Illustrative Mathematics®

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# GRADE 4

# Unit

# 2

## Teacher Adaptation Pack

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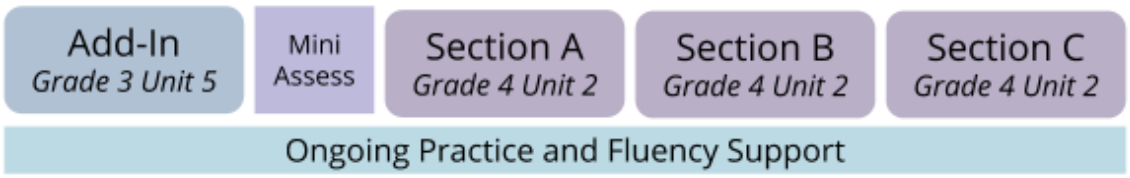
K5_Beta

# Grade 4 Unit 2 Teacher Adaptation Pack

Directions for Use

1. Read the current grade level unit standards and dependencies.
2. Ask prior grade level teachers if students were taught the topics when school was in physical session last year. Another option is to show the students a problem on the topic and anonymously ask students if they know how to solve the problem.
    a. If yes, start the current grade level section without the add-in lessons.
    b. If not, teach the prior grade level add-in lessons.
3. After the add-in lessons, give the mini-assessment.
    a. If students got the questions correct, start the current grade level section.
    b. If students got some things correct, start the current grade level section, but use the ongoing practice materials to support students.

Recommended Implementation



| Grade 4 Unit 2: Fraction Equivalence and Comparison | |
|---|---|
| | **Sections A, B, and C** |
| **Standards** | • 4.NF.A.1, 4.NF.A.2 |
| **Prior-Grade Connections** | • 3.NF.A.1, 3.NF.A.2, 3.NF.A.3 |
| **Rationale** | In 4.2 Section A, students revisit the meaning of fractions using fraction strips, tape diagrams, and number lines. Students reason about the size of fractions, and compare fractions with the same numerators or the same denominators. They also recall the meaning of equivalent fractions.<br><br>In Section B, students extend their understanding of equivalent fractions as they use the number line to represent equivalent fractions and generalize about how to generate equivalent fractions.<br><br>In Section C, students develop their ability to compare and order fractions with different numerators and different denominators. |
| **Add-in Lessons** | Before Section A:<br>• 3.5 Lessons 1-3<br><br>Complete 4.2 Lessons 1-3<br><br>• 3.5 Lesson 6<br>• 3.5 Lesson 7 (can skip Activity 2)<br>• 3.5 Lesson 8 (can skip Activities 2 and 3)<br>• 3.5 Lesson 10<br>• 3.5 Lesson 11<br><br>Continue 4.2 at Lesson 4 |
| **4.2 Lessons to Combine or Skip** | Combine 3.5 Lesson 11 with 4.2 Lesson 4<br>Skip either 3.5 Lesson 11 Activity 2 or 4.2 Lesson 4 Activity 1 |

| | |
|---|---|
| **Prior-grade Practice and Fluency** | • Fraction Concentration: Grade 3 Unit 8 Lesson 4 Activity 2<br>• Generation Equivalent Center: Stage 1<br>• Fraction Action Center: Stage 1 |
| **Extension and Exploration** | • IM tasks from site: Find 1, Find $\frac{2}{3}$<br>• Grade 3 Unit 8: Lessons 1-3 |
| **Assessment** | Mini-assessment 1 (After 3.5 Lessons 1-3)<br><br>Mini-assessment 2 (After 3.5 Lesson 6-8, 10-11)<br><br>If students need Ongoing Practice<br>• Generation Equivalent Center: Stage 1<br>• Fraction Action Center: Stage 1<br>• Practice problems |

## Table of Contents

## 3.5 Lesson 1: Name the Parts

**Teacher-facing Learning Goals**

- Partition shapes into parts with equal areas and express the area of each part as a unit fraction of the whole.
- Understand a fraction $\frac{1}{b}$ as the quantity formed by 1 part when a whole is partitioned into *b* equal parts.

**Building on CCSS:** 2.G.A.3
**Addressing CCSS:** 3.G.A.2

**Lesson Purpose**
The purpose of this lesson is for students to revisit the grade 2 work of partitioning rectangles and to begin to consider how the parts could be named with a fraction.

| **Access for Students with Disabilities** | **Access for English Learners** |
|---|---|
| Activity 2: Engagement | Activity 2: MLR8 Discussion Supports |

**Materials Needed**

| **Gather** | **Copy** |
|---|---|
| • none | • Create a set of name the parts cards for each group of 2 students. |

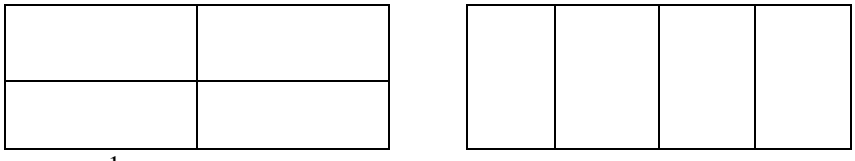
**Cool-down:** Partition a Rectangle

1. Partition the rectangle into fourths.

2. What fraction of the whole is each part?

**Student Responses**

1.



2. $\frac{1}{4}$

**Teacher Reflection Question**
In grade 2, students learned to partition rectangles and were introduced to halves, thirds, and fourths. How did they leverage their prior experiences as they were introduced to fractions in this lesson?

**Lesson Narrative**

In previous grades, students learned how to partition circles and rectangles into two, three, or four equal shares and describe the shares using the words "halves," "thirds," and "fourths."

The purpose of this lesson is to revisit the work of partitioning rectangles and formally introduce the **fractions** $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$ as the numbers we write for the parts described as one half, one third, and one fourth in grade 2.

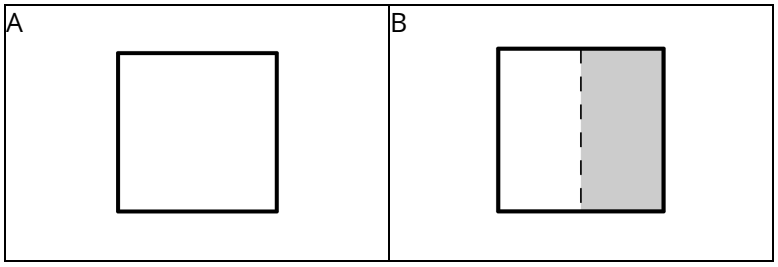
**Student-facing Learning Goal:** Let's name parts of a whole.

**Warm-up Narrative:** Which One Doesn't Belong: Parts

**Addressing CCSS:** 2.G.A.3
**Building Toward CCSS:** 3.G.A.2

This warm-up prompts students to compare four figures. It gives students a reason to use language precisely (MP6). It gives the teacher an opportunity to hear how students use terminology and talk about characteristics of the items in comparison to one another. During the synthesis, ask students to explain the meaning of any terminology they use, such as partition, parts, pieces, equal, and halves.

**Task Statement**
Which one doesn't belong?



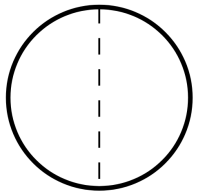

**Launch/Activity**

- Groups of 2
- Display image.
- "Pick one that doesn't belong. Be ready to share why it doesn't belong."
- 1 minute: quiet think time
- 2-3 minutes: partner discussion
- Record responses.

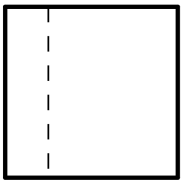
**Synthesis**

- Focus question: "Why can't we say that D is split into halves?" (The parts aren't the same size. The parts have to be equal.)

C



D



**Student Responses**

Sample responses:

A doesn't belong because:

- It's the only one that hasn't been split into parts.

B doesn't belong because:

- It's the only one that is shaded.

C doesn't belong because:

- It's the only one that isn't a square.
- It's the only one that doesn't have flat sides.
- It's the only one that doesn't have corners/vertices.

D doesn't belong because:

- It's the only one that has parts that aren't the same size.

- Consider asking:
  - "Let's find at least one reason why each one doesn't belong."

## **Activity 1 Narrative:** Partitioning Problems

**Addressing CCSS:** 2.G.A.3

The purpose of this activity is for students to revisit the grade 2 work of partitioning shapes into two, three, or four equal shares and describe the shares using the words halves, thirds, and fourths. Students solve three problems involving equal parts of a shape. The first problem is used in the synthesis for students to see different ways that the shape can be partitioned into equal parts. This sets up the next activity in which students will create a number that could represent one equal part of a shape.

**Task Statement**

Solve each problem. Draw a diagram to show your thinking.

1. A space on a table is shared equally for 3 activities. How much of the table is used for each activity?
2. Two students want to share one piece of tape so each student gets the same amount. How much of the piece of tape will each student get?
3. Some classes are sharing a basketball court for

**Launch/Activity**

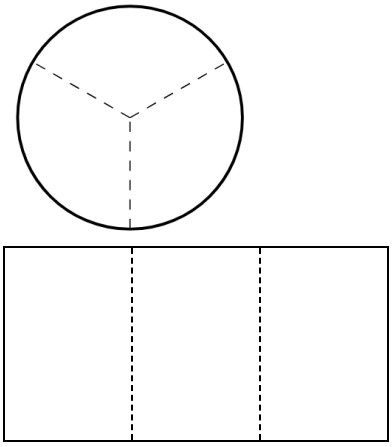
- Groups of 2
- "Solve these problems and explain or show your reasoning."
- 5-7 minutes: independent work time
- Monitor for a variety of ways that students partition the shape in the third problem, as shown in the student responses.
- "Share your diagrams and your

P.E. If 4 classes share the court equally how much of the court does each class get to use?

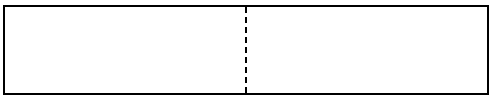
**Student Responses**

Possible responses:

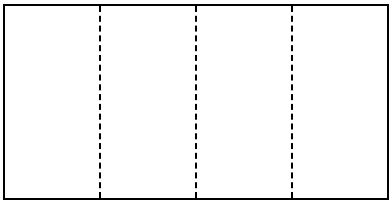
1. one third

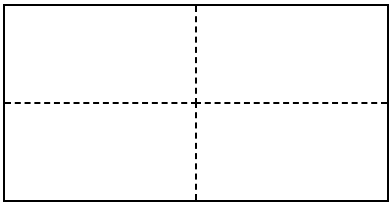


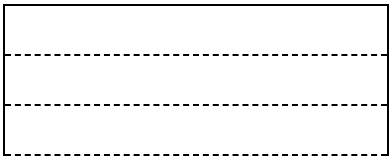
2. one half



3. one fourth



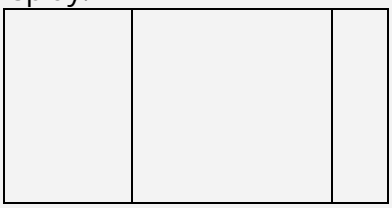




reasoning with your partner."
- 3 minutes: partner discussion
- Monitor for students describing the parts as halves, thirds, and fourths.
- If students finish early, ask them to draw a diagram to show how:
  - 6 classes share a basketball court equally
  - 8 classes share a basketball court equally

**Synthesis**

- Have students share diagrams for number 1.
- Display student diagrams for number 1 and ask:
  - "What do we call each part if there are 3 equal parts?" (Thirds)
  - How many of the parts does it take to make the whole shape? (Three)
- Have students share solutions for number 2.
- Display student solutions for number 2 and ask:
  - "What do we call each part if there are 2 equal parts?" (Halves)
  - How many parts does it take to make the whole shape? (Two)
- Have 2-3 students share diagrams for number 3. Make sure that different ways the court could be partitioned are shared.
- Keep the different ways of partitioning the court displayed.
- "These ways of partitioning the court

| | |
|---|---|
| | look different. What's the same about all of them?" (They all were partitioned into 4 pieces/parts. All the parts/pieces are the same size.)<br>• Display:<br>  <br>• Ask, "Why can't we call these parts thirds?" (There are 3 parts, but the parts aren't equal.)<br>• 1 minute: partner discussion<br>• Share responses. |

**Activity 2 Narrative:** Partition Sort

**Addressing CCSS:** 3.G.A.2, 3.NF.A.1

The purpose of this activity is for students to sort circles and rectangles into groups based on whether they've been partitioned into halves, thirds, or fourths. The categories that students create will be used to formally introduce the unit fractions for halves, thirds, and fourths.

**SwD Support Tags**
- Engagement

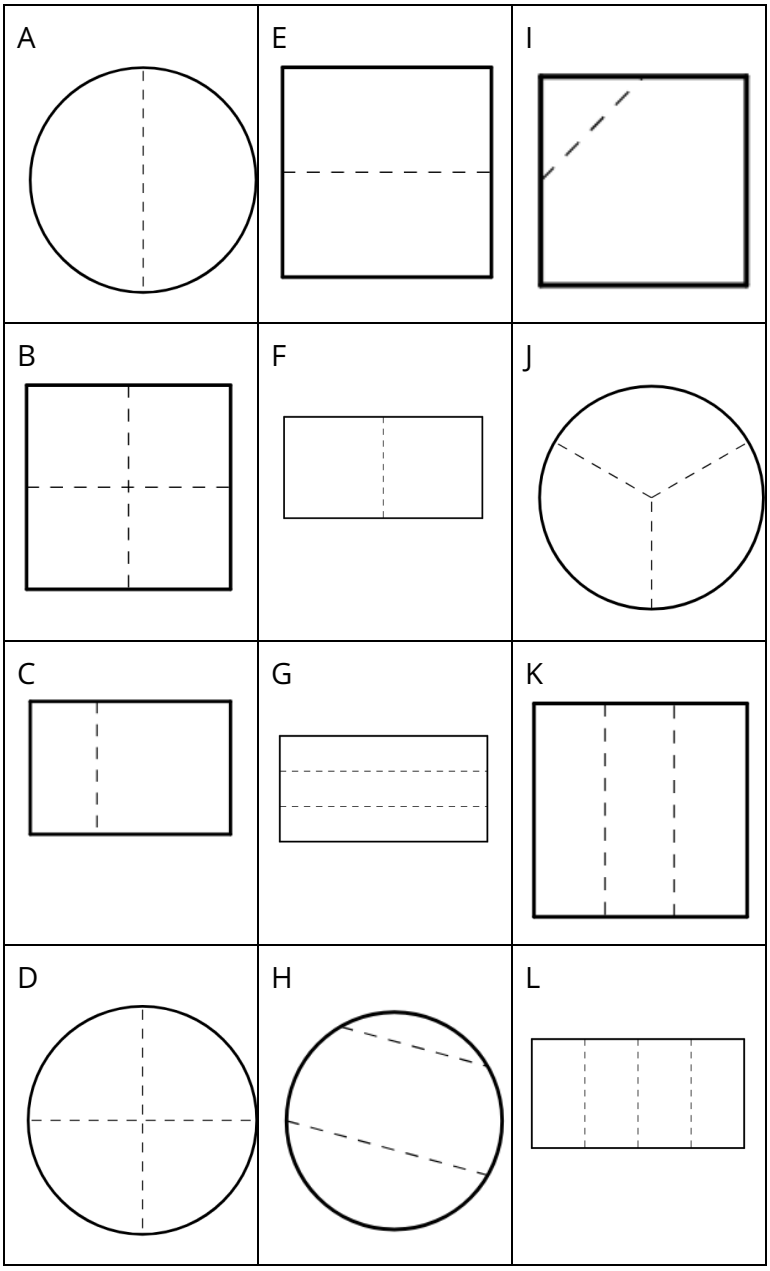
**MLR Tags**
- MLR8 Discussion Supports

**EL Support Text**
*MLR8 Discussion Supports*. Activity: Think aloud and use gestures to emphasize partitions, fraction bars, halves, thirds, fourths. Point at the partitions in the pictures and connect it to the parts in the fractions you write. *Advances: Listening, Representing*

**SwD Support Text**
*Engagement: Develop Effort and Persistence.* Activity: Chunk this task into more manageable parts. Give students a subset of the cards to start with and introduce the remaining cards once students have completed their initial sorting of cards
*Supports accessibility for: Social-Emotional Functioning*

| **Task Statement** | **Launch/Activity** |
|---|---|

Sort the shapes in any way that makes sense to you. Be ready to explain your reasoning.




**Student Responses**

Students may sort by shape, (circles, rectangles, and squares) the direction of the partitions, (vertical, horizontal, diagonal, or some combination) equal or

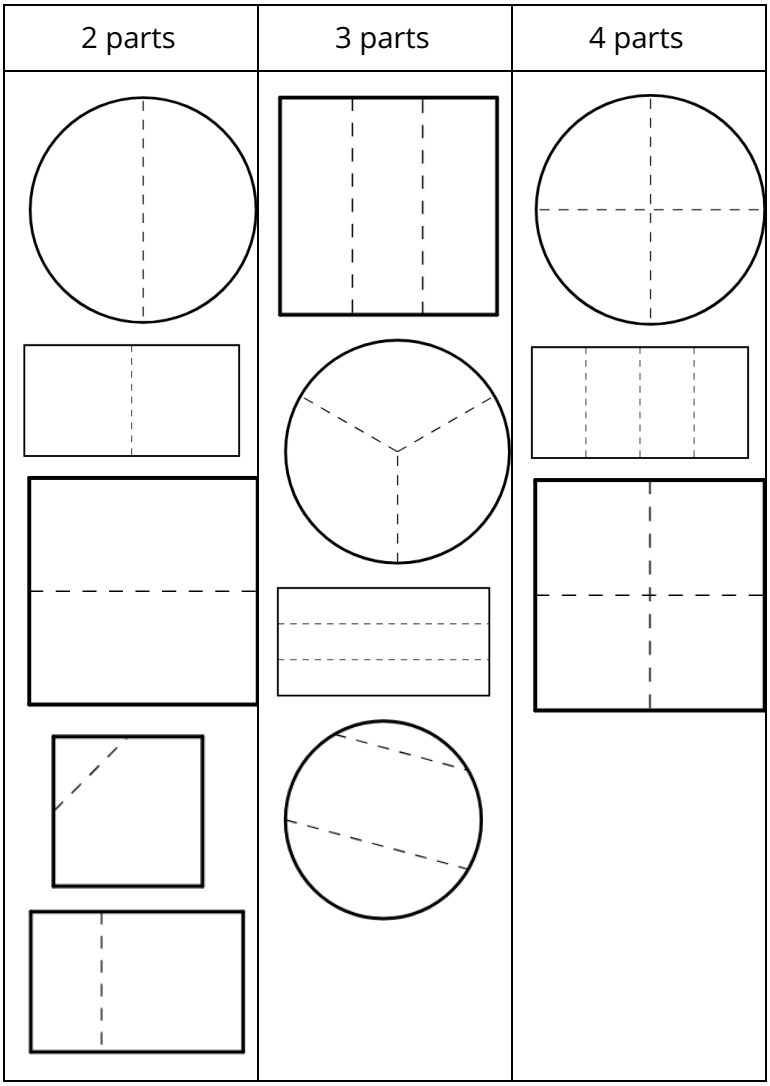
- Groups of 2
- "Take a minute to look at the shapes and think about how you'll sort them."
- 1 minute: quiet think time
- "Now, work with your partner to sort the shapes in any way that makes sense to you."
- 3-5 minutes: partner work time
- Monitor for students who sort by the number of partitions.
- Have students share different ways that they sorted the shapes.
- "_____ sorted his/her shapes by the number of partitions. Use _____'s method to sort your shapes."
- 1 minute: partner work time

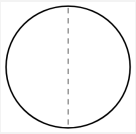
**Synthesis**

- Display

- "These have two partitions and three partitions. Why can't we call these halves or thirds?" (The parts aren't equal.)
- 1 minute: partner discussion
- Share responses.
- "Today we're going to learn the number we use when we partition a whole into equal parts and want to describe one of the parts. The bottom part of the number is below the fraction bar and tells us how many equal parts the shape was partitioned into."
- Display:

non-equal parts, or the number of partitions (2 parts, 3 parts, or 4 parts).



- Write "$\frac{}{2}$" in one of the halves.
- "The top part of the number is above the fraction bar and is the one in the phrase 'one half.'"
- Write "1" above the fraction bar.
- "Each part can be represented with the number one half so we could label the other part of the circle the same way."
- Write "$\frac{1}{2}$" in the other half of the circle.
- "This is called a **fraction**. Go ahead and label all your halves with this fraction."
- 1 minute: quiet work time
- Monitor to make sure that students don't label non-equal sized parts.
- "How do you think you would write the fraction one third?"
- 1 minute: partner discussion.
- Share and record answers.
- Have students label thirds with $\frac{1}{3}$.
- "How do you think you would write the fraction for one fourth?"
- 1 minute: partner discussion.
- Share and record responses.
- Have students label fourths with $\frac{1}{4}$.

**Lesson Synthesis**

Display:

"Today we learned $\frac{1}{3}$ is the number you use when you partition a whole into equal parts and describe one of them. How do the 1 and the 3 connect with the diagram? (The 3 tells us that the rectangle was partitioned into 3 equal parts. The 1 tells us that 1 of the parts is shaded.)
1 minute: partner discussion
Share responses.

"Now, use what you learned in Activity 2 to go back and label your diagrams from Activity 1."
2–3 minutes: independent work time
Have students share how they labeled their diagrams.

## 3.5 Lesson 2: Unit Fractions

**Teacher-facing Learning Goals**

- Partition shapes into parts with equal areas and express the area of each part as a unit fraction of the whole.
- Understand a fraction $\frac{1}{b}$ as the quantity formed by 1 part when a whole is partitioned into $b$ equal parts.

**Addressing CCSS:** 3.G.1.2, 3.NF.A.1

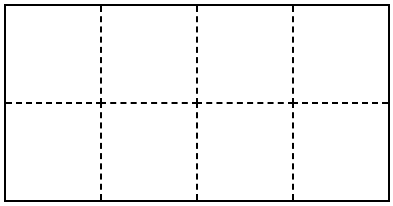
**Lesson Purpose**

The purpose of this lesson is for students to extend their partitioning work to sixths and eighths and to introduce the fractions $\frac{1}{6}$ and $\frac{1}{8}$.

**Materials Needed**

| Gather | Copy |
|---|---|
| • pattern blocks (at least 3 hexagons, trapezoids, and rhombuses, and 8 triangles for each group of 2 students) | • none |

**Cool-down:** Label the Parts
Label each part with the correct fraction.



**Student Responses**

| | | | |
|---|---|---|---|
| $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ |
| $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ |

**Teacher Reflection Question**
What student strategies surprised you in today's lesson? How will you build on those strategies as students develop ideas about fractions?

**Lesson Narrative**

| **Access for Students with Disabilities** | **Access for English Learners** |
|---|---|
| Activity 2:Engagement | Activity 2: MLR8 Discussion Supports |

In previous lessons, students were introduced to the fractions $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$ as the numbers we write for the parts described as one half, one third, and one fourth.

The purpose of this lesson is to partition shapes into 6 and 8 equal parts and learn that one sixth and one eighth are written with the numbers $\frac{1}{6}$ and $\frac{1}{8}$. Students use pattern blocks and rectangles to partition shapes into equal parts and label the equal parts, including the other unit fractions they have learned so far.

**Student-facing Learning Goal:** Let's learn about unit fractions.

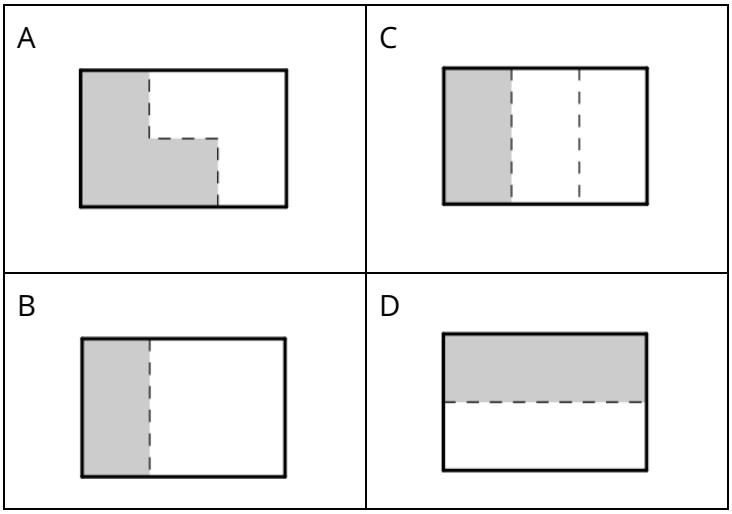
**Warm-up Narrative:** Which One Doesn't Belong?: Partitions

**Addressing CCSS:** 2.G.A.3
**Building Toward CCSS:** 3.NF.A.1

This warm-up prompts students to compare four images. It gives students a reason to use language precisely (MP6). It gives the teacher an opportunity to hear how students use terminology and talk about the characteristics of the items in comparison to one another. During the synthesis, ask students to explain the meaning of any terminology they use, such as partition, equal parts, halves, and thirds.

### Task Statement

Which one doesn't belong?




### Student Responses

Sample responses:
A doesn't belong because:
- It's the only one that doesn't have a straight line for the partition.

B doesn't belong because:
- It's the only one that doesn't have equal parts.

C doesn't belong because:
- It's the only one that wasn't partitioned into 2 parts.
- It's the only one with 3 parts.
- It's the only one with thirds.

D doesn't belong because:
- It's the only one that doesn't have a horizontal partition.
- It's the only one with just a vertical partition.

### Launch/Activity

- Groups of 2
- Display image.
- "Pick one that doesn't belong. Be ready to share why it doesn't belong."
- 1 minute: quiet think time
- 2-3 minutes: partner discussion
- Record responses.

### Synthesis

- Focus question: "What numbers could we use to label the shaded parts?" (I could label the shaded part in A [or D] as $\frac{1}{2}$ because there are 2 parts that are equal and 1 is shaded. I could label the shaded part in C as $\frac{1}{3}$ because there are 3 equal parts and 1 is shaded. I can't label the shaded part in D because the parts aren't equal.)
- Consider asking:
  - "Let's find at least one reason why each one doesn't belong."

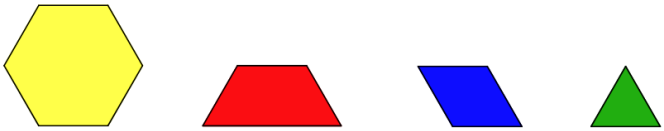
## **Activity 1 Narrative:** Fractions with Pattern Blocks

**Addressing CCSS:** 3.G.A.2, 3.NF.A.1

The purpose of this activity is to have students partition a hexagon into six equal parts and write $\frac{1}{6}$ for each of the parts. Also, students label parts with unit fractions from the previous activity. Pattern blocks are used for this activity because of how they are easily partitioned into sixths.

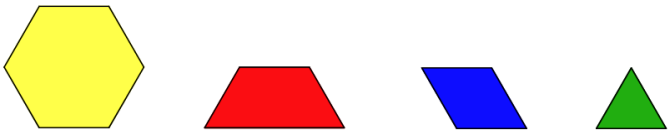
### Task Statement

The yellow hexagon is 1 whole. What number represents each of the blocks? Be prepared to explain your reasoning.



1 whole

### Student Responses



1 whole $\frac{1}{2}$ $\frac{1}{3}$ $\frac{1}{6}$

### Launch/Activity

- Groups of 2
- Give students pattern blocks.
- "Now, work with your partner to label each one of the pattern blocks if the hexagon represents one whole."
- 3-5 minutes: partner work
- Monitor for students who are able to apply what they've learned about halves, thirds, and fourths to use the number $\frac{1}{6}$ to represent the triangle. This will be used in the synthesis.

### Synthesis

- Share and record responses for the trapezoid and the rhombus.
- Display: $\frac{1}{6}$
- "_____ wrote this fraction to represent the triangle. What does each part of the number represent?" (The bottom tells us that the hexagon was partitioned into 6 equal parts. The top part tells us that the triangle is 1 of the equal parts.)
- "We say this number is "one sixth" because the whole was partitioned into six equal parts and we are showing one of the parts."

## **Activity 2 Narrative:** Partitions

**Addressing CCSS:** 3.NF.A.1

The purpose of this activity is for students to partition shapes into 2, 3, 4, 6, or 8 equal parts. Students name the size of each part with the unit fractions $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{6}$, and $\frac{1}{8}$. Students will use their experience from the previous activities to name eighths with a unit fraction.

**SwD Support Tags**

- Engagement

**MLR Tags**

- MLR8 Discussion Supports

**EL Support Text**

*MLR8 Discussion Supports*. Synthesis: During group presentations, invite the student(s) who are not speaking to follow along and point to the corresponding parts of the display. *Advances: Speaking, Representing*

**SwD Support Text**

*Engagement: Develop Effort and Persistence.* Activity: Chunk this task into more manageable parts. Check in with students to provide feedback and encouragement after each chunk. *Supports accessibility for: Attention, Organization*

**Task Statement**

Partition each rectangle into 2, 3, 4, 6, or 8 equal parts. Then label the size of each part with the correct fraction.

2 parts

3 parts

4 parts

6 parts

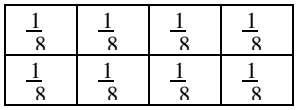
**Launch/Activity**

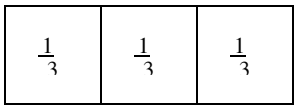
- Groups of 2
- "You're going to partition and label some rectangles. Take a minute to think about how you'll partition each rectangle and label the size of the parts."
- 1 minute: quiet think time
- "Now, work with your partner to partition each rectangle and label the size of each part."
- 3-5 minutes: partner work
- Monitor for students who are able to apply what they've learned about other unit fractions to name "eighths" and represent them with the corresponding unit fraction "$\frac{1}{8}$." This will be used in the synthesis.

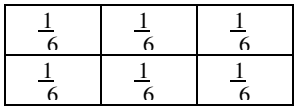
8 parts

**Student Responses**






- Consider asking:
  - "What do you think is the size of these parts if there are eight equal parts?"
  - "Using what you know from the other fractions, how do you think we would write the number one eighth?"

**Synthesis**

- Have students share how they partitioned their rectangles into 2, 3, 4, 6, and 8 equal shares.
- Display rectangle that a student partitioned into eighths.
- "_____ named the size of each of these parts as an eighth.' How do you think _____ came up with that name?" (Just like sixths have 6 equal parts, eighths would have 8 equal parts. It took 8 parts to make up the rectangle.)
- Display: $\frac{1}{8}$
- "_____ wrote this symbol to name an eighth.' What does each part of the number represent?" (The bottom tells us that the rectangle was partitioned into 8 equal parts. The top part tells us that we're labeling 1 of the equal parts.)

## **Activity 3 Narrative:** Partition, Shade, Trade

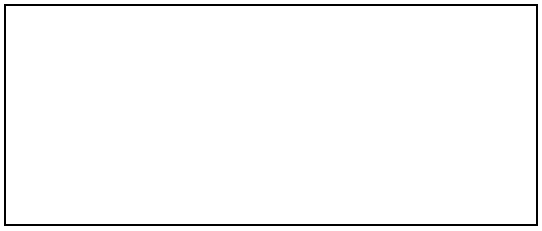
**Addressing CCSS:** 3.NF.A.1

The purpose of this activity is for students to determine the part of a rectangle that has been shaded. Students partition and shade, but don't label, a fraction on a rectangle and then trade with a partner to

determine the fraction their partner has shaded. Remind students to shade, but not to label their partitions and their fraction, so that their partner has to focus on the number of equal parts and the number of parts that have been shaded.

**Task Statement**

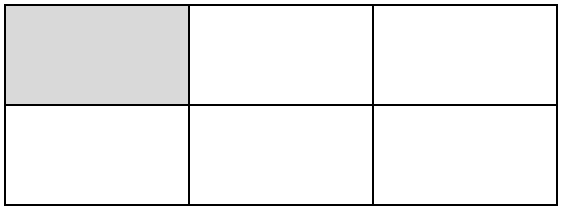
1. Partition the rectangle into equal-sized parts. Shade one of the parts.



2. Trade rectangles with a partner. If the whole rectangle is 1, what number represents the shaded part? Explain your reasoning.

**Student Responses**

Sample responses:

1. 
2. My partner partitioned the rectangle into 6 equal parts. My partner shaded $\frac{1}{6}$ of the rectangle because the rectangle was partitioned into 6 equal parts and 1 of them is shaded.

**Launch/Activity**

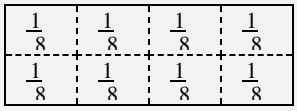
- Groups of 2
- "Complete the first part of the activity on your own. Partition the rectangle and shade to show a fraction, but don't label it. Don't tell your partner how you are partitioning or what number you are showing.
- 2 minutes: independent work time
- "Now, trade rectangles with your partner and answer the question about their rectangle. When you are both finished, share your reasoning."
- 1-2 minutes: independent work time
- 1-2 minutes: partner work time

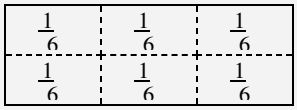
**Synthesis**

- "How did you decide how to partition your rectangle and what fraction the shaded part would show?"
- "How did you decide how your partner's rectangle was partitioned and decide what fraction the shading was showing?"

**Lesson Synthesis**

Display:






Say: "Today we wrote fractions to show the size of each part when we partitioned a shape into 6 equal parts and 8 equal parts. How are these fractions the same as other fractions you've already written? How are they different? (There was a one for the top part of the fraction to show we were labeling one of the parts. The bottom part of the fraction told us how many equal parts there were in the shape. There were more parts. We had only partitioned into 2, 3, or 4 parts and now we can partition into 6 parts or 8 parts.)
2 minutes: partner discussion
Share and record responses.

## 3.3 Lesson 3: Non-unit Fractions

**Teacher-facing Learning Goals**

- Understand a fraction $\frac{a}{b}$ as the quantity formed by $a$ parts of size $\frac{1}{b}$.

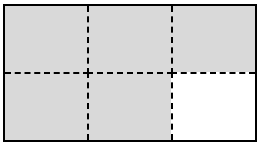
**Addressing CCSS:** 3.NF.A.1

**Lesson Purpose**
The purpose of this lesson is for students to see that non-unit fractions are made of unit fractions.

**Materials Needed**

| **Gather** | **Copy** |
|---|---|
| • none | • none |

**Cool-down:** Shaded Fraction
What fraction is shaded? Explain your reasoning.



**Student Responses**

$\frac{5}{6}$: The rectangle is split into 6 parts and 5 of the one sixth parts are shaded.

**Teacher Reflection Question**
How did students leverage their knowledge of unit fractions from previous lessons to make sense of non-unit fractions for the first time?

**Lesson Narrative**

In previous lessons, students learned how to write unit fractions, using numbers of the form $\frac{1}{b}$. They also partitioned rectangles to think about the size of unit fractions.

The purpose of this lesson is to introduce students to non-unit fractions. Students use a table to consider how to write fractions that tell the amount of the rectangle that's shaded when there's more than one part shaded. Then, students practice naming shaded parts of rectangles and partition and shade to show given fractions on area diagrams.

| **Access for Students with Disabilities** | **Access for English Learners** |
|---|---|
| Activity 1: Engagement | Activity 1: MLR8 Discussion Supports |

**Student-facing Learning Goal:** Let's learn about non-unit fractions.

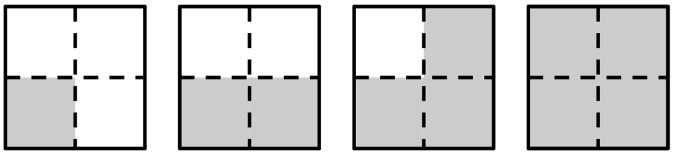
**Warm-up Narrative:** Notice and Wonder: More Than One Part

The purpose of this warm-up is to elicit the idea that fractions are made up of unit fractions, which will be useful when students identify fractions in diagrams and shade diagrams to show a specific fraction in a later activity. While students may notice and wonder many things about these images, the fact that more than one part of the square is shaded is the important discussion point.

This prompt gives students opportunities to look for and make use of structure (MP7). The specific structure they might notice is that we can consider more than one part of the square after it is split into fourths.

**Task Statement**

What do you notice? What do you wonder?



**Student Responses**

**Launch/Activity**

- Groups of 2
- Display the image.
- "What do you notice? What do you wonder?"
- 1 minute: quiet think time
- 1 minute: partner discussion
- Share and record responses.

| | |
|---|---|
| Students may notice:<br>• Each image shows more pieces shaded.<br>• Some of the squares have more than 1 one fourth shaded.<br>• The first square shows $\frac{1}{4}$.<br>• The second square shows $\frac{1}{2}$.<br>Students may wonder:<br>• Why is more than one piece shaded sometimes?<br>• Why are we shading one more piece each time?<br>• Could each of the big squares be showing a different fraction? | **Synthesis**<br>• "How are the shaded parts the same as parts you've worked with before? How are they different?" (We are shading parts of the shape after it has been split into smaller parts. In the past, we only shaded one part after we partitioned the shape.) |

**Activity 1 Narrative:** Write Fractions

**Addressing CCSS:** 3.NF.A.1

The purpose of this activity is for students to make sense of the notation used to write non-unit fractions, specifically that the denominator tells the number of equal parts the whole was partitioned into and the numerator tells the number of parts that are being described. Students then practice writing non-unit fractions that represent the shaded portions of area diagrams. The activity concludes with students practicing how to read non-unit fractions. The terms "numerator" and "denominator" are not used in this lesson, but will be introduced in a later lesson.

**SwD Support Tags**
- Engagement

**MLR Tags**
- MLR8 Discussion Supports

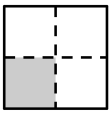
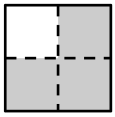
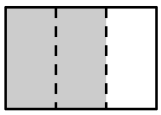
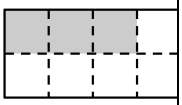
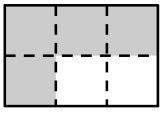
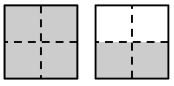
**EL Support Text**
*MLR8 Discussion Supports. Activity:* Invite students to begin partner interactions by repeating the question, "How many shaded parts are there?". You may encourage partners to begin the next step of the chart with a question. For example, What size is each part?" This gives both students an opportunity to produce language.
*Advances: Conversing*

**SwD Support Text**

*Engagement: Provide Access by Recruiting Interest.* Activity: Leverage choice around perceived challenge. Invite students to select 4 out of the 6 remaining problems to complete. *Supports accessibility for: Organization; Attention; Social-emotional skills*

**Task Statement**

You learned how to represent the shaded amount in the first diagram with the number $\frac{1}{4}$. Use the diagrams in the table to figure out the information that's missing. Be prepared to explain your reasoning.

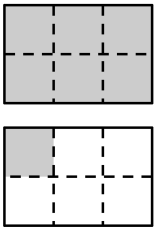
| | Number of shaded parts | Size of each part | Number that represents the total amount shaded |
|---|---|---|---|
|  | 1 | $\frac{1}{4}$ | $\frac{1}{4}$ |
|  | | | $\frac{3}{4}$ |
|  | | | |
|  | | | |
|  | | | |
|  | | | |

**Launch/Activity**

- Groups of 2
- Display table.
- "You've learned that we can represent this shaded one fourth with the number $\frac{1}{4}$. We're going to use this table to think about how to write other fractions. Let's look at the second row in the table together. Think about what the 3 and the 4 could represent in the new number."
- 1 minute: quiet think time
- "Discuss what the 3 and the 4 represent in the new number with your partner." (The 3 represents the 3 parts that are shaded. The 4 represents the 4 equal parts in the square.)
- 1 minute: partner discussion
- Share and record responses in correct columns for $\frac{3}{4}$.
- Consider asking: "If there are 4 equal parts, what is the size of each part?"
- "Now work with your partner to fill in the missing information in the table."
- 5-7 minute: partner work time

**Synthesis**

- Have students share what they wrote in each empty cell of the table and their thinking behind their answer.
- Consider asking:
  - "How did the diagram help you make sense of this?"
  - "How do you see the parts of the

| | | | |
|---|---|---|---|
|  | | | |

**Student Responses**

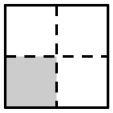
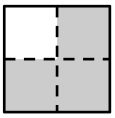
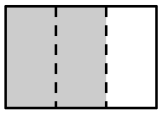
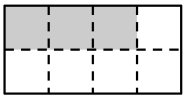
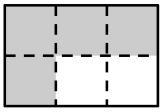
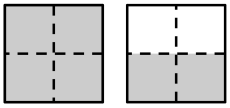
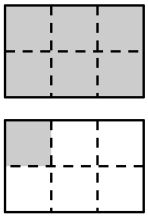
| | Number of shaded parts | Size of each part | Number that represents the total amount shaded |
|---|---|---|---|
|  | 1 | $\frac{1}{4}$ | $\frac{1}{4}$ |
|  | 3 | $\frac{1}{4}$ | $\frac{3}{4}$ |
|  | 2 | $\frac{1}{3}$ | $\frac{2}{3}$ |
|  | 3 | $\frac{1}{8}$ | $\frac{3}{8}$ |
|  | 4 | $\frac{1}{6}$ | $\frac{4}{6}$ |
|  | 6 | $\frac{1}{4}$ | $\frac{6}{4}$ |

diagram in the number that represents the total amount shaded?"

- Keep complete table displayed.
- "Now that the table is complete, what do you notice? What do you wonder?" (The size of each part always has a 1 in the top part of the fraction. The bottom part of the fraction is the same for each part and the total amount shaded. The top part of the fraction is how many parts are shaded.)
- 1 minute: quiet think time
- 1 minute: partner discussion
- Share and record responses.
- Display $\frac{3}{4}$.
- "The first number we discussed is pronounced 'three fourths.' Think about how the other numbers could be pronounced."
- 30 seconds: quiet think time
- "Discuss how they are pronounced and practice saying them with your partner."
- 2-3 minutes: partner discussion
- Monitor for students pronouncing the fractions correctly.
- Share responses.

| | | | |
|---|---|---|---|
|  | 7 | $\frac{1}{6}$ | $\frac{7}{6}$ |

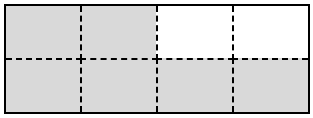
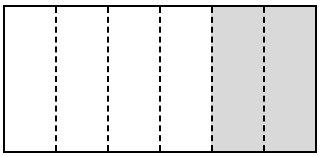
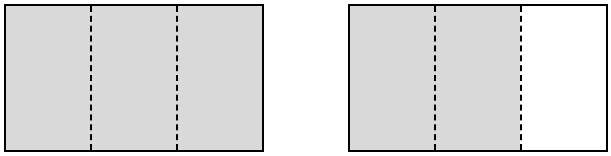
## **Activity 2 Narrative:** Identify and Shade Fractions

**Addressing CCSS:** 3.NF.A.1

The purpose of this activity is for students to identify fractions on shaded area diagrams and to partition and shade area diagrams to show fractions. They use the unit fraction labels to notice how fractions are built from unit fractions and the new notation from Activity 1 to record the fraction that is shaded. In the second part of the activity, students partition and shade their own rectangles to show fractions. Encourage students to partition and shade the area diagrams in any way that makes sense to them as long as the parts are still the same size.

**Task Statement**

Part 1

1. What fraction is shaded? Explain your reasoning.
   a. 
   b. 
   c. 

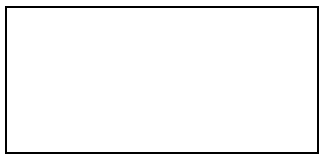
Part 2

**Launch/Activity**

Part 1

- Groups of 2
- "Take a few minutes to decide what fraction is shaded in each problem. Explain how you know."
- 2 minutes: independent work time
- "Talk to your partner about what fraction is shaded. Be ready to share your reasoning."
- 2 minutes: partner discussion
- "What fraction is shaded?"
- Share and record responses.
- "Let's focus on 1a. How did you know what fraction was shaded?" (I counted the number of one eighths that are shaded. Six one eighths were shaded so the fraction is $\frac{6}{8}$.)
- Share and record responses.

2. Partition and shade each diagram to represent each fraction.
   a. $\frac{3}{8}$



   b. $\frac{5}{6}$

   c. $\frac{2}{3}$

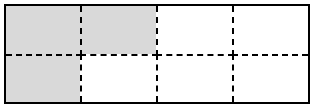
**Student Responses**

Part 1

1.
   a. $\frac{6}{8}$
   b. $\frac{2}{6}$
   c. $\frac{5}{3}$

Part 2

2. Sample responses:
   a. $\frac{3}{8}$



   b. $\frac{5}{6}$

- Have students label the unit fraction of each shaded part in problem 1.
- "Now let's think about problem 1c. "Why do you think someone might say that $\frac{5}{6}$ is shaded in problem 1c? Why might someone else say that $\frac{5}{3}$ is shaded?" (There are 5 out of 6 pieces shaded so you might say $\frac{5}{6}$. But it's two rectangles and each rectangle is in thirds, so each part is one-third. If I count how many thirds are shaded, there are 5 thirds.)
- 2 minutes: partner discussion
- Share and record responses.
- "So, because the rectangle is the whole, we know that we are splitting each rectangle into thirds and we can count that we have 5 one third pieces."

Part 2

- "Work on your own to partition and shade these rectangles to represent each fraction."
- 3-5 minutes: independent work time
- Monitor for students who partition the rectangles in different ways.
- "Share how you partitioned and shaded with your partner."
- 2 minutes: partner discussion

**Synthesis**

- For each rectangle, have 1-2 students share how they partitioned and shaded. Try to show a variety of ways each rectangle can be partitioned in equal parts.
- For each rectangle, consider asking:
  - "Did anyone partition in a different way?"

| | |
|---|---|
| c. $\frac{2}{3}$  | ○ "Did anyone shade in a different way?"<br>○ "What do these different ways of partitioning and shading have in common?" (They all show ___ equal parts and ___ are shaded.) |

**Lesson Synthesis**

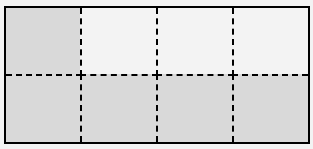
Display: $\frac{1}{8}$ and $\frac{5}{8}$

"Today we learned how to build more fractions, like $\frac{5}{8}$, from fractions we already knew, like $\frac{1}{8}$. We call fractions, like $\frac{1}{8}$, with a one in the top part, **unit fractions**. How did you see unit fractions helping us build new fractions today?" (Every fraction we worked with today was made up of unit fractions. If we shade more than one unit fraction in a rectangle we get a new fraction that doesn't have a one on the top of the number.)

2 minutes: partner discussion

Share and record responses.

Display:



$\frac{5}{8}$

"Look at the fraction $\frac{5}{8}$. What does each part of the number tell us?" (The 8 tells us how many parts the rectangle is being split into and what size they are. There are 8 one eighth parts. The 5 tells us how many of those 8 parts are shaded. Five of the one eighth parts will be shaded.)

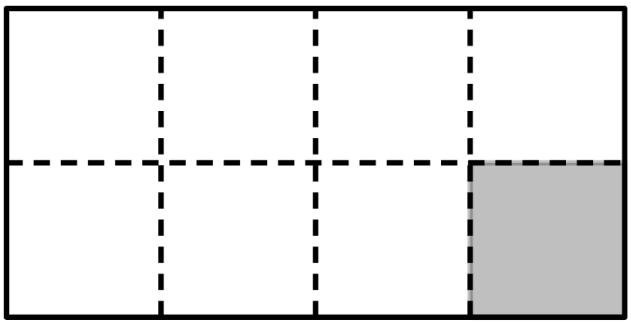
2 minutes: partner discussion

Share and record responses.

## Mini-assessment 1

**Student Facing Task Statement**

What fraction of the rectangle is shaded? Explain how you know.

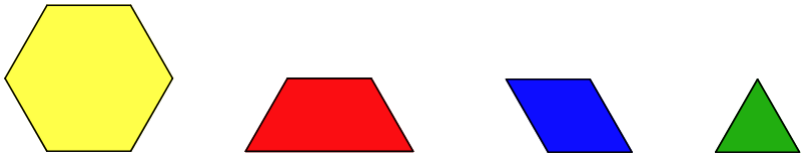


**Student Responses**

$\frac{1}{8}$. The rectangle is divided into 8 equal squares and one of them is shaded.

**Student Facing Task Statement**

The yellow hexagon is a whole. Which shapes represent $\frac{2}{3}$ of the hexagon? Select 2 answers.



A. 4 triangles
B. 2 triangles
C. 2 rhombuses
D. 3 trapezoids
E. 3 hexagons

**Student Responses**

A, C

## 3.5 Lesson 6: Unit Fractions on a Number Line

**Teacher-facing Learning Goals**

- Understand a fraction $\frac{1}{b}$ as the quantity formed by 1 part when a whole is partitioned into *b* equal parts.
- Recognize that when the interval from 0 to 1 is partitioned into b equal parts, each part has size $\frac{1}{b}$ and that the endpoint of the part based at 0 locates the number $\frac{1}{b}$ on the number line.

**Addressing CCSS:** 3.NF.A.1, 3.NF.A.2.A

**Lesson Purpose**

The purpose of this lesson is for students to apply what they've learned about partitioning and unit fractions to locate and label a unit fraction on the number line.

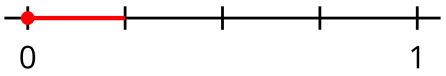
**Materials Needed**

| **Gather** | **Copy** |
|---|---|
| • none | • none |

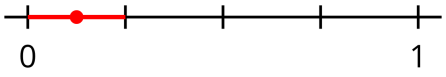
**Cool-down:** Showing $\frac{1}{4}$

Which number line shows the correct location of the number $\frac{1}{4}$?

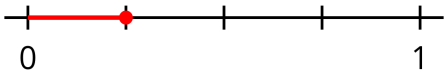
a.




b.




c.

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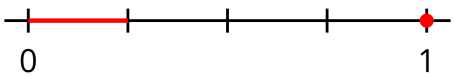



**Student Responses**

c

**Teacher Reflection Question**
What was the best question you asked students today? Why would you consider it the best one based on what students said or did?

**Lesson Narrative**

In previous lessons, students learned how to partition rectangles and fold fraction strips and describe the parts with unit fractions.

The purpose of this lesson is to have students apply what they've learned about fractions to represent unit fractions on the number line. Students examine how a whole is partitioned on a number line and consider how to label a fraction on the number line. Then students partition the interval from 0 to 1 into equal parts and label the endpoint of the first part with the corresponding unit fraction. If students struggle to partition the number line and locate fractions, you can suggest they use their fraction strips from an earlier lesson to assist them.

| **Access for Students with Disabilities** | **Access for English Learners** |
|---|---|
| Activity 2:Engagement | Activity 2:MLR8 Discussion Supports |

**Student-facing Learning Goal:** Let's represent unit fractions on a number line.

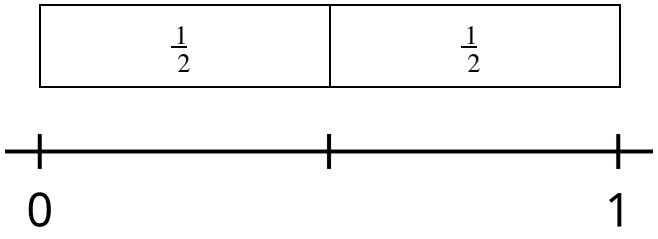
**Warm-up Narrative:** Notice and Wonder: Strips and Number Lines

**Addressing CCSS:** 3.NF.A.1, 3.NF.A.2.A

The purpose of this warm-up is to elicit the idea that number lines can be partitioned into parts smaller than 1, which will be useful when students learn how to label a fraction on the number line in a later activity. While students may notice and wonder many things about these images, the idea that the number line from 0 to 1 is partitioned into smaller parts is the important discussion point.

This prompt gives students opportunities to look for and make use of structure (MP7). The specific structure they might notice is how number lines are partitioned and the parts are identified on the number line.

| **Task Statement** | **Launch/Activity** |
|---|---|
| What do you notice? What do you wonder? | • Groups of 2<br>• Display the image.<br>• "What do you notice? What do you wonder?"<br>• 1 minute: quiet think time |




**Student Responses**

Students may notice:

- There's a number line that goes up to 1.
- There's a diagram that's been split into halves.
- Both have been partitioned.
- The parts are harder to see on the number line.
- One half isn't labeled on the number line.

Students may wonder:

- Where would $\frac{1}{2}$ go on the number line?
- Could we put other fractions on the number line?
- Could we partition the number line into more parts?

- 1 minute: partner discussion
- Share and record responses.

**Synthesis**

- "How does seeing the strip next to the number line help you partition the number line?" (I can see the parts easier in the strip. I can picture where the tick marks should be on the number line from looking at the diagram. I can imagine a strip over the number line when I'm partitioning it.)

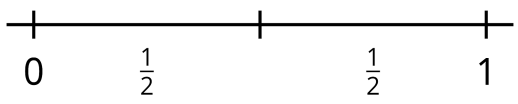
## **Activity 1 Narrative:** Thinking about $\frac{1}{2}$ on the Number Line

**Addressing CCSS:** 3.NF.A.2.A

The purpose of this activity is for students to consider how fractions can be represented on the number line. Students think about how the interval from 0 to 1 has been partitioned, and different ways of showing the distance of a number from 0. Each part has length one-half and the endpoint of the first one-half part locates $\frac{1}{2}$ on the number line. This will be helpful in subsequent lessons as students partition into more parts and locate other fractions on the number line.

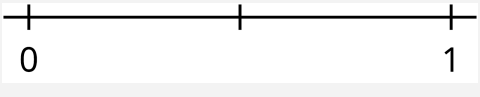
**Task Statement**

Andre is labeling his number line and says $\frac{1}{2}$ can be labeled like this:



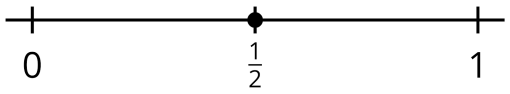

**Launch/Activity**

- Groups of 2.
- Display:




- "What could the distance from 0 to 1 on the number line represent?" (1 foot of

Clare is labeling her number line and says $\frac{1}{2}$ can be labeled like this:




How could each student's labeling make sense?

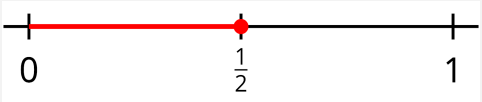
**Student Responses**

Andre's reasoning makes sense because that is showing $\frac{1}{2}$ of the length just like we did on our fraction strips. Clare's reasoning makes sense because you can label the point on the number line just as we did with other numbers.

ribbon. 1 inch of tape. 1 yard of string. 1 step. 1 mile.)
- 30 seconds: quiet think time
- Share responses.
- "Take some time to think about Andre and Clare's number lines. "
- 1 minutes: quiet think time
- "Now, work with your partner to explain how each student's labeling could make sense."
- 3-5 minutes: partner work time
- Monitor for students who can explain why Andre or Clare's reasoning makes sense, so that both perspectives can be shared in the synthesis.

**Synthesis**

- Have a student share why Andre's reasoning makes sense to them and another student explain why Clare's reasoning makes sense to them.
- Consider asking:
  - "Does anyone want to add on to ____ 's explanation?"
  - "Why is it possible that both ways of labeling make sense?"
- Display:




- "Andre was thinking about the parts that had length $\frac{1}{2}$, so he labeled the parts from 0 to $\frac{1}{2}$ and $\frac{1}{2}$ to 1 with $\frac{1}{2}$. Here we see the length with the red part of the number line."
- "The length of the parts is helpful for finding how far away from 0 the number $\frac{1}{2}$ is on the number line. If we want to

| | |
|---|---|
| | locate and label the number $\frac{1}{2}$ we can move up 1 one-half part from 0 and label the point at the end of that part. We know that 2 one-halves makes 1, which we can also see from Andre's labels. Counting 2 one-half lengths shows us where to label 1 on the number line." |

**Activity 2 Narrative:** Unit Fractions on a Number Line

**Addressing CCSS:** 3.NF.A.2.A

The purpose of this activity is for students to partition the interval from 0 to 1 into equal parts. The important experience for students in this activity is the partitioning of the whole and thinking about how partitioning the interval from 0 to 1 is the same as partitioning they've done before and how it's different.

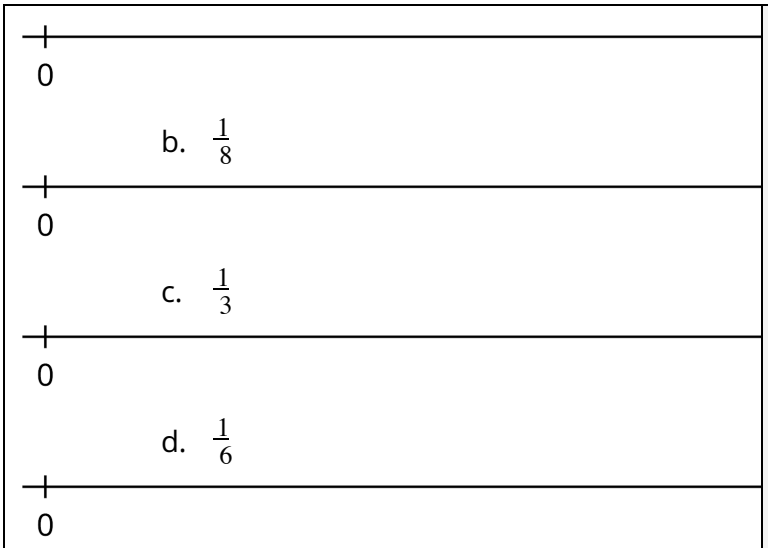
**SwD Support Tags**
- Engagement

**MLR Tags**
- MLR8 Discussion Supports

**EL Support Text**
*MLR8 Discussion Supports*. Activity:Display sentence frames to support partner discussion: "First, I _____ because . . .", "I noticed _____ so I . . . ."
*Advances: Speaking, Conversing, Representing*

**SwD Support Text**
*Engagement: Develop Effort and Persistence.* Activity: Chunk this task into more manageable parts. Check in with students to provide feedback and encouragement after each chunk. *Supports accessibility for: Organization, Focus*

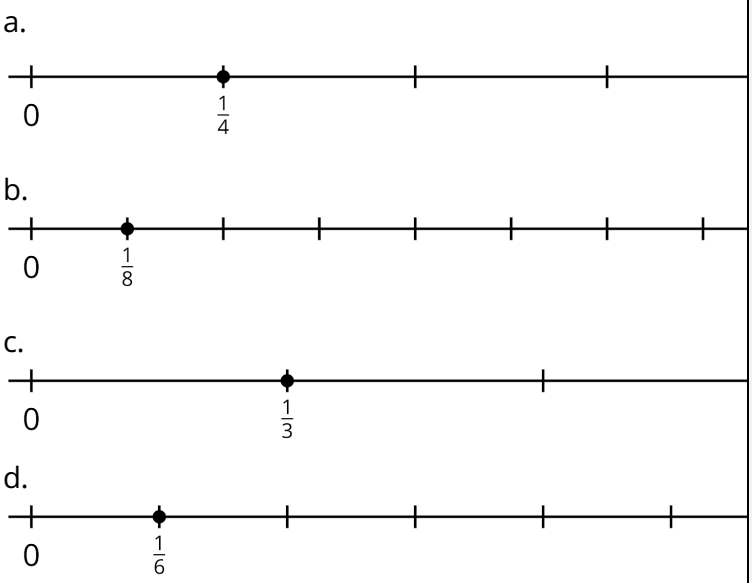
| **Task Statement** | **Launch/Activity** |
|---|---|
| 1. Partition each number line so that you can locate and label each fraction.<br><br>a. $\frac{1}{4}$ | • Groups of 2<br>• "Work independently to partition each number line and locate and label each fraction."<br>• 3-5 minutes: independent work time.<br>• "Now, share how you partitioned each |




2. How is seeing the parts of a partitioned number line the same as seeing the parts of a partitioned rectangle? How is it different?

**Student Responses**

1.




2. It's the same because the parts are all the same size. It's different because the parts are just lines, not rectangles. Also, there are usually labels inside the rectangles to let you

number line and where you located and labeled each fraction. Be sure to share tips on how you partitioned or ask for tips for any of the partitions that were challenging."

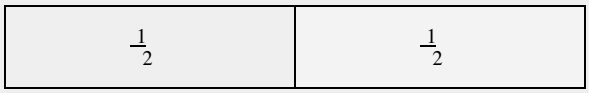
- 2-3 minutes: partner discussion
- Have students share any tips they shared or heard for partitioning that they found to be helpful.
- "Now, think about how seeing the parts on a number line is the same as partitioning a rectangle and how it's different."
- 1 minute: quiet think time
- "Now, share with your partner how partitioning on the number line is the same as partitioning rectangles and how it's different."
- 2-3 minutes: partner discussion

**Synthesis**

- "What was the same about partitioning a whole on the number line? What was different?"

| | |
|---|---|
| know the size of each piece. | |

**Lesson Synthesis**
Display the image from the warm-up.





"Today we started to use what we know about fractions to put fractions on number lines. What connections did you notice between fraction strips and number lines during the lesson?
2 minutes: partner discussion
Share and record responses.

Display:


"How could we use this length to locate and label the number $\frac{1}{3}$ on this number line?" (We could label the end of the first part with $\frac{1}{3}$ to show it's a third of the distance to 1 from 0 on the number line.)
1 minute: partner discussion
Share and record responses. Locate and label $\frac{1}{3}$ on the number line.

## 3.5: Lesson 7: Locate Unit Fractions on the Number Line

**Teacher-facing Learning Goals**

- Represent a fraction $\frac{1}{b}$ on a number line by defining the interval from 0 to 1 as the whole and partitioning it into *b* equal parts.
- Recognize that each part has size $\frac{1}{b}$ and that the endpoint of the part based at 0 locates the number $\frac{1}{b}$ on the number line.

**Addressing CCSS:** 3.NF.A.2.A

**Lesson Purpose**

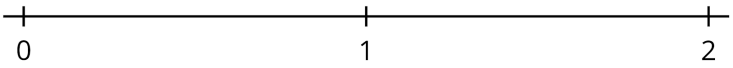
The purpose of this lesson is for students to partition the interval from 0 to 1 into *b* equal parts and locate the number $\frac{1}{b}$ on the number line. In addition, given the location of $\frac{1}{b}$, students can locate 1.

**Materials Needed**

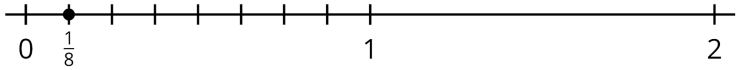
| **Gather** | **Copy** |
|---|---|
| • none | • none |

**Cool-down:** Locate and Label

Locate and label $\frac{1}{8}$ on the number line. Explain your reasoning.




**Student Responses**




I know that 8 one-eighths are in 1, so I partitioned the number line from 0 to 1 into 8 equal parts and labeled the end of the first eighth.

**Teacher Reflection Question**

How did you see or hear students leverage their prior experiences with fractions to place fractions on the humber line?

**Lesson Narrative**

In previous lessons, students learned about how unit fractions are located and labeled on the number line.

The purpose of this lesson is for students to understand that they partition the interval from 0 to 1 into equal parts in order to locate fractions and 1 on the number line. Students examine the misconception that partitions the entire piece of the number line shown, even if it is not just from 0 to 1, into the number of parts required. Students locate and label unit fractions on number lines that vary in length and use the location of unit fractions to locate 1.

| **Access for Students with Disabilities** | **Access for English Learners** |
|---|---|
| Activity 1: Engagement | Activity 1:MLR8 Discussion Supports |

**Student-facing Learning Goal:** Let's locate unit fractions and 1 on the number line.

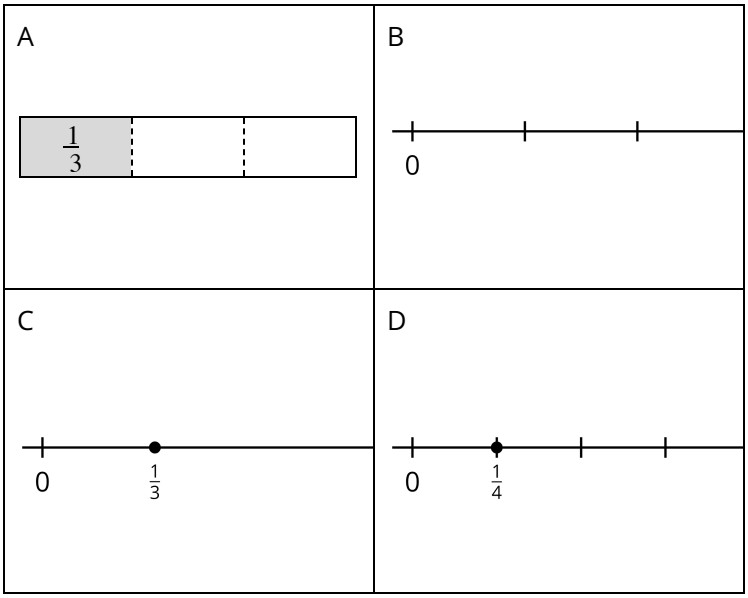
**Warm-up Narrative:** Which One Doesn't Belong: It's in the Details

**Addressing CCSS:** 3.NF.A.1.A

This warm-up prompts students to compare four images. It gives students a reason to use language precisely (MP6). It gives the teacher an opportunity to hear how students use terminology and talk about characteristics of the items in comparison to one another. During the synthesis, ask students to explain the meaning of any terminology they use, such as parts, partitions, mark, label, thirds, or fourths.

### Task Statement

Which one doesn't belong?




### Student Responses

Sample responses:

A doesn't belong because:
- It's not a number line.
- It has shading.

B doesn't belong because:
- There are no fractions labeled.

C doesn't belong because:
- It's not split into equal parts.
- It doesn't show the partitions.

### Launch/Activity

- Groups of 2
- Display image.
- "Pick one that doesn't belong. Be ready to share why it doesn't belong."
- 1 minute: quiet think time
- 2-3 minutes: partner discussion
- Record responses.

### Synthesis

- Focus question: "When you want to make your reasoning clear while locating and labeling fractions on a number line, what are some important things to include?" (Partitions of the equal parts, a dot and label at the fraction.)
- Consider asking:
  - "Let's find at least one reason why each one doesn't belong."

D doesn't belong because:

- It doesn't show thirds or $\frac{1}{3}$.

**Activity 1 Narrative:** Partition Number Lines

**Addressing CCSS:** 3.NF.A.2.A

The purpose of this activity is for students to consider how to partition the number line when the number line has numbers greater than one. Students examine the misconception that you partition the whole number line into *b* equal parts instead of using the interval from 0 to 1 to determine the size of the parts. Then, students label unit fractions on number lines that contain different intervals. Number lines with numbers greater than one also give students the opportunity to think about fractions greater than one even though they are not explicitly addressed in this lesson.

**SwD Support Tags**

- Engagement

**MLR Tags**

- MLR8 Discussion Supports

**EL Support Text**

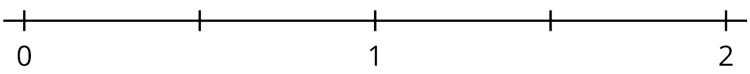
*MLR8 Discussion Supports*. Synthesis: For each observation that is shared, invite students to turn to a partner and restate what they heard using precise mathematical language. *Advances: Listening, Speaking*

**SwD Support Text**

*Engagement: Provide Access by Recruiting Interest.* Activity: Leverage choice around perceived challenge. Invite students to select to complete at least 3 of the 5 problems to complete. *Supports accessibility for: Organization; Attention; Social-emotional skills*

**Task Statement**

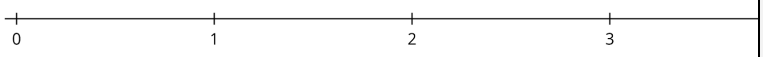
1. Elena says the number line is partitioned into fourths. Do you agree or disagree? Explain your reasoning.



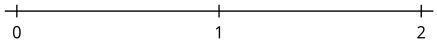

2. Partition each number line. Locate and label each fraction.
   a. $\frac{1}{2}$

**Launch/Activity**

- Groups of 2
- "Take a minute to look at how Elena partitioned her number line into fourths and think about if you agree or disagree."
- 1 minute: quiet think time
- "Work with your partner to decide if you agree or disagree with Elena. Be sure to explain your reasoning."
- 2-3 minutes: partner discussion
- Have students share why they agree or



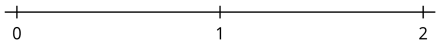

b. $\frac{1}{4}$




c. $\frac{1}{8}$


d. $\frac{1}{3}$


e. $\frac{1}{6}$

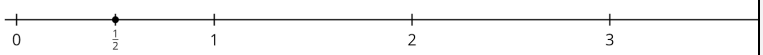



**Student Responses**

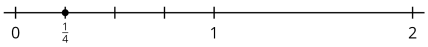
1. I disagree, because those parts are just halves, not fourths. He needed to partition the part from 0 to 1 into 4 equal parts, not the whole number line.

2.

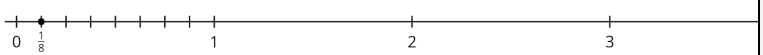
a.




b.




c.

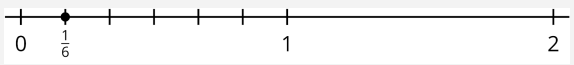


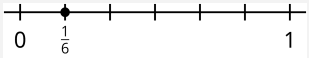

disagree with Elena.

- "When we are partitioning a number line, what do we use as one whole?" (The part from 0 to 1.)
- "Now you're going to partition some more number lines. Take a minute and think about how you'll partition so you can locate and label these fractions."
- 1 minute: quiet think-time.
- "Work independently to partition and locate and label the fractions on the number lines."
- 3-5 minutes: independent work time
- "Discuss how you partitioned and located and labeled the fractions on your number lines with your partner."
- 3-5 minutes: partner discussion

**Synthesis**

- "What was different about partitioning and locating and labeling fractions on number lines with numbers greater than one?" (You have to be careful to just partition the one whole, not the whole number line.)
- "How can we avoid making the mistake that Elena made when she partitioned her number line? (Be sure to focus on partitioning the part from 0 to 1, not the whole number line.)
- Display:

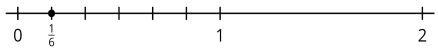



- Ask: "What do you notice?" (The top 

number line just has 0 to 1. The bottom number line has the 0 to 2. The number 1 is located in

d.


e.




the same place on both number lines. The number $\frac{1}{6}$ is located in the same place on both number lines.)

- 1 minute: partner discussion
- Share and record responses.
- "The location of any number on the number line doesn't change just because we extend the number line. The number $\frac{1}{6}$ is located between 0 and 1 whether the number line goes up to 1 or it goes up to another number."

## OPTIONAL - Activity 2 Narrative: Locate 1 on a Number Line

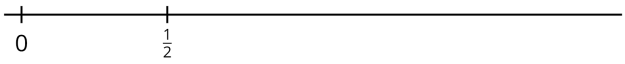
**Addressing CCSS:** 3.NF.A.2

The purpose of this activity is for students to use the location of a unit fraction to locate 1 on a number line. It is likely students will reason about repeating the size of the unit fraction to locate 1. Students need to use their understanding that points on the number line are numbers, so they may use the size of the unit fraction, but they need to locate the number 1. Students also consider how they could locate 2 on the number line. They may continue to count unit fraction size parts or use the location of 1 to locate 2.

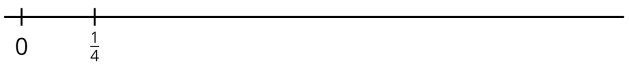
**Task Statement**

1. Locate and label 1 on each number line. Be prepared to explain your reasoning.

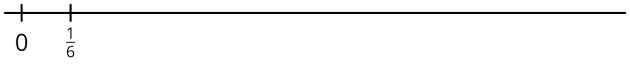
a.




b.




c.

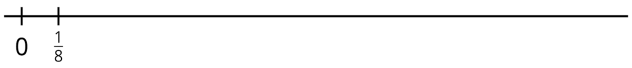



**Launch/Activity**

- Groups of 2
- "Take a few minutes to locate 1 on these number lines."
- 3-5 minutes: independent work time
- "Share your strategies with your partner and talk together about how you might locate 2 on these number lines."
- 3-5 minutes: partner work time

**Synthesis**

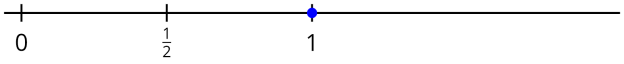
- Have students share a variety of strategies or representations of the number line for locating 1 when given the location of a unit fraction.

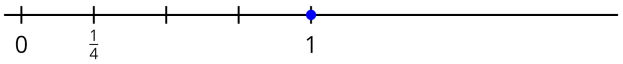
d. 

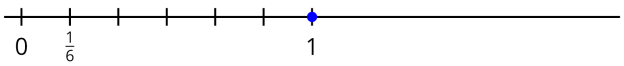

2. How could you locate 2 on the number lines in the previous problem?

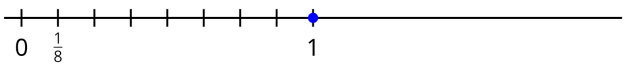
**Student Responses**

1.

a. 


b. 


c. 

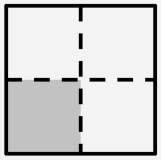

d. 

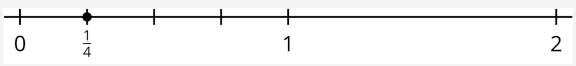

2. I could continue to mark unit fractions past 1 and count up to 2. I could use the location of 1 and double that size to find 2.

- Consider asking:
  - "Did anyone think about it in a similar way?"
  - "Does anyone want to add on to ____ 's reasoning?"
- "What patterns did you notice in how different people located one?" (Several people repeated the size of the unit fraction or jumped the sizes of the unit fraction and used how many of those they knew would make one whole to find 1.)
- 2 minutes: partner discussion
- Share and record responses.
- "What strategies did you have for locating 2 once you had located 1?"

**Lesson Synthesis**

Display:




Ask: "Today we used our knowledge of unit fractions and the number line to locate unit fractions on the number line and used unit fractions to help us find 1 on the number line. We have seen unit fractions represented several ways now. How are these representations the same? How are they different?" (They all show that the whole is split into four equal parts. One fourth is one of the those parts. The first diagram shows area or how much of the shape is one fourth. The fraction strip is more like the number line, but you can still see rectangles in it. The number line shows the point where the number

$\frac{1}{4}$ is located.)
2 minutes: partner discussion
Share and record responses.

"What is particularly helpful for you to remember when you are locating unit fractions on the number line?" (I need to partition the whole, which is the whole shape, the strip, or the space between 0 and 1, into the number of equal parts given by the number on the bottom part of the fraction. Then I can label one of those parts at the unit fraction I am looking for.)
Whole-class discussion

## 3.5 Lesson 8: Non-Unit Fractions on the Number Line

**Teacher-facing Learning Goals**

- Represent a fraction $\frac{a}{b}$ on a number line.

**Addressing CCSS:** 3.NF.A.2.B

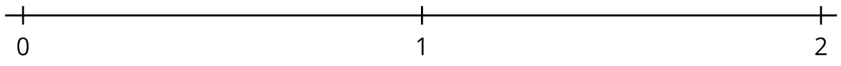
**Lesson Purpose**
The purpose of this lesson is for students to locate fractions on the number line.

**Materials Needed**

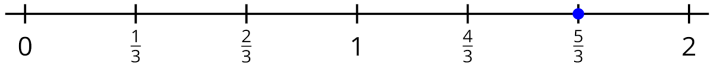
| **Gather** | **Copy** |
|---|---|
| • a number cube for each group of 2 students<br>• at least 4 counters for each student | • a number lines game board |

**Cool-down:** Where is $\frac{5}{3}$?

Locate and label $\frac{5}{3}$ on the number line. Explain your reasoning.




**Student Responses**
I partitioned the number line into thirds, and then I counted 5 one-thirds.



**Teacher Reflection Question**
Who has been sharing their ideas in class lately? Make a note of students whose ideas have not been featured in class and look for an opportunity for them to share their thinking in tomorrow's lesson.

**Lesson Narrative**

In previous lessons, students learned how to build fractions from unit fraction using area diagrams, pattern blocks, and fraction strips. They also placed unit fractions on number lines.

The purpose of this lesson is for students to locate non-unit fractions on the number line. Students put together their knowledge of partitioning into equal parts, counting unit fractions to build non-unit fractions, and to location and label fractions. Students also discuss how they know when fractions are less than 1 or greater than 1 and are introduced to the terminology numerator and denominator.

| **Access for Students with Disabilities** | **Access for English Learners** |
|---|---|
| Activity 1: Action and Expression | Activity1: MLR8 Discussion Supports |

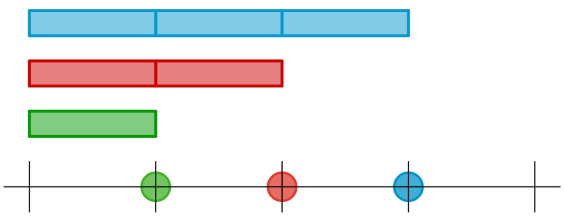
**Student-facing Learning Goal:** Let's locate fractions on the number line.

**Warm-up Narrative:** Notice and Wonder: Strips and Dots

**Building Toward CCSS:** 3.NF.A.2.B

The purpose of this warm-up is to elicit the idea that there are different ways of indicating the same distance, which will be useful when students locate fractions on a number line in a later activity. While students may notice and wonder many things about these images, the fact that the fraction strip-like segments and the points on the number line indicate the same distance is the important discussion point. In the synthesis, students will also think about what numbers might be represented by the points on the number line in preparation for placing a non-unit fraction on the number line.

**Task Statement**
What do you notice? What do you wonder?



**Launch/Activity**
- Display the image.
- "What do you notice? What do you wonder?"
- 1 minute: quiet think time
- 1 minute: partner discussion
- Share and record responses.

**Synthesis**
- "What is the same and what is different

**Student Responses**
Students may notice:
- There are fraction strips.
- There is a number line.
- There are strips that match points on a number line.
- There are matching colors.

Students may wonder:
- Why do the colors match?
- What do the dots mean?
- What numbers match those dots?

about the top portion of the image that looks like fraction strips and the bottom portion that looks like a number line?" (They line up at the same spot. The top part shows a colored area and the bottom part just shows a single dot.)
- "If the number line was labeled with 0 on one end and 1 on the other end, what numbers would those points represent?" (They would be fourths since the number line is in 4 equal parts. The green point would be $\frac{1}{4}$, the red one would be $\frac{2}{4}$, and the blue would be $\frac{3}{4}$.)
- 1 minute: partner discussion
- Share responses.

**Activity 1 Narrative:** Fractions on the Number Line

The purpose of this activity is for students to locate a variety of fractions on number lines. The activity synthesis will focus on counting the number of unit fractions in a fraction to locate it on a number line and how we know when fractions are less than 1 or greater than 1.

Students should be familiar with partitioning number lines from previous lessons. If they incorrectly partition the interval from 0 to 2 into four parts for fourths, ask them what the whole is and where $\frac{1}{4}$ would be located.

**SwD Support Tags**
- Action and Expression

**MLR Tags**
- MLR8 Discussion Supports

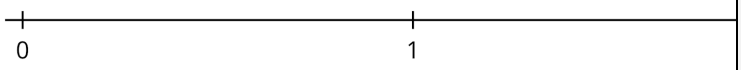
**EL Support Text**
*MLR8 Discussion Supports.* Synthesis: To support the transfer of new vocabulary to long term memory, invite students to chorally repeat these words in unison 1-2 times: numerator, denominator. *Advances:Memory*

**SwD Support Text**

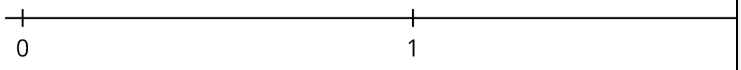
*Action and Expression: Develop Expression and Communication.* Synthesis: Identify connections between strategies that result in the same outcomes but use differing approaches. *Supports accessibility for: Conceptual Processing, Visual-Spatial Processing*

**Task Statement**

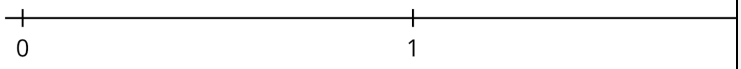
1. Locate and label $\frac{3}{4}$ and $\frac{6}{4}$.



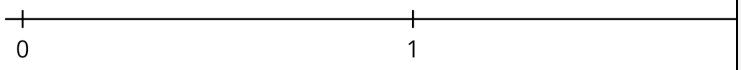

2. Locate and label $\frac{7}{8}$ and $\frac{12}{8}$.




3. Locate and label $\frac{2}{3}$ and $\frac{4}{3}$.




4. Locate and label $\frac{2}{6}$ and $\frac{7}{6}$.




5. How did you partition the number line when you were locating the numbers $\frac{7}{8}$ and $\frac{12}{8}$? Explain your reasoning.
6. What is the same and what is different about the first number and the second number you located in each problem?

**Student Responses**

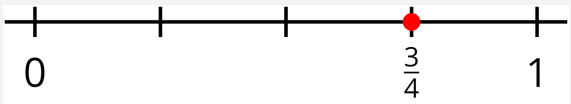
1.

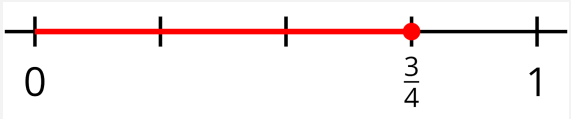
**Launch/Activity**

- Groups of 2
- Take a minute to think about how you would locate these fractions on the number lines."
- 1 minute: quiet think time
- "Work with your partner to locate the fractions on the number lines and answer the questions about your work."
- 5-7 minutes: partner work time
- Monitor for students who locate non-unit fractions on the number line by partitioning into equal parts of size $\frac{1}{b}$ and count the number of those parts.

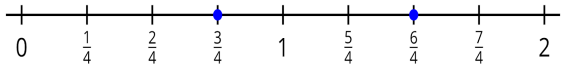
**Synthesis**

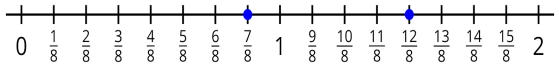
- Have students share their strategies for placing fractions on the number line. Emphasize the counting of unit fractions.
- Display:

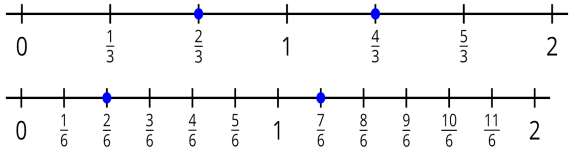



- "Remember, when we are locating a fraction on the number line, there are two ways to show the distance of that number from 0. We can mark the length, showing 3 one-fourth parts, and then we mark and label the number $\frac{3}{4}$ at the end of those parts. When we locate

2. 


3. 


4. 


5. Into eighths. The 8 on the bottom of the fraction tells us how many parts the whole, or the part from 0 to 1 is split into.
6. The first numbers were all less than 1, the second numbers were all greater than 1. In the first numbers, the top part of the fraction was a smaller number than the bottom part. In the second numbers, the top part was bigger than the bottom part.

and label fractions, we don't have to mark the length, we can just count the unit fractions and then mark and label the point at the end.

- "How did you partition the number line when you were locating the numbers $\frac{7}{8}$ and $\frac{12}{8}$ ? Why does that make sense?"
- "What is the same and what is different about the first number and the second number you located in each problem?"
- Consider asking:
  - "How do you know when a fraction is less than 1?"
  - "How do you know when a fraction is greater than 1?"
- "This is a place where it's helpful to talk about the top part of the fraction and the bottom part of the fraction. We have words for those parts. The top part of a fraction is called the **numerator**. The bottom part of a fraction is called the **denominator**. Looks for places in future lessons where that terminology might help you explain your reasoning."

## **OPTIONAL- Activity 2 Narrative:** Many Fractions on Many Number Lines

**Addressing CCSS:** 3.NF.A.2.B

The purpose of this activity is for students to practice moving fractional intervals along a number line. This activity encourages students to count by the number of intervals, the numerator. The synthesis asks students to relate counting on a number line marked off in whole numbers to their number lines marked off in fractional-sized intervals. Students are forced to land exactly on the last tick mark, 3, to encourage them to move along different number lines. While this activity does not focus on equivalence, it gives students exposure to this idea before they work more formally with it in the next section.

It may be helpful to play a few rounds against the whole class to be sure students are clear on the rules of the game.

**Task Statement**

Goal: Move the most counters to the end of the number lines.

1. Each player, place a small cube or counter on zero on every number line.
2. Players take turns.
3. Roll a number cube.
4. Place the number you rolled in the numerator of one of the given fractions for Roll 1 on the Recording Sheet.
5. Count aloud as you move a counter that distance on the appropriate number line.
6. Each time a counter lands ***exactly*** on the last tick mark of one of the number lines, keep that counter and put a new one at 0.
7. The player with the most counters after 20 rolls wins.

| | | | | |
|---|---|---|---|---|
| Roll 1 | $\frac{\square}{2}$ | $\frac{\square}{3}$ | $\frac{\square}{4}$ | $\frac{\square}{6}$ |
| Roll 2 | $\frac{\square}{2}$ | $\frac{\square}{3}$ | $\frac{\square}{4}$ | $\frac{\square}{6}$ |
| Roll 3 | $\frac{\square}{2}$ | $\frac{\square}{3}$ | $\frac{\square}{4}$ | $\frac{\square}{6}$ |
| Roll 4 | $\frac{\square}{2}$ | $\frac{\square}{3}$ | $\frac{\square}{4}$ | $\frac{\square}{6}$ |
| Roll 5 | $\frac{\square}{2}$ | $\frac{\square}{3}$ | $\frac{\square}{4}$ | $\frac{\square}{6}$ |
| Roll 6 | $\frac{\square}{2}$ | $\frac{\square}{3}$ | $\frac{\square}{4}$ | $\frac{\square}{6}$ |
| Roll 7 | $\frac{\square}{2}$ | $\frac{\square}{3}$ | $\frac{\square}{4}$ | $\frac{\square}{6}$ |
| Roll 8 | $\frac{\square}{2}$ | $\frac{\square}{3}$ | $\frac{\square}{4}$ | $\frac{\square}{6}$ |
| Roll 9 | $\frac{\square}{2}$ | $\frac{\square}{3}$ | $\frac{\square}{4}$ | $\frac{\square}{6}$ |
| Roll 10 | $\frac{\square}{2}$ | $\frac{\square}{3}$ | $\frac{\square}{4}$ | $\frac{\square}{6}$ |

**Student Responses**

**Launch/Activity**

- Groups of 2
- Give each group 2 number lines game boards, a number cube, and at least 8 counters.
- "Now you will play a game where you move, by fractions, along different number lines. To start, each player places a small cube on zero on each number line. The goal of the game is to get as many cubes as you can to the end of any of the number lines."
- Roll the number cube, demonstrate where to record the rolled number and move that fraction along one of the number lines.
- 10 minutes: partner work time
- As students work, monitor for students who count by the numerator once they have chosen a number line.

**Synthesis**

- Display a gameboard with a marker on $\frac{3}{6}$.
- "If I rolled a 6, and chose to move $\frac{6}{6}$, how would you count the move?" (I would count 1, 2, 3, 4, 5, 6).
- "How did you know you have moved $\frac{6}{6}$?" (Because each space is $\frac{1}{6}$, so I need to move 6 times.)
- Display a number line marked with only 0, 1, 2, 3, 4, 5, 6.
- "How is counting along this number line the same and different than counting along your number lines?" (On the whole number one each space is 1 so we just count 1, 2, 3, 4, 5, 6. On our

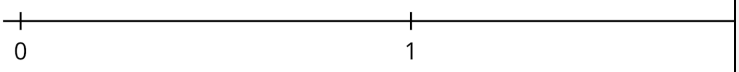
| | |
|---|---|
| Answers vary. | number lines we still count the jumps, but now each space is smaller than 1 so we need the denominator to tell us the size of each space.) |

**OPTIONAL- Activity 3 Narrative:** Secret Fraction

The purpose of this activity is for students to determine how a number line is partitioned and what fraction is marked on it without any labels. Students partition and mark, but don't label, a fraction on a number line and then trade with a partner to determine the fraction their partner has marked. Remind students to mark, but not to label their partitions and their fraction, so that their partner only has the 0, 1, and 2 to use to determine what fraction is on their number line.

**Task Statement**

1. Partition the number line in any way you'd like in equal size parts. Locate and mark, but don't label, a fraction of your choice.




2. Trade number lines with a partner.
   a. How did your partner partition their number line? Explain your reasoning.
   b. What number did your partner mark on their number line? Explain your reasoning.

**Student Responses**

1. Answers vary.
2. Answers vary.

**Launch/Activity**

- Groups of 2
- "Complete the first part of the activity on your own. Partition the number line and mark, but don't label, a fraction on the number line. Don't tell your partner how you are partitioning or what number you are marking.
- 2 minutes: independent work time
- "Now, trade number lines with your partner and answer the questions about their number line. When you are both finished, share your reasoning"
- 1-2 minutes: independent work time
- 1-2 minutes: partner work time

**Synthesis**

- "How did you decide how to partition your number line and what fraction you'd put on your number line?"
- "How did you decide how your partner's number line was partitioned and decide what fraction was marked?"

**Lesson Synthesis**

"Today we located more fractions on the number line. What strategies do you have for locating fractions on the number line?" (I counted the unit fractions, like 3 one-fourths, to get to $\frac{3}{4}$. I partition the number line into unit fractions and then I can count parts up to the fraction I am locating.)

2 minutes: partner discussion
Share and record responses.

"What questions do you have about locating fractions on the number line?"
2 minutes: partner discussion
Whole-class discussion

## 3.5 Lesson 10: Equivalent Fractions

**Teacher-facing Learning Goals**

- Explain equivalence of fractions in special cases.
- Understand two fractions as equivalent if they are the same size.
- Recognize and generate simple equivalent fractions.

**Addressing CCSS:** 3.NF.A.3, 3.NF.A.3.A, 3.NF.A.3.B

**Lesson Purpose**

The purpose of this lesson is for students to understand and explain that two fractions are equivalent if they are the same size.

**Materials Needed**

| **Gather** | **Copy** |
|---|---|
| • pattern blocks (at least 3 hexagons, trapezoids, and rhombuses, and 8 triangles for each group of 2 students) | • none |

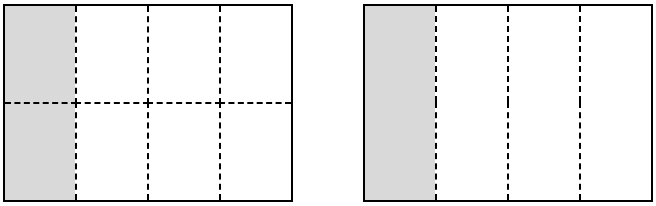
**Cool-down:** Equivalent Fractions

Are these fractions equivalent? Show or explain your reasoning. Use the rectangles if they are helpful.

$\frac{1}{4}$ $\frac{2}{8}$

**Student Responses**

Yes, because $\frac{1}{4}$ and $\frac{2}{8}$ are the same size.



**Teacher Reflection Question**

What ideas do students have about what it means for fractions to be equivalent? How can you build on those ideas in this section?

**Lesson Narrative**

In previous lessons, students were introduced to unit fractions and non-unit fractions using area diagrams, fraction strips, and number lines.

The purpose of this lesson is for students to see that fractions with different denominators can be equivalent if they are the same size. Students work with area diagrams to recognize fractions that are equivalent, then use pattern blocks to generate fractions that are equivalent. Student explanations of why two fractions are equivalent should be focused on the fractions representing the same portion of the whole.

| **Access for Students with Disabilities** | **Access for English Learners** |
|---|---|
| Activity 2: Engagement | Activity 2: MLR7 Connect and Compare |

**Student-facing Learning Goal:** Let's learn about equivalent fractions.

**Warm-up Narrative:** Choral Count: One-halves

**Building Toward CCSS:** 3.NF.A.2

The purpose of this Choral Count is to invite students to practice counting by $\frac{1}{2}$ and notice patterns in the count. These understandings help students develop fluency and will be helpful later in this lesson when students will need to be able to recognize and generate equivalent fractions. Students may note that $\frac{2}{2}$ and $\frac{4}{4}$ are both equal to 1 whole. This idea can be made public but doesn't need to be discussed at length since fraction equivalence will be the focus of the tasks in this lesson.

**Task Statement**

N/A

**Student Responses**

Record count

$\frac{1}{2}, \frac{2}{2}$
$\frac{3}{2}, \frac{4}{2}$
$\frac{5}{2}, \frac{6}{2}$
$\frac{7}{2}, \frac{8}{2}$

Sample responses:

- The bottom part of the fraction never changes.
- The top part of the fraction is increasing by 1.
- The rows end on a multiple of two in the top.

**Launch/Activity**

- Count by $\frac{1}{2}$, starting at $\frac{1}{2}$.
- Record as students count.
- Stop counting and recording at $\frac{8}{2}$.
- "What patterns do you see?"
- 1-2 minutes: quiet think time
- Record responses.

**Synthesis**

- Display count from previous lesson:

$\frac{1}{4}, \frac{2}{4}, \frac{3}{4}, \frac{4}{4}$
$\frac{5}{4}, \frac{6}{4}, \frac{7}{4}, \frac{8}{4}$
$\frac{9}{4}, \frac{10}{4}, \frac{11}{4}, \frac{12}{4}$
$\frac{13}{4}, \frac{14}{4}, \frac{15}{4}, \frac{16}{4}$

- Focus question: "How are these two counts the same? How are they different?" (The bottom part stays the same in both counts, 4 for yesterday's count and 2 for today's count. The top part of the fractions change in the same way counting by one. There are only 2 fractions in each row today, but there were 4 in the other count.)
- Consider asking:
  - "Who can restate the pattern in different words?"
  - "Does anyone want to add an observation on why that pattern is happening here?"
  - "Do you agree or disagree? Why?"

**Activity 1 Narrative:** Is It $\frac{1}{2}$?

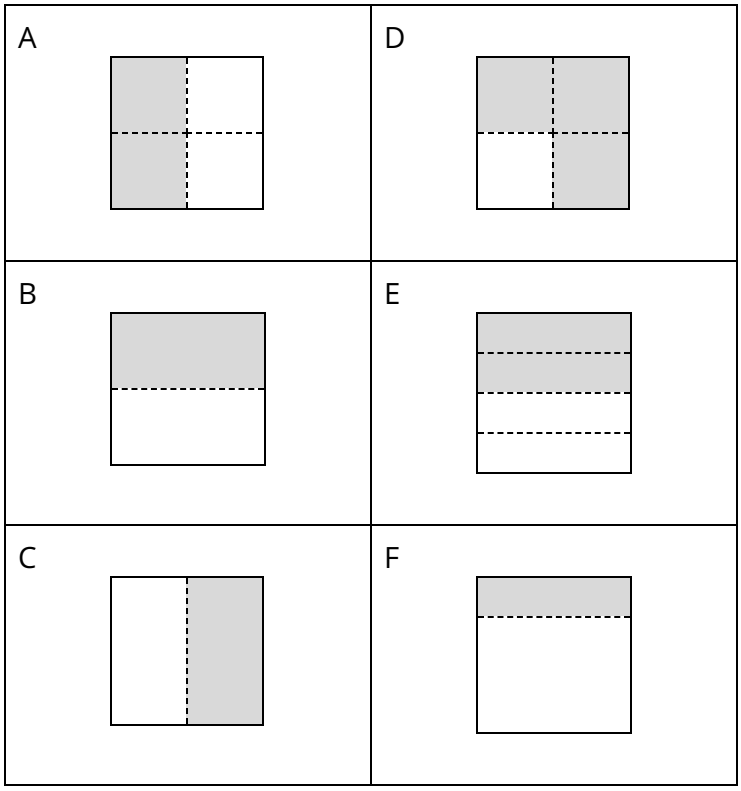
**Addressing CCSS:** 3.NF.A.3.A, 3.NF.A.3.B

The purpose of this activity is for students to consider equivalence of fractions. Halves and fourths of squares have been chosen because students have experience with partitioning squares in this way.

Student justifications about whether or not the shaded parts represents $\frac{1}{2}$ should be focused on whether or not half of the whole is shaded. In the synthesis **equivalent** fractions are defined.

**Task Statement**

Which figures have $\frac{1}{2}$ of the shape shaded? Be prepared to share your reasoning.




**Student Responses**

- $\frac{1}{2}$ shaded: A, B, C, E
- Not $\frac{1}{2}$ shaded: D, F

Sample responses:

- A is $\frac{1}{2}$ because it's partitioned into four parts and 2 are shaded, but one half of the whole

**Launch/Activity**

- Groups of 2
- "Think about which of these figures have $\frac{1}{2}$ of the shape shaded."
- 1 minute: quiet think time
- "Now work with you partner to decide which figures have $\frac{1}{2}$ of the shape shaded. "
- 5-7 minutes: partner work time
- Monitor for students who explain that A, F, or H are $\frac{1}{2}$ because they are the same size as $\frac{1}{2}$.

**Synthesis**

- Have students share which figures have $\frac{1}{2}$ shaded and which figures don't, and how they know.
- Display A and E.
- "How can these fractions each be $\frac{1}{2}$ when the squares have been partitioned into 4 equal parts? (The shaded part is the same size even though they look different. They have the same amount of the square shaded.)
- "Even though A and E are partitioned into fourths and $\frac{2}{4}$ are shaded, we can say that $\frac{1}{2}$ of the square is shaded because the same amount of the square is shaded, which means the two fractions are the same size. If 2 numbers are the same size we say that

| | |
|---|---|
| square is shaded.<br>• F isn't $\frac{1}{2}$ because there are two parts, but they aren't equal. | they are **equivalent**. So, $\frac{2}{4}$ and $\frac{1}{2}$ are equivalent fractions." |

**Activity 2 Narrative:** Pattern Block Equivalence

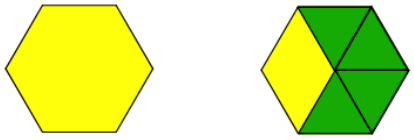
The purpose of this activity is for students to generate equivalent fractions. Pattern blocks are used for this activity because students have the opportunity to manipulate different parts to create different fractions that are the same size, but composed of different size parts. Student explanations about whether or not the fractions are equivalent should be focused on whether they are the same size.

**SwD Support Tags**
- Engagement

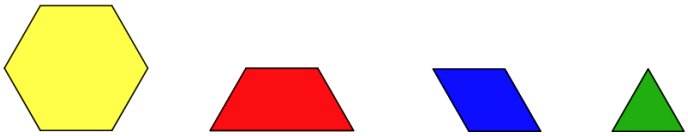
**MLR Tags**
- MLR7 Compare and Connect

**EL Support Text**
*MLR7 Compare and Connect.* Synthesis: After all strategies have been presented, lead a discussion comparing, contrasting, and connecting the different approaches. Ask,"What did the one: approaches have in common?", "How were they different?", "Why did the different approaches lead to the same outcomes?" *Advances: Representing, Conversing*

**SwD Support Text**
*Engagement: Develop Effort and Persistence.* Activity: Chunk this task into more manageable parts. Check in with students to provide feedback and encouragement after each chunk. *Supports accessibility for: Attention, Organization*

| **Task Statement** | **Launch/Activity** |
|---|---|
| Part 1<br>  <br>Lin says the 4 triangles are $\frac{4}{6}$ of the hexagon.<br>Mai says the 4 triangles are $\frac{2}{3}$ of the hexagon.<br><br>How could both of their answers make sense? | • Groups of 2<br>• "Take a minute to look at what Lin and Mai said about the triangles and think about how their answers could make sense."<br>• 1 minute: quiet think time<br>• "Now discuss how both of their answers could make sense with your partner."<br>• 2 minute: partner discussion<br>• Share and record responses.<br>• "Take a minute and think about how |

Part 2
Use the pattern blocks to generate as many equivalent fractions of the hexagon as you can. Show or explain your reasoning.



| Fraction 1 | Fraction 2 | Reasoning |
|---|---|---|
| | | |
| | | |
| | | |

**Student Responses**

Sample responses:

| Fraction 1 | Fraction 2 | Reasoning |
|---|---|---|
| $\frac{1}{2}$ | $\frac{3}{6}$ |  The red trapezoid fits exactly on top of the 3 green triangles. |
| $\frac{2}{3}$ | $\frac{4}{6}$ | I showed both fractions with pattern blocks. I built $\frac{2}{3}$ with 2 rhombuses and $\frac{4}{6}$ with 4 triangles and they were the same size. |

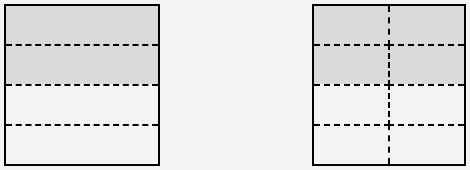
you could use the pattern blocks to generate as many equivalent fractions as you can."

- 1 minute: quiet think time
- "Now, use the pattern blocks to generate as many fractions that are equivalent as you can. Be ready to explain your reasoning."
- 7-10 minutes: partner work

**Synthesis**

- Have students share fractions they generated that are equivalent.
- Ask:
  - "How do we know that these fractions are equivalent?" (They are the same size. They show the same amount.)
  - "What strategy did you use to find these fractions?" (Sample responses: I made $\frac{1}{2}$ first, then used sixths to make the same amount. I pictured a rhombus made out of triangles. The rhombus is $\frac{1}{3}$ and the triangles are sixths, so 2 triangles would be $\frac{2}{6}$ of the hexagon.)

**Lesson Synthesis**
Display:



$\frac{2}{4}$ $\frac{4}{8}$

Ask: "How do we know that these fractions are equivalent?" (The same portion of the rectangle is shaded.)
30 seconds: partner discussion
Share responses.

Ask: "If you were given two fractions, how would you decide if they are equivalent?" (I would draw a diagram of them to see if they are the same size. I would draw diagrams and shade them to see if the same amount was shaded.)
1 minute: partner discussion
Share and record responses.

## 3.5 Lesson 11: Generate Equivalent Fractions

**Teacher-facing Learning Goals**

- Explain equivalence of fractions in special cases.
- Understand two fractions as equivalent if they are the same size.
- Recognize and generate simple equivalent fractions.

**Addressing CCSS:** 3.NF.A.3, 3.NF.A.3.A, 3.NF.A.3.B

**Lesson Purpose**
The purpose of this lesson is for students to name fractions in as many ways as they can and generate equivalent fractions with fractions strips.

**Materials Needed**

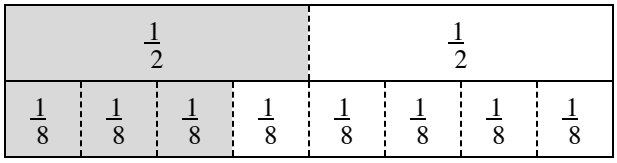
| **Gather** | **Copy** |
|---|---|
| • student-made fraction strips | • none |

**Cool-down:** Equivalent or Not Equivalent

Andre says $\frac{1}{2}$ is equivalent to $\frac{3}{8}$. Do you agree or disagree? Explain or show your reasoning.

**Student Responses**

They are not equivalent because $\frac{3}{8}$ is less than $\frac{1}{2}$. They don't match up.




It would take $\frac{4}{8}$ to make $\frac{1}{2}$ so $\frac{3}{8}$ would be too small to be equivalent to $\frac{1}{2}$.

**Teacher Reflection Question**

Who got to do math today in class? How do you know? What norms or routines allowed those students to engage in the mathematics? How can you adjust these norms and routines so all students do math tomorrow?

**Lesson Narrative**

In previous lessons, students learned what it means for two fractions to be equivalent.

The purpose of this lesson is for students to name given fractions in as many ways as they can. Then, students use fraction strips to generate fractions that are equivalent. Fraction strips encourage students to consider the length of different fractions in preparation for using the number line to justify that two fractions are equivalent.

| **Access for Students with Disabilities** | **Access for English Learners** |
|---|---|
| Activity 1: Engagement | Activity 2: MLR8 Discussion Supports |

**Student-facing Learning Goal:** Let's generate equivalent fractions.

**Warm-up Narrative:** Which One Doesn't Belong?: Rectangles

**Building Toward CCSS:** 3.NF.A.2

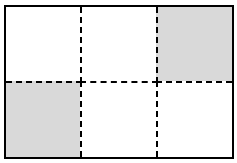
This warm-up prompts students to compare four rectangles that have been partitioned. It gives

students a reason to use language precisely (MP6). It gives the teacher an opportunity to hear how students use terminology and talk about characteristics of the items in comparison to one another. During the synthesis, ask students to explain the meaning of any terminology they use, such as equal parts, equivalent, sixths, and thirds.

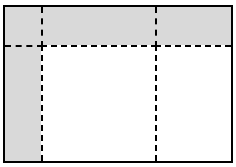
**Task Statement**

Which one doesn't belong?

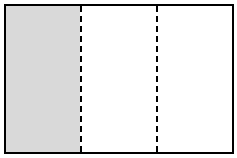
A



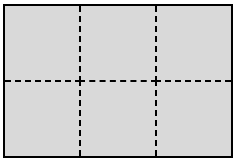
C



B



D



**Student Responses**

Sample responses:

A doesn't belong because:
- It's the only rectangle where the shaded parts aren't together.

B doesn't belong because:
- It's the only one that doesn't have 6 parts.

C doesn't belong because:
- It's the only one where the parts aren't equal.

D doesn't belong because:
- It's the only rectangle that doesn't have unshaded space.
- It's the only one that doesn't have less than $\frac{1}{2}$ shaded.

**Launch/Activity**

- Groups of 2
- Display image.
- "Pick one that doesn't belong. Be ready to share why it doesn't belong."
- 1 minute: quiet think time
- 2-3 minutes: partner discussion
- Record responses.

**Synthesis**

- Focus question: "Which images show that $\frac{1}{3}$ is equivalent to $\frac{2}{6}$? How does it show the fractions are equivalent?" (A and B, because they have the same amount shaded. A and B, because the shaded part is the same size.)
- Consider asking:
  - "Let's find at least one reason why each one doesn't belong."

**Activity 1 Narrative:** How Many Names?

**Addressing CCSS:** 3.NF.A.3.A, 3.NF.A.3.B

The purpose of this activity is for students to generate as many equivalent fractions as they can for a given diagram of a fraction. Student explanations should focus on the fractions being the same size. In the synthesis students are encouraged to share strategies they used for naming fractions in multiple ways.

**SwD Support Tags**

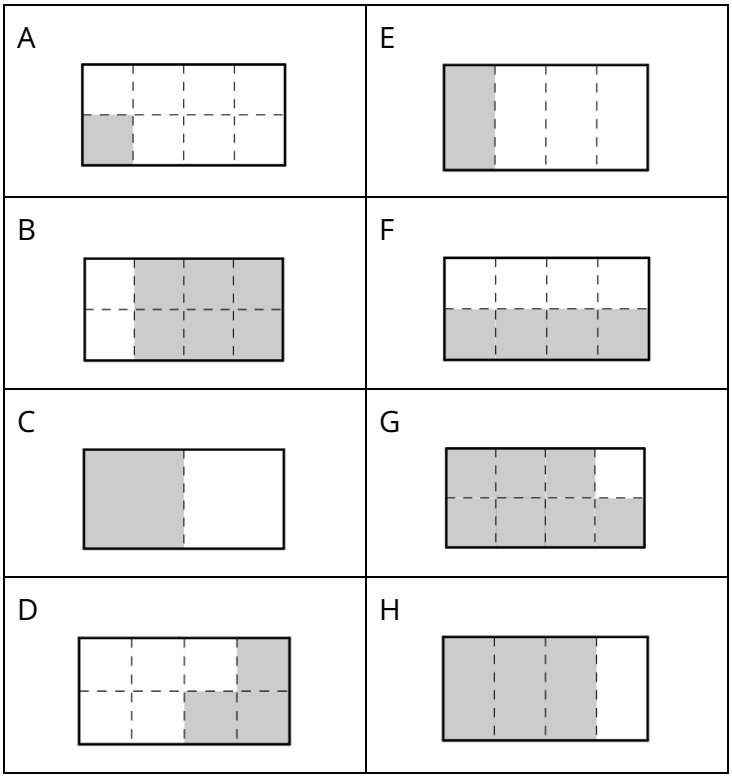
- Engagement

**SwD Support Text**

*Engagement: Provide Access by Recruiting Interest.* Activity: Leverage choice around perceived challenge. Invite students to select at least 5 out of the 8 rectangles. *Supports accessibility for: Organization; Attention; Social-emotional skills*

**Task Statement**

What fraction of each rectangle is shaded? Name the fraction in as many ways as you can. Be prepared to share your reasoning.




**Launch/Activity**

- Groups of 2
- "Work independently to name each fraction in as many ways as you can."
- 5-7 minutes: independent work time
- "Now, discuss the names you came up with for each fraction with your partner. Be sure to share your reasoning for each fraction."
- 3-5 minutes: partner discussion
- Monitor for students who make statements like:
  - F is $\frac{4}{8}$ because 4 of the 8 parts are shaded. I could also name it as $\frac{1}{2}$ because I see 2 bigger parts and one is shaded.
  - C is $\frac{1}{2}$, but if I partitioned it into fourths, I could name that same shaded part $\frac{2}{4}$.

**Synthesis**

**Student Responses**

A. $\frac{1}{8}$

B. $\frac{3}{8}$, $\frac{3}{4}$

C. $\frac{1}{2}$, $\frac{2}{4}$, $\frac{4}{8}$, $\frac{3}{6}$

D. $\frac{3}{8}$

E. $\frac{1}{4}$, $\frac{2}{8}$

F. $\frac{4}{8}$, $\frac{2}{4}$, $\frac{1}{2}$

G. $\frac{7}{8}$

H. $\frac{3}{4}$, $\frac{6}{8}$

- Have students share how they were able to name some of the fractions in multiple ways.
- Consider asking:
  - "How did seeing the fraction in multiple ways help you think of different fractions?"
  - "How did partitioning help you come up with different fractions?"

## **Activity 2 Narrative:** Find Equivalent Fractions

**Addressing CCSS:** 3.NF.A.3.A, 3.NF.A.3.B

The purpose of this activity is for students to identify equivalent fractions. Students use fraction strips, which begins the transition to using linear representations, to explain fraction equivalence. Student explanations about why two fractions are equivalent should be focused on the length of the shaded parts of the fraction strips being the same.

**MLR Tags**

- MLR8 Discussion Supports

**EL Support Text**

*MLR8 Discussion Supports*. Synthesis: For each observation that is shared, invite students to turn to a partner and restate what they heard using precise mathematical language. *Advances: Listening, Speaking*

**Task Statement**

Use your fraction strips to find as many equivalent fractions as you can that are equivalent to:

a. $\frac{1}{2}$
b. $\frac{2}{3}$
c. $\frac{6}{6}$
d. $\frac{3}{4}$

**Launch/Activity**

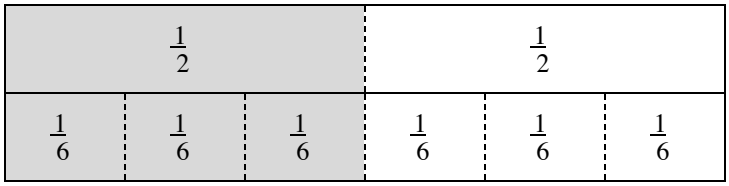
- Groups of 2
- "We're going to use our fractions strips to find as many equivalent fractions as we can for these fractions."
- Pass out student-made fraction strips.
- "Work independently to use your fraction strips to find as many equivalent fractions as you can for these fractions."

Explain your reasoning.

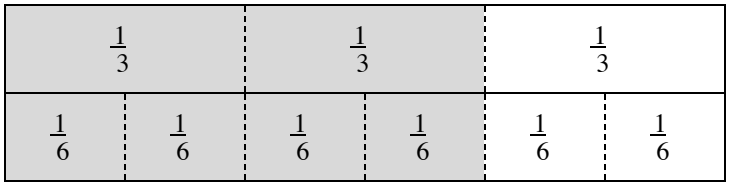
**Student Responses**

Sample responses:

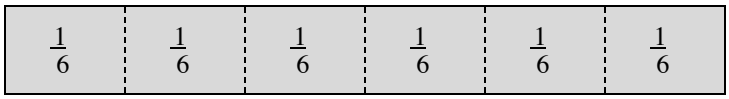
a. $\frac{1}{2}$ is equivalent to $\frac{3}{6}$ because they are the same size.




b. $\frac{2}{3}$ is equivalent to $\frac{4}{6}$ because they are the same length.

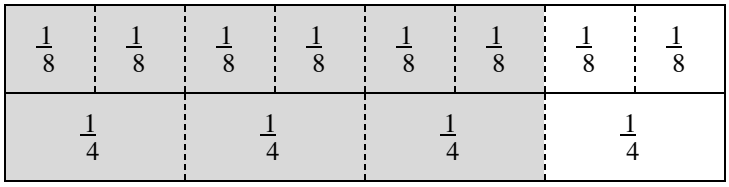



c. $\frac{6}{6}$ is equivalent to $\frac{4}{4}$ because they are the same size.





d. $\frac{3}{4}$ is equivalent to $\frac{6}{8}$ because they are the same size.



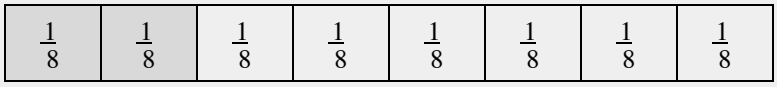

- 5-7 minutes: independent work time
- "Now, share the equivalent fractions you found with your partner. Be sure to share your reasoning."
- 3-5 minutes: partner discussion
- Monitor for students who explain the equivalence by explaining that the fractions are the same size and some who are more specific referring to length. Both will be shared during the synthesis.
- If there is extra time, have students use their fraction strips to find other fractions that are equivalent.

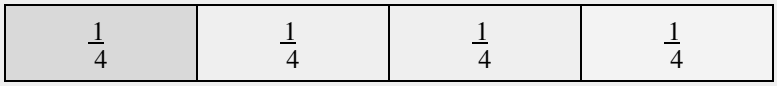
**Synthesis**

- Have students share pairs of equivalent fractions that they found and the explanation for why they are equivalent. Be sure to include students who refer to the size of the fractions and students who are more specific about the length of the fractions.
- As students share record pairs of equivalent fractions using the equal sign like, $\frac{1}{2} = \frac{3}{6}$.

**Lesson Synthesis**

Display:



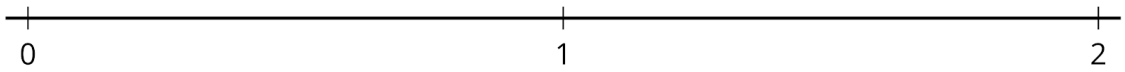

"Today, we recognized fractions that were equivalent and you generated fractions that were equivalent. How would you use fractions and the equal sign to record the shaded amounts are equivalent?"
1 minute: partner discussion
Share and record responses. Record $\frac{2}{8} = \frac{1}{4}$ for this example.

"What were some strategies you used to recognize and generate equivalent fractions?" (I drew diagrams to see if the shaded amounts were the same size. I matched up fractions using my fraction strips.)
Share responses.

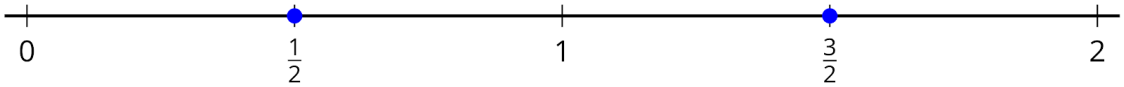
## Mini-assessment 2

**Student Facing Task Statement**

Locate and label $\frac{1}{2}$ and $\frac{3}{2}$ on the number line. Explain your reasoning.

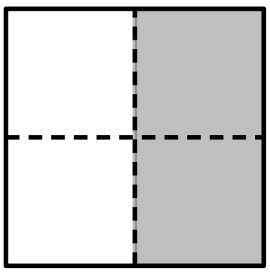



**Student Responses**




The first point is $\frac{1}{2}$ because it is halfway between 0 and 1. Two halves is 1 so $\frac{3}{2}$ is halfway between 1 and 2.

**Student Facing Task Statement**



Jada says that $\frac{2}{4}$ of the square is shaded. Han says that $\frac{1}{2}$ of the square is shaded. How could both ideas make sense? Explain your reasoning.

**Student Responses**

Jada is correct. The square is cut into 4 equal pieces (the small squares) and 2 of the 4 are shaded.
Han is also correct. The square is cut vertically into 2 rectangles and 1 of the rectangles is shaded.

## Prior-grade Practice and Fluency Resources

### Fraction Concentration

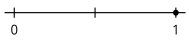
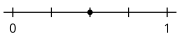
**Addressing CCSS:** 3.NF.A.1 and 3.NF.A.2

| 15 min | The purpose of this activity is for students to practice representing fractions with area diagrams, fraction strips, and number lines. |
|---|---|

**Task Statement**

Use the directions to play Fraction Concentration.

1. Shuffle the cards.
2. Place the cards upside down in 4 rows with 8 cards in each row.
3. Choose two cards. If the two cards are a match, explain how they match to your partner and keep the pair. You get to go again (no more than 2 turns).
4. If the cards aren't a match, place them back where they were.
5. The player who collects the most pairs wins.

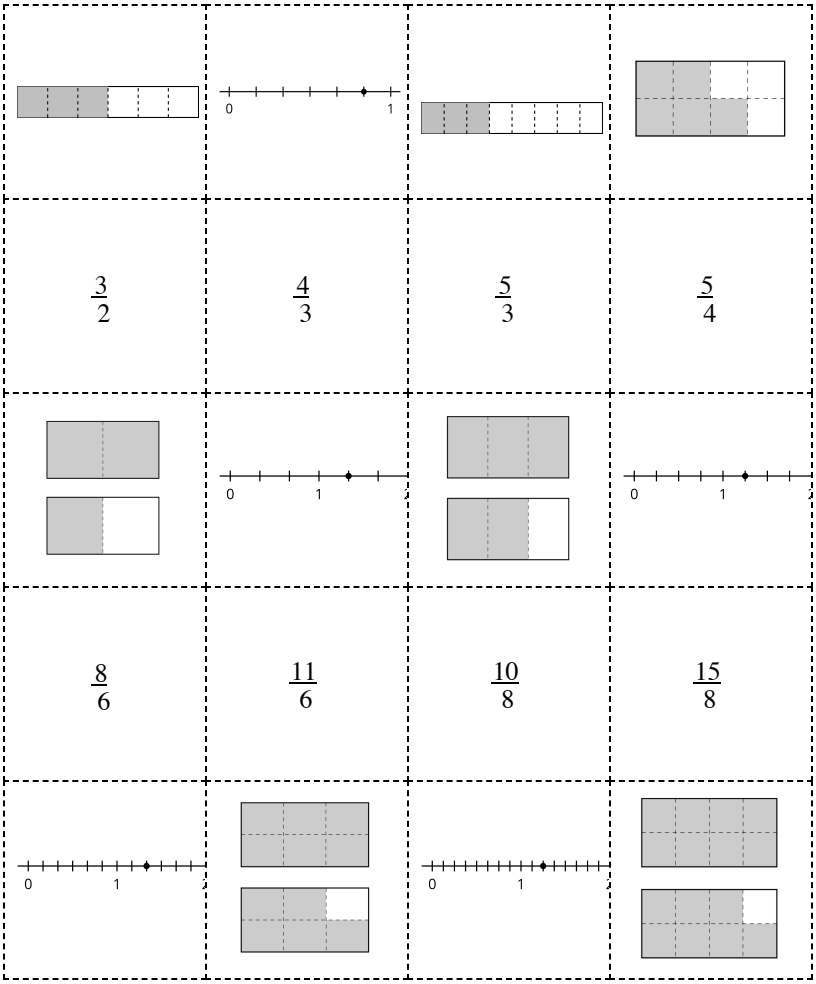
| | | | |
|---|---|---|---|
| $\frac{2}{2}$ | $\frac{2}{3}$ | $\frac{2}{4}$ | $\frac{3}{4}$ |
|   |  |   |  |
| $\frac{3}{6}$ | $\frac{5}{6}$ | $\frac{3}{8}$ | $\frac{5}{8}$ |

**Launch/Activity**

- Groups of 2
- "Take a minute to read over the directions for Expression Concentration."
- 1 minute: quiet think time
- Give each group of 2 students a set of cards.
- "Play Expression Concentration with your partner."
- 10–15 minutes: partner game time

**Synthesis**

- "What strategies were helpful as you played Expression Concentration?" (I thought about how the whole had been partitioned so I could match the fraction with the right diagram. I thought about how many parts had been shaded. I thought about what point was marked on the number line. I tried to remember where a fraction was, so when I saw the right diagram I could match them up.)




**Student Responses**
Responses will vary.

**Lesson Synthesis**
"Today you played fraction games. What were some of the big ideas about fractions that you used as you played the games?" (The bottom part of the fraction tells you how the whole was partitioned. The numerator tells you how many of the equal parts there are. When you represent a fraction on the number line, the denominator tells you how many lengths to partition the whole into, not how many marks there should be.)
2 minutes: partner discussion
Share responses.

| Center: Generation Equivalent 1 |
| --- |
| **Narrative**<br>In this center, students use what they know about the size of fractions and their location on a number line to generate equivalent fractions. |
| **Stage Number 1:** Generation Equivalent; Denominators 2, 3, 4, 6, and 8 |
| **Addressing CCSS:** 3.NF.A.3, 4.NF.A.1 |
| **Learning Goals**<br>● Explain equivalence of fractions in special cases and express whole numbers as fractions and fractions as whole numbers (3.5.C)<br>● Reason about the location of fractions on the number line. (4.2.A) |
| **Required Material**<br>● timer |
| **BLM**<br>● Generation Equivalent: Stage 1 Recording Sheet<br>● Stage 1 Fraction Cards |
| **Stage Narrative**<br>In this stage, students choose from fractions with the denominators 2, 3, 4, 6, and 8.<br>1. Shuffle the fraction cards and choose a card from the deck. Record the fraction on the recording sheet.<br>2. Draw a representation (a diagram or number line) of the fraction you chose.<br>3. In 1 minute, think of as many equivalent fractions as you can. Draw a representation for each equivalent fraction.<br>4. Discuss the equivalent fractions you generated with a partner. If a fraction you or your partner generated is not equivalent, explain why.<br>5. Each correct equivalent fraction earns 1 point.<br>6. Repeat with a new fraction card. |

| Center: Fraction Action 1 |
| --- |
| **Narrative**<br>In this center, students use their understanding of fraction size and equivalence to compare fractions. Play Fraction Action with 2 players:<br><br>1. Shuffle the cards from your teacher.<br>2. Deal 8 cards to each player. Place the cards face down.<br>3. Each player turns one card over to face up.<br>4. Compare the fractions. The player with the greater fraction wins that round and keeps both cards.<br>5. If the cards are equivalent, each player turns one more card over. The player with the greater fraction keeps all four cards.<br>6. The player with the most cards wins the game.<br>7. Record any pair of fractions that are challenging to compare |
| **Stage Number 1:** Compare Fractions with Denominators 2, 3, 4, 6, and 8 |
| **Addressing CCSS:** 3.NF.A.3 |
| **Learning Goals (Section goal)**<br>• Compare two fractions with the same numerator or denominator, record the results with the symbols > or <, and justify the conclusions. (3.5.C) |
| **Required Material**<br>• pencils |
| **BLM**<br>• Fraction Action: Recording Sheet<br>• Stage 1 Fraction Cards |
| **Stage Narrative**<br>In this stage, students compare two fractions with denominators of 2, 3, 4, 6 and 8. |

## Extension and Exploration Resources

**IM Task:** Find One

a. Locate 1 on the number line. Label the point. Be as exact as possible.


b.

Locate 1 on the number line. Label the point. Be as exact as possible.

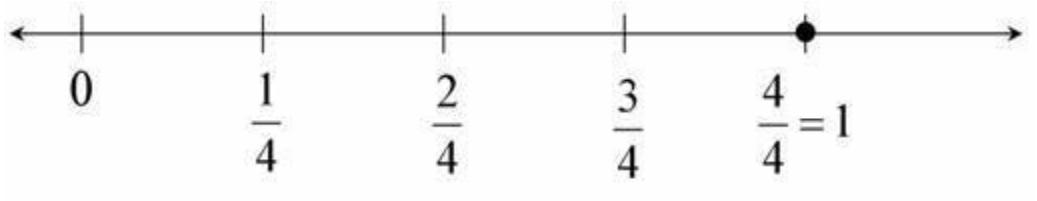

The purpose of this task is to assess whether students understand fractions as being built from unit fractions and whether they can accurately locate fractions on the number line.

Typically, students start with 0 and 1 on the number line and find unit (and other) fractions.
In part (a) students must work in the other direction: they use a unit fraction to find 1 on the number line. This task reinforces the idea that a point on the number line represents a number. This kind of work also lays the groundwork for students to represent addition and subtraction on the number line in grade 4.
Part (b) reinforces the meaning of the numerator and the denominator. When students begin with the interval from 0 to 1, they typically start by partitioning that interval into unit fractions defined by the denominator of the fraction they are given. Here they must start with the numerator because they are partitioning the interval between 0 and $\frac{5}{3}$. This part also helps reinforce the notion that when a fraction has a numerator that is larger than the denominator, it has a value greater than 1 on the number line.

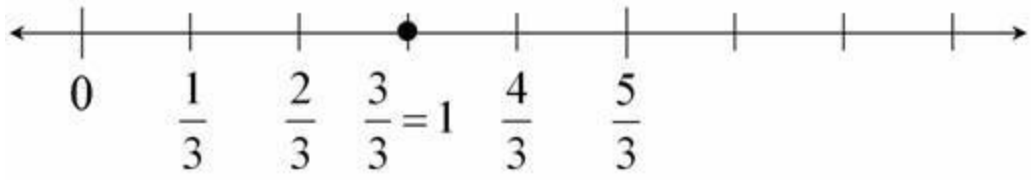
**Solution**

While it is not necessary to name all of the intervals on the number line, we expect many students will do so.

a. There are 4 fourths in 1, so if we take the length from 0 to $\frac{1}{4}$ four times, we will find 1.




b. $\frac{5}{3}$ is 5 equal pieces where 3 pieces make 1. So if we partition the interval between 0 and $\frac{5}{3}$ into 5 pieces, each will be a third and 3 thirds is 1.



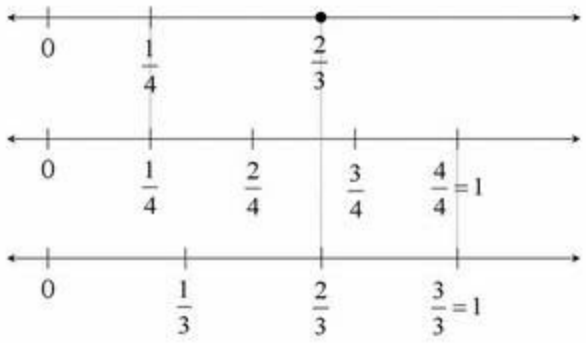
**IM Task:** Find $\frac{2}{3}$

Label the point where $\frac{2}{3}$ belongs on the number line. Be as exact as possible.


This simple-looking problem reveals much about how well students understand unit fractions as well as representing fractions on a number line.
First students must locate 1 by repeatedly marking off the length of the interval between 0 and $\frac{1}{4}$,
recognizing that $\frac{4}{4}$ = 1. Students must then partition the interval between 0 and 1 into 3 equal parts and identify which of those points represent $\frac{2}{3}$.

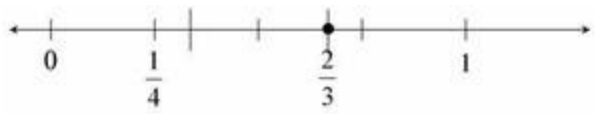
Many students will find it easier to do this on two separate number lines, but a few may be able to do it on a single number line. The solutions below reflect these two approaches.

**Solution: Two number lines**
Students may choose to label none, some or all of the points they find on the number line on the way to solving the problem. A correct solution only requires that the point $\frac{2}{3}$ be labeled.



**Solution: One number line**

Students may choose to label none, some or all of the points they find on the number line on the way to solving the problem. A correct solution only requires that the point $\frac{2}{3}$ be labeled.




## 3.8 Lesson 1: Estimation Explorations with Fractions

**Teacher-facing Learning Goals**

- Describe a fraction $\frac{a}{b}$ as the quantity formed by $a$ parts of size $\frac{1}{b}$.
- Represent fractions on a number line diagram.

**Addressing CCSS:** 3.NF.A.1, 3.NF.A.2

**Lesson Purpose**
The purpose of this lesson is for students to practice reasoning about fraction representations through estimation.

**Materials Needed**

| **Gather** | **Copy** |
|---|---|
| • none | • none |

**Cool-down:** Fraction Representations

1. Which fraction representation were you most comfortable with today: area, strip, or number line? Why?
2. Which fraction representation do you think you need to do more work with?

**Student Responses**

1. Answers vary.
2. Answers vary.

**Teacher Reflection Question**
Which fraction representations did students seem most comfortable with today? Which representations do you want to be sure to work more with before the year is over?

**Lesson Narrative**

In previous lessons, students learned how to represent fractions with area diagrams, fraction strips, and number lines. The purpose of this lesson is for students to revisit each of these representations within an estimation context. Students have an opportunity to think about how to partition each representation to decide what fraction is shown. Additionally, if time allows and it seems of benefit to student understanding, there is an option after each activity to find the exact value of the fraction in the task statement.

**Student-facing Learning Goal:** Let's do some estimation explorations with fractions.

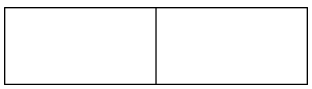
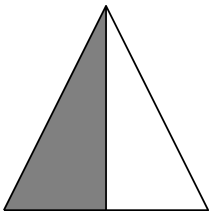
**Warm-up Narrative:** Which One Doesn't Belong: Fractions

**Addressing CCSS:** 3.NF.A.1

| | |
|---|---|
| 10 min | This warm-up prompts students to compare four images. It gives students a reason to use language precisely (MP6). It gives the teacher an opportunity to hear how students use terminology and talk about characteristics of the items in comparison to one another. During the synthesis, ask students to explain the meaning of any terminology they use, such as parts, pieces, whole, shapes, triangle, quadrilateral, or halves. |

**Task Statement**

Which one doesn't belong?

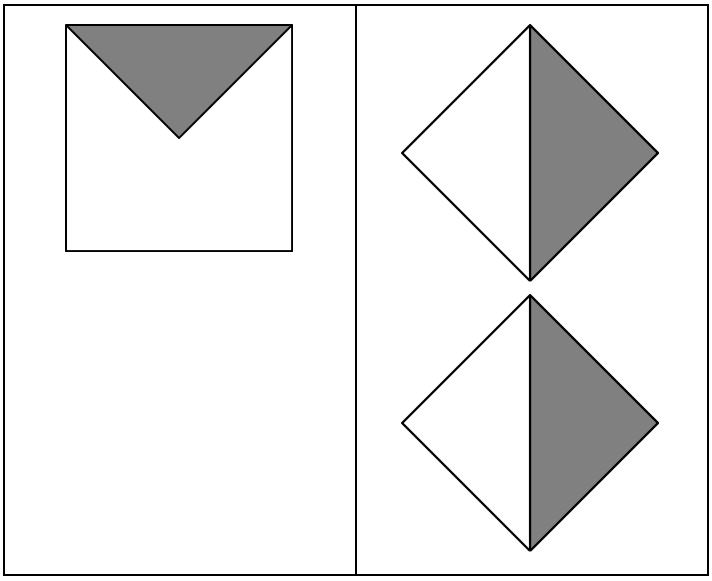
| | |
|---|---|
| A  | C  |
| B | D |

**Launch/Activity**

- Groups of 2
- Display image.
- "Pick one that doesn't belong. Be ready to share why it doesn't belong."
- 1 minute: quiet think time
- 2–3 minutes: partner discussion
- Record responses.

**Synthesis**

- "Let's find at least one reason why each one doesn't belong."



**Student Responses**

A doesn't belong because:
- It doesn't have any shaded parts.
- It doesn't have any triangles.

B doesn't belong because:
- It doesn't show halves.
- It doesn't show equal parts.

C doesn't belong because:
- It is not a quadrilateral.

D doesn't belong because:
- It isn't just one shape.
- It isn't just one whole.

**Activity 1 Narrative:** Estimation Exploration: Area

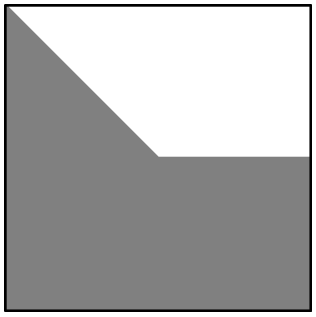
**Addressing CCSS:** 3.NF.A.1

| | |
|---|---|
| 10 min | The purpose of an Estimation Exploration is to practice the skill of estimating a reasonable answer based on experience and known information. It gives students a low-stakes opportunity to share a mathematical claim and the thinking behind it (MP3). Asking yourself "Does this make sense?" is a component of making sense of problems (MP1), and making an estimate or a range of reasonable answers with incomplete information is a part of modeling with mathematics (MP4). |

**Task Statement**

What fraction of the square is shaded?

**Launch/Activity**
- Groups of 2
- Display image.



Record an estimate that is:

| too low | about right | too high |
|---|---|---|
| | | |

**Student Responses**

Sample responses:

- Too low: $\frac{1}{4}$ - $\frac{1}{2}$
- About right: $\frac{5}{6}$ - $\frac{5}{8}$
- Too high: $\frac{6}{8}$ - 1

- "What is an estimate that's too high? Too low? About right?"
- 1 minute: quiet think time
- 1 minute: partner discussion
- Record responses.

**Synthesis**

- Consider asking:
  - "Is anyone's estimate less than ___? Is anyone's estimate greater than ___?"
  - "Based on this discussion does anyone want to revise their estimate?"
- "If you wanted to find out exactly what fraction of the square is shaded, how would you go about doing that?" (We could try to partition the whole square into equal parts and see how many of the parts are shaded.)
- 2 minutes: partner discussion
- Share and record responses.
- Optional: Have students find the exact fraction shaded.

**Activity 2 Narrative:** Estimation Exploration: Fraction Strip

**Addressing CCSS:** 3.NF.A.1

| | |
|---|---|
| 10 min | The purpose of an Estimation Exploration is to practice the skill of estimating a reasonable answer based on experience and known information. It gives students a low-stakes opportunity to share a mathematical claim and the thinking behind it (MP3). Asking yourself "Does this make sense?" is a component of making sense of problems (MP1), and making an estimate or a range of reasonable answers with incomplete information is a part of modeling with mathematics (MP4). |

**Task Statement**

What fraction of the strip is shaded?

**Launch/Activity**

- Groups of 2
- Display image.
- "What is an estimate that's too high? Too low? About right?"
- 1 minute: quiet think time

Record an estimate that is:

| too low | about right | too high |
|---|---|---|
| | | |

**Student Responses**

Sample responses:

- too low: $\frac{1}{8}$ - $\frac{1}{4}$
- about right: $\frac{1}{4}$ - $\frac{3}{8}$
- too high: $\frac{1}{2}$ - $\frac{2}{3}$

- 1 minute: partner discussion
- Record responses.

**Synthesis**

- Consider asking:
  - "Is anyone's estimate less than ___? Is anyone's estimate greater than ___?"
  - "Based on this discussion does anyone want to revise their estimate?"
- "If you wanted to find out exactly what fraction of the strip is shaded, how would you go about doing that?" (We could try to put copies of the shaded part next to each other and see how many fit into the whole strip. We could partition the strip into fractions we know and see what fraction the end of the shaded part lines up with.)
- 2 minutes: partner discussion
- Share and record responses.
- Optional: Have students find the exact fraction shaded.

**Activity 3 Narrative:** Estimation Exploration: Number Line

**Addressing CCSS:** 3.NF.A.2

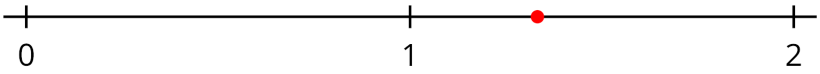
| | |
|---|---|
| 10 min | The purpose of an Estimation Exploration is to practice the skill of estimating a reasonable answer based on experience and known information. It gives students a low-stakes opportunity to share a mathematical claim and the thinking behind it (MP3). Asking yourself "Does this make sense?" is a component of making sense of problems (MP1), and making an estimate or a range of reasonable answers with incomplete information is a part of modeling with mathematics (MP4). |

**Task Statement**

What is the location of the point on the number line?

**Launch/Activity**

- Groups of 2
- Display image.
- "What is an estimate that's too high? Too low? About right?"




Record an estimate that is:

| too low | about right | too high |
|---|---|---|
| | | |

**Student Responses**

Sample responses:

- Too low: 1 - $1\frac{1}{4}$
- About right: $1\frac{1}{4}$ - $1\frac{2}{6}$
- Too high: $1\frac{1}{2}$ - 2

- 1 minute: quiet think time
- 1 minute: partner discussion
- Record responses.

**Synthesis**

- Consider asking:
  - "Is anyone's estimate less than ___? Is anyone's estimate greater than ___?"
  - "Based on this discussion does anyone want to revise their estimate?"
- "If you wanted to find out exactly what fraction is at that point on the number line, how would you go about doing that?" (We could partition the number line into fractions we know and see what fraction the point lines up with.)
- 2 minutes: partner discussion
- Share and record responses.
- Optional: Have students find the exact location marked on the number line.

**Lesson Synthesis**

"Today we practiced our estimation skills with fractions. Estimation can be helpful when you want to make sure your answer is reasonable or when you don't need to solve a problem for an exact answer. What are some strategies you used today when you were estimating that you'd want to keep in mind for when you estimate in the future?" (It's helpful to remember where some fractions are located or show up on areas like $\frac{1}{2}$ because it helps you think about where other fractions will be. It's helpful to think about how fractions compare to one another. For example, remembering that eighths are smaller than sixths or fourths and so on. Remembering how to partition into equal parts is helpful so you can decide how many parts are shaded.)
2 minutes: partner discussion
Share and record responses.

## 3.8 Lesson 2: Create Your Own Number Line

**Teacher-facing Learning Goals**

- Represent fractions on a number line diagram.

- Record the results of comparisons with the symbols >, =, or <.

**Addressing CCSS:** 3.NF.A.2

**Lesson Purpose**
The purpose of this lesson is for students to create their own number line and represent fractions on the number line. Students then write comparison statements about fractions with the symbols >, =, or <.

**Materials Needed**

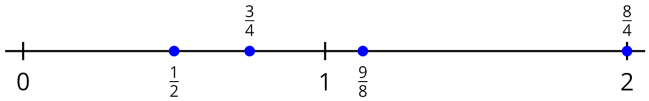
| **Gather** | **Copy** |
|---|---|
| • painter's tape, one roll for each group of 3-4 students | • none |

**Cool-down:** Where Do I Go?

Locate and label each fraction on the number line. Explain your reasoning.

$$0,\ 1,\ 2,\ \frac{1}{2},\ \frac{3}{4},\ \frac{8}{4},\ \frac{9}{8}$$

**Student Responses**




**Teacher Reflection Question**
What strategies did students use most today when they were locating fractions on their number lines? What strategies do you want students to practice using more frequently?

**Lesson Narrative**

In previous lessons, students learned to represent fractions on number lines and to record the results of comparisons of fractions with the symbols >, =, or <.

The purpose of this lesson is for students to create their own number lines to practice this reasoning.

**Student-facing Learning Goal:** Let's build some number lines.

**Warm-up Narrative:** Which One Doesn't Belong: Fractions on Number Lines

**Addressing CCSS:** 3.NF.A.2

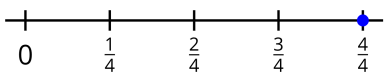
10 min

This warm-up prompts students to compare four images. It gives students a reason to use language precisely (MP6). It gives the teacher an opportunity to hear how students use terminology and talk about characteristics of the items in comparison to one another. During the synthesis, ask students to explain the meaning of any terminology they use, such as tick marks, labels, unit fractions, whole numbers, and length.

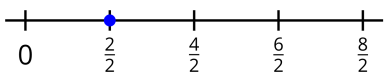
**Task Statement**

Which one doesn't belong?

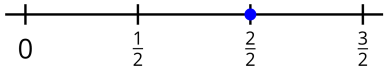
A



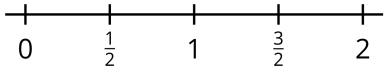

B




C




D




**Student Responses**

Sample responses:

A doesn't belong because:

- It doesn't go past 1.
- It doesn't show partitions of $\frac{1}{2}$.

B doesn't belong because:

- It isn't marked with unit fractions

C doesn't belong because:

**Launch/Activity**

- Groups of 2
- Display image.
- "Pick one that doesn't belong. Be ready to share why it doesn't belong."
- 1 minute: quiet think time
- 2–3 minutes: partner discussion
- Record responses.

**Synthesis**

- "Let's find at least one reason why each one doesn't belong."

- It doesn't have 5 marks.
- It doesn't have 4 lengths.
- It doesn't stop at a whole number.

D doesn't belong because:

- It doesn't have only fractional labels, it has whole numbers.
- It isn't marked at a location.

**Activity 1 Narrative:** Create Your Own Number Line

**Addressing CCSS:** 3.NF.A.2

25 min

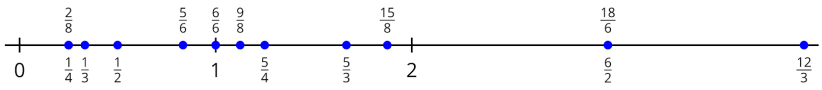
The purpose of this activity is for students to use their fractional reasoning skills to practice locating fractions on a number line. Students should be in groups to discuss their ideas, but the groups should stay small enough that every member will have a chance to share their ideas. Be sure to space groups so that each group has their own area to work in.

**Task Statement**

Create a long number line on the floor.
Locate and label each fraction on the number line. Be prepared to explain your reasoning.

$0, 1, 2, \frac{1}{2}, \frac{1}{3}, \frac{6}{2}, \frac{12}{3}, \frac{1}{4}, \frac{5}{4}, \frac{6}{6}, \frac{5}{6}, \frac{9}{8}, \frac{15}{8}, \frac{5}{3}, \frac{18}{6}, \frac{2}{8}$

**Student Responses**




**Launch/Activity**

- Groups of 3-4
- "Today you are going to work with your group to create a number line and place fractions on it. Be prepared to share your strategies with the class."
- Give students painter's tape.
- 10–15 minutes: small-group work time
- Monitor for strategies that groups use to locate the points, such as:
  - starting with benchmark numbers, such as unit fractions or whole numbers
  - considering whether fractions are larger or smaller than 1
  - considering whether the fractions are equivalent to whole numbers
  - comparing fractions with the same numerator or denominator

| | |
|---|---|
| | **Synthesis**<br>● Have each group share a strategy they used or a fraction they placed, based on what you noticed during the activity. Encourage groups to use their number lines when demonstrating their reasoning.<br>● Consider asking:<br>○ "Did any groups use a similar strategy?"<br>○ "Did any groups place that fraction in a different way?"<br>○ "Which fractions did think were easier to place?"<br>○ "Which fractions were harder to locate?" |
| **Activity 2 Narrative:** Make a Statement | **Addressing CCSS:** 3.NF.A.2 |
| 10 min | The purpose of this activity is for students to use the number line they created in the previous activity to make comparison statements about fractions. Students use the symbols >, =, and < to record comparisons between pairs of fractions. |
| **Task Statement**<br>Use your number line to write 6 fraction comparison statements using the symbols >, =, and <. Include 2 statements for each symbol. Explain your reasoning.<br><br>**Student Responses**<br>Sample responses:<br>$\frac{18}{6} = 3$: They are at the same location on the number line.<br>$1 > \frac{1}{2}$: $\frac{1}{2}$ is to the left of 1 so I know 1 is greater than $\frac{1}{2}$. | **Launch/Activity**<br>● Groups of 3-4<br>● "Now you are going to work with your group to write comparison statements based on your number line."<br>● 8-10 minutes: small-group work time<br>● Monitor for a variety of student generated statements that will be interesting to share during the synthesis.<br>**Synthesis**<br>● Have each group share at least one comparison statement they |

| | |
|---|---|
| | came up with. Encourage them to show or explain how they used their number line to justify their statement. Be sure to share at least one statement that uses each symbol. |

**Lesson Synthesis**
"Today we spent time locating fractions on a number line. What was a new strategy that you learned to use during today's activity or a strategy that you don't use very often that you want to try to use more often?" (I learned that it's helpful to compare fractions with the same denominator to place them on the number line because you can just look at the numerator to tell you which is bigger. I remembered that whole numbers can be written as fractions, so I can check to see if any of the fractions are actually whole numbers to plot those first.)
2 minutes: partner discussion
Share and record responses.

## 3.8 Lesson 3: Fractions Round Table

**Teacher-facing Learning Goals**
- Solidify key ideas that students have learned about fractions, such as what fractions mean, whole numbers as fractions, and fraction comparisons.

**Addressing CCSS:** 3.NF.A1, 3.NF.A.2, 3.NF.A.3

**Lesson Purpose**
The purpose of this lesson is for students to consider statements about fractions that will help them solidify their understanding of fractions.

**Materials Needed**

| Gather | Copy |
|---|---|
| • none | • none |

**Cool-down:** Round Table Reflection

1. Which statement did you feel most sure about? Why?
2. Which statement would you like to spend more time thinking about? Why?

**Student Responses**

1. Answers vary.
2. Answers vary.

**Teacher Reflection Question**

What was the best question you asked students today? Why would you consider it the best one based on what students said or did?

**Lesson Narrative**

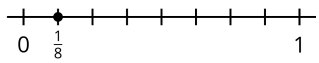
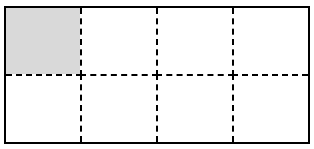
In previous lessons, students learned what fractions are and how to represent fractions with area diagrams, strips, and on the number line. Students also compared fractions and recognized and generated equivalent fractions.

The purpose of this lesson is to give students a chance to think about and discuss statements that address their understanding of important ideas about fractions.

**Student-facing Learning Goal:** Let's discuss fractions.

| **Warm-up Narrative:** What Do You Know About $\frac{1}{8}$? | **Addressing CCSS:** 3.NF.A1, 3.NF.A.2, 3.NF.A.3 |
|---|---|
| 10 min | The purpose of this What Do You Know About ____? is to invite students to share what they know and how they can represent the number $\frac{1}{8}$. |

| **Task Statement** | **Launch/Activity** |
|---|---|
| What do you know about $\frac{1}{8}$?<br><br>**Student Responses** | • Display the number.<br>• "What do you know about $\frac{1}{8}$?"<br>• 1 minute: quiet think time<br>• Record responses. |

<table>
<tr>
<td>Sample responses:<br>• $\frac{1}{8}$ is 1 part when the whole is split into 8 equal parts<br>• $\frac{1}{8}$ is smaller than $\frac{1}{2}$<br>• I can represent $\frac{1}{8}$:<br>  <br><br>  </td>
<td>• “How could we represent the number $\frac{1}{8}$?”<br><br>Synthesis<br>• “What connections do you see between different answers?”</td>
</tr>
<tr>
<td>Activity 1 Narrative: Fractions Round Table</td>
<td>Addressing CCSS: 3.NF.A1, 3.NF.A.2, 3.NF.A.3</td>
</tr>
<tr>
<td>35 min</td>
<td colspan="2">The purpose of this activity is to give students a chance to think about and discuss statements that address their understanding of important ideas about fractions. Students will consider ideas about how fractions are defined, comparing fractions, and how fractions relate to whole numbers. It is not necessary for each group to discuss all of the statements, but if there are any you’d like to make sure each group discusses, let them know at the start of the activity.</td>
</tr>
<tr>
<td>Task Statement<br><br>Discuss each statement in 3 rounds with your group.<br><br>Round 1: Go around the group and state whether you agree, disagree, or are unsure about the statement and justify your choice. You will be free to change your response in the next round.<br><br>Round 2: Go around the group and state whether you agree, disagree, or are unsure about the statement you or someone else made in the first round. You will be free to change your response in the next round.<br><br>Round 3: State and record whether you agree, disagree, or are unsure about the statement now that discussion has ended.</td>
<td>Launch/Activity<br>• Groups of 4<br>• “Take a minute to read the directions for today’s activity. You will be discussing statements about fractions with your group.”<br>• 1 minute: quiet think time<br>• Consider walking students through the process or answer any questions.<br>• 25–30 minutes: small-group work time<br><br>Synthesis<br>• “Was there a statement that you changed your mind about during your group's discussion? What</td>
</tr>
</table>

Repeat the rounds for as many statements as you can.

| statement | round 1 | round 2 | round 3 |
|---|---|---|---|
| Fractions are numbers. | Agree ___ Disagree ___ Unsure ___ | Agree ___ Disagree ___ Unsure ___ | Agree ___ Disagree ___ Unsure ___ |
| A fraction is a number less than 1. | Agree ___ Disagree ___ Unsure ___ | Agree ___ Disagree ___ Unsure ___ | Agree ___ Disagree ___ Unsure ___ |
| A fraction can be located on a number line. | Agree ___ Disagree ___ Unsure ___ | Agree ___ Disagree ___ Unsure ___ | Agree ___ Disagree ___ Unsure ___ |
| The numerator tells us the size of the part. | Agree ___ Disagree ___ Unsure ___ | Agree ___ Disagree ___ Unsure ___ | Agree ___ Disagree ___ Unsure ___ |
| The denominator tells us the number of parts. | Agree ___ Disagree ___ Unsure ___ | Agree ___ Disagree ___ Unsure ___ | Agree ___ Disagree ___ Unsure ___ |
| Whole numbers are fractions. | Agree ___ Disagree ___ Unsure ___ | Agree ___ Disagree ___ Unsure ___ | Agree ___ Disagree ___ Unsure ___ |
| Fractions are whole numbers. | Agree ___ Disagree ___ Unsure ___ | Agree ___ Disagree ___ Unsure ___ | Agree ___ Disagree ___ Unsure ___ |
| One half is always greater than one third. | Agree ___ Disagree ___ Unsure ___ | Agree ___ Disagree ___ Unsure ___ | Agree ___ Disagree ___ Unsure ___ |
| Fractions can be used to describe a length. | Agree ___ Disagree ___ Unsure ___ | Agree ___ Disagree ___ Unsure ___ | Agree ___ Disagree ___ Unsure ___ |

**Student Responses**

was the statement? What made you change your mind?"

- Consider asking:
  - "What statements do you still have questions about?"

| | |
|---|---|
| Answers vary. | |

**Lesson Synthesis**

"Which statement did your group have the most discussion about and why?" (We discussed the idea that one half is always greater than one third the most because some people agreed and some disagreed.)
2 minutes: small-group discussion
Share and record responses.