NEBRASKA

Alternate Mathematics Instructional Supports for NSCAS Mathematics Extended Indicators Grade 3

for
Students with the Most Significant Cognitive Disabilities
who take the
Statewide Mathematics Alternate Assessment

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Overview

Introduction

Mathematics standards apply to all students, regardless of age, gender, cultural or ethnic background, disabilities, aspirations, or interest and motivation in mathematics (NRC, 1996).

The mathematics standards, extended indicators, and instructional supports in this document were developed by Nebraska educators to facilitate and support mathematics instruction for students with the most significant intellectual disabilities. They are directly aligned to the Nebraska's College and Career Ready Standards for Mathematics adopted by the Nebraska State Board of Education.

The instructional supports included here are sample tasks that are available to be used by educators in classrooms to help instruct students with significant intellectual disabilities.

The Role of Extended Indicators

For students with the most significant intellectual disabilities, achieving grade-level standards is not the same as meeting grade-level expectations, because the instructional program for these students addresses extended indicators.

It is important for teachers of students with the most significant intellectual disabilities to recognize that extended indicators are not meant to be viewed as sufficient skills or understandings. Extended indicators must be viewed only as access or entry points to the grade-level standards. The extended indicators in this document are not intended as the end goal but as a starting place for moving students forward to conventional reading and writing. Lists following "e.g." in the extended indicators are provided only as possible examples.

Students with the Most Significant Intellectual Disabilities

In the United States, approximately 1% of school-aged children have an intellectual disability that is "characterized by significant impairments both in intellectual and adaptive functioning as expressed in conceptual, social, and practical adaptive domains" (U.S. Department of Education, 2002 and American Association of Intellectual and Developmental Disabilities, 2013). These students show evidence of cognitive functioning in the range of severe to profound and need extensive or pervasive support. Students need intensive instruction and/or supports to acquire, maintain, and generalize academic and life skills in order to actively participate in school, work, home, or community. In addition to significant intellectual disabilities, students may have accompanying communication, motor, sensory, or other impairments.

Alternate Assessment Determination Guidelines

The student taking a Statewide Alternate Assessment is characterized by significant impairments both in intellectual and adaptive functioning which is expressed in conceptual, social, and practical adaptive domains and that originates before age 18 (American Association of Intellectual and Developmental Disabilities, 2013). It is important to recognize the huge disparity of skills possessed by students taking an alternate assessment and to consider the uniqueness of each child.

Thus, the IEP team must consider all of the following guidelines when determining the appropriateness of a curriculum based on Extended Indicators and the use of the Statewide Alternate Assessment.

- The student requires extensive, pervasive, and frequent supports in order to acquire, maintain, and demonstrate performance of knowledge and skills.
- The student's cognitive functioning is significantly below age expectations and has an impact on the student's ability to function in multiple environments (school, home, and community).
- The student's demonstrated cognitive ability and adaptive functioning prevent completion of the general academic curriculum, even with appropriately designed and implemented modifications and accommodations.
- The student's curriculum and instruction is aligned to the Nebraska College and Career Ready Mathematics Standards with Extended Indicators.
- The student may have accompanying communication, motor, sensory, or other impairments.

The Nebraska Department of Education's technical assistance documents "***IEP Team Decision Making Guidelines—Statewide Assessment for Students with Disabilities***" and "***Alternate Assessment Criteria/Checklist***" provide additional information on selecting appropriate statewide assessments for students with disabilities. School Age Statewide Assessment Tests for Students with Disabilities—Nebraska Department of Education.

Instructional Supports Overview

The mathematics instructional supports are scaffolded activities available for use by educators who are instructing students with significant intellectual disabilities. The instructional supports are aligned to the extended indicators in grades three through eight and in high school. Each instructional support includes the following components:

- Scaffolded activities for the extended indicator
- Prerequisite extended indicators
- Key terms
- Additional resources or links

The scaffolded activities provide guidance and suggestions designed to support instruction with curricular materials that are already in use. They are not complete lesson plans. The examples and activities presented are ready to be used with students. However, teachers will need to supplement these activities with additional approved curricular materials. The scaffolded activities adhere to research that supports instructional strategies for mathematics intervention, including explicit instruction, guided practice, student explanations or demonstrations, visual and concrete models, and repeated, meaningful practice.

Each scaffolded activity begins with a learning goal, followed by instructional suggestions that are indicated with the inner level, circle bullets. The learning goals progress from less complex to more complex. The first learning goal is aligned with the extended indicator but is at a lower achievement level than the extended indicator. The subsequent learning goals progress in complexity to the last learning goal, which is at the achievement level of the extended indicator.

The inner level, bulleted statements provide instructional suggestions in a gradual release model. The first one or two bullets provide suggestions for explicit, direct instruction from the teacher. From the teacher's perspective, these first suggestions are examples of "I do." The subsequent bullets are suggestions for how to engage students in guided practice, explanations, or demonstrations with visual or concrete models, and repeated, meaningful practice. These suggestions start with "Ask students to . . ." and are examples of moving from "I do" activities to "we do" and "you do" activities. Visual and concrete models are incorporated whenever possible throughout all activities to demonstrate concepts and provide models that students can use to support their own explanations or demonstrations.

The prerequisite extended indicators are provided to highlight conceptual threads throughout the extended indicators and show how prior learning is connected to new learning. In many cases, prerequisites span multiple grade levels and are a useful resource if further scaffolding is needed.

Key terms may be selected and used by educators to guide vocabulary instruction based on what is appropriate for each individual student. The list of key terms is a suggestion and is not intended to be an all-inclusive list.

Additional links from web-based resources are provided to further support student learning. The resources were selected from organizations that are research based and do not require fees or registrations. The resources are aligned to the extended indicators, but they are written at achievement levels designed for general education students. The activities presented will need to be adapted for use with students with significant intellectual disabilities.

Mathematics—Grade 3
MA 3.1 Number

MA 3.1.1 Numeric Relationships

MA 3.1.1.a

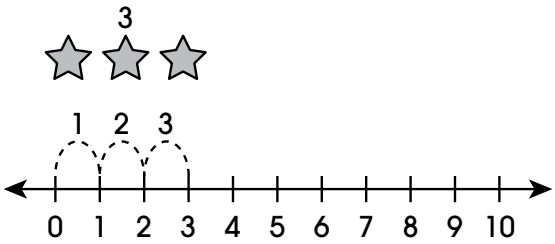
Read, write, and demonstrate multiple equivalent representations for the numbers up to 100,000 using objects, visual representations, including standard form, work form, expanded form, and expanded notation.

Extended: Read, write, and demonstrate whole numbers up to 20 that are equivalent representations including visual models, standard form, and word form.

Scaffolding Activities for the Extended Indicator

❑ **Identify equivalent representations of whole numbers up to 10.**

- Use a number line and objects to demonstrate counting to 3 on the number line and counting the number of stars. Count out loud to 3 and write "3."



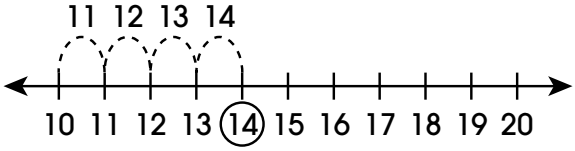
- Ask students to identify the word form of a whole number represented by a given set of objects. For example, ask students, "How many stars are there?"

- Ask students to identify the word form and to write or identify the whole number represented by a given set of objects.

❑ **Identify equivalent representations of whole numbers 11–20.**

- Use a group of objects and a number line to show equivalent representations. For example, present 14 stars. Circle the group of 10. Then count on to 14 and write "14."

Demonstrate using a number line. Since the group of 10 was circled, and therefore established, count on from 10 to 14 on the number line.



- Ask students to identify visual models that represent values between 10 and 20.
- Ask students to identify the word form and to write or identify the whole number represented by a given set of objects.

Prerequisite Skills

- Perform the counting sequence by counting forward from any given number to 10.
- Demonstrate cardinality (i.e., the last number name said indicates the number of objects counted) in which up to 10 objects were counted.
- Use one-to-one correspondence when counting up to 10 objects.

Key Terms

group, set, standard form, whole number, word form

Additional Resources or Links

https://www.engageny.org/resource/kindergarten-mathematics-module-5-topic-lesson-1

https://www.engageny.org/resource/kindergarten-mathematics-module-5-topic-lesson-2

MA 3.1.1.b

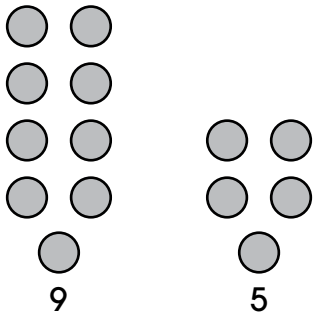
Compare whole numbers through the hundred thousands and represent the comparisons using the symbols >, <, or =.

Extended: Compare and order whole numbers, 1–20.

Scaffolding Activities for for the Extended Indicator

❑ **Compare whole numbers up to 20.**

- Use manipulatives to compare whole numbers. For example, count the 9 objects on the left and the 5 objects on the right in the figure below. Demonstrate by counting and comparing visually that the group of 9 has more objects than the group of 5 and that 9 is greater than 5. Repeat by comparing other groups of objects and indicating which group has the lesser number.

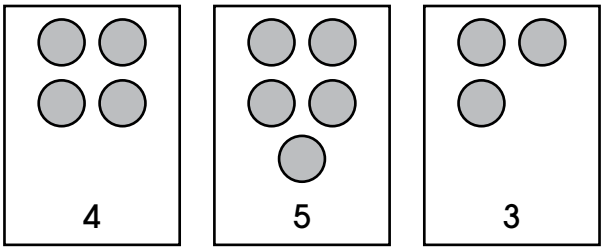


- Ask students to compare two groups of objects. Which group has more objects? Which number is greater? Which group has fewer objects? Which number is less?
- Use a number line to compare the quantity of a set of objects. Demonstrate with manipulatives and a number line that more objects will equal a number that is farther away from 0 on the number line and that fewer objects will equal a number that is closer to 0 on the number line. For example, present 2 objects and locate the number 2 on a created or purchased number line slider board. Add more objects, and then locate that number on the number line. Continue adding objects and emphasizing that more objects means the number is farther from 0 on the number line. Repeat the process by starting with 20 objects and gradually taking away objects. Emphasize that fewer objects means the number is closer to 0 on the number line.
- Present a set of 6 objects. Indicate the number 6 on a number line, and then add more objects. Ask students to indicate the direction on the number line (to the right or farther away from 0) where the number for the additional objects will be located. Repeat by asking students to indicate where to find a number on a number line that equals fewer objects (to the left or closer to 0).
- Use number lines to compare two numbers. Present a set of 12 objects and a number line with the number 12 indicated. Also present 6 objects and a number line with the number 6 indicated. Compare the two sets of objects and the two number lines, demonstrating how to determine which number is greater and which number is less.

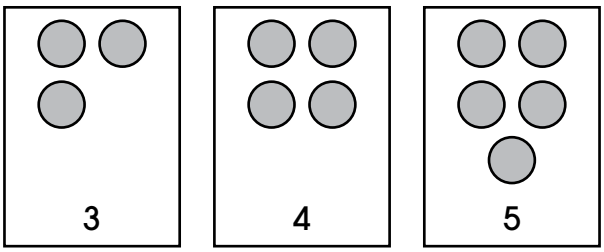
- Ask students to compare two numbers when presented with two sets of objects and two number lines with the number of objects indicated on the number line.
- Progress to comparing two numbers on one number line. For example, present a line with arrows pointing to 14 and 17 and ask students to identify which value is greater or which value is less.

❑ **Order whole numbers up to 20.**

- Use manipulatives to order whole numbers. For example, present three cards with different quantities of objects.

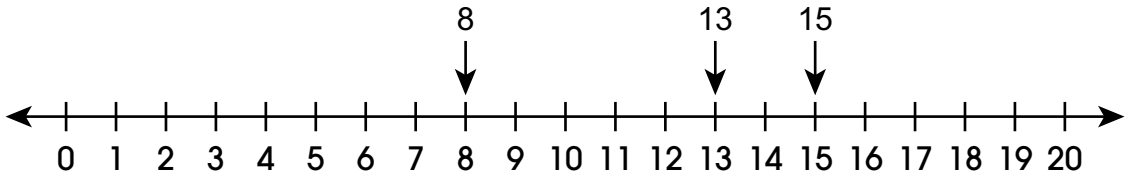


Demonstrate placing the cards in order from least to greatest.



- Ask students to order three number cards with objects from least to greatest.

- Use a number line to order whole numbers. For example, present a number line with three numbers indicated. Write the numbers in order from least to greatest, explaining that the number with the least value is located farthest to the left (or closest to 0) and the number with the greatest value is located farthest to the right (or farthest from 0). Demonstrate selecting from three options the set of numbers correctly ordered from least to greatest.



Numbers in order: 8, 13, 15

15, 8, 13
8, 13, 15
15, 13, 8

- Ask students to order a set of three numbers from least to greatest when given a number line. When appropriate, progress to ordering a set of three numbers from least to greatest without a number line or visual representation of objects.

Prerequisite Extended Indicator

MAE 3.1.1.a—Read, write, and demonstrate whole numbers up to 20 that are equivalent representations including visual models, standard form, and word form.

Key Terms

greater, greatest, least, less, more, order

Additional Resources or Links

http://tasks.illustrativemathematics.org/content-standards/1/NBT/B/3/tasks/1102

http://nlvm.usu.edu/en/nav/frames_asid_334_g_1_t_1.html?from=topic_t_1.html

(Note: Java required for website. Most recent version recommended, but not needed.)

MA 3.1.1.c

Round a whole number to the tens or hundreds place, using place value understanding or a visual representation.

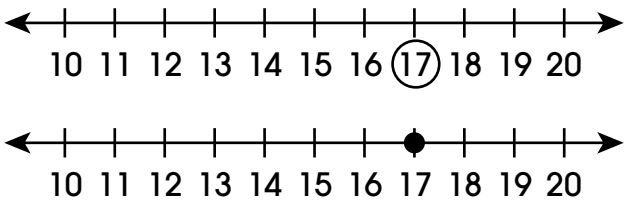
Extended: Identify a number closer to a given number on a number line, 1–20.

Scaffolding Activities for the Extended Indicator

❑ **Identify the location of a number on a number line.**

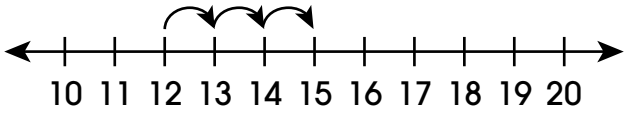
- Use a number line marked with whole numbers to demonstrate finding a given number's location. Use a variety of number lines (e.g., from 0 to 10, 10 to 20, 0 to 20).

  Demonstrate how to determine the location of the number 17 on a number line. Begin by circling the number 17. Then, point to the location on the number line that represents the 17. Place a dot at that location on the number line.



❑ **Identify the distance between numbers on a number line.**

- Use a number line to show the distance between numbers. For example, the distance between 12 and 15 is three "jumps," indicated by the arrows.

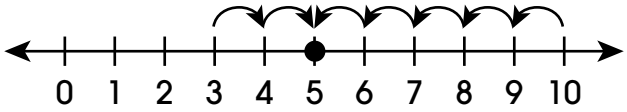


  Since there are three "jumps" from 12 to 15, the distance between them is 3. Continue to demonstrate with a variety of numbers from 0 to 20.

- Ask students to find the distance between two numbers on a number line by counting the "jumps."

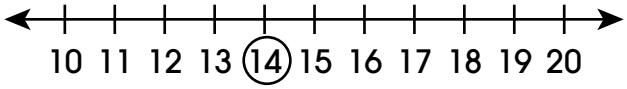
❑ **Identify a number closer to a given number on a number line.**

- Use a number line to demonstrate comparing the distances between numbers. For example, compare the distance from 3 to 5 to the distance from 10 to 5.



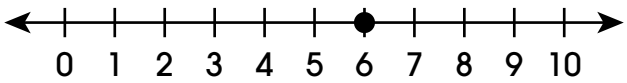
Count the number of "jumps" from 3 to 5 and the number of jumps from 10 to 5. Identify that 3 is closer to 5 than 10 is because it took fewer jumps.

Progress to comparing the distance of a third number. For example, "given the number 14 on the number line, which of these numbers is closest: 10, 15, or 20?"



Demonstrate by counting jumps or measuring the distances in a more concrete way, such as using manipulatives like pipe cleaners or popsicle sticks to compare the distances, to find that 15 is closest to 14.

- Ask students to identify a number closer to a given number on a number line. For example, present the following question and number line: "Which number is closest to 6?" Give students three choices: 1, 5, or 10.



Students should determine that 5 is closest to 6 on the number line.

Prerequisite Extended Indicator

MAE 3.1.1.a—Read, write, and demonstrate whole numbers up to 20 that are equivalent representations including visual models, standard form, and word form.

Key Terms

closest, distance, location, number line

Additional Resources or Links

https://www.mathlearningcenter.org/apps/number-line

http://nlvm.usu.edu/en/nav/frames_asid_180_g_1_t_1.html?open=activities&from=search.html?qt=nnumber%20line

(Note: Java required for website. Most recent version recommended, but not needed.)

MA 3.1.1.d

Represent and understand a fraction as a number on a number line.

Extended: Represent halves and wholes on a number line.

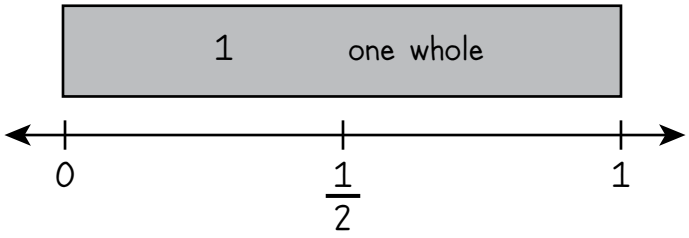
Scaffolding Activities for the Extended Indicator

❑ **Create models of one whole and one-half using strips of paper and number lines.**

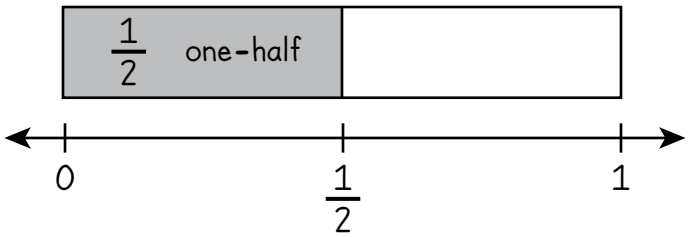
- Show students one long rectangular strip of paper. Color in the whole piece. Label it with "1" and "one whole."

- Show students how to fold a paper strip into two equal parts. Describe the parts as halves, stating each part is a fraction named one-half and together there are two parts or two halves that make a whole. Color half the strip and write the fraction "$\frac{1}{2}$" as well as the word "one-half."

- Ask students to create their own models of one whole and one-half using paper strips. Rectangles may already be partitioned.
- Model how to create a number line from 0 to 1 using the paper strips.



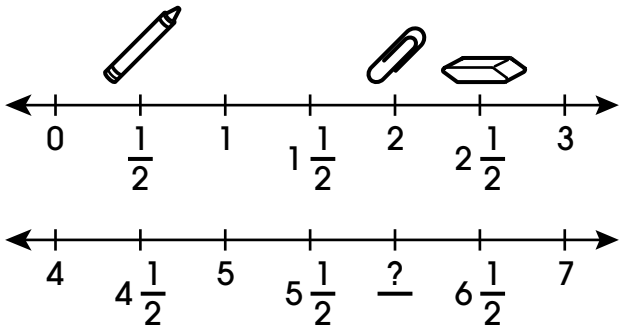
Repeat the procedure for one-half. Include a tick mark at $\frac{1}{2}$.



- Ask students to create a number line from 0 to 1 using paper strips. Ask students to identify the correct label for each tick mark (0, $\frac{1}{2}$, 1).

❑ Identify halves and wholes on a number line.

- Demonstrate finding whole numbers and halves on a number line from 0 to 3 that is labeled in increments of one-half. Place or draw objects at different tick marks and then model identifying an object at a specific location (e.g., determine which object is located at two and one-half). Present a similar number line with one tick mark not labeled and demonstrate filling in the missing number.



- Ask students to identify an object located at a position on a number line that is labeled in increments of one-half.
- Ask students to fill in or select a missing number on a number line that is labeled in increments of one-half.

Prerequisite Skills

- Divide objects and images into two equal parts and use the language one-half, halves, and whole.

Key Terms

half, number line, whole

Additional Resources or Links

https://www.mathlearningcenter.org/apps/number-line

https://www.engageny.org/resource/grade-3-mathematics-module-5-topic-d-lesson-16/file/35386

MA 3.1.1.e

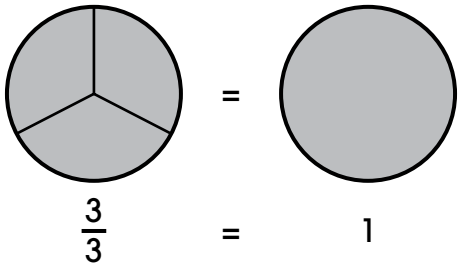
Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers.

Extended: Given a model, represent a whole number (1–3) as a fraction with a denominator of 2, 3, or 4.

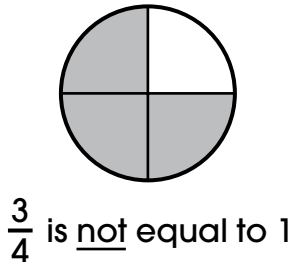
Scaffolding Activities for the Extended Indicator

❑ **Use models to represent the whole number 1 as a fraction with a denominator of 2, 3, or 4.**

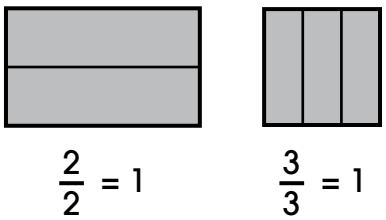
- Use circles to demonstrate the equivalence of fractions and the whole number 1. Use the graphic below to indicate that the 3 in the numerator represents the number of shaded pieces, the 3 in the denominator represents the number of equal-sized pieces the whole is divided into, and the whole number 1 represents the number of whole circles.



Show counterexamples to students as well, such as $\frac{3}{4}$ does **not** equal 1 whole.



- Use rectangular and square models with denominators of 2, 3, and 4 to represent the whole number 1.

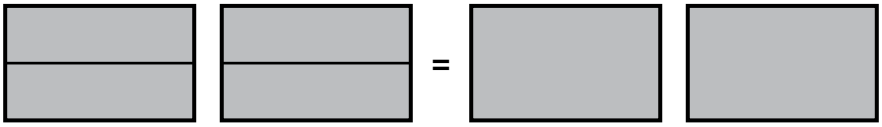


- Ask students to identify the fraction form of the whole number 1 represented with circles, squares, and rectangles with 2, 3, and 4 sections.

___ = 1 ___ = 1 ___ = 1

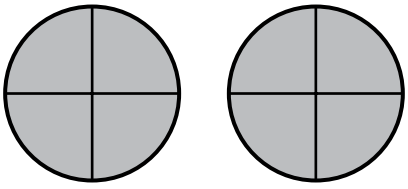
❑ **Use models to represent whole numbers up to 3 as fractions with denominators of 2, 3, or 4.**

- Use rectangular models to demonstrate the equivalence of fractions and whole numbers. Use the graphic below to indicate that the 4 in the numerator represents the number of shaded pieces, the 2 in the denominator represents the number of pieces each whole is divided into, and the whole number 2 represents the number of whole rectangles.



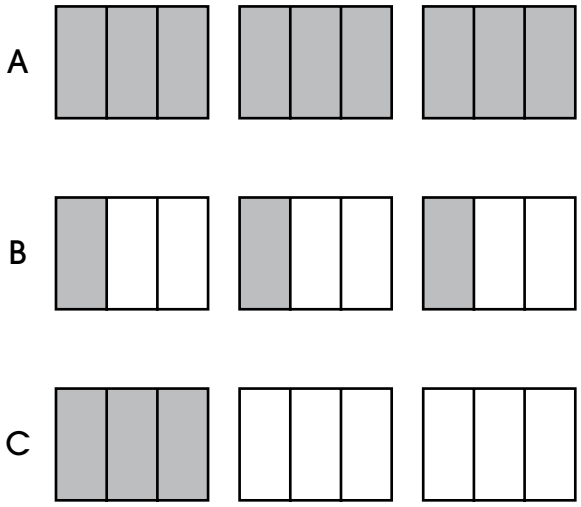
$\frac{4}{2} = 2$

- Ask students to identify a whole number up to 3 represented in fraction form with circles, squares, and rectangles divided into 2, 3, and 4 sections.



$\frac{8}{4} = \_\_$

- Ask students to identify a whole number up to 3 in its fractional form in multiple-choice formats such as “Which model represents the whole number 3?”



Prerequisite Skills

- Draw lines to separate two-dimensional figures into equal areas and express the area of each part as a unit fraction of the whole.
- Decompose circles, squares, and rectangles into two, three, and four equal parts while using the terms halves, thirds, and fourths.
- Divide real-world objects into two, three, or four equal parts. Describe the parts using the language of halves, thirds, and fourths.

Key Terms

denominator, equal, fraction, numerator, whole number

Additional Resources or Links

https://www.mathlearningcenter.org/apps/fractions

http://tasks.illustrativemathematics.org/content-standards/3/NF/A/2/tasks/173

MA 3.1.1.g

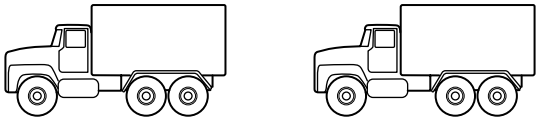
Find parts of a whole and parts of a set using visual representations.

Extended: Identify parts of a set as one-half, one-fourth, or the whole of the set, limited to four objects.

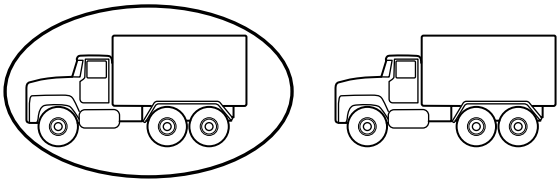
Scaffolding Activities for the Extended Indicator

❑ **Identify the whole and part of the whole in a set of 2 objects.**

- Use manipulatives or drawings to show sets of 2 objects. Explain that 2 trucks together make a whole set of trucks. Demonstrate selecting both trucks to represent the whole.



- One-half of the set is only part of the set. This can be shown by circling 1 of the 2 trucks. Explain that the fraction one-half refers to 1 part out of 2 equal parts of a whole. In this case, the whole is the set of 2 trucks, and each truck is 1 part out of 2.

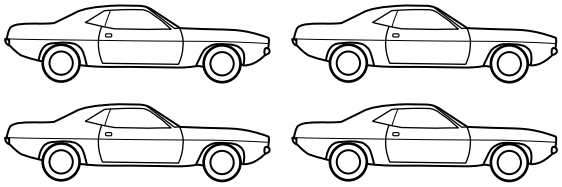


Continue to present a variety of objects, all sets of 2, and circle or highlight 1 object to show one-half.

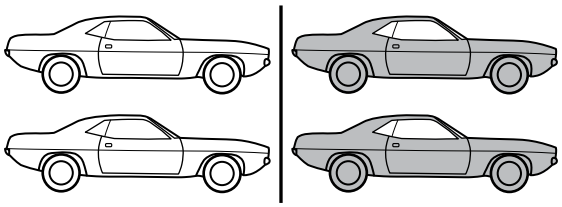
- Ask students to identify the whole in a set of 2 objects.
- Ask students to identify one-half in a set of 2 objects.

❑ **Identify the whole and one-half of the whole in a set of 4 objects.**

- Use manipulatives or drawings to show students sets of 4 objects. Explain that 4 cars together make a whole set of cars. Demonstrate selecting all 4 cars to represent the whole.

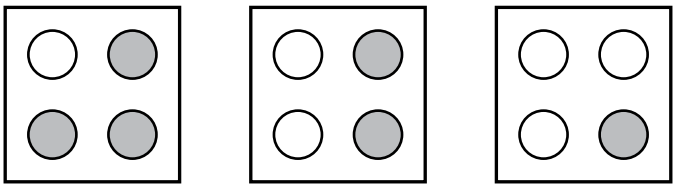


- One-half of the set is 1 part out of every 2 parts of the set. Demonstrate separating the cars into 2 equal parts and then selecting or highlighting 2 of the cars to represent one-half.



Continue to present a variety of objects in sets of 4 and circle or highlight 2 of the objects to show one-half of the set.

- Ask students to identify the whole in a set of 4 objects.
- Ask students to identify a drawing that shows one-half in a set of 4 objects. For example, present the figure shown and ask, “Which set of circles shows one-half of the circles shaded?”



Students should determine that the set of circles in the middle shows one-half of the circles shaded.

❑ **Identify one-fourth of the whole in a set of 4 objects.**

- Use manipulatives or drawings to show a set of 4 objects. Explain that the fraction one-fourth means 1 part out of 4 equal parts. Demonstrate selecting or highlighting 1 butterfly to represent one-fourth of the whole set of butterflies.

Continue to present a variety of objects in sets of 4 and circle or highlight 1 object to show one-fourth of the set.

- Ask students to select one-fourth of the objects when given a set of 4 objects.
- Ask students to identify a drawing that shows one-fourth in a set of 4 objects. For example, present the figure shown and ask, “Which set of stars shows one-fourth of the stars shaded?”

Students should determine that the first set of stars shows one-fourth shaded.

Prerequisite Extended Indicators

MAE 3.1.1.i—Use a model to compare unit fractions one-half, one-third, and one-fourth.

MAE 3.1.1.d—Represent halves and wholes on a number line.

Key Terms

one-fourth, one-half, part, set, whole

Additional Resources or Links

https://www.mathlearningcenter.org/sites/default/files/pdfs/SecB2SUP-A10_NumFractions-201304.pdf

http://nlvm.usu.edu/en/nav/frames_asid_103_g_1_t_1.html?from=topic_t_1.html

(Note: Java required for website. Most recent version recommended, but not needed.)

MA 3.1.1.i

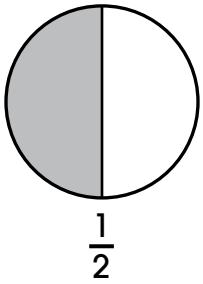
Compare and order fractions having the same numerators or denominators using visual representations, comparison symbols, and verbal reasoning.

Extended: Use a model to compare unit fractions one-half, one-third, and one-fourth.

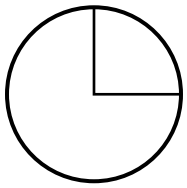
Scaffolding Activities for the Extended Indicator

❑ **Identify the fractions one-half, one-third, and one-fourth as part of a whole.**

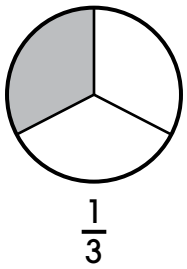
- Use models to show what one-half, one-third, and one-fourth of a whole look like. Present the figure as shown. Explain that the shaded part of the circle represents one-half, or $\frac{1}{2}$, of the circle. Make note that the two parts **must** be equal in size to represent $\frac{1}{2}$.



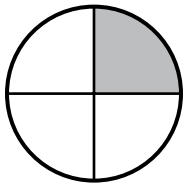
Present the figure as shown, and explain that the circle has two parts, but the parts are not equal in size, so they do not represent $\frac{1}{2}$.



Show a circle that is divided into three parts of equal size. Then, to represent one-third, or $\frac{1}{3}$, shade one of the parts. As with the fraction $\frac{1}{2}$, the fraction $\frac{1}{3}$ must have 3 parts of equal size, with one of the parts shaded.



Next, show a circle that is divided into four parts of equal size, with one part shaded to represent $\frac{1}{4}$.



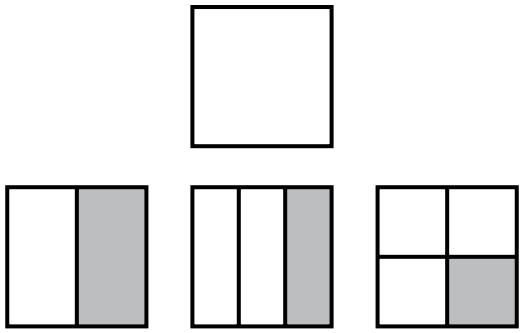
$\frac{1}{4}$

Continue to demonstrate models that represent $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$ of a whole using a variety of shapes in different sizes.

- Ask students to identify the model that represents one-half as part of a whole when given two models to compare. Present one model divided into two equal parts with one part shaded and another model divided into two unequal parts with one part shaded. For example, ask students which rectangle shows $\frac{1}{2}$ shaded. Repeat with the fractions $\frac{1}{3}$ and $\frac{1}{4}$.
- Ask students to identify the fraction one-third as part of a whole when presented the figure as shown. Repeat with the fractions $\frac{1}{2}$ and $\frac{1}{4}$.

❑ **Compare the unit fractions one-half, one-third, and one-fourth using a model.**

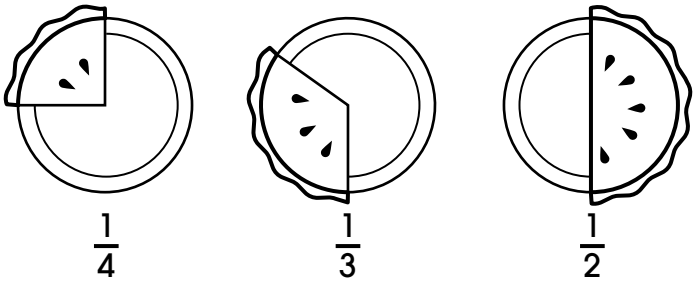
- Use a model to show the size differences of $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$. Present a square as shown, and indicate that the square represents one whole. Demonstrate shading the whole square. Next, present the same square, and demonstrate shading $\frac{1}{2}$ of the whole. Repeat the process with $\frac{1}{3}$ and $\frac{1}{4}$.



Explain that one part was shaded in each square, but a different amount was shaded each time because the size of the parts was different. Indicate that the more parts the square is divided into, the smaller each part is.

Present models with shading representing $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$ of the whole, in that order. Explain that each model shows a smaller amount of shading than the model before it, so $\frac{1}{2}$ is greater than $\frac{1}{3}$, and $\frac{1}{3}$ is greater than $\frac{1}{4}$. Also, $\frac{1}{2}$ is greater than $\frac{1}{4}$.

It may be helpful to use a real-life situation to compare the sizes of unit fractions. Present the idea of cutting up a pie into pieces. Point out that $\frac{1}{4}$ of the pie is a smaller piece than $\frac{1}{3}$ of the pie or $\frac{1}{2}$ of the pie. Also, $\frac{1}{2}$ of the pie is a larger piece than $\frac{1}{3}$ of the pie.



Continue to demonstrate comparing the unit fractions $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$ and using a variety of models and placing the models in order from least to greatest. Consider using a piece of bread or a piece of paper as models that can be easily manipulated.

- Ask students to compare two models that represent unit fractions $\frac{1}{2}$, $\frac{1}{3}$, or $\frac{1}{4}$ and indicate which fraction is more or which fraction is less.
- Ask students to compare three models that represent unit fractions $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$ and place the models in order from least to greatest.

Prerequisite Extended Indicators

MAE 3.1.1.g—Identify parts of a set as one-half, one-fourth, or the whole of the set, limited to four objects.

MAE 3.1.1.d—Represent halves and wholes on a number line.

Key Terms

divide, equal, greatest, least, less, more, part, unit fraction, whole

Additional Resources or Links

https://www.engageny.org/resource/grade-3-mathematics-module-5-topic-c-overview

http://nlvm.usu.edu/en/nav/search.html?qt=ffraction

(Note: Java required for website. Most recent version recommended, but not needed.)

MA 3.1.2 Operations

MA 3.1.2.a

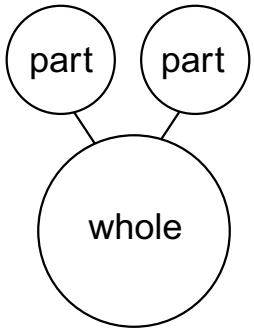
Add and subtract within 1,000 with or without regrouping.

Extended: Add and subtract, through 20 without regrouping.

Scaffolding Activities for the Extended Indicator

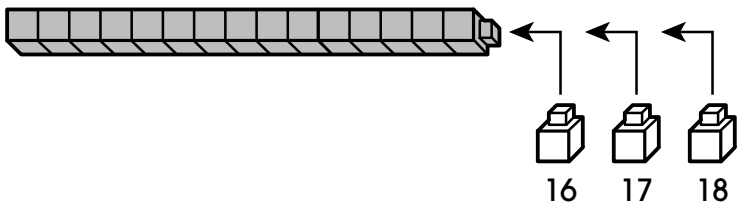
❑ **Add numbers with sums of 20 or less without regrouping.**

- Use manipulatives and a part-part-whole model to demonstrate how to add values with sums up to 20 without regrouping.



Present the problem 8 + 1 = _____. Count 8 tokens and place them in the first circle labeled “part.” Place 1 token in the other circle labeled “part.” Move the tokens from the smaller circles that represent the parts to the larger circle that represents the whole. Count the total number of tokens to determine the answer, 9. Complete the addition sentence, 8 + 1 = 9.

- Ask students to use the part-part-whole model and manipulatives to solve addition problems with sums up to 20.
- Use snap-together blocks to demonstrate how to add numbers with sums up to 20 without regrouping. Present a group of snap-together blocks in two colors and the problem 15 + 3 = _____. Demonstrate counting out 15 blocks of one color. Then count out 3 blocks of another color and add them one by one to the stack of 15. Count forward from 15 as each block of the group of 3 is added to find the solution. Complete the addition sentence, 15 + 3 = 18.

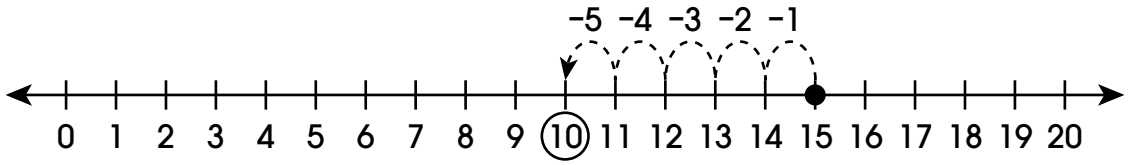


- Ask students to use blocks in two colors to solve addition problems with sums up to 20.

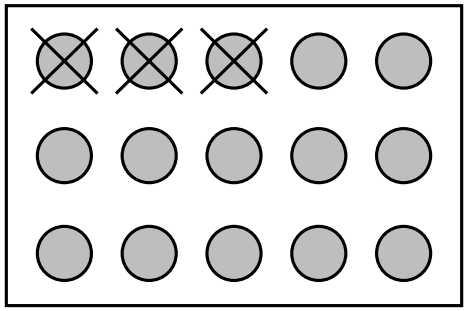
❑ **Subtract from 20 or less without regrouping.**

- Use a number line to demonstrate how to subtract numbers from 20 or less without regrouping. Present a number line and the problem 15 – 5 = _____. Demonstrate

subtraction by first locating 15 on the number line. Then explain that subtracting means moving to the left on a number line to get a smaller number. Demonstrate moving to the left 5 units to arrive at the solution to the problem. Complete the subtraction sentence, 15 – 5 = 10.



- Ask students to use a number line from 0 to 20 to solve subtraction problems.
- Use manipulatives to demonstrate how to subtract numbers from 20 or less without regrouping. Present the problem 15 – 3 = _____. Count out 15 tokens. Explain that subtracting means to take away or remove some tokens. Remove 3 tokens. Count the number of tokens that are left, 12. Complete the subtraction sentence, 15 – 3 = 12.



- Ask students to use manipulatives and real-life objects or situations to solve subtraction problems.

Prerequisite Skills

- Demonstrate the relationship between whole numbers 1–20, by identifying that each sequential number refers to a quantity that is one larger.
- Use models to increase a quantity while using the terms “2 more,” “plus 1,” or “add 3.”
- Use models to decrease a quantity while using the terms “take away 2,” “minus 2,” or “subtract 3.”

Key Terms

add, addition, decrease, increase, less, more, subtract, subtraction, total

Additional Resources or Links

https://www.engageny.org/resource/grade-1-mathematics-module-2

https://www.insidemathematics.org/common-core-resources/1st-grade

MA 3.1.2.c

Use drawings, words, arrays, symbols, repeated addition, equal groups, and number lines to explain the meaning of multiplication.

Extended: Use a model to show multiplication as repeat addition with a product no greater than 20.

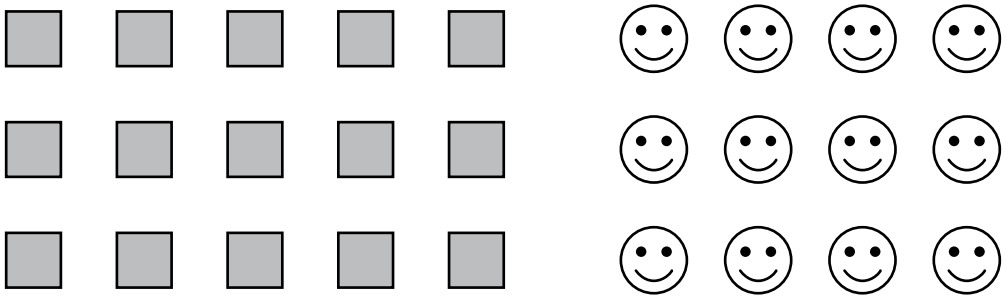
Scaffolding Activities for the Extended Indicator

❑ **Use common objects with multiple parts (for example, toy cars that each have four wheels or toy figures that have two eyes and two ears) to represent multiplication as repeated addition.**

- Use real-life objects to demonstrate that multiple copies of the same object type represent repeated addition. For example, provide multiple toy cars to students. Count each of the 4 wheels on the first car. Then, pick up another car and repeat counting the 4 wheels. Indicate that there are 8 wheels in total on the two cars. Write the number sentences 4 + 4 = 8 and 4 × 2 = 8. Indicate that the sentences represent the same thing, the total number of wheels on the cars. Repeat the activity with 3, 4, and 5 cars. Indicate that each time a car is added to the group and the wheels are counted, there is another 4 added to the addition sentence and the number that 4 is multiplied by increases by one in the multiplication sentence.
- Ask students to identify addition and multiplication sentences to represent multiple copies of the same parts in common objects.

❑ **Use arrays consisting of objects or pictures to illustrate multiplication as repeated addition.**

- Use an array such as three rows of five squares or three rows of four happy faces to demonstrate how to count the objects in the array.



Count the squares as 5 + 5 + 5 = 15 and as 5 × 3 = 15. Additionally, count each square to show that there are 15. Repeat the same process for the happy faces: 4 + 4 + 4 = 12 and 4 × 3 = 12. Continue with different arrays.

- Ask students to complete tables that represent multiplication three ways: as a multiplication sentence, as an addition sentence, and as an array. Present students with a multiplication sentence and ask them to select or create an array and addition sentence that match.

Multiplication Sentence	Addition Sentence	Array
3 × 4		

Present students with a repeated-number addition sentence and ask them to select or create an array and multiplication sentence that match.

Multiplication Sentence	Addition Sentence	Array
	5 + 5 + 5	

Present students with an array and ask them to select or create a multiplication sentence and addition sentence that match.

Multiplication Sentence	Addition Sentence	Array
		* * * * * * * * * * * * * * * *

Prerequisite Extended Indicators

MAE 3.1.2.a—Add and subtract, through 20 without regrouping.

MAE 3.1.1.a—Read, write, and demonstrate whole numbers up to 20 that are equivalent representations including visual models, standard form, and word form.

Key Terms

add, addition, addition sentence, array, multiply, multiplication, multiplication sentence, times

Additional Resources or Links

https://www.mathlearningcenter.org/apps/number-line

https://www.engageny.org/resource/grade-3-mathematics-module-1-topic-lesson-1/file/33806

MA 3.1.2.e

Multiply one-digit whole numbers by multiples of 10 in the range of 10 to 90.

Extended: Multiply one and two by ten, twenty, and thirty up to 60.

Scaffolding Activities for the Extended Indicator

❑ **Multiply one by ten, twenty, and thirty.**

- Explain that multiplying any number by 1 will result in a product (answer) that is the same as the other factor (number). Since multiplying 1 by 10 is the same as repeating the 10 one time, the product is 10.

  $$1 \times 10 = 10$$

  Another way to interpret 1 × 10 is one group of ten. Use real-life objects, base ten blocks, other manipulatives, or drawings to demonstrate making one group of ten, one group of twenty, and one group of thirty up to one group of sixty to find the products for 1 × 10, 1 × 20, and 1 × 30 up to 60.

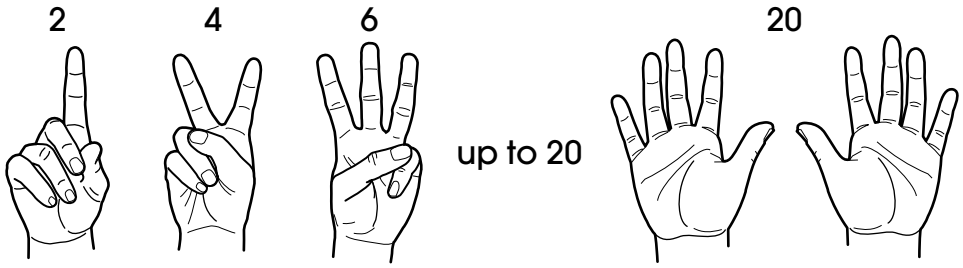
  Emphasize that the order of the factors does not change the product (or answer): 10 × 1 = 10 and 1 × 10 = 10. Use base ten blocks, other manipulatives, or drawings to compare one group of ten to ten groups of one. Repeat with the other factor combinations 1 × 20 and 20 × 1 up to 60.

- Ask students to multiply and compare the products of 1 × 10 and 10 × 1. Repeat with 1 × 20 and 20 × 1, and 1 × 30 and 30 × 1.

- Ask students to multiply 10 × 1, 20 × 1, and 30 × 1 using all factor combinations.

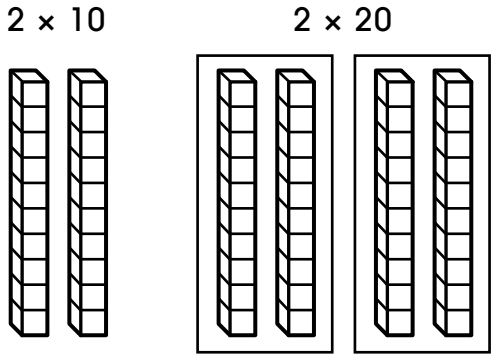
❑ **Multiply two by ten, twenty, and thirty.**

- Use skip counting by two to find the product of two times ten, twenty, and thirty. For example, skip count aloud (2, 4, 6, 8, . . .), using fingers to count how many twos are counted.



  Show how to skip count by two involving another person's hands to get to forty, which would be twenty times, and then with a third person's hands to get to sixty, which would be skip counting by two thirty times.

- Use base ten blocks or other manipulatives to show 2 × 10 as two groups of ten and 2 × 20 as two groups of twenty. Repeat for two groups of thirty.



- Use repeated addition to demonstrate multiplying two by ten. This can be done using manipulatives or the number sentences shown. Repeat for 2 × 20 and 2 × 30.

2 × 10
2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 = 20

Demonstrate creating picture models that represent the multiplication problems that can then be used to count to find the product (e.g., tally marks or circles in sets of two). When appropriate, introduce using the standard algorithm to multiply two by ten, twenty, and thirty. Be sure to emphasize that the order of the factors does not change the product.

- Ask students to multiply two by ten, twenty, and thirty when given picture models or manipulatives.
- Ask students to multiply two by ten, twenty, and thirty when not given picture models or manipulatives.

Prerequisite Extended Indicators

MAE 3.1.2.c—Use a model to show multiplication as repeat addition with a product no greater than 20.

MAE 3.1.2.a—Add and subtract, through 20 without regrouping.

Key Terms

factor, multiply, product, repeated addition, skip count

Additional Resources or Links

https://www.engageny.org/resource/grade-3-mathematics-module-3-topic-f-lesson-19

https://www.engageny.org/resource/grade-3-mathematics-module-3-topic-f-lesson-20

MA 3.1.2.f

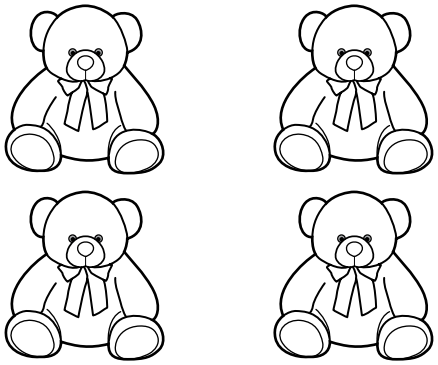
Use objects, drawings, arrays, words, and symbols to explain the relationship between multiplication and division (e.g., if 3 × 4 = 12 then 12 ÷ 3 = 4).

Extended: Count the number of twos in four, six, and eight and the number of threes in six and nine using a model.

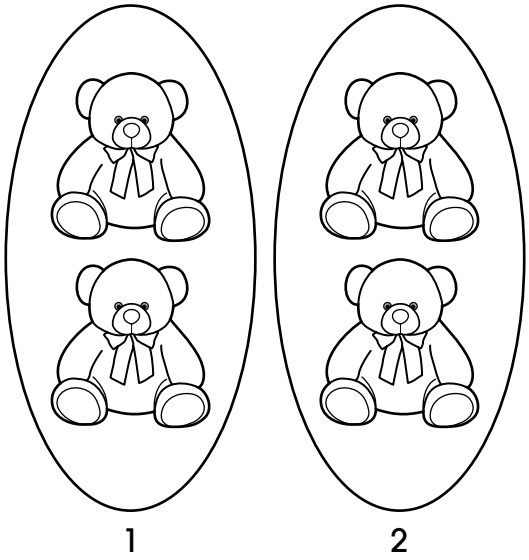
Scaffolding Activities for the Extended Indicator

❑ **Count the number of twos in four, six, and eight.**

- Use manipulatives or drawings to show four objects. Arrange or group the objects in pairs. Describe pairs of objects as sets of two or groups of two interchangeably.

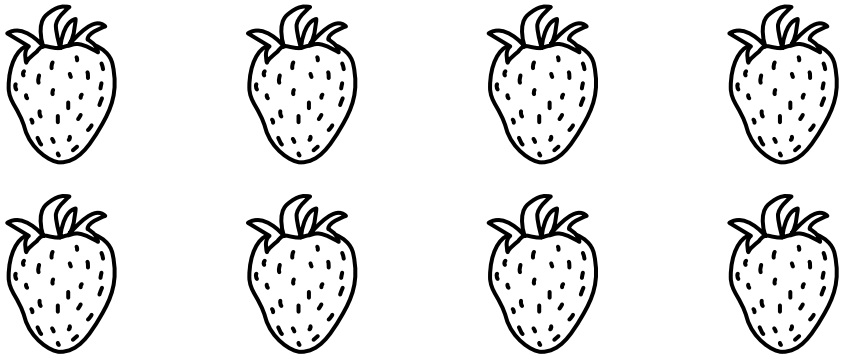


Next, demonstrate counting the number of sets of two. It might be helpful to start by providing each pair in a different color to indicate the sets. For example, provide two blue bears and two red bears.



Repeat this activity with six objects and eight objects.

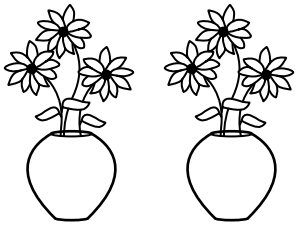
- Ask students to identify sets of two objects.
- Ask students to count the number of twos in four, six, and eight. For example, present the following figure and ask, “How many sets of two are there?”



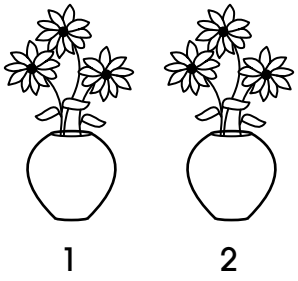
Students should determine there are four sets of two.

❑ **Count the number of threes in six and nine.**

- Use manipulatives or drawings to show a set of six objects. Arrange the objects in groups of three. For example, the six flowers shown are in groups of three in each vase.

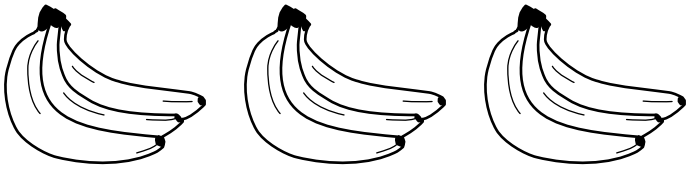


Next, demonstrate counting the number of groups of three. There are two groups of three in six as shown by the following figure.



Repeat this activity with a collection of nine objects.

- Asks students to identify groups of three objects.
- Ask students to count the number of threes in six and nine. For example, present the following figure and ask, “How many groups of three are there?”



Students should determine there are three groups of three.

Prerequisite Extended Indicator

MAE 3.1.1.a—Read, write, and demonstrate whole numbers up to 20 that are equivalent representations including visual models, standard form, and word form.

Key Terms

group, pair, set

Additional Resources or Links

https://www.engageny.org/resource/kindergarten-mathematics-module-1-topic-b-lesson-4

https://www.engageny.org/resource/kindergarten-mathematics-module-1-topic-b-lesson-5

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Mathematics—Grade 3
MA 3.2 Algebra

MA 3.2 Algebraic Relationships

MA 3.2.1.a

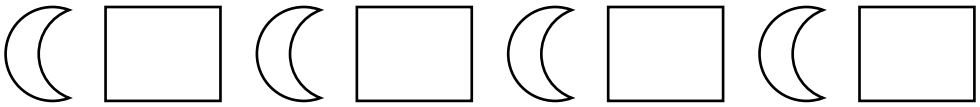
Identify arithmetic patterns (including patterns in the addition or multiplication tables) using properties of operations.

Extended: Identify the next term in numeric and non-numeric AB patterns.

Scaffolding Activities for the Extended Indicator

❑ **Identify the next term in a non-numeric AB pattern.**

- Demonstrate two different actions (e.g., touch the sky and touch the ground, thumbs up and thumbs down, raise a hand and tap a foot). Model and explain the AB pattern with the actions.
- Ask students to indicate when an AB pattern of actions is performed **incorrectly**. For example, if the pattern is to raise a hand and stomp a foot and the actions demonstrated were raise, stomp, raise, stomp, raise, stomp, stomp, students indicate that the AB pattern was not correctly followed.
- Show an AB pattern with objects. Demonstrate extending the pattern by placing the next objects in the pattern.



- Ask students to extend an AB pattern with objects or pictures.

❑ **Identify the next number in a numeric AB pattern.**

- Use different colored cards with numbers written on them to create an AB pattern. For example, write the number 4 on three green cards and the number 6 on three yellow cards. Demonstrate sorting the cards to create the pattern green, yellow, green, yellow, green, yellow. Write the number pattern created: 4, 6, 4, 6, 4, 6. Model identifying the next number in the pattern.
- Show the numbers 3, 5, 3, 5, 3, 5. Model identifying the next number in the pattern.
- Ask students to identify the next number in an AB pattern made with numbers.

Prerequisite Skill

- Recognize patterns and copy patterns.

Key Terms

before, next, pattern

Additional Resources or Links

https://www.nctm.org/Classroom-Resources/Illuminations/Interactives/Creating,-Describing,-and-Analyzing-Patterns/

https://www.mathlearningcenter.org/sites/default/files/pdfs/SecBKSUP-B1_AlgPatterns-201304.pdf

MA 3.2.1.b

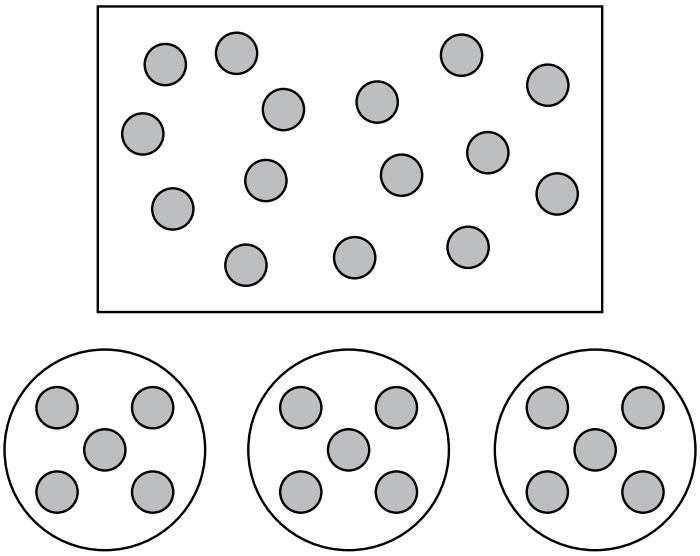
Interpret a multiplication equation as equal groups (e.g., interpret 4 × 6 as the total number of objects in four groups of six objects each). Represent verbal statements of equal groups as multiplication equations.

Extended: Identify a multiplication equation as representing equal groups up to 20.

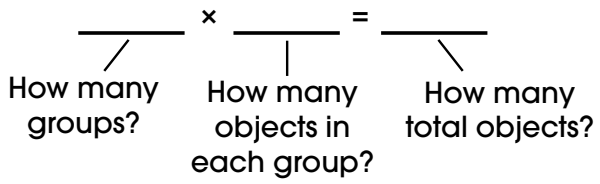
Scaffolding Activities for the Extended Indicator

❑ **Identify a multiplication equation that represents a set of objects sorted into groups of equal size.**

- Use manipulatives to show a group of 15 objects. Also show 15 objects in smaller groups of equal size. Indicate that both examples have the same number of objects and that having groups of equal size can help students find the total number of objects quickly.



Refer to the set of 15 objects that is arranged in 3 equal groups of 5 and ask the following questions. How many groups are there? How many objects are in each group? How many total objects are there? Demonstrate how to use this information to fill in the template for the multiplication equation.

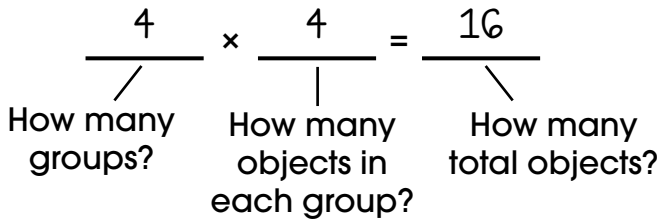


Repeat the same process with other examples of up to 20 objects arranged in groups of equal size.

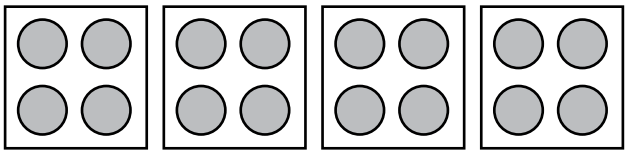
- Ask students to identify the multiplication equation for images of objects in equal groups. Be sure to practice all multiplication equations of groups up to 20. For example, use 2 groups of 6 objects to show 2 × 6 = 12; also use 6 groups of 2 objects to show 6 × 2 = 12.

❑ **Use groups of equal size to represent a multiplication equation.**

- Write the equation 4 × 4 = 16 on the template indicating the number of groups, the number of objects in each group, and the total number of objects.

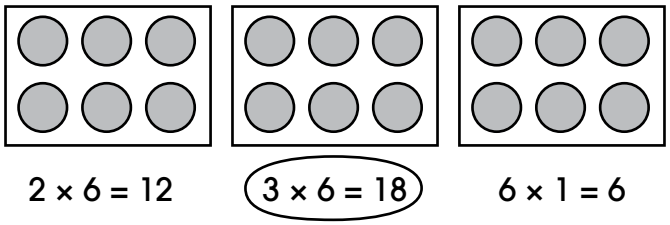


Demonstrate sorting objects into equal groups to represent the equation.



Do this for several equations, with up to 20 objects total. Then progress to creating groups of equal size without using the template. Demonstrate this process with objects and drawings of objects.

- Ask students to create groups of equal size that represent a multiplication equation that is written on a template. Then progress to a multiplication equation that is not written on the template.
- Ask students to identify a multiplication equation that matches a given picture. For example, give students the picture shown, with three possible equations to choose from.



Students should choose the equation 3 × 6 = 18.

Prerequisite Extended Indicator

MAE 3.1.2.c—Use a model to show multiplication as repeat addition with a product no greater than 20.

Key Terms

equal, equation, groups, multiplication

Additional Resources or Links

https://www.engageny.org/resource/grade-3-mathematics-module-1-topic-lesson-1

https://www.engageny.org/resource/grade-3-mathematics-module-1-topic-lesson-2

MA 3.2.2 Algebraic Processes

MA 3.2.2.b

Solve one-step whole number equations involving addition, subtraction, multiplication, or division, including the use of a letter to represent the unknown quantity.

Extended: Solve a one-step equation for sums and differences 0–9.

Scaffolding Activities for the Extended Indicator

❑ **Identify how the position of an unknown changes the problem in an addition or subtraction sentence.**

- Explain that when solving number sentences, sometimes the number missing is at the end. In 5 + 3 = ____, the problem is asking for the total when adding 5 and 3. Model rephrasing a number sentence as a question.

6 – 4 = ☐	2 + 1 = ____
What is six take away four? Start with six and then remove four. How many are left?	What is the total of 2 and 1? Start with two and then add one more. How many altogether?

- Explain that the missing number can also be in the middle of a number sentence. In 4 + ____ = 7, the missing number is added to four to make seven. Model rephrasing a number sentence as a question.

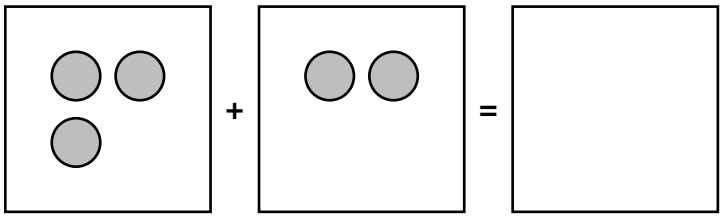
3 + ____ = 5	8 – ☐ = 1
What number is added to three to make five? When starting with three, how many more do we need to have five?	What number is taken away from eight to make one? When starting with eight, how many need to be removed so there is one left?

- Ask students to identify the missing information in a number sentence.

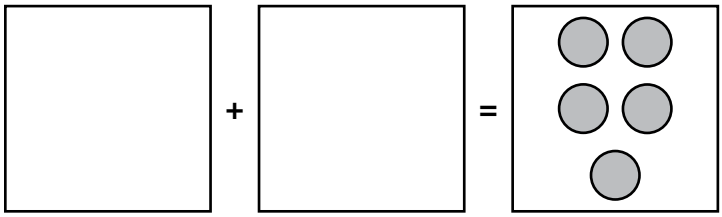
8 – 2 = ____	7 + ☐ = 8	3 + 3 = ____
7 – ☐ = 1	5 – 4 = ____	0 + ☐ = 5

❑ **Solve addition equations with a missing addend or a missing sum.**

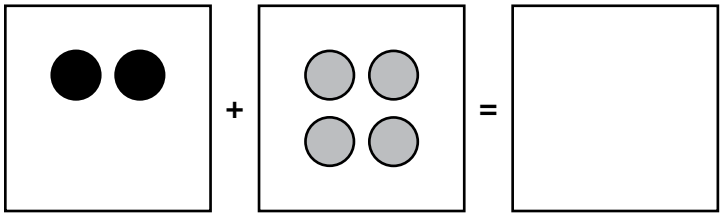
- Present the addition sentence 3 + 2 = ____. Reference a question model. Start with 3 and then add 2 more. How many altogether? Count out 3 tokens and place them in the first box. Add 2 more tokens and place them in the second box.



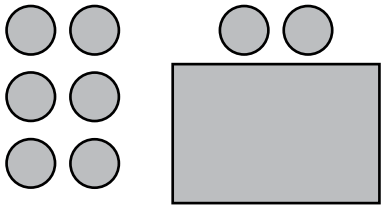
Next, demonstrate adding or combining the tokens by moving the tokens into the box after the equal sign. Count the tokens to find the total, 5. Complete the addition sentence, 3 + 2 = 5.



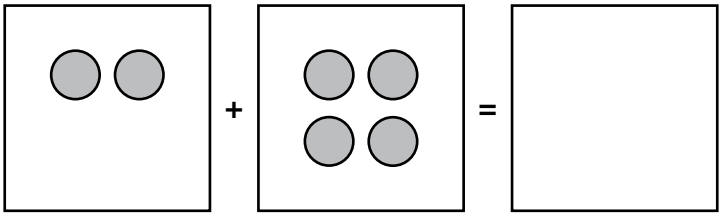
- Ask students to use manipulatives to solve addition equations with the sum as the missing number.
- Present the addition sentence 2 + ____ = 6. Reference a question model. When starting with 2, how many more do we need to have 6? Start with 2 and place in the first box. Count on, 3, 4, 5, 6 tokens as you place 4 tokens in the second box. Count the number of tokens in the second box, 4. Complete the addition sentence, 2 + 4 = 6.



- Another option is to explain that the answer 6 in this problem represents the whole, or total, number and indicates that 6 tokens are needed to solve this problem. Count out 6 tokens. Next, cover 4 tokens so only the quantity for the first addend (2 tokens) is visible. Place those 2 tokens in the first box. Next, indicate that the number of tokens covered is the missing number in the addition sentence. Uncover the 4 tokens and place them in the second box.



Count the number of tokens in the second box, 4. Complete the math problem, 2 + 4 = 6.



- Ask students to use manipulatives to solve addition equations with the second added as the missing number.
- Model using manipulatives to solve addition equations with a missing addend or a missing sum.

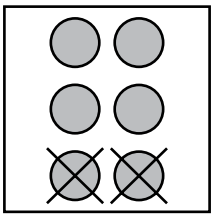
2 + ☐ = 9	4 + ☐ = 8	3 + 3 = ☐

- Ask students to use manipulatives to solve addition equations with a missing addend or a missing sum.

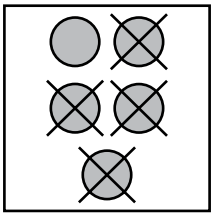
2 + 4 = ☐	6 + ☐ = 9	4 + 4 = ☐
5 + ☐ = 6	1 + 8 = ☐	0 + ☐ = 6

❑ **Solve one-step subtraction equations with a missing subtrahend or missing difference.**

- Present the subtraction sentence 6 – 2 = ____. Reference a question model. Start with 6 then take away 2. How many are left? Model solving the problem. Count out 6 tokens. Take away 2. Count the number of tokens that are left, 4. Complete the subtraction sentence, 6 – 2 = 4.



- Ask students to use manipulatives to solve subtraction equations with the difference as the missing number.
- Present the number sentence 5 – ____ = 1. Reference a question model. When starting with 5, how many need to be removed so there is 1 left? Count out 5 tokens. Remove tokens until there is 1 left. Count the number of tokens that were removed, 4. Complete the number sentence, 5 – 4 = 1.



Indicate that the number of tokens removed or crossed off, in this case 4, is the missing number in the equation. Four tokens were removed; therefore, 5 – 4 = 1.

- Model using manipulatives to solve subtraction equations with a missing subtrahend or missing difference.

8 – ☐ = 5	9 – ☐ = 4	6 – 5 = ☐

- Ask students to use manipulatives to solve subtraction equations with a missing subtrahend or missing difference.

7 – 3 = ☐	8 – ☐ = 2	6 – 1 = ☐
9 – ☐ = 2	4 – 2 = ☐	5 – ☐ = 3

Prerequisite Extended Indicator

MAE 3.1.2.a—Add and subtract, through 20 without regrouping.

Key Terms

add, altogether, number sentence, remove, subtract, take away, total

Additional Resources or Links

https://www.engageny.org/resource/grade-1-mathematics-module-1-topic

http://nlvm.usu.edu/en/nav/frames_asid_161_g_1_t_1.html?from=search.html?qt=color+chips

(Note: Java required for website. Most recent version recommended, but not needed.)

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MA 3.2.3 Applications

MA 3.2.3.a

Solve real-world problems involving two-step equations (involving two operations) involving whole numbers using addition and subtraction.

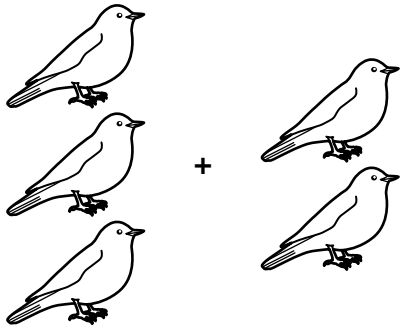
Extended: Solve a one-step real-world problem using addition or subtraction 0–9.

Scaffolding Activities for the Extended Indicator

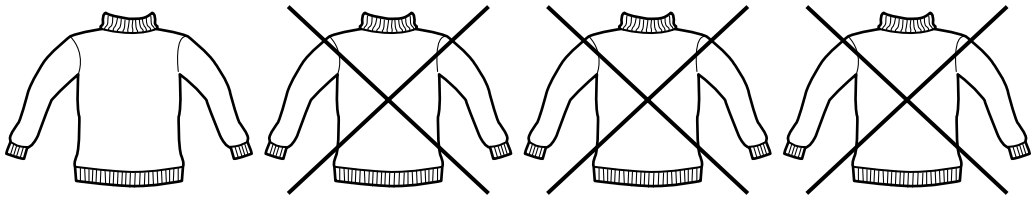
❑ **Solve a one-step addition or subtraction problem using a visual model and the numbers 0–9.**

- Use manipulatives or drawings to demonstrate creating a visual model that represents a real-world problem. Present the real-world scenario and figure shown. Demonstrate counting or adding 3 + 2 to find the total number of birds.

  Alfonzo saw 3 birds at a bird feeder.
  Then 2 more birds came to the feeder.
  How many birds were at the bird feeder?



- Present the real-world scenario “There are 4 sweaters in a closet, and then 3 sweaters are removed from the closet. How many sweaters remain in the closet?” and a drawing of 4 sweaters. Demonstrate crossing off 3 sweaters to represent removing 3 sweaters from the closet and identifying 1 as the number of sweaters remaining.



  Continue to demonstrate solving a variety of addition and subtraction problems using visual models that represent real-world scenarios with the numbers 0–9.

- Ask students to identify the correct model for a real-world addition or subtraction problem when given two or more choices of models.

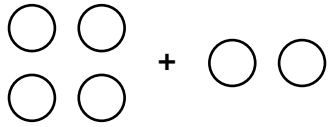
- Ask students to solve a real-world addition or subtraction problem using a model.

- ❑ **Solve a one-step real-world problem using addition or subtraction and the numbers 0–9.**

  - Use equations to model real-world addition and subtraction problems. Present the scenario shown.

    Maurice saw 4 dogs on his walk to school.
    He saw 2 more dogs on his walk to the park.
    What was the total number of dogs Maurice saw?

    Explain that the numbers and words in the story can be used to create a drawing that will help solve the problem (or answer the question) in the story. Demonstrate drawing 4 circles to represent the 4 dogs Maurice saw on his walk to school. Explain that the clue word "more" indicates that it is an addition problem and demonstrate drawing the addition sign and 2 more circles to represent the dogs Maurice saw on his walk to the park. Demonstrate writing the expression 4 + 2, using an appropriate computation strategy (e.g., counting the circles, start with 4 and add on 2) to find the total number of dogs, and completing the equation 4 + 2 = 6.

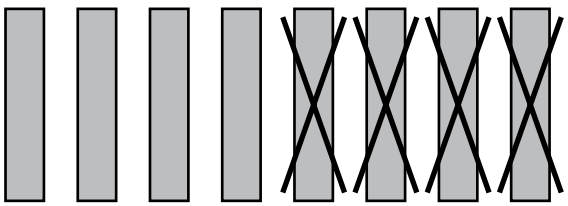
    4 dogs + 2 dogs

    4 + 2 = 6

  - Present the scenario shown and create a drawing to represent the scenario.

    Abigail has 8 markers.
    She gives 4 markers to her brother.
    How many markers does Abigail have remaining?

    Demonstrate drawing 8 lines or rectangles to represent Abigail's markers. Explain that the clue words "gives" and "remaining" indicate a subtraction problem and cross off 4 of the lines or rectangles to represent the markers Abigail gave to her brother. Demonstrate writing the expression 8 – 4, counting the remaining lines or rectangles that represent the remaining markers, and completing the equation 8 – 4 = 4.

    8 markers – 4 markers

    8 – 4 = 4

    Continue to demonstrate solving a variety of addition and subtraction problems presented in a real-world scenario using equations and the numbers 0–9.

MA 3.2.3 Applications

- Ask students to identify the correct equation that represents a real-world addition or subtraction problem when given two or more choices of equations.
- Ask students to solve a real-world addition or subtraction problem using an equation.

Prerequisite Extended Indicators

MAE 3.1.2.a—Add and subtract, through 20 without regrouping.

MAE 3.1.1.a—Read, write, and demonstrate whole numbers up to 20 that are equivalent representations including visual models, standard form, and word form.

Key Terms

add, difference, less, more, remaining, subtract, sum, total

Additional Resources or Links

https://www.insidemathematics.org/sites/default/files/materials/perfect%20pair.pdf

http://tasks.illustrativemathematics.org/content-standards/K/OA/A/2/tasks/1151

MA 3.2.3.b

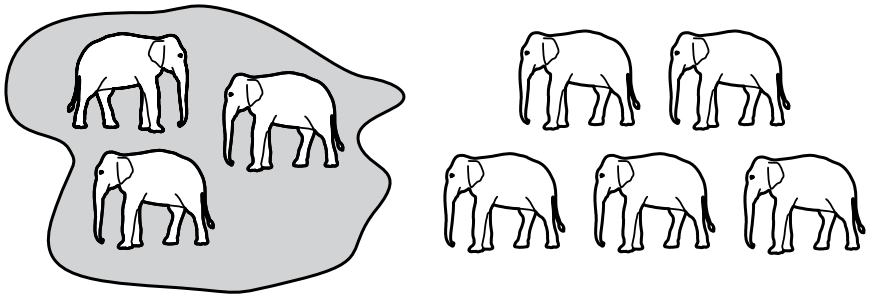
Write an equation (e.g., one operation, one variable) to represent real-world problems involving whole numbers.

Extended: Identify a one-step equation that represents a real-world problem with a variable limited to addition or subtraction with sums and differences 0–9.

Scaffolding Activities for the Extended Indicator

❑ **Identify a one-step equation that represents a real-world problem.**

- Use a real-world scenario to model an addition equation. For example, there are 3 elephants in the water, and 5 more elephants join them.



This problem represents an addition equation because more elephants join the other elephants in the water. There are now 3 + 5 = 8 elephants in the water. Remind students that words like “more” are clues that it is an addition problem. Also note that each side of the equal sign represents the same amount, since 3 plus 5 is the same as 8.

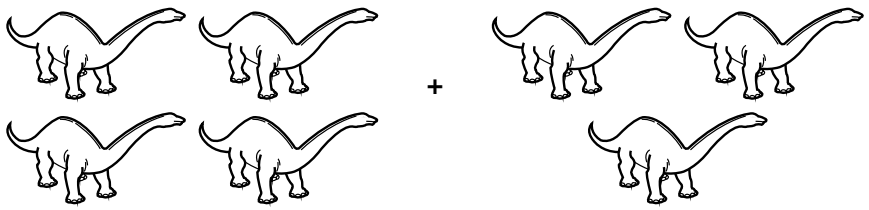
- Use a real-world scenario to model a subtraction equation. For example, there are 3 bees sitting on a flower, and 2 bees fly away.

This problem represents a subtraction equation because bees leave the flower. There is now 3 – 2 = 1 bee on the flower. Remind students that words like “away” are clues that it is a subtraction problem. Again, note that each side of the equal sign represents the same amount, since 3 minus 2 is the same as 1.

- Ask students to determine if a real-world scenario involves addition or subtraction. Remind students to look and listen for the words more, less, add, take away, and so on because those words are clues to the correct operation.

- ❑ **Identify a one-step equation with an unknown number that represents a real-world problem.**

  - Use a real-world scenario to explain that an addition or subtraction problem can have missing numbers that need to be found using math knowledge. For example, Jason had 4 dinosaur toys, and he gets 3 more dinosaur toys. How many dinosaur toys does he have now?



    The picture shows 4 dinosaur toys being added to 3 dinosaur toys, which can be represented with the equation 4 + 3 = ____.

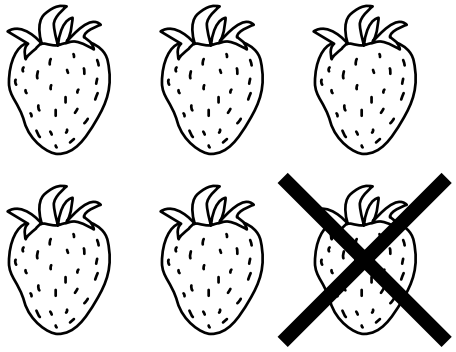
  - Use a variety of objects and real-world scenarios to demonstrate other addition and subtraction equations where one of the numbers is missing. Be sure to have a blank (or variable) representing the unknown number when writing out each equation. Some examples are shown.

    5 + ___ = 8

    7 – 2 = ___

    4 – *x* = 0

  - Ask students to identify an equation that represents a given scenario or picture. For example, Sheree has 6 strawberries in her lunch box and eats 1 of them. How many strawberries does she have left in her lunch box?



    Students should identify 6 – 1 = *y* and 6 – 1 = 5 as equations that represent this scenario.

Prerequisite Extended Indicators

MAE 3.2.3.a—Solve a one-step real-world problem using addition or subtraction 0–9.

MAE 3.2.2.b—Solve a one-step equation for sums and differences 0–9.

Key Terms

addition, equation, operation, subtraction, variable

Additional Resources or Links

https://www.engageny.org/resource/grade-1-mathematics-module-1/file/109001

http://tasks.illustrativemathematics.org/content-standards/1/OA/D/8/tasks/4

Mathematics—Grade 3
MA 3.3 Geometry

MA 3.3.1 Characteristics

MA 3.3.1.a

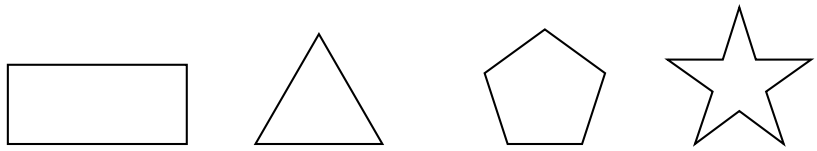
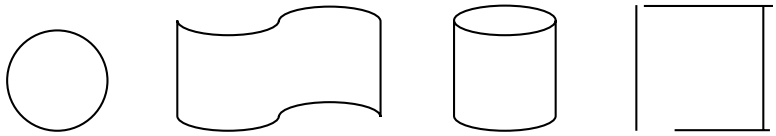
Identify the number of sides, angles, and vertices of two-dimensional shapes.

Extended: Identify the number of sides or angles in a regular polygon.

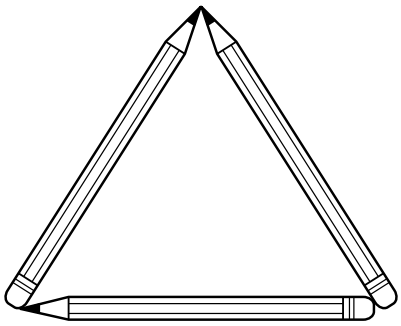
Scaffolding Activities for the Extended Indicator

❑ **Identify the number of sides in a regular polygon.**

- Explain that a polygon is a flat, closed shape made of line segments. Review the examples and non-examples with students.

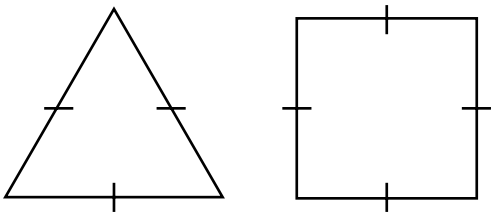
Polygon Examples	
Polygon Non-Examples	

- Explain that the sides of a polygon are the line segments that form a polygon. Use pencils, markers, pipe cleaners, or other straight manipulatives to create several regular polygons and model identifying the number of sides by counting the number of manipulatives used to create the polygon.

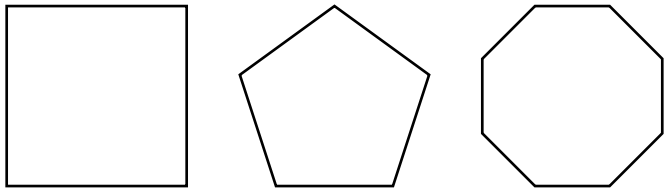


- Ask students to identify the number of sides in regular polygons created with manipulatives.

- Model a strategy for identifying and counting the number of sides of a regular polygon by counting and circling tick marks or placing tick marks on each side as it is counted.

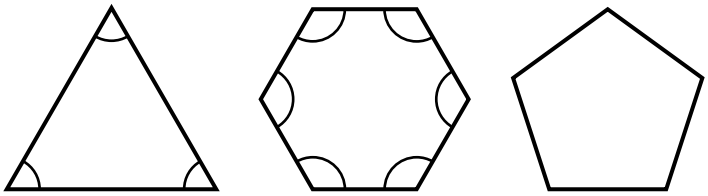


- Ask students to identify the number of sides in regular polygons.

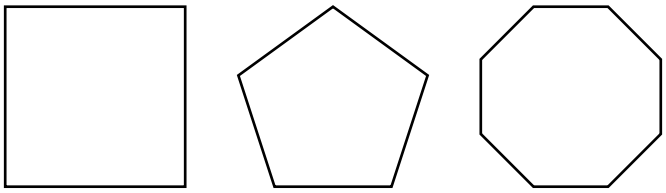


❑ **Identify the number of angles in a regular polygon.**

- Explain that an angle is formed where two sides meet. Model a strategy for identifying and counting the number of angles in a regular polygon by circling the arc at each angle as it is counted, drawing an arc at each angle as it is counted, or highlighting the angle as it is counted.

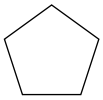


- Ask students to identify the number of angles in regular polygons.

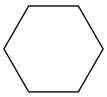
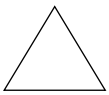
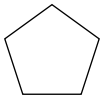


❑ **Determine that the number of sides and the number of angles are the same in regular polygons.**

- Model identifying the number of sides and angles in the following regular polygons. (Note: Students do not have to identify the names of the shapes to meet this standard.)

Regular Polygon			
Number of Sides and Angles			

- Ask students to identify the number of sides and angles in regular polygons.

Regular Polygon					
Number of Sides and Angles					

Prerequisite Skills

- Describe real-world objects using names of shapes, regardless of their orientation or size (e.g., squares, circles, and triangles).
- Determine defining attributes (sides and corners) and non-defining attributes (size, color, and orientation) of two-dimensional shapes.

Key Terms

angle, polygon, regular polygon, side

Additional Resources or Links

https://www.engageny.org/resource/grade-2-mathematics-module-8-topic/file/86031

https://www.mathlearningcenter.org/sites/default/files/pdfs/SecB1SUP-C6_Feb2-D_ShapeAtt-201304.pdf

MA 3.3.1.b

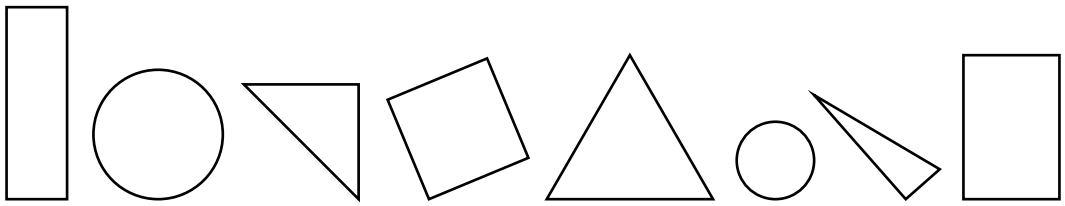
Sort quadrilaterals into categories (e.g., rhombuses, squares, and rectangles).

Extended: Identify two-dimensional shapes, circles, triangles, rectangles, or squares from a collection of circles, triangles, rectangles, and squares.

Scaffolding Activities for the Extended Indicator

❑ **Identify circles and triangles.**

- Explain that two-dimensional shapes are flat figures. Compare and contrast a circle to a sphere (ball) and a square to a cube (block or die).
- Explain that two-dimensional shapes have names. Circles are round shapes without corners or edges. Reference examples of circles around the classroom. Explain that triangles are two-dimensional shapes that have three sides and three angles. Sides are the straight lines that form the shape. An angle is where two sides meet. Reference examples of triangles around the classroom.
- Model sorting cutout circles and cutout triangles in a variety of sizes into two categories: circles and triangles.
- Ask students to sort cutout circles and cutout triangles in a variety of sizes into two categories: circles and triangles.
- Model identifying circles and triangles by coloring all circles green and all triangles yellow, placing emphasis on the round shape of the circles and the three straight lines in the triangles.

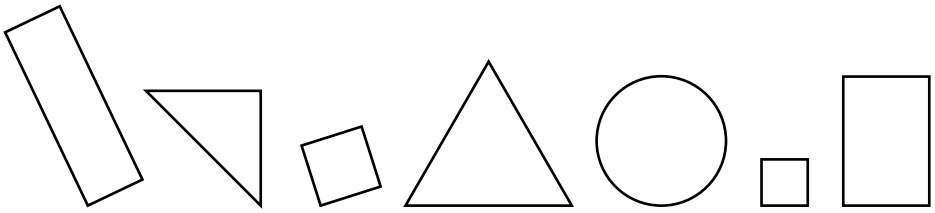


- Ask students to identify circles and triangles.

❑ **Identify circles, triangles, rectangles, and squares.**

- Explain that squares and rectangles are shapes with four sides and four angles. All four sides of a square are the same length. In a rectangle, the opposite sides are the same length. Reference real-world objects and math manipulatives that are in the shape of a square or a rectangle. Demonstrate sorting the objects and manipulatives into the two categories: squares and rectangles.
- Ask students to sort real-world objects and math manipulatives into two categories: squares and rectangles. .
- Model creating squares using four manipulatives that are the same length (e.g., straws, pipe cleaners, pencils). Model creating rectangles using manipulatives of two different lengths. Reference the four equal sides in squares and opposite equal sides in rectangles.

- Ask students to create squares and rectangles using manipulatives of different lengths.
- Model identifying squares and rectangles by coloring all the squares red and all the rectangles blue.



- Ask students to identify squares and rectangles.
- Model identifying circles, triangles, rectangles, and squares.
- Ask students to identify circles, triangles, rectangles, and squares.

Prerequisite Extended Indicator

MAE 3.3.1.a—Identify the number of sides or angles in a regular polygon.

Key Terms

angle, circle, opposite, rectangle, side, square, triangle, two-dimensional shape

Additional Resources or Links

https://www.engageny.org/resource/kindergarten-mathematics-module-2-topic-lesson-1

http://tasks.illustrativemathematics.org/content-standards/K/G/B/4/tasks/515

MA 3.3.1.c

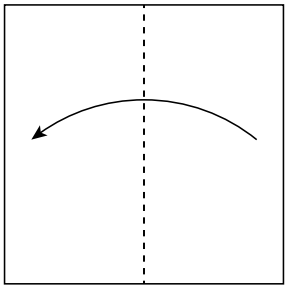
Draw lines to separate two-dimensional figures into equal areas, and express the area of each part as a unit fraction of the whole.

Extended: Identify a line that separates a symmetric two-dimensional shape into halves.

Scaffolding Activities for the Extended Indicator

❑ **Identify a line of symmetry when a symmetric two-dimensional shape made of paper is folded.**

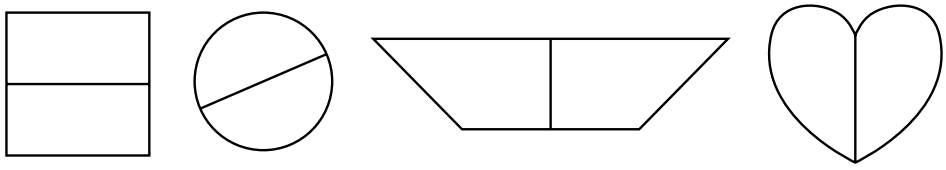
- Fold a piece of rectangular paper evenly in half. Indicate that each section is one half. Cut the paper along the fold line and place the halves on top of each other to demonstrate that the pieces are the same size and the same shape. Explain that because the two pieces are the same size and shape, the fold line separated the rectangle into two equal pieces, called halves.



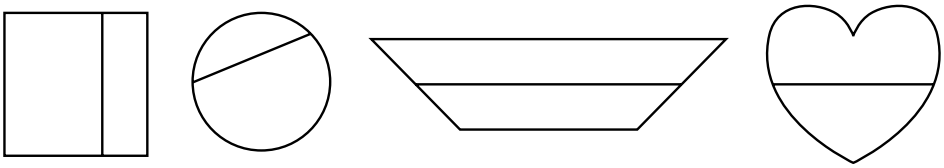
- Fold additional symmetric shapes (circle, equilateral triangle, square, regular hexagon, etc.) made of paper in half and indicate that the two halves are equal.
- Fold symmetric shapes made of paper in places that make the sections **unequal**. Indicate that the two sections are **not** separated in half since the sections are not the same size and shape.
- Prepare an assortment of symmetric shapes, with some folded into halves and some not folded into halves. Ask students to identify the shapes that have been separated in half by the fold line.

❑ **Identify a line of symmetry drawn on a symmetric two-dimensional shape.**

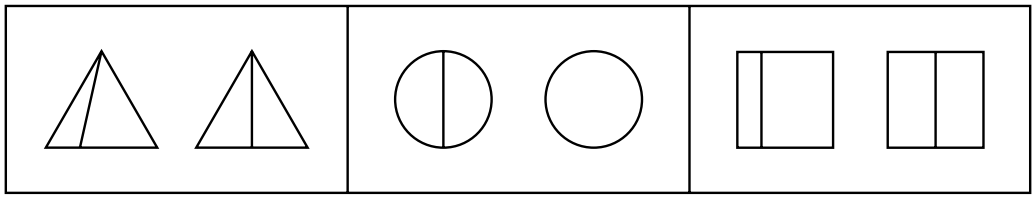
- Show examples of two-dimensional shapes that are separated into halves by a line of symmetry.



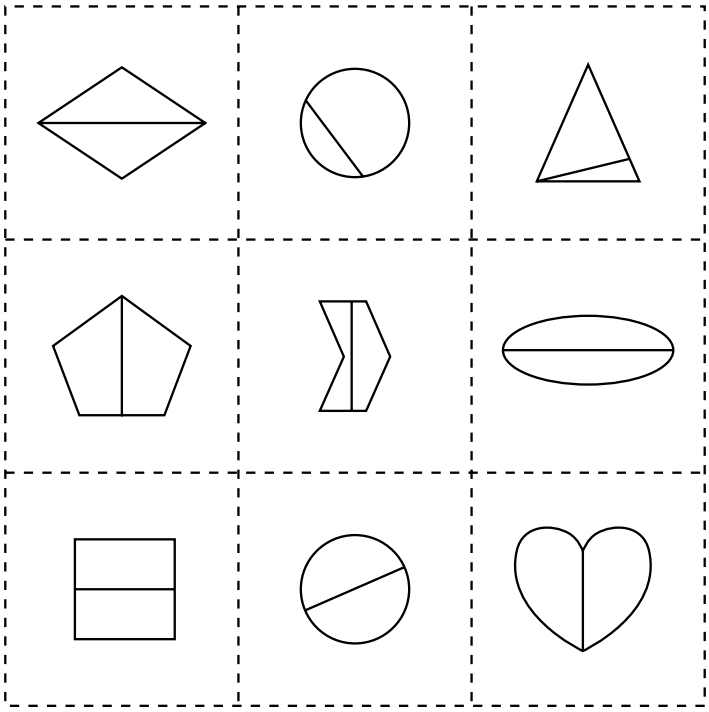
- Show similar non-examples in which the line drawn does not separate the shape into halves.



- Ask students to identify which shape in a set of two shapes is separated in half.



- Ask students to sort a variety of shapes into two categories to indicate examples and non-examples of a line of symmetry.



Prerequisite Extended Indicator

MAE 3.1.1.i—Use a model to compare unit fractions one-half, one-third, and one-fourth.

Key Terms

equal, half, halves, line, separated, shape, size

Additional Resources or Links

http://tasks.illustrativemathematics.org/content-standards/2/G/A/3/tasks/826

https://www.mathlearningcenter.org/apps/geoboard

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MA 3.3.3 Measurements

MA 3.3.3.a

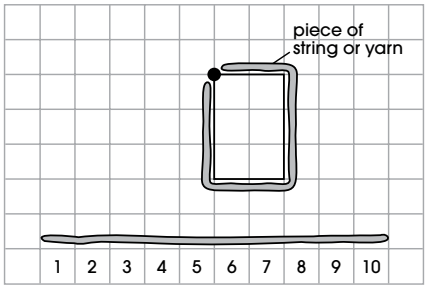
Find the perimeter of polygons given the side lengths, and find an unknown side length.

Extended: Find the perimeter of a rectangle given the side lengths and a figure.

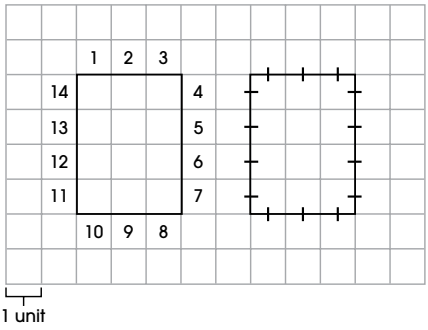
Scaffolding Activities for the Extended Indicator

❑ **Find the perimeter of a rectangle drawn on grid paper.**

- Explain that perimeter is the distance along the outside edge of a shape. Place or draw a rectangle on a piece of grid paper. Trace or highlight the sides of the rectangle and explain that the perimeter is the total length of all the sides. Make a mark on one corner of the rectangle to represent a starting point. Then use a piece of yarn or string to go around all sides of the rectangle. Cut the yarn or string at the length that represents the perimeter of the rectangle. Place the length of the string on the coordinate grid to find the total length of all the sides. Another method is to use painter's tape to tape out the perimeter of a rectangle on a tiled floor.



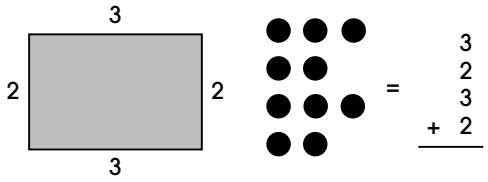
- Demonstrate counting strategies to find the perimeter of a rectangle drawn on grid paper. Count each unit along the edge of the rectangle to find the perimeter. Be sure to explain that the perimeter is found by counting the units on each side, not the squares inside the rectangle. Use tick marks to count each unit along the edge of the rectangle to find the perimeter.



- Ask students to identify the sides of a rectangle by highlighting or tracing.
- Ask students to use a counting strategy to find the perimeter of a rectangle placed or drawn on grid paper.

❑ **Find the perimeter of a rectangle given side lengths.**

- Use a rectangle with the side lengths labeled to demonstrate how to add the side lengths to find the perimeter. Model strategies to find the total length of the four sides. For example, use tokens to represent each side length and then add them to find the perimeter. Continue to demonstrate finding the perimeter of rectangles using a familiar computation method (e.g., manipulatives, number lines, calculator).



- Ask students to determine the perimeter of a rectangle when given the side lengths.

Prerequisite Extended Indicators

MAE 3.3.1.a—Identify the number of sides or angles in a regular polygon.

MAE 3.1.2.a—Add and subtract, through 20 without regrouping.

Key Terms

add, perimeter, side, side length, sum, total

Additional Resources or Links

https://www.engageny.org/resource/grade-3-mathematics-module-7-topic-c-lesson-12

http://nlvm.usu.edu/en/nav/frames_asid_166_g_2_t_3.html?open=activities&from=search.html?qt=perimeter

(Note: Java required for website. Most recent version recommended, but not needed.)

MA 3.3.3.b

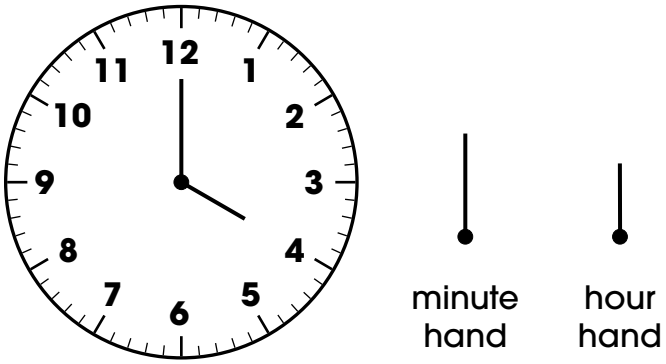
Tell and write time to the minute using both analog and digital clocks.

Extended: Tell time to the hour.

Scaffolding Activities for the Extended Indicator

❑ **Identify the hour hand, the minute hand, and the numbers on an analog clock.**

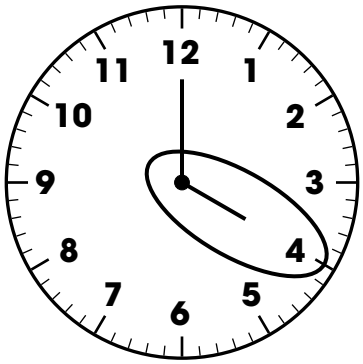
- Use an analog clock to demonstrate the difference between the hour hand and the minute hand. Compare the length of the hour hand and the length of the minute hand. Indicate that both the hour hand and the minute hand move around a clock to show the time. Use real analog clocks and pictures of analog clocks to identify the hour hand, the minute hand, and the numbers on the clockface that indicate the time.



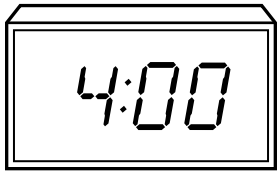
- Ask students to identify the hour hand, the minute hand, and the numbers on an analog clock.

❑ **Tell time to the hour on a digital clock and an analog clock.**

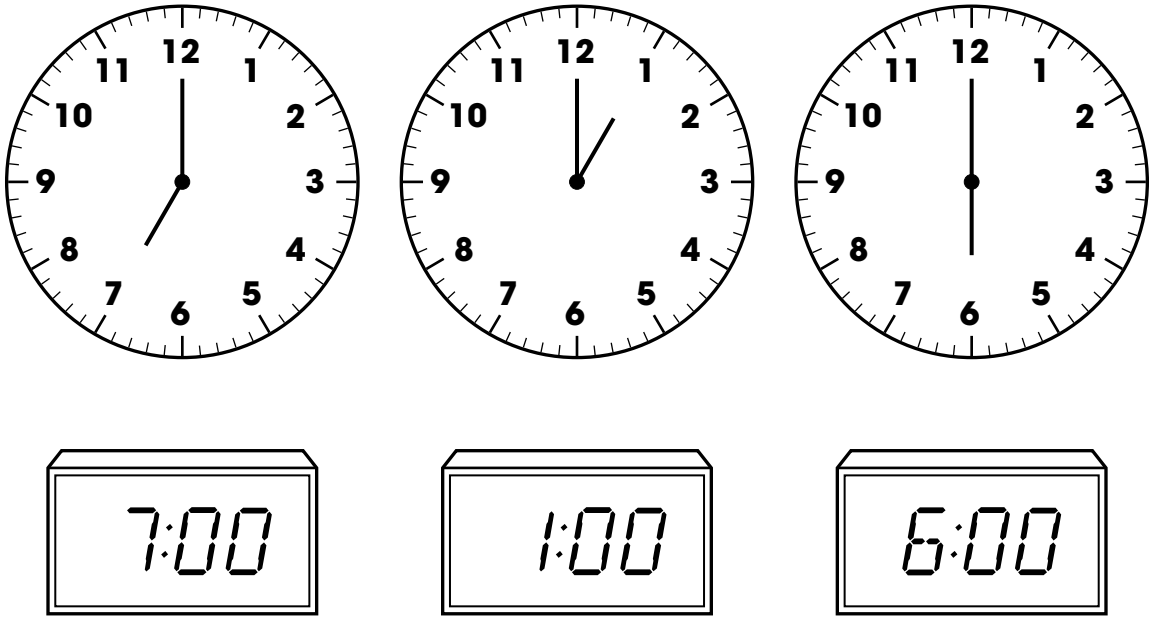
- Demonstrate finding the hour hand on an analog clock. Circle the hour hand and the number the hour hand points to. Emphasize saying the name of the number circled when stating the time. For example, four is circled, so it is “four o’clock.” Be sure to make a connection between the minute hand pointing to twelve and “o’clock” when it is the exact hour. Show clocks in which the minute hand is not pointing to twelve as non-examples.



- Demonstrate reading the time on a digital clock by saying the name of the first number. For example, the first number is 4, so it is “four o’clock.” Be sure to make a connection between the numbers after the colon both being zero and “o’clock” when it is the exact hour. Show clocks in which it is not the exact hour as non-examples.



- Ask students to identify the time to the hour on both analog and digital clocks. Ask students to match analog and digital clocks that have the same time.



Prerequisite Skills

- Describe the relative positions of objects (e.g., above, below, beside, in front of, behind, next to, between).
- Compare the length of two objects using the words *longer* and *shorter*.
- Read and write whole numbers up to 12.

Key Terms

hour, longer, minute, o’clock, shorter, time

Additional Resources or Links

https://www.insidemathematics.org/sites/default/files/materials/once%20upon%20a%20time.pdf

https://www.engageny.org/resource/grade-2-mathematics-module-8-topic-d

MA 3.3.3.c

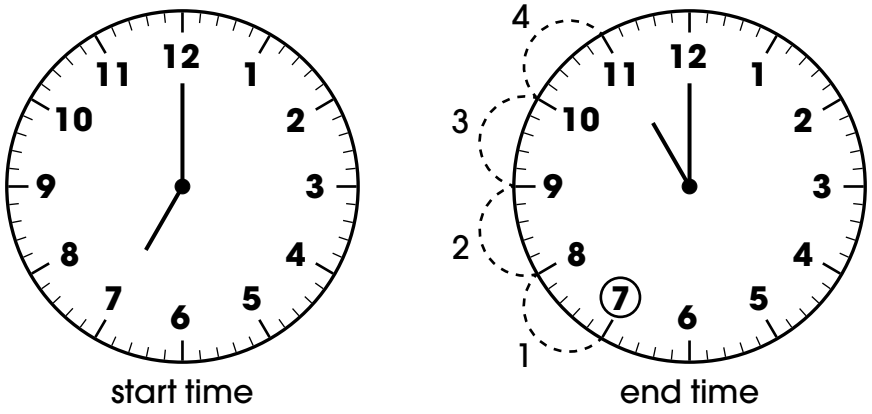
Solve real-world problems involving addition and subtraction of time intervals, and find elapsed time.

Extended: Add whole numbers of hours to find elapsed time.

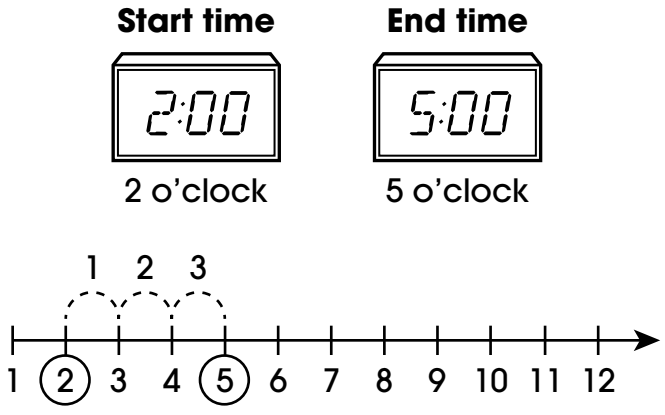
Scaffolding Activities for the Extended Indicator

❑ **Find the elapsed time when given the start time and end time.**

- Introduce the concept of elapsed time. Explain that elapsed time is the amount of time that passes from the time something starts to the time something ends. Provide examples of elapsed time using relevant real-world scenarios.
- Demonstrate finding the elapsed time when given the start time and end time on analog clocks. Show a start time of seven o'clock and an end time of eleven o'clock. On the second clock, circle the start time and then demonstrate counting the intervals from 7 to 11 to get the elapsed time of 4 hours. Continue demonstrating with other examples of start and end times shown on analog clocks.



- Demonstrate finding the elapsed time when given the start time and the end time on digital clocks. Show a digital clock that displays two o'clock and represents the start time. Show a second digital clock that displays five o'clock and represents the end time. Circle the number 2 for the start time and the number 5 for the end time on a number line. Then count the intervals between the two numbers to get the elapsed time of 3 hours. Continue demonstrating with other examples of start and end times shown on digital clocks.



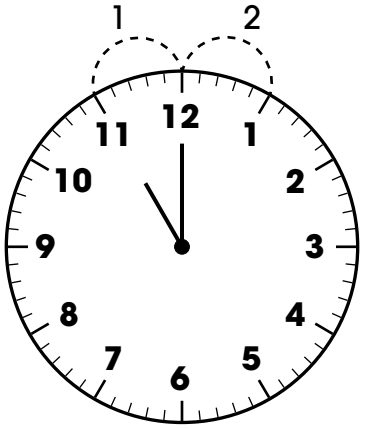
- Demonstrate other counting strategies to find the elapsed time. For example, say the start time and then count up with tally marks or fingers to the end time.
- Ask students to use a counting strategy to find the elapsed time when start and end times are given in digital or analog forms.

❑ **Find the end time when given the start time and the elapsed time.**

- Demonstrate using addition to find the end time when given a start time and the elapsed time. Show the start time of six o'clock on an analog clock. Count up two intervals to find the end time of eight o'clock.
- Demonstrate other counting strategies to find the end time. For example, say the start time and then count up with tally marks or fingers to the end time. Continue with other examples showing the start time on both analog and digital clocks.

Start time		Elapsed time		End time
6:00	+	2 hours	=	?

Be sure to include examples where the elapsed time passes twelve o'clock: for example, a start time of 11:00 a.m. and an elapsed time of 2 hours.



- Ask students to identify the end time on both analog and digital clocks when given a start time and the elapsed time.

Prerequisite Extended Indicators

MAE 3.3.3.b—Tell time to the hour.

MAE 3.1.2.a—Add and subtract, through 20 without regrouping.

Key Terms

elapsed time, end time, hour, o'clock, start time

Additional Resources or Links

https://www.engageny.org/resource/grade-2-mathematics-module-8-topic-d-lesson-16

http://nlvm.usu.edu/en/nav/frames_asid_318_g_1_t_4.html?from=search.html?qt=nnumber%20line

(Note: Java required for website. Most recent version recommended, but not needed.)

MA 3.3.3.e

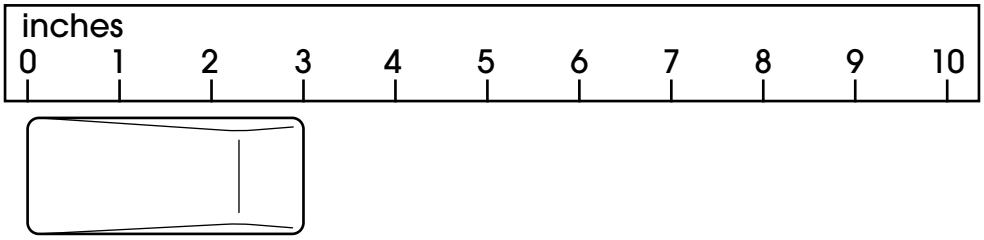
Estimate and measure length to the nearest half inch, quarter inch, and centimeter.

Extended: Measure length to the nearest inch using a model of an object.

Scaffolding Activities for the Extended Indicator

❑ **Align an object on a ruler for measuring.**

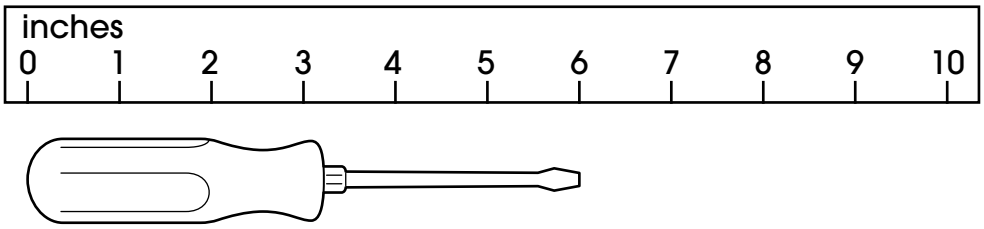
- Use a ruler to demonstrate how to align an object for measuring. For example, present a ruler and an object and show how to align the left end or edge of the object to the 0 on a ruler.



- Provide examples of objects that are correctly and incorrectly aligned. Ask students to indicate which objects are correctly aligned.
- Ask students to align the left end of an object to 0 on a ruler.

❑ **Measure length to the nearest inch using a model of an object.**

- Explain that the distance between each number on the ruler represents a length of 1 inch. Demonstrate placing the left edge of an object at 0 inches. Using the following example, note that since the right end aligns with 6, the object is 6 inches long.



- Ask students to identify the length of an object when it is placed next to a ruler.
- Ask students to use a ruler to measure an object to the nearest inch.

Prerequisite Extended Indicators

MAE 3.1.1.c—Identify a number closer to a given number on a number line, 1–20.

MAE 3.1.1.a—Read, write, and demonstrate whole numbers up to 20 that are equivalent representations including visual models, standard form, and word form.

Key Terms

edge, end, inch, length, long, measure, ruler

Additional Resources or Links

https://www.engageny.org/resource/grade-2-mathematics-module-7-topic-c-lesson-14

https://www.engageny.org/resource/grade-2-mathematics-module-7-topic-c-lesson-15

MA 3.3.3.g

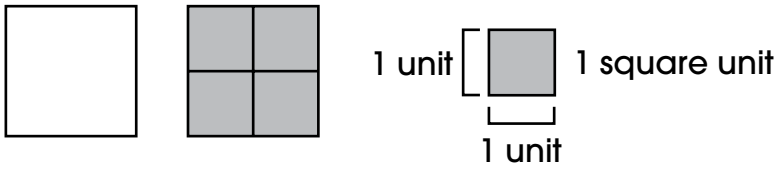
Find the area of a rectangle with whole number side lengths by modeling with unit squares, and show that the area is the same as would be found by multiplying the side lengths.

Extended: Find the area of a square by counting whole number unit squares.

Scaffolding Activities for the Extended Indicator

❑ **Identify the unit squares included in the area of a square.**

- Use manipulatives to teach area as a count of the number of unit squares that cover a shape. Unit squares are used for covering a shape and have a length of 1 unit on each side. Use a 2-by-2 square and unit square tiles to show that the unit square tiles can be placed on the square to cover it.

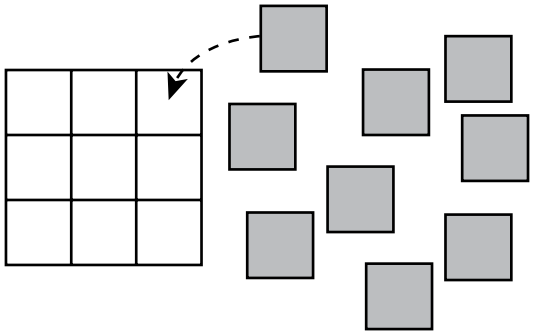


  Use the unit square tiles to cover the entire inside of the 2-by-2 square. Note that the unit square tiles will completely cover the 2-by-2 square.

- Show other examples of a square, for example, a 4-by-4 square, marked with unit square lines and ask students to identify a unit square.

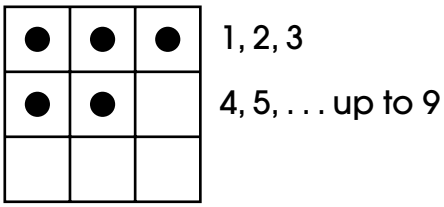
❑ **Find the area of a square by counting whole number unit squares.**

- Use manipulatives to calculate area. For example, use a 3-by-3 square with 9 unit squares marked on the 3-by-3 square. Gather 9 tiles that are the same size as the unit squares. Place one tile over each unit square to make a connection between a tile and a unit square.



  Find the area of the square by counting each tile as it is placed on the square to cover a unit square. The count of the tiles, which is the area, is 9 unit squares.

Use a counting strategy to determine the area of the square by counting the number of unit squares from left to right. Make a small dot in each unit square to keep track of the unit squares that have been counted.



- Ask students to identify the number of unit squares in a given gridded square by counting.

Prerequisite Extended Indicators

MAE 3.3.1.b—Identify two-dimensional shapes, circles, triangles, rectangles, or squares from a collection of circles, rectangles, and squares.

MAE 3.1.1.a—Read, write, and demonstrate whole numbers up to 20 that are equivalent representations including visual models, standard form, and word form.

Key Terms

area, square, square unit, tile, unit square

Additional Resources or Links

https://www.engageny.org/resource/grade-3-mathematics-module-4-topic-lesson-3

http://nlvm.usu.edu/en/nav/frames_asid_192_g_1_t_1.html?from=topic_t_1.html

(Note: Java required for website. Most recent version recommended, but not needed.)

MA 3.3.3.h

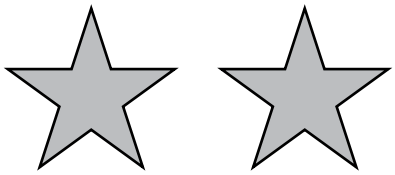
Identify and draw rectangles with the same perimeter and different areas or with the same area and different perimeters.

Extended: Identify congruent non-square rectangles.

Scaffolding Activities for the Extended Indicator

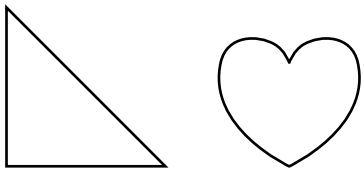
❑ **Recognize congruent and noncongruent non-square shapes.**

- Present two identical cutout shapes, such as the stars shown.



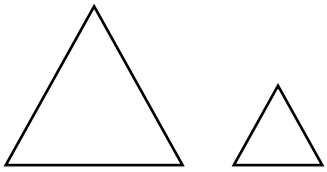
Explain that the two stars are congruent because they are the same shape and the same size. Show that one star can be placed on top of the other star with no overlap.

Present two different cutout shapes, such as the triangle and the heart shown.



Explain that because the triangle and the heart are not the same shape, they are **not** congruent. When one shape is placed on top of the other, there is overlap.

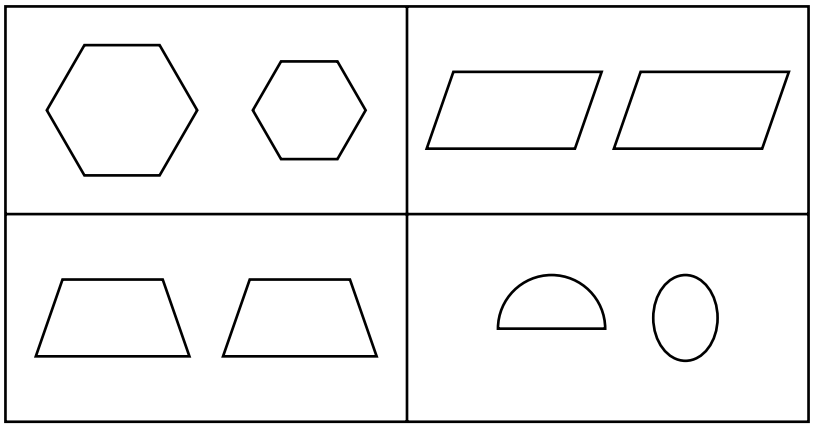
Present two cutouts that are the same shape but different sizes, such as the triangles shown.



Explain that the two triangles are not congruent, because despite being the same shape, they are not the same size. When one shape is placed on top of the other, there is overlap.

- Ask students to identify whether cutout shapes are congruent or not congruent.

- Model identifying congruent shapes, placing emphasis on congruent meaning same size and same shape. Indicate congruent or not congruent for each pair of shapes.

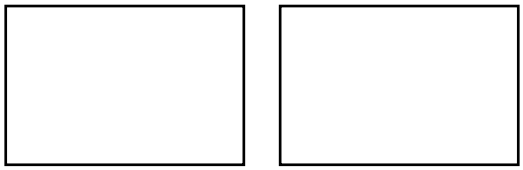


- Ask students to identify whether a pair of shapes drawn on paper are congruent or not congruent.

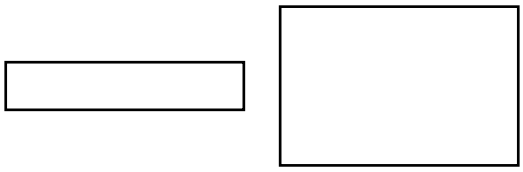
❑ **Identify congruent non-square rectangles.**

- Explain that rectangles are shapes with four sides and four square corners. Show examples of a variety of rectangles.

  Explain that congruency means that both shapes must be the same shape in addition to being the same size. The rectangles shown are congruent because they are the same shape and the same size.

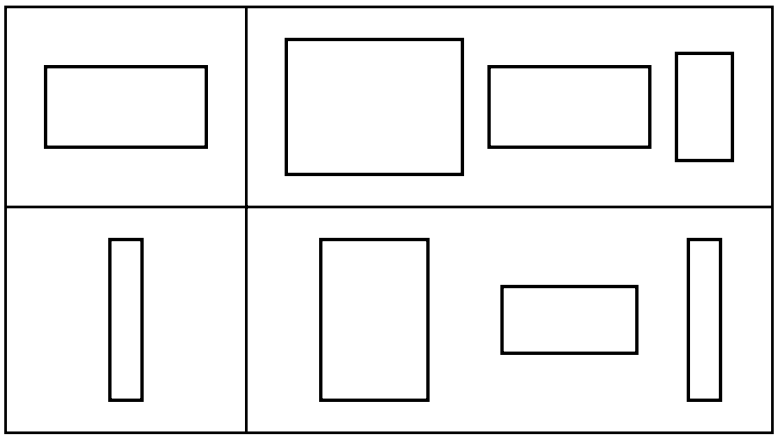


  Explain that the two rectangles shown are not congruent, because while both shapes are rectangles, they are not the same shape and not the same size.



- Use cutout rectangles to demonstrate congruent rectangles. Place cutout rectangles on top of each other. Check for overlap. If there is no overlap, the rectangles are congruent. If there is overlap, the rectangles are not congruent.
- Ask students to identify whether cutout rectangles are congruent or not congruent.

- Demonstrate identifying the rectangle on the right that is congruent to the given rectangle on the left.



- Ask students to identify congruent rectangles drawn on paper.

Prerequisite Extended Indicator

MAE 3.3.1.b—Identify two-dimensional shapes, circles, triangles, rectangles, or squares from a collection of circles, rectangles, and squares.

Key Terms

congruent, rectangle, same, shape, size

Additional Resources or Links

https://www.engageny.org/resource/kindergarten-mathematics-module-2-topic-lesson-3

http://nlvm.usu.edu/en/nav/frames_asid_277_g_1_t_3.html?open=activities&from=category_g_1_t_3.html

(Note: Java required for website. Most recent version recommended, but not needed.)

Mathematics—Grade 3
MA 3.4 Data

MA 3.4.1 Representations

MA 3.4.1.a

Create scaled pictographs and scaled bar graphs to represent a data set—including data collected through observations, surveys, and experiments—with several categories.

Extended: Identify a characteristic of a bar graph or a pictograph (e.g., quantities, comparisons).

Scaffolding Activities for the Extended Indicator

❑ **Recognize bar graphs and pictographs.**

- Recognize bar graphs and pictographs as distinct from other data displays such as tables and line plots. Show examples of bar graphs, pictographs, tables, and line plots and describe the characteristics of each type of data display. Present a pictograph and identify it as a graph that uses symbols or pictures to represent data.

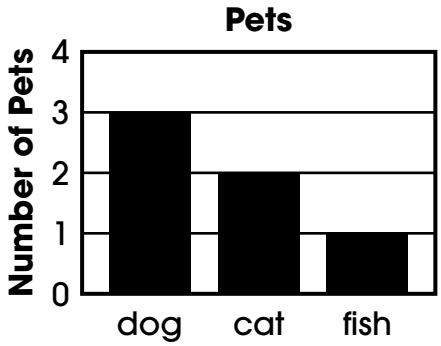
Favorite Fruit

Fruit	Votes
	
	
	

Key
 = 1 student

Present a line graph as a non-example of a pictograph because it doesn't have pictures.

Present a bar graph and identify it as a graph that uses bars of different lengths to represent data.



Present a table as a non-example of a bar graph because it doesn't have bars and as a non-example of a pictograph because it doesn't have pictures.

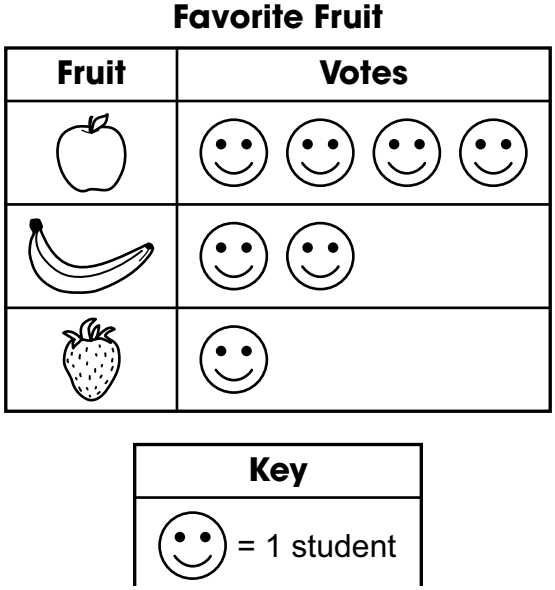
Student Lunch Count

Type	Number
hot lunch	𝍸 |||
cold lunch	||||

- Ask students to identify a pictograph and a bar graph from a group of data representations including pictographs, bar graphs, tables, and line plots.

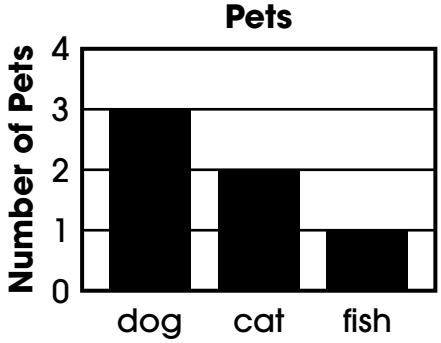
❑ **Identify a characteristic of a bar graph or pictograph.**

- Point to and name the title, axis labels, and categories for bar graphs and pictographs. Present a pictograph showing data collected about which fruit students prefer.



Identify the title of the pictograph and reinforce that the title tells what the pictograph is about. Identify the column of three different fruits and indicate that these are the types of fruits being counted.

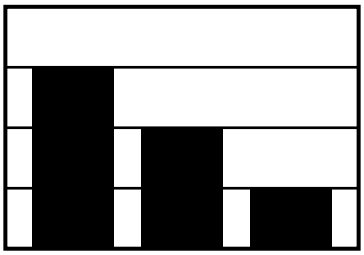
Present a bar graph showing data collected about which pets students have at home.



Identify the title of the bar graph and reinforce that the title tells what the bar graph is about. Identify the categories given. Identify the label on the vertical axis.

- Ask students to point to the title, axis labels, and categories of a given bar graph and pictograph.

- Ask students to complete a bar graph by placing the missing axis labels and title in the appropriate places on a bar graph. For example, present students with the gridlines and bars for a bar graph as shown and three cards with the following information: the title, the labels for the categories on the horizontal axis, and the label for the scale on the vertical axis. Ask students to place the three cards to complete the bar graph.



Prerequisite Skills

- Recognize different parts of an illustration or image.
- Identify objects that do not belong to a particular group and the reason why objects do not belong to a particular group.
- Identify, sort, and classify objects by size, shape, color, and other attributes.

Key Terms

bar graph, category, data, label, pictograph, title

Additional Resources or Links

https://www.engageny.org/resource/grade-2-mathematics-module-7-topic-lesson-2

https://www.engageny.org/resource/grade-2-mathematics-module-7-topic-lesson-3

MA 3.4.1.b

Represent data using line plots where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters.

Extended: Identify the scale of a bar graph and/or the key of a pictograph.

Scaffolding Activities for the Extended Indicator

❑ **Recognize the scale of a bar graph and the key of a pictograph.**

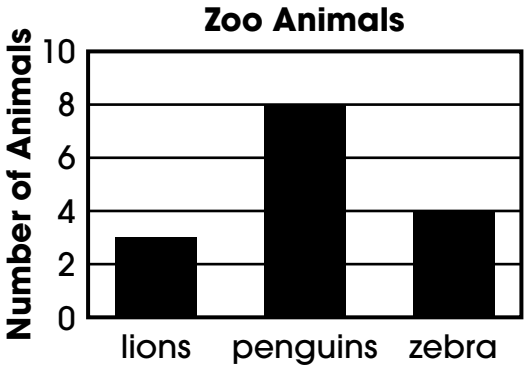
- Present a pictograph with a key. Identify the key and explain that the key indicates what each picture symbol in the pictograph represents. Show a variety of pictographs to emphasize that many different picture symbols are used in pictographs and to provide practice finding the key in different locations above, below, or beside the graph.

3rd Grade Book Sale

Day	Books Sold
Tuesday	Book Book Book
Wednesday	Book Book Book Book
Thursday	Book Book

Key
Book = 2 books

Present a bar graph with a clearly marked scale.



Identify the scale as the numbers along the left side of the bar graph and explain that the scale is needed to determine the number in each category.

- Ask students to point to the scale on a bar graph and the key on a pictograph.

❑ **Identify the scale of a bar graph and/or the key of a pictograph.**

- Present the pictograph shown above and locate the key. Explain that the key indicates that each book in a category stands for 2 books in the book sale. Use other examples to demonstrate keys where the picture symbol represents other amounts.

  Present the bar graph above and locate the scale. Explain that the scale shows that the space between the lines represents a value of 2. Demonstrate that the height of the bars will either end at a scale line or end between two lines. Use other examples to demonstrate scales of 1 and 5.

- Ask students to identify the key of a pictograph and to determine the value of an individual symbol used in the pictograph.
- Ask students to identify the scale of a bar graph and to determine the scale used (i.e., the number value between each line).

Prerequisite Extended Indicator

MAE 3.4.1.a—Identify a characteristic of a bar graph or a pictograph. (e.g., quantities, comparisons).

Key Terms

bar graph, key, pictograph, scale, symbol

Additional Resources or Links

https://www.engageny.org/resource/grade-2-mathematics-module-7-topic-lesson-3

https://www.engageny.org/resource/grade-2-mathematics-module-7-topic-lesson-2

MA 3.4.2 Analysis and Applications

MA 3.4.2.a

Solve problems and make simple statements about quantity differences (e.g., how many more and how many less) using information represented in pictographs and bar graphs.

Extended: Solve a problem using a bar graph or a pictograph.

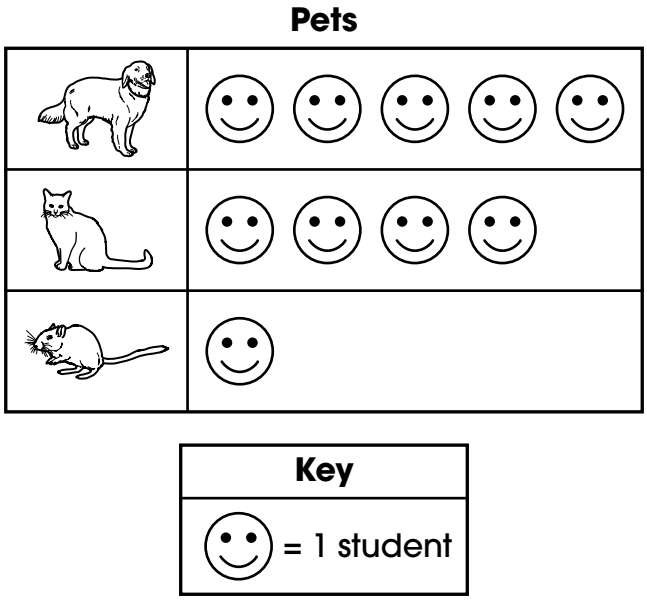
Scaffolding Activities for the Extended Indicator

❑ **Identify the categories, frequencies, and scale of a bar graph or the categories, frequencies, and key of a pictograph.**

- Present the bar graph shown. Explain that this bar graph represents the number of hours a student spent practicing piano lessons each week. Demonstrate locating the title, categories, and scale.

Demonstrate using the scale of 2 to determine the number of hours in each category.

- Present the pictograph shown. Explain that this pictograph shows the data gathered when 10 students were asked what pet they have at home. Demonstrate locating the title, categories, and key.

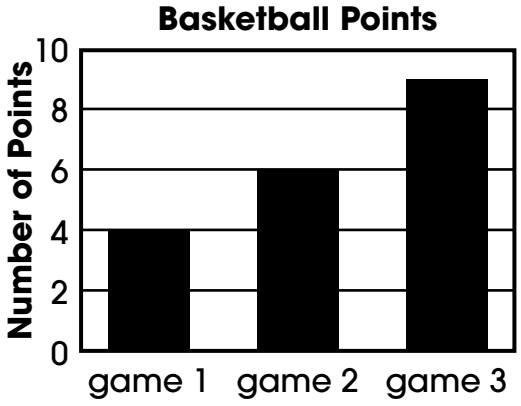


Demonstrate using the key to determine the number of students in each category.

- Ask students to compare a bar graph with a scale of 1 to a bar graph with a scale **not** equal to 1. Ask students to select the bar graph with the scale that is **not** equal to 1.
- Ask students to compare a pictograph with a key of 1 to a pictograph with a key **not** equal to 1. Ask students to select the pictograph with the key that is **not** equal to 1.

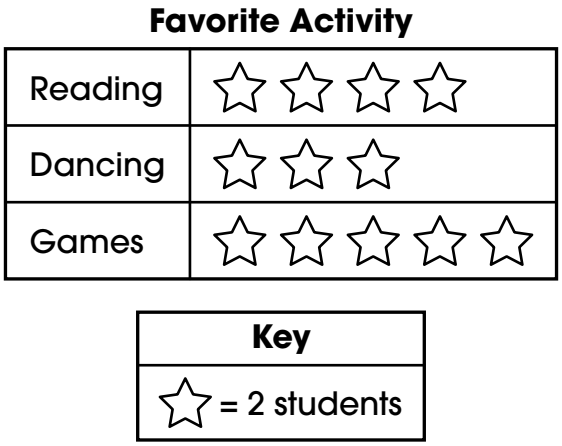
❑ **Solve a problem (not involving addition or subtraction) using a bar graph or a pictograph.**

- Present the bar graph shown. Explain that this bar graph represents the number of points a student scored during three basketball games. Demonstrate locating the title, categories, and scale.



Demonstrate using the scale to determine the number of points in each category. Explain how to identify a number that is between the labeled lines. Ask questions about the bar graph data, such as “Which game had the least number of points scored?” Avoid problems that require addition or subtraction between categories for this standard.

- Present the pictograph shown. Explain that this pictograph represents the data collected when 24 students were asked what they liked to do for fun. Demonstrate locating the title, categories, and key.



  Demonstrate using the key to determine the number of students in each category. Demonstrate skip counting to determine 6 students chose dancing. Or draw 2 tally marks by each star and then count the tally marks to determine the total number of students. Ask questions about the pictograph data, such as “Which activity is the most popular?” Avoid problems that require addition or subtraction between categories for this standard.

- Ask students to solve problems (not involving addition or subtraction) and answer questions about data by using bar graphs with a scale of 1 and pictographs with a key of 1.
- Ask students to solve problems (not involving addition or subtraction) and answer questions about data by using bar graphs with a scale that is **not** equal to 1 and pictographs with a key that is **not** equal to 1.

Prerequisite Extended Indicators

MAE 3.4.1.b—Identify the scale of a bar graph and/or the key of a pictograph.

MAE 3.4.1.a—Identify a characteristic of a bar graph or a pictograph. (e.g., quantities, comparisons)

Key Terms

bar graph, category, data, greatest, key, least, most, pictograph, scale

Additional Resources or Links

https://www.engageny.org/resource/grade-2-mathematics-module-7-topic-lesson-1

https://www.engageny.org/resource/grade-2-mathematics-module-7-topic-lesson-3

Alternate Mathematics Instructional Supports for NSCAS Mathematics Extended Indicators Grade 3