style="border: 1px solid black; border-radius: 15px; padding: 10px; display: inline-block;"> <h3 style="margin: 0;">K.MD.1</h3> </div>	<p>Identify and describe measurable attributes (length, weight, and height) of a single object using vocabulary terms such as long/short, heavy/light, or tall/short.</p>	<p style="text-align: center;">Common Misconceptions</p> <p>Discourage the use of the words bigger and smaller and ask the students to use words appropriate to the attributes they are measuring. For length, objects are shorter and longer, for weight heavier and lighter, and height taller and shorter.</p> <p style="text-align: center;">Grade K Common Core Math</p>	<p style="text-align: center;">Academic Vocabulary/Language</p> <ul style="list-style-type: none"> ▪ height ▪ length ▪ weight ▪ shorter ▪ longer ▪ heavier ▪ lighter ▪ taller ▪ shorter <p style="text-align: center;">Tier 2</p> <ul style="list-style-type: none"> ▪ describe ▪ compare ▪ explain
<p style="text-align: center;">Essential Understanding</p> <ul style="list-style-type: none"> • Objects have multiple attributes that can be identified and described. 			
<p>Learning Target</p>	<p>I can identify the measurable attributes of length, weight, and height to an object. I can describe an object's measurable attributes using vocabulary such as long/short, heavy/light, or tall/short.</p>		

Assessment of Learning

- Students will identify all of the attributes of an object that can be measured, such as length, width or weight.
- Students will describe the measured attribute using vocabulary such as long/short, heavy/light, or tall/short.

Sample Questions/Activities

1. Ask students to choose an object from their desk (e.g., a pencil, crayon, scissors, etc.). Work together to create and record a list of all of the attributes of that object that could be measured (e.g., length, width, weight). Ask students to describe the object using these attributes (e.g. “The part of my pencil that writes is long. The part of my pencil that erases is short.”).
2. Choose an attribute of an object that students want to measure and ask students, “What tool would you like to use to measure this attribute?” Provide students with math tools, such as centimeter cubes, color tiles, snap cubes, etc. and ask them to measure the attribute. For example, if students want to determine how long their pencil is, they could use centimeter cubes and discover that their pencil is 15 cubes long.
3. Display 2-3 objects for students to see, such as a marker, a crayon and a pair of scissors. Describe one of the objects using vocabulary such as long/short, heavy/light or tall/short, and have students determine which object you are describing. For example, to describe the marker as “This object has one long side and one very short side. This object is not heavy.” Repeat with other objects.

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

It is critical for students to be able to identify and describe measurable attributes of objects. An object has different attributes that can be measured, like the height and weight of a can of food. When students compare shapes directly, the attribute becomes the focus. For example, when comparing the volume of two different boxes, ask students to discuss and justify their answers to these questions: Which box will hold the most? Which box will hold least? Will they hold the same amount? Students can decide to fill one box with dried beans then pour the beans into the other box to determine the answers to these questions. In Kindergarten, the focus of measurement is not the *units* of measurement but rather the attributes and vocabulary that goes with the measurement. Informal units should be used to keep the size of the numbers manageable for Kindergarteners. The use of these informal or nonstandard units will also lead to good discussions about the importance of standard units as students move to first grade.

Connections Across Standards

Classify objects into given categories (K.MD.3).

Compare quantities of objects (K.CC.6).

Pre-K (Prior Grade Standard)

Sort and classify objects by one or more attributes (e.g., size, number).

1.MD.1 (Future Grade Standard)

Order three objects by length; compare the lengths of two objects indirectly by using a third object.



Ohio's Learning Standards-Clear Learning Targets

Math Kindergarten

K.MD.2

Directly compare two objects with a measurable attribute in common, to see which object has “more of” or “less of” the attribute, and describe the difference. *For example, directly compare the heights of two children and describe one child as taller/shorter.*

Essential Understandings

- Objects have multiple attributes that can be identified and described.
- Objects have common attributes that can be compared.

Common Misconceptions

Discourage the use of the words bigger and smaller and ask the students to use words appropriate to the attributes they are measuring. For length, objects are shorter and longer and for weight heavier and lighter.

Grade K Common Core Math

Academic Vocabulary/Language

- longer
- shorter
- heavier
- lighter
- taller
- more of
- less of

Tier 2

- describe
- compare

Learning Target

I can compare a measurable attribute of two objects and describe how they differ.

Assessment of Learning

- Students will compare a measurable attribute of two objects and use vocabulary to compare (e.g. “This pencil is longer than that pencil.” or “This book is lighter than this chair.”).

Sample Questions/Activities

1. Display 2 objects for students to see, such as a glue stick and a pencil box. Ask students, “What attributes do these objects have that we could measure?” Choose one attribute and say a comparison sentence (e.g., “This object is longer than the other object.”). Have students say which object they think it is and why. Repeat with other objects and other attributes.
2. Display an object, such as a marker, crayon, or pencil. Say to students, “I want you to find an object that you think is longer than my object, shorter than my object, and the same length as my object.” Have students share their findings. Repeat with another object but this time have students find an object that is heavier, lighter and the same weight as your object.
3. Shay compared the weight of a pencil box and a chapter book. He held one object in each hand and said the chapter book is heavier than the pencil box. How could Shay change the pencil box so that the pencil box is heavier than the chapter book? How do you know?

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

Comparing a measurable attribute of two objects lays the groundwork for understanding measurement. Making measurement comparisons helps to focus students on the *attribute* being measured rather than the units of measurement. Engage students in measurement comparison activities that can be directly determined (e.g., “I can see that the red pencil is longer than the blue pencil.”) as well as measurement comparison activities that need more exploration (e.g., Lining up centimeter cubes or color tiles to compare the lengths of two pencils.). For example, have students work in pairs to compare their arm spans. As they stand back-to-back with outstretched arms, compare the lengths of their spans, then determine who has the smallest arm span. Ask students to explain their reasoning. Then ask students to suggest other measurable attributes of their bodies that they could directly compare, such as their height or the length of their feet.

Connections Across Standards

Classify objects into given categories (K.MD.3).
Compare quantities of objects (K.CC.6).

Pre-K(Prior Grade Standard)

Describe and compare objects using measurable attributes (e.g., length, size, capacity and weight).

1.MD.2 (Future Grade Standard)

Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps.
Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.



Ohio's Learning Standards-Clear Learning Targets

Math Kindergarten

K.MD.3	Classify objects into given categories; count the numbers of objects in each category and sort the categories by count. The number of objects in each category should be less than or equal to ten. Counting and sorting coins should be limited to pennies.	Common Misconceptions During initial instruction, students may need guidance in identifying the categories in which to sort objects.	Academic Vocabulary/Language <ul style="list-style-type: none">• alike• different• shape• size• sort• count Tier 2 <ul style="list-style-type: none">• classify• category• categorize
Essential Understandings <ul style="list-style-type: none">• Groups of objects can be classified in multiple ways and counted.• Classifying objects is the process of sorting objects into categories and naming those categories.• Pennies can be used as a manipulative to count and sort.	Grade K Common Core Math		
Learning Targets	I can classify objects into groups using attributes the objects have in common. I can count the objects in a group and order the groups from least to greatest.		

Assessment of Learning

- Students will sort a collection of objects using an attribute they have in common.
- Students will determine the total number of objects in each group (10 or less).
- Students will begin to compare and discuss the sorted groups.

Sample Questions/Activities

- 1) Give students a collection of math tools, such as color tiles, centimeter cubes or snap cubes. Ask students, “What attribute could we use to sort these math tools?” Ask students to sort their math tools by color and determine how many of each color they have. Share students’ results and discuss the results using comparison sentences, such as “Jasmynn has 7 red cubes and 3 blue cubes. Jasmynn has more red cubes than blue cubes.”
- 2) Display a set of color tiles (or other math tools) that have been sorted by color. Discuss what students see and how the different sorted groups compare. Then ask students questions such as, “How could I change the sorted groups so that the smallest number of cubes are blue?” or “How could I change the sorted groups so there are the same number of red cubes as blue cubes?” Have students share their answers and strategies.
- 3) Jeremiah and Lucy sorted 10 snap cubes by color. The snap cubes are blue, red and green. The blue pile had the most snap cubes. The red pile and the green pile had the same number of snap cubes. What could Jeremiah and Lucy’s sorted groups look like? How do you know?

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

Sorting objects into groups using an attribute prepares students for organizing data into graphs. Provide categories for students to use to sort a collection of objects. Each category can relate to only one attribute, like Red and Not Red or Hexagon and Not Hexagon, and contain up to 10 objects. Students count how many objects are in each category and then order the categories by the number of objects they contain. Engage students in discussions about the finished sorts. Encourage students to count the total number of objects they see in each group, and ask questions to get students thinking about how to describe the data and compare the data.

Connections Across Standards

Count to answer “how many?” questions (K.CC.5).

Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group (K.CC.6).

Compare two numbers between 1 and 10 represented as written numerals (K.CC.7).

Pre-K (Prior Grade Standard)

Sort and classify objects by one or more attributes (e.g., size, number).

1.MD.4 (Future Grade Standard)

Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.



Ohio's Learning Standards-Clear Learning Targets

Math Kindergarten

K.G.1

Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as *above, below, beside, in front of, behind, and next to.*

Essential Understandings

- Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).
- Shapes exist in the environment.
- Shapes can be described by position and location.

Common Misconceptions

Students many times use incorrect terminology when describing shapes. For example students may say a cube is a square or that a sphere is a circle. The use of the two-dimensional shape that appears to be part of a three-dimensional shape to name the three-dimensional shape is a common misconception. Work with students to help them understand that the two-dimensional shape is a part of the object but it has a different name.

Academic Vocabulary/Language

- above
- below
- in front of
- behind
- beside
- next to
- square
- circle
- triangle
- rectangle
- hexagon
- cube
- cone
- cylinder
- sphere

Tier 2

- describe
- find
- identify
- location

Learning Targets

I can make observations in my environment and identify shapes that are found by using the shape names.
I can apply my understanding of positional vocabulary to describe the location of shapes in the environment.

Assessment of Learning

- Students will describe examples of shapes they find in their environment using shape names.
- Students will describe the position of these shapes using position words, such as above, below, beside, in front of, behind and next to.
- Students will use informal language as they describe shapes.

Sample Questions/Activities

1. Play a game of I Spy. Model for students how to play by saying, “I Spy a circle. This circle is above the alphabet line. This circle is next to the window.” Students will identify the object and then explain how they knew they were correct. Repeat by having students give their I Spy clues to a partner or the whole class.
2. Send students on a shape hunt. Ask students to find an example of a square, rectangle, circle and triangle in the classroom. Share students’ findings. Ask students to use position words to explain where they found each shape example. Ask students if they agree or disagree with how a shape has been described. Choose one shape category and discuss what students notice about all of the shapes in that category.
3. On his paper, John drew a circle next to a triangle, a square above the triangle, and a rectangle below the circle. What could John’s paper look like? How do you know?

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

Discussions of shapes at this stage should not focus on proper geometry vocabulary. Instead, students should identify and describe the shapes they see using informal language (e.g., “It’s a circle because it’s round.”). The use of position words to explain where they see the shapes prepares students for later work with symmetry, rotations, coordinate grids, and more. Engage students in opportunities to describe shapes and explain their location. For example, ask students to find rectangles in the classroom and describe the relative positions of the rectangles they see, e.g. This rectangle (a poster) is over the sphere (globe). Teachers can use a digital camera to record these relationships. Hide shapes around the room. Have students say where they found the shape using positional words, e.g. I found a triangle UNDER the chair.

Connections Across Standards

Identify and describe measurable attributes (K.MD.1).
Directly compare two objects with a measurable attribute (K.MD.2).

Pre-K(Prior Grade Standard)

Demonstrate understanding of the relative position of objects using terms such as in/on/under, up/down, inside/outside, above/ below, beside/between, in front of/ behind and next to.

1.G.1 (Future Grade Standard)

Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.



Ohio's Learning Standards-Clear Learning Targets

Math Kindergarten

K.G.2

Correctly name shapes regardless of their orientations or overall size.

Essential Understandings

- Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).
- Shapes can be identified regardless of size or orientation.

Common Misconceptions

Students many times use incorrect terminology when describing shapes. For example students may say a cube is a square or that a sphere is a circle. The use of the two-dimensional shape that appears to be part of a three-dimensional shape to name the three-dimensional shape is a common misconception. Work with students to help them understand that the two-dimensional shape is a part of the object but it has a different name.

Academic Vocabulary/Language

- circle
- rectangle
- hexagon
- triangle
- square
- cube
- cone
- cylinder
- sphere
- straight
- round
- side
- vertex
- shapes
- solids
- Tier 2**
- name
- identify
- describe

Learning Targets

I can identify two-dimensional shapes no matter the orientation in space or the size.
I can identify three-dimensional shapes no matter the orientation in space of the size.

Assessment of Learning

- Students will identify two-dimensional and three-dimensional shapes.
- Students will understand that the name of a two-dimensional or three-dimensional shape does not change when the shape is rotated, flipped or moved.
- Students will understand that the name of a two-dimensional or three-dimensional shape does not change when the shape is made bigger or smaller.

Sample Questions/Activities

1. Show students an equilateral triangle and ask them to name the shape. Ask students how they know that this is a triangle. Rotate the triangle so it sits on one of its vertices. Ask students, “Is this shape still a triangle? Why or why not?” Repeat with other shapes. Work together to prove that the name of a shape does not change when the shape is rotated or moved.
2. Show students a set of circles of all different sizes. Ask students to name the shapes. Ask students, “Do you think the size of a shape determines the name of the shape? Why or why not?” Ask students to find circles in the classroom to prove that size is not a defining characteristic of a shape. Repeat with other two-dimensional and three-dimensional shapes.
3. Danny identified his piece of paper as a rectangle. He moved his piece of paper from the floor to his desk. Is the piece of paper still a rectangle? How do you know?

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

As students identify and name shapes, they begin to explore defining characteristics of a shape. Defining characteristics are used to categorize shapes into groups. Defining characteristics are attributes such as number of sides, types of angles, parallel or perpendicular sides, etc. Attributes such as color, size and location or *not* defining characteristics of a shape. Engage students in activities and discussions to help them to see that moving or turning a shape does not change the name of a shape or the groups it belongs to. Making a shape bigger or smaller also does not change the name of the shape or the groups it belongs to. Use a shape in different orientations and sizes along with non-examples of the shape so students can learn to focus on defining attributes of the shape.

Connections Across Standards

Identify and describe measurable attributes (K.MD. 1).
 Directly compare two objects with a measurable attribute (K.MD.2).
 Classify objects into given categories (K.MD.3).

Pre-K(Prior Grade Standard)

Understand and use names of shapes when identifying objects.

1.G.1 (Future Grade Standard)

Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.



Ohio’s Learning Standards-Clear Learning Targets

Math Kindergarten

K.G.3

Identify shapes as two-dimensional (lying in a plane, “flat”) or three-dimensional (“solid”).

Essential Understandings

- Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).
- Shapes can be categorized as two-dimensional (flat) or three-dimensional (solid).

Common Misconceptions

Students many times use incorrect terminology when describing shapes. For example students may say a cube is a square or that a sphere is a circle. The use of the two-dimensional shape that appears to be part of a three-dimensional shape to name the three-dimensional shape is a common misconception. Work with students to help them understand that the two-dimensional shape is a part of the object but it has a different name.

Academic Vocabulary/Language

- circle
- rectangle
- hexagon
- triangle
- square
- cube
- cylinder
- cone
- sphere
- two-dimensional
- three-dimensional
- shapes
- solids

Tier 2

- name
- label

Learning Targets

- I can identify two-dimensional shapes.
- I can identify three-dimensional shapes.
- I can classify shapes as two-dimensional and three-dimensional.

Assessment of Learning

- Students will identify two-dimensional shapes as “flat” shapes or shapes lying in a plane.
- Students will identify three-dimensional shapes as “solid” shapes.
- Students will understand that two-dimensional shapes make up the surfaces of some of the three-dimensional shapes (e.g., the faces of a cube are squares).

Sample Questions/Activities

1. Give students a collection of both two- and three-dimensional shapes and ask students to sort the shapes into two groups. Have students discuss their sort and how they decided which shapes belong to which group. Encourage students to describe the shapes and how they are the same and different.
2. Give students a collection of both two- and three-dimensional shapes. Ask students to select one shape. Ask students to find a partner and have each student take turns describing their shape to their partner. Then ask students to compare their shapes to their partner’s shape to determine what is the same and what is different about the two shapes. Have a few sets of partners share their shapes and their comparisons. Have students select a different shape and repeat.
3. Mrs. Foster asked her students to find an example of a circle in the classroom. Heather found a shape drawn in her math notebook and said that it was a circle. Bailey found a globe and said it was a circle. Who is correct? Why do you think so?

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

The number of dimensions a shape has is one more way for students to describe and sort shapes. Describing shapes as “flat” or “solid” is appropriate in Kindergarten. Engage students in activities that continue to put the focus on the attributes of a shape rather than proper geometry vocabulary. Manipulatives used for shape identification actually have three dimensions. However, Kindergartners need to think of these shapes as two-dimensional or “flat” and typical three-dimensional shapes as “solid.” Students will identify two-dimensional shapes that form surfaces on three-dimensional objects. Students need to focus on noticing two and three dimensions, not on the words two-dimensional and three-dimensional.

Connections Across Standards

Identify and describe measurable attributes (K.MD.1).
Directly compare two objects with a measurable attribute (K.MD.2).
Classify objects into given categories (K.MD.3).

Pre-K (Prior Grade Standard)

Compare two-dimensional shapes, in different sizes and orientations, using informal language.

1.G.2 (Future Grade Standard)

Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape. (Note: Students do not need to learn formal names such as “right rectangular prism.”)



Ohio's Learning Standards-Clear Learning Targets

Math Kindergarten

K.G.4

Describe and compare two- or three-dimensional shapes, in different sizes and orientations, using informal language to describe their commonalities, differences, parts, and other attributes.

Essential Understandings

- Shapes can be described by their attributes.
- Shapes can be compared by their attributes.

Common Misconceptions

One of the most common misconceptions in geometry is the belief that orientation is tied to shape. A student may see the first of the figures below as a triangle, but claim to not know the name of the second.



Students need to have many experiences with shapes in different orientations.

Another misconception is confusing the name of a two-dimensional shape with a related three-dimensional shape or the shape of its face. For example, students might call a cube a square because the student sees the face of the cube.

Academic Vocabulary/Language

- circle
- rectangle
- hexagon
- triangle
- square
- cube
- cylinder
- cone
- sphere
- roll
- stack
- slide
- vertices
- two-dimensional
- three-dimensional

Tier 2

- compare
- analyze
- describe

Learning Targets

- I can describe the attributes of a two-dimensional shape.
- I can describe the attributes of a three-dimensional shape.
- I can compare two-dimensional shapes by looking for commonalities and differences.
- I can compare three-dimensional shapes by looking for commonalities and differences.

Assessment of Learning

- Students will describe the attributes of a two-dimensional shape.
- Students will describe the attributes of a three-dimensional shape.
- Students will compare two two-dimensional shapes. They will determine how the shapes and/or the parts of the shapes are the same and how they are different.
- Students will compare two three-dimensional shapes. They will determine how the shapes and/or the parts of the shapes are the same and how they are different.
- Students will use informal language as they describe and compare shapes.

Sample Questions/Activities

1. Give students geoboards or dot paper. Ask students to create a two-dimensional shape on their geoboard or dot paper. Have students turn to a neighbor and share their shape. Ask partners to determine how the two shapes they have made are the same and how they are different. Have a couple of partners share their shapes and discuss the comparison with the whole class. Have students clear their geoboards, create a new two-dimensional shape and repeat.
2. Display a set of two-dimensional and three-dimensional shapes. Tell students that you have secretly selected one of the shapes shown to be your Mystery Shape. Give students a set of clues to describe your shape and have students try to guess which shape is your Mystery Shape. Repeat with other Mystery Shapes.
3. Choose a shape. Create a poster to tell about the shape. Include examples of the shape and words to describe the shape. Present your poster to the class or small group.

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

Use shapes collected from students to begin the investigation into basic properties and characteristics of two- and three-dimensional shapes. Have students analyze and compare each shape with other objects in the classroom and describe the similarities and differences between the shapes. Remember that informal language is expected and accepted. Ask students to describe the shapes while the teacher records key descriptive words in common student language. Present shapes in varying sizes and orientations to encourage students to focus on defining characteristics. Students can use the word “flat” to describe two-dimensional shapes and the word “solid” to describe three-dimensional shapes rather than “two-dimensional” or “three-dimensional”.

Connections Across Standards

Identify and describe shapes (K.G.1-3)

Identify and describe measurable attributes (K.MD.1).

Directly compare two objects with a measurable attribute (K.MD.2).

Classify objects into given categories (K.MD.3).

Pre-K (Prior Grade Standard)

Compare two-dimensional shapes, in different sizes and orientations, using informal language.

1.G.2 (Future Grade Standard)

Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape. (Note: Students do not need to learn formal names such as “right rectangular prism.”)



Ohio's Learning Standards-Clear Learning Targets

Math Kindergarten

K.G.5

Model shapes in the world by building shapes from components e.g., sticks and clay balls and drawing shapes.

Common Misconceptions

Students may create 2D shapes when being asked to use 3D materials such as sticks, clay balls, etc. thus creating a 3D shape. Work with students to identify how 2D and 3D shapes are similar and different to develop an understanding of the attributes of 2D and 3D shapes.

Academic Vocabulary/Language

- round
- rectangle
- side
- square
- straight
- triangle

Tier 2

- analyze
- compare
- create
- compose

Essential Understanding

- Shapes in the environment can be represented with models.

Learning Targets

I can build and/or draw two-dimensional and three-dimensional shapes using objects in the environment.

Assessment of Learning

- Students will model real world shapes by building shapes out of common classroom items.
- Students will model real world shapes by drawing shapes.
- Students will understand that models and drawings can represent shapes in the real world.

Sample Questions/Activities

1. Violet went on a shape hunt in her classroom. Draw and label some of the shapes Violet might have found during her shape hunt.
2. Draw a map of our classroom. What shapes did you use to represent the objects in our classroom? What shape did you use most often? Least often?
3. Penny’s teacher gave her toothpicks and marshmallows. What shapes could Penny make? How do you know? Use toothpicks and marshmallows to record your answers.

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

Understanding that drawings and models can represent real world objects helps students to develop efficient and flexible problem solving strategies. Students must understand that they can represent real world objects, such as pencils or children, using shapes rather than detailed drawings. This understanding allows students to represent and solve problems more quickly. Engage students in activities to practice modeling real world objects with drawings and common materials. For example, the teacher and students orally describe and name the shapes. Students draw a shape and build it using materials regularly kept in the classroom such as construction paper, clay, wooden sticks or straws.

Connections Across Standards

Identify and describe shapes (K.G.1-3).

Identify and describe measurable attributes (K.MD.1).

Directly compare two objects with a measurable attribute (K.MD.2).

Classify objects into given categories (K.MD.3).

Pre-K (Prior Grade Standard)

Create shapes during play by building, drawing, etc.

1.G.2 (Future Grade Standard)

Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape. (Note: Students do not need to learn formal names such as “right rectangular prism.”)



Ohio's Learning Standards-Clear Learning Targets

Math Kindergarten

K.G.6

Combine simple shapes to form larger shapes.

Essential Understandings

- Analyze, compare, create and compose shapes.
- Shapes can be combined to form larger shapes.

Common Misconceptions

Students may struggle to see a new shape from a composite shape. For example, a triangle and a square create a composite shape - pentagon. Students may see only the triangle and square not the pentagon. Students struggle to identify attributes of a shape that determines the shape name.

Academic Vocabulary/Language

- round
- rectangle
- side
- square
- straight
- triangle
- order

Tier 2

- analyze
- compare
- create
- compose

Learning Target

I can create a shape by combining simple shapes to form a larger shape.

Assessment of Learning

- Students will combine two shapes and identify the larger shape that is created.
- Students will use the attributes of the new shape to name it.

Sample Questions/Activities

1. Megan pushed two square blocks together and made a new shape. She said the new shape was a rectangle because it had two long sides and two short sides. Do you agree or disagree with Megan? Explain your thinking.
2. James has some triangle blocks, some rectangle blocks, and some square blocks. He wants to see what shapes he could make by putting two blocks together. What shapes could James make? What would the new shapes be called? How do you know?
3. Give students geoboards and rubber bands (or grid paper). Have students create a large square or rectangle on their geoboard. Then ask students to use another rubber band to divide the big shape into two smaller shapes. Have students share their findings and name the two new shapes that were made. Challenge students to divide the bigger shapes into three smaller shapes and name the new shapes.

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

Exploring how shapes can be combined to form larger shapes helps students to build their understanding of the properties of shapes. Geoboards, tangram puzzles, pattern blocks and grid paper are good tools for this type of exploration. Have students compose (build) a larger shape using only smaller shapes that have the same size and shape. The sides of the smaller shapes should touch and there should be no gaps or overlaps within the larger shape. For example, use one-inch squares to build a larger square with no gaps or overlaps. Have students also use different shapes to form a larger shape where the sides of the smaller shapes are touching and there are no gaps or overlaps. Ask students to describe the larger shape and the shapes that formed it.

Connections Across Standards

Identify and describe shapes (K.G.1-3).

Identify and describe measurable attributes (K.MD.1).

Directly compare two objects with a measurable attribute (K.MD.2).

Classify objects into given categories (K.MD.3).

Pre-K (Prior Grade Standard)

Combine simple shapes to form larger shapes.

1.G.2 (Future Grade Standard)

Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape. (Note: Students do not need to learn formal names such as “right rectangular prism.”)