LESSON 15: Concept of Fractions

[Objective]

The student will build fraction kits and apply concepts of fractions by using equivalency and comparisons.

[Prerequisite Skills]

knowledge of comparing and ordering whole numbers

[Materials]

Student pages **S143–S151**
Transparencies **T457, T459, T460, T461, and T463**
Fraction strips for all three kits
Scissors
Overhead fraction strips
Resealable plastic bag (1 per student)
Colored pencils
Paper for foldable (1 sheet per student)

[Essential Questions]

1. What is a fraction?
2. How can we compare fractions?
3. How can we identify equivalent fractions?

[Words For Word Wall]

numerator, denominator, fraction, halves, fourths, eighths, thirds, sixths, twelfths, fifths, tenths, equivalent, legal trade, one whole unit

[Grouping]

Cooperative Pairs (CP), Whole Group (WG), Individual (I)
*For Cooperative Pairs (CP) activities, assign the roles of Partner A and Partner B to students. This allows each student to be responsible for designated tasks within the lesson.

[Levels of Teacher Support]

Modeling (M), Guided Practice (GP), Independent Practice (IP)

[Multiple Representations]

SOLVE, Verbal Description, Pictorial Representation, Concrete Representation, Graphic Organizer

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[*Note]

This lesson is designed to be taught in 2 days. On Day 1, you will model fractions using Kit 1 from the concrete through the pictorial and on to the abstract. You will also create Kit 2. On Day 2, you will create Kit 3 and use Kit 2 and Kit 3 to model fractions from the concrete through the pictorial and on to the abstract.

[Warm-Up] (5 minutes – IP, WG, I) S143 (Answers on T456.)

• Have students turn to S143 in their books to begin the Warm-Up. Students will compare and order whole numbers. Monitor students to see if any of them need help during the Warm-Up. Give students 3 minutes to complete the problems and then spend 2 minutes reviewing the answers as a class. **{Verbal Description}**

[Homework] (5 minutes)

Take time to go over the homework from the previous night.

[Lesson] Day 1: (60 minutes – M, GP, IP, WG, CP) Day 2: (60 minutes – M, GP, IP, WG, CP)

----------------------------- **Day 1 Fraction Concepts** -----------------------------

SOLVE Problem	**(3 minutes – GP, WG) T457, S144 (Answers on T458.)**

Have students turn to S144 in their books, and place T457 on the overhead. The first problem is a SOLVE problem. You are only going to complete the S step with students at this point. Tell students that during the lesson they will learn how to identify equivalent fractions. They will use this knowledge to complete this SOLVE problem at the end of the lesson. **{SOLVE, Graphic Organizer}**

Fractions	**(5 minutes – M, GP, WG, CP) T457, S144 (Answers on T458.)**

5 minutes – M, GP, WG, CP: Use the following activity to introduce fractions. Have students turn to page S144, and place T457 on the overhead. Assign the roles of Partner A and Partner B. **{Graphic Organizer, Verbal Description, Pictorial Representation}**

MODELING

Fractions

Step 1: Ask students to explain $\frac{1}{2}$. (It is a fraction.)

- Partner A, identify the top number in the fraction. (1)
- Partner B, identify the bottom number in the fraction. (2)
- What is the top number in any fraction called? (**numerator**) Record the term numerator by the 1 in the fraction.
- What is the bottom number in any fraction called? (**denominator**) Record the term denominator by the 2 in the fraction.

- Ask students what the fraction $\frac{1}{2}$ means. (one half of a whole) Record on the graphic organizer.

Step 2: Direct students' attention to the circle.

- How many parts are in the circle? (2)
- How many parts are shaded? (1)

- If $\frac{1}{2}$ of the fraction is shaded, what term can we use to describe the 2? (denominator) The 1? (numerator)
- Have Partner A and Partner B discuss a possible definition for denominator. (the number of parts in the whole)

Have students share their definitions and record.

- Have Partner A and Partner B discuss a possible definition for the numerator. (the number of parts that are counted)

Have students share their definitions and record.

Fraction Kit 1   **(20 minutes – WG, CP, M, GP)**

20 minutes – M, GP, CP, WG: Use the following activity to help students create Fraction Kit 1. Have students clear their desks. Assign Partner A and Partner B for this activity.
{Concrete Representation, Verbal Description}

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MODELING
Fraction Kit 1

Step 1: Pass out a blue fraction strip to each student. Explain to students that this strip will represent **one whole unit**.

- Have students label this strip "1 Whole Unit".
- Ask students, "What does this blue strip represent?" (one whole unit)
- Have students lay the strip near the top edge of their desks.

*Teacher Note - You may want to wear the unit by attaching it to your clothes with a paper clip, as you will be comparing the other strips to it throughout the lesson.

Step 2: Pass out a brown fraction strip to each student.

- Say, "Tell me something about this brown strip." (Students may give the color, shape, or size, but focus on the idea that it is the same size as the blue strip.)
- Tell students that the brown strip is **equivalent** to 1 whole unit. (You may want to hold the brown unit next to the blue unit to show this to students.)
- Model for students how to fold the brown strip end to end to form two equal parts.
- Ask students to describe the folded brown strip to their partners. (Students may give color, shape, or size.)

Explain to students that the folded strip is one-half of the blue strip.

- Ask students how they might prove that the folded strip is one-half of the whole unit. (Possible answers include: laying it next to the whole strip, putting it together with their partner's one-half and seeing that the two together equal one whole.)
- Have students unfold the brown strips and write "$\frac{1}{2}$ unit" on each of the **halves**.
- Tell students to cut the brown strip carefully on the fold.
- Ask students how many one-half units are equivalent to the one whole unit? (2)
- Have students lay the two one-half units below the blue one whole strip on their desks.

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Step 3: Pass out a yellow fraction strip to each student.

- Say, "Tell me something about this yellow strip." (Students may give the color, shape, or size, but focus on the idea that it is the same size as the blue strip.)
- Tell students that the yellow is equivalent to 1 whole unit. (You may want to hold the yellow unit next to the blue unit to show the equivalency to students.)
- Model for students how to fold the yellow strip end to end to form two equal parts.
- Have the students look at the fraction strips on their desks and ask students to describe the folded yellow strip to their partner. (Students may give color, shape, or size.)

Explain to students that the folded strip is now one-half of the blue strip.

- Ask students to keep the yellow strip folded and carefully fold it a second time - end to end. Have students lay the folded strip down below the one-half unit (brown) and the one whole unit strip (blue).
- Have students describe the yellow strip in relation to the other two strips.
- Stress to students that it takes 4 of the yellow strips to cover the unit strip. This means that the yellow strip is one-fourth of the whole unit.
- Ask students how they might prove that the folded strip is one-fourth of the whole unit? (Possible answers include: laying it next to the whole strip.)
- Have students unfold the yellow strip and write "$\frac{1}{4}$ unit" on each of the **fourths.**
- Tell students to cut the yellow strip carefully on the folds.
- Ask students how many one-fourth units are equivalent to the one whole unit. (4)
- Have students lay the four one-fourth units below the brown one-half units on their desks.

Step 4: Pass out a red fraction strip to each student.

- Say, "Tell me something about this red strip." (Students may give the color, shape, or size, but focus on the idea that it is the same size as the blue strip.)
- Tell students that the red is equivalent to 1 whole unit. (You may want to hold the red unit up next to the blue unit to show the equivalency to students.)
- Model for students how to fold the red strip end to end to form two equal parts.
- Have the students look at the fraction strips on their desks and ask students to describe the folded red strip to their partner. (Students may give color, shape, or size.)

Explain to students that the folded strip is now one-half of the blue strip.

- Ask students to keep the red strip folded and carefully fold a second time - end to end.
- Ask students to describe the red strip. (It is the same size as the yellow strip.)
- Ask students to carefully fold the red strip one last time end to end. Have students lay the folded red strip below the yellow, brown, and the one whole unit strips (blue).
- Have students describe the red strip in relation to the other three strips.
- Stress to students that it takes 8 of the red strips to cover the unit strip.

This means that the red strip is one-eighth of the whole unit.

- Ask students how they might prove that the folded strip is one-eighth of the whole unit. (Possible answers include: laying it next to the whole strip.)

- Have students unfold the red strip and write "$\frac{1}{8}$ unit" on each of the **eighths**.
- Tell students to cut the red strip carefully on the folds.
- Ask students how many one-eighth units are equivalent to the one whole unit? (8)
- Have students lay the red one-eighth units below the yellow one-fourth units on their desks.

| **Fraction Kit 1 Legal Trades** | **(12 minutes – WG, M, IP, GP, CP)** |

5 minutes – M, GP, WG, CP: Use the following activity to model legal trades with Kit 1. Teachers will use overhead fraction kits, and students will use the fraction strips on their desks. Assign Partner A and Partner B for this activity. **{Concrete Representation, Verbal Description}**

MODELING

Fraction Kit 1 Legal Traders

Step 1: Use your overhead fraction strips. Line up the fraction strips with the unit (blue) at the top, the one-half strips (brown) below blue, the one-fourth strips (yellow) below brown, and the one-eighth strips (red) below yellow, as students set up the fraction kit on their desks.

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

Step 2: Tell students that they are going to make "legal trades" of fraction strips with their partner. Explain that to make a **legal trade**, the strip or strips that are traded must be the same length. As an example, model on the overhead how trading a 1-unit strip for two one-half strips would be a legal trade because, together, two one-half strips have the same length as one 1-unit strip. Ask students to talk with their partners about what they might legally trade for a one-half strip (two one-fourth strips). Tell students that they can check to see if a trade is legal by putting one trade above the other. Show them how to do this by using the proper vocabulary:

- "You give your partner a one-half strip. What can your partner trade that equals this?"

- "A legal trade is two one-fourth strips. That is a legal trade because a one-half strip equals two one-fourth strips."

5 minutes – IP, CP:	Have students work in partners to practice legal trading, with partners taking turns offering legal trades. Make sure students understand that they must "undo" one legal trade before making another. **{Verbal Description, Concrete Representation}**
2 minutes – WG:	As a class, have students discuss the legal trades they were able to make. Make sure students justify their answers by showing the trades and talking about the fractional units. Examples of legal trades are shown below: **{Verbal Description, Concrete Representation}**

$\frac{1}{2}$ and $\frac{1}{4}$ equal $\frac{3}{4}$

one unit and $\frac{1}{4}$ equal $\frac{1}{2}$ and $\frac{1}{2}$ and $\frac{1}{4}$

four red = one brown, or $\frac{4}{8} = \frac{1}{2}$

two yellow = four red, or $\frac{2}{4} = \frac{4}{8}$

one blue = eight red, or 1 whole unit = $\frac{8}{8}$

one blue = 4 yellow, or 1 whole unit = $\frac{4}{4}$

one brown = one yellow and two red, or $\frac{1}{2} = \frac{1}{4}$ and $\frac{2}{8}$

one brown and two red = two yellow and two red, or $\frac{1}{2}$ and $\frac{2}{8} = \frac{2}{4}$ and $\frac{2}{8}$

Recording Legal Trades - Kit 1 **(6 minutes – M, GP, IP, CP, WG) T457, T458, T459, S144, S145**

2 minutes – M, GP, WG:	Have students organize all of their fraction parts from Kit 1 on their desks so they are ready to model legal trades and record the information. Have students turn to S144 in their books, and place T457 on the overhead. Use the following activity to model for students how to record legal trades. **{Verbal Description, Concrete Representation, Pictorial Representation, Graphic Organizer}**

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Recording Legal Trades – Kit 1

Step 1: Tell students that you have one one-half strip, or $\frac{1}{2}$, and you want to legally trade it for two one-fourth strips.

Step 2: Model for students how to draw a picture of the one-half strip in the I GAVE box and a picture of the two one-fourth strips in the PARTNER GAVE ME BACK box on T459 (S145). Have students write $\frac{1}{2}$ under the picture of the one-half strip and $\frac{1}{4} + \frac{1}{4}$ under the picture of the two one-fourth strips.

  • Shade the one-half strip brown.
  • Shade the one-fourth strips yellow.

Step 3: Have students write an equal sign (=) between $\frac{1}{2}$ and $\frac{1}{4} + \frac{1}{4}$ (or $\frac{1}{2} = \frac{2}{4}$) to show that the trade is legal. Explain to students that when they use the equal sign to show legal trades, they are showing equivalent fractional parts.

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3 minutes – IP, CP: Have students complete S145 in partners. Have students record legal trades in the remaining boxes on S145. Students should use colored pencils to shade the fraction strips in the appropriate color. **{Verbal Description, Concrete Representation, Pictorial Representation, Graphic Organizer}**

1 minute – WG: As a class, have students discuss the legal trades they were able to make. Make sure students justify their answers by showing the trades and talking about the fractional units. **{Verbal Description, Concrete Representation, Pictorial Representation, Graphic Organizer}**

Fraction Kit 2	(5 minutes – M, GP, CP, WG)

5 minutes – M, GP, CP, WG: Have students clear their desks of all materials. Organize students into cooperative pairs. Use the following activity to help students create Fraction Kit 2. The fraction strips for this lesson have already been marked for cutting. Students will not have to fold them. **{Verbal Description, Concrete Representation}**

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Fraction Kit 2

Step 1: Have students take their blue strip from Kit 1 and place it near the top of their desks. Then, pass out a green strip to each student. Ask students what fractional pieces the green strip has been divided into that. (**thirds**) Have students put the green strip under the blue strip so they can clearly see that it takes three-thirds, or three one-third strips, to equal one whole unit. Have students write "$\frac{1}{3}$ unit" on each of the three parts. Then, have students carefully cut apart the one–third strips as you demonstrate.

Step 2: Pass out an orange strip to each student. Have students place this strip beneath the one-third strips. Ask students what they notice about this fraction strip when compared to the one-third strips. (The number of parts doubled, just like when they folded the paper for the fourths and eighths.) Show students that the orange strip shows six parts in the whole, or six-sixths. Have students write "$\frac{1}{6}$ unit" on each of the six parts.

Ask students how many **sixths** strips it takes to create one whole unit (6) and how many sixths strips it takes to create a one-third strip (2). Have students carefully cut apart the one-sixth strips.

Step 3: Pass out a pink strip to each student. Have students place this strip beneath the one-sixth strips. Ask students what they notice about this fraction strip when compared to the one-sixth strips. (The number of parts doubled, just like when they folded the paper for the fourths and eighths and for the thirds and sixths.) Show them that the pink strip shows twelve parts in the whole, or twelve-twelfths. Have students write "$\frac{1}{12}$ unit" on each of the twelve parts. Ask students how many **twelfths** strips it takes to create one whole unit (12), how many twelfths strips it takes to create a one-third strip (4), and how many twelfths strips it takes to create a one-sixth strip (2). Have students carefully cut apart the one-twelfth strips.

Fraction Kit 2 Legal Trades	**(9 minutes – M, WG, IP, CP, GP)**

5 minutes – M, GP, CP, WG: Use the following activity to model legal trades for Kit 2. Teachers will use overhead fraction kits, and students will use the fraction strips on their desks. Determine Partner A and Partner B for this activity. **{Concrete Representation, Verbal Description}**

MODELING

Fraction Kit 2 Legal Trades

Step 1: Use your overhead fraction strips. Line up the fraction strips with the unit (blue) at the top, the one-third strips (green) below blue, the one-sixth strips (orange) below green, and the one-twelfth strips (pink) at the bottom, as students do the same thing with the strips on their desks.

Step 2: Tell students that they are going to make "legal trades" of fraction strips with their partner using their Kit 2 fraction strips. Remind students that to make a legal trade, the strip or strips that are traded must be the same length. As an example, model on the overhead how trading a 1-unit strip for three one-third strips would be a legal trade because, together, three one-third strips have the same length as one 1-unit strip. Ask students to talk with their partners about what they might legally trade for a one-third strip (one one-third, two one-sixths, and so on). Tell students that they can check to see if a trade is legal by putting one strip above the other. Show students how to do this by using the proper vocabulary:

- "You give your partner a one-third strip. What can your partner trade that equals this?"

- "A legal trade is two one-sixth strips. That is a legal trade because a one-third strip equals two one-sixth strips."

Encourage students to find as many legal trades as possible.

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3 minutes – IP, CP: Have students work in partners to practice legal trading with partners taking turns offering legal trades. Make sure students understand that they must "undo" one legal trade before making another. **{Verbal Description, Concrete Representation}**

1 minute – WG: As a class, have students discuss the legal trades they were able to make. Make sure students justify their answers by showing their trades and talking about the fractional units. **{Verbal Description, Concrete Representation}**

------------------------- **Day 2 Fraction Concepts** -------------------------

Recording Legal Trades – Kit 2   **(7 minutes – M, GP, IP, WG, CP) T460, S146**

2 minutes – M, GP, CP, WG: Have students organize all of their fraction parts from Kit 2 on their desks so that they are ready to make some legal trades and record the information. Have students turn to S146 in their books, and place T460 on the overhead. Use the following activity to model for students how to record legal trades. **{Verbal Description, Concrete Representation, Pictorial Representation}**

┌──────────────────────────── **MODELING** ────────────────────────────┐

Recording Legal Trades – Kit 2

Step 1: Tell students that you have two one-sixth strips, or $\frac{2}{6}$, and you want to legally trade them for one-third strips.

Step 2: Model for students how to draw a picture of the two one-sixth strips in the I GAVE box and shade them orange. Have students write $\frac{2}{6}$ under the first box.

•   How many one-third strips do I need for a legal trade? (1)
•   Explain to your partner how you know this is a legal trade. (They are the same size.)

Draw the $\frac{1}{3}$ fraction bar in the "PARTNER GAVE ME BACK" Box and shade it green.

•   Write $\frac{1}{3}$ under the box.

Step 3: Have students write an equal sign (=) between $\frac{2}{6}$ and $\frac{1}{3}$ to show that the trade is legal. Explain to students that when they use the equal sign to show **legal trades**, they are showing **equivalent** fractional parts.

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LESSON 15: Concept of Fractions

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3 minutes – IP, CP: Have students complete S146 in partners. Have students record as many legal trades as they can in the boxes on that page. **{Verbal Description, Concrete Representation, Pictorial Representation}**

2 minutes – WG: As a class, have students discuss the legal trades they were able to make. Make sure students justify their answers by showing the trades and talking about the fractional units. **{Verbal Description, Concrete Representation, Pictorial Representation}**

Fraction Kit 3	**(5 minutes – M, GP, WG, CP)**

5 minutes – M, GP, CP, WG: Have students completely clear their desks of all materials. Organize students into their cooperative pairs. Use the following activity to help students create Fraction Kit 3. The fraction strips for this lesson have already been marked for cutting. Students will not have to fold their strips. **{Verbal Description, Concrete Representation}**

MODELING

Fraction Kit 3

Step 1: Have students keep out their blue strip from Kit 1 and place it near the top of their desks. Then, pass out a light green strip to each student. Ask students what fractional pieces the light green strip has been divided into (**fifths**). Have students put the light green strip under the blue strip so that they can clearly see that it takes five-fifths, or five one-fifth strips, to equal one whole unit. Have students write "$\frac{1}{5}$ unit" on each of the five parts. Then, have students carefully cut apart the one-fifth strips as you demonstrate.

Step 2: Pass out a tan strip to each pair. Have students place this strip beneath the one-fifth strips. Ask students what they notice about this fraction strip when compared to the one-fifth strips. (The number of parts doubled, just like when they folded the paper for the fourths and eighths.) Show students that the tan strip shows ten parts in the whole, or ten-tenths. Have students write "$\frac{1}{10}$ unit" on each of the ten parts. Ask students how many **tenths** strips it takes to create one whole unit (10) and how many tenths strips it takes to create a one-fifth strip (2). Have students carefully cut apart the one-tenth strips.

| **Fraction Kit 3 Legal Trades** | **(9 minutes – M, GP, IP, CP, WP)** |

4 minutes – M, GP, CP, WG: Use the following activity to model legal trades for Kit 3. Teachers will use overhead fraction kits and students will use the fraction strips on their desks. Determine Partner A and Partner B for this activity. **{Concrete Representation, Verbal Description}**

MODELING

Fraction Kit 3 Legal Trades

Step 1: Use your overhead fraction strips. Line up the fraction strips with the unit (blue) strip at the top, the one-fifth (light green) strips below the blue strip and the one-tenth (tan) strips on the bottom as students do the same thing with the strips on their desks.

Step 2: Tell students that they are going to make more "legal trades" of fraction strips with their partners using the strips from Kit 3. Remind students that to make a legal trade, the strip or strips that are traded must be the same length. As an example, model on the overhead how trading a 1-unit strip (blue) for 5 one-fifth strips (light green) would be a legal trade because, together, the 5 one-fifth strips would be the same length as the 1-unit strip.

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3 minutes – IP, CP: Have students complete as many legal trades as they can. Make sure students understand that they must "undo" one legal trade before making another. **{Verbal Description, Concrete Representation}**

2 minutes – WG: As a class, have students discuss the legal trades they were able to make. Make sure students justify their answers by showing the trades and talking about the fractional units. **{Verbal Description, Concrete Representation}**

| **Recording Legal Trades – Kit 3** | **(10 minutes – M, GP, IP, WG, CP) T461, S147** |

5 minutes – M, GP, CP, WG: Have students organize all of their fraction parts from Kit 3 on their desks so that they are ready to model legal trades and record the information. Have students turn to S147 in their books, and place T461 on the overhead. Use the following activity to model for students how to record legal trades. **{Verbal Description, Concrete Representation, Pictorial Representation}**

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Recording Legal Trades – Kit 3

Step 1: Tell students that you have six one-tenth strips, or $\frac{6}{10}$, and you want to legally trade them for three one-fifth strips.

Step 2: Model for students how to draw a picture of the six one-tenth strips in the I GAVE box and a picture of the three one-fifth strips in the PARTNER GAVE ME BACK box on T461 (S147). Have students write $\frac{6}{10}$ under the picture of the six one-tenth strips and $\frac{1}{5} + \frac{1}{5} + \frac{1}{5}$ under the picture of the three one-fifth strips.

- Shade the six-tenths strips tan.
- Shade the three-fifths strips light green.

Step 3: Have students write an equal sign (=) between $\frac{6}{10}$ and $\frac{1}{5} + \frac{1}{5} + \frac{1}{5}$ to show that the trade is legal. Remind students that when they use the equal sign to show legal trades, they are showing equivalent fractional parts.

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3 minutes – IP, CP: Have students complete S147 in partners. Have students record as many legal trades as they can in the boxes on that page. **{Verbal Description, Concrete Representation, Pictorial Representation}**

2 minutes – WG: As a class, have students discuss the legal trades they were able to make. Make sure students justify their answers by showing their trades and talking about the fractional units. **{Verbal Description, Concrete Representation, Pictorial Representation}**

Legal Trades Kits 1 – 3   (7 minutes – M, GP, IP, WG, CP) S148 (Answers on T462.)

3 minutes – M, GP, CP, WG: Use the following activity to help students record legal trades using all three kits. **{Verbal Description, Concrete Representation, Pictorial Representation}**

┌─────────────────── **MODELING** ───────────────────┐

Legal Trades Kits 1 – 3

Step 1: Have students take out all three fraction kits. Model the following legal trades, showing equivalency. Use the overhead fraction strips to model.

Step 2: Model the following legal trades.

$$\frac{1}{2} = \frac{5}{10} \qquad \frac{1}{2} = \frac{1}{6} + \frac{1}{3} \qquad \frac{1}{2} = \frac{3}{6} \qquad \frac{1}{2} = \frac{1}{6} + \frac{4}{12}$$

Model, similar to the following example for $\frac{1}{2} = \frac{5}{10}$:

Put $\frac{1}{2}$ on the overhead using the overhead fraction strips. Ask the following questions:

- "How many halves do I have?" (1)

- "How many tenths will equal $\frac{1}{2}$?" (5) Put them on the overhead.

- "How many tenths are equivalent to $\frac{1}{2}$?" (5)

- "What can you tell me about $\frac{1}{2}$ and $\frac{5}{10}$?" ($\frac{1}{2} = \frac{5}{10}$, and $\frac{1}{2}$ is equivalent to $\frac{5}{10}$.)

Tell students that when they use the equal sign to show legal trades, they are showing equivalent fractional parts.

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3 minutes – IP, CP: Have students complete the legal trades on S148 with a partner and record by drawing and listing their legal trades. **{Verbal Description, Concrete Representation, Pictorial Representation}**

1 minute – WG: As a class, have students discuss the legal trades they were able to make. Make sure students justify their answers by showing the trades and talking about the fractional units. **{Verbal Description, Concrete Representation, Pictorial Representation}**

Working with Equivalent Fractions	**(5 minutes – WG, CP, M, GP, IP)**
	S148 (Answers on T462.)

2 minutes – M, WG, CP, GP: Use the overhead fraction kit to model and review the concept of equivalency with students. Students will need Fraction Kit 1 and Kit 2. Assign the roles of Partner A and Partner B. **{Concrete Representation, Pictorial Representation, Graphic Organizer, Verbal Description}**

MODELING

Equivalent Fractions

Step 1: Place the $\frac{1}{3}$ fraction strip on the overhead.

- Have Partner A place a $\frac{1}{3}$ fraction strip in the work area.
- Place two $\frac{1}{6}$ fraction strips on the overhead below the $\frac{1}{3}$.
- Have Partner B place two $\frac{1}{6}$ fraction strips below the $\frac{1}{3}$.
- Ask Partner A if these two fractions are equivalent. (Yes.)
- Have Partner B explain why they are equivalent. (They show the same amount.)

Step 2: Place the $\frac{1}{2}$ fraction strip on the overhead.

- Have Partner A place a $\frac{1}{2}$ fraction strip in the work area.
- Place two $\frac{1}{3}$ fraction strips on the overhead below the $\frac{1}{2}$.
- Have Partner B place two $\frac{1}{3}$ fraction strips below the $\frac{1}{2}$.
- Ask Partner B if these two fractions are equivalent. (No.)
- Have Partner A explain why they are not equivalent. (They do not show the same amount.)

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2 minutes – CP, IP: Have students work in partners to complete the 6 problems on the bottom of S148. Students can use their fraction strips and draw a pictorial representation for each problem. **{Concrete Representation, Pictorial Representation, Graphic Organizer, Verbal Description}**

1 minute – WG: Go over the problems on S148. Make sure students can justify their answers for equivalency. **{Concrete Representation, Pictorial Representation, Graphic Organizer, Verbal Description}**

Fraction Foldable	**(10 minutes – WG, M)**

10 minutes – M, WG: Pass out one sheet of paper to each student. Use the following activity to help students make a fraction foldable. **{Graphic Organizer, Verbal Description, Pictorial Representation}**

MODELING

Equivalent Fractions

Step 1: Fold the piece of paper horizontally (hot dog fold).

Step 2: Leave the paper folded and fold the piece of paper in half (hamburger fold) and then fold the piece of paper in half again (hamburger fold).

Step 3: Open the paper up to the original size. Hamburger fold one time.

Step 4: Cut from the fold to the center, following the fold line to the middle.

Step 5: Open the paper again and fold horizontally (hot dog fold).

Step 6: Hold the ends of the paper and push toward the center, creating a diamond. Continue pushing until the diamond flattens, creating a book.

Step 7: Label the outside of the foldable "Fractions Book". Create a transparency to model for students what should be written on each page.

Step 8: On the back cover of the Fractions Foldable, model for students the information to write about Kit 1, Kit 2, and Kit 3.

SOLVE Problem	**(5 minutes – GP, WG) T463, S149 (Answers on T464.)**

Remind students that the SOLVE problem is the same one from the beginning of the lesson. Complete the SOLVE problem with your students. Ask them for possible connections from the SOLVE problem to the lesson. (The SOLVE problem relates to fraction equivalency.) **{SOLVE, Verbal Description, Graphic Organizer, Pictorial Representation}**

If time permits…	**(10 minutes – IP, CP) S150 (Answers on T465.)**

Have students complete page S150 using Fraction Kits 1– 3.

[CLOSURE] (2 minutes)

To wrap up the lesson, go back to the essential questions and discuss them with students.

- What is a fraction? (a *part of a whole number*)
- How can we compare fractions? (*Use fraction strips and pictures to compare.*)
- How can we identify equivalent fractions? (*use fraction strips and pictures*)

[HOMEWORK] Assign S151 for homework. (Answers on T466.)

[QUIZ ANSWERS] T467–T468

1. **C**   2. **C**   3. **A**   4. **C**   5. **B**   6. **C**   7. **C**   8. **C**   9. **C**   10. **A**
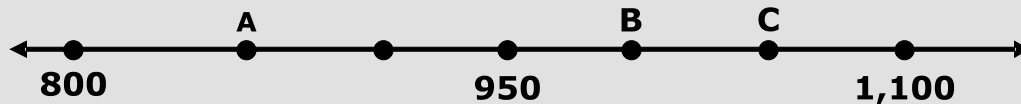
The quiz can be used at any time as extra homework or to assess how students progress on understanding fractions and equivalent fractions.

Here is the key to **S143**.

───────────────── **Warm–Up** ─────────────────

Directions: Use the number line below to help you answer the questions.

1. What number is located at Point *A*? **850**

2. Put the following numbers in order from least to greatest.

805	905	850	1,005
805	**850**	**905**	**1,005**

3. What number is located at Point *C* ? **1,050**

4. Put the following numbers in order from greatest to least.

975	915	875	1,075
1,075	**975**	**915**	**875**

5. Compare the numbers by using the symbols >, <, or =.

825 $<$ 852   905 $>$ 855   1,075 $>$ 995

6. What number is located at the point between Point *A* and 950? **900**

TRANSPARENCY MASTER for S144

Directions: Complete the following SOLVE problem with your teacher. You will only complete the S step.

Dalton, Sherry, and Tyler worked on their homework after school. They wanted to go out and play kickball after doing homework. Dalton spent $\frac{1}{2}$ of an hour on his homework, Sherry spent $\frac{3}{4}$ of an hour on her homework, and Tyler spent $\frac{2}{3}$ of an hour on his homework. Which student spent the most time on homework?

S Underline the question.
This problem is asking me to find _____

_____.

Directions: Complete this page with your teacher and partner.

$$\frac{1}{2}$$

_____   _____

What does the fraction $\frac{1}{2}$ mean?   _____
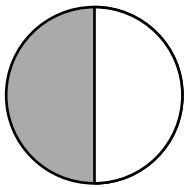
The circle is divided into_____ equal parts.

How many parts are shaded? _____

The denominator tells _____.

The numerator tells _____.

I GAVE Picture	PARTNER GAVE ME BACK Picture
Fraction	Fraction
=	

LESSON 15: Concept of Fractions

Here is the key to **S144**.

Directions: Complete the following SOLVE problem with your teacher. You will only complete the S step.

Dalton, Sherry, and Tyler worked on their homework after school. They wanted to go out and play kickball after doing homework. Dalton spent $\frac{1}{2}$ of an hour on his homework, Sherry spent $\frac{3}{4}$ of an hour on her homework, and Tyler spent $\frac{2}{3}$ of an hour on his homework. <u>Which student spent the most time on homework</u>?
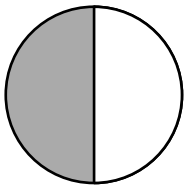
S Underline the question.
   This problem is asking me to find **the student who spent the most time on homework**.

Directions: Complete this page with your teacher and partner.

numerator $\dfrac{1}{2}$ denominator
What does the fraction $\frac{1}{2}$ mean?   **one-half of a whole**
The circle is divided into **2** equal parts. How many parts are shaded? **1** The denominator tells **the number of parts in the whole.** The numerator tells **the number of parts that are counted.**

I GAVE Picture $\boxed{\frac{1}{2} \text{ unit}}$ Fraction $\frac{1}{2}$	PARTNER GAVE ME BACK Picture $\boxed{\frac{1}{4}\text{ unit}}$ $\boxed{\frac{1}{4}\text{ unit}}$ Fraction $\frac{1}{4} + \frac{1}{4}$
$\frac{1}{2} = \frac{1}{4} + \frac{1}{4}$	

TRANSPARENCY MASTER for S145

Legal Trades for Kit 1

I GAVE Picture Fraction	PARTNER GAVE ME BACK Picture Fraction
=	

I GAVE Picture Fraction	PARTNER GAVE ME BACK Picture Fraction
=	

I GAVE Picture Fraction	PARTNER GAVE ME BACK Picture Fraction
=	

I GAVE Picture Fraction	PARTNER GAVE ME BACK Picture Fraction
=	

TRANSPARENCY MASTER for S146

Legal Trades for Kit 2

I GAVE Picture	PARTNER GAVE ME BACK Picture
Fraction	Fraction
=	

I GAVE Picture	PARTNER GAVE ME BACK Picture
Fraction	Fraction
=	

I GAVE Picture	PARTNER GAVE ME BACK Picture
Fraction	Fraction
=	

I GAVE Picture	PARTNER GAVE ME BACK Picture
Fraction	Fraction
=	

TRANSPARENCY MASTER for S147

Legal Trades for Kit 3

I GAVE Picture	PARTNER GAVE ME BACK Picture
Fraction	Fraction
=	

I GAVE Picture	PARTNER GAVE ME BACK Picture
Fraction	Fraction
=	

I GAVE Picture	PARTNER GAVE ME BACK Picture
Fraction	Fraction
=	

I GAVE Picture	PARTNER GAVE ME BACK Picture
Fraction	Fraction
=	

Here is the key to **S148**.

Legal Trades for Kits 1, 2 and 3

I GAVE Picture	PARTNER GAVE ME BACK Picture
Fraction	Fraction
=	

I GAVE Picture	PARTNER GAVE ME BACK Picture
Fraction	Fraction
=	

I GAVE Picture	PARTNER GAVE ME BACK Picture
Fraction	Fraction
=	

Which of the following are equivalent? Draw fraction strips to help you solve.

$\frac{6}{9} = \frac{2}{3}$	$\frac{6}{10} = \frac{3}{5}$	$\frac{6}{10} = \frac{3}{4}$
Equivalent? **yes**	Equivalent? **yes**	Equivalent? **no**

Draw equivalent fractions for each of the following.

$\frac{2}{10} =$	$\frac{6}{8} =$	$\frac{1}{2} =$
Answers may vary.	**Answers may vary.**	**Answers may vary.**

TRANSPARENCY MASTER for S149

Directions: Complete the following SOLVE problem with your teacher.

Dalton, Sherry, and Tyler worked on their homework after school. They wanted to go out and play kickball after doing homework. Dalton spent $\frac{1}{2}$ of an hour on his homework, Sherry spent $\frac{3}{4}$ of an hour on her homework, and Tyler spent $\frac{2}{3}$ of an hour on his homework. Which student spent the most time on homework?

S Underline the question.
    This problem is asking me to find _____

    _____.

O Identify the facts.
    Eliminate the unnecessary facts.
    List the necessary facts.

L Choose an operation or operations.
    Write in words what your plan of action will be.

V Estimate your answer.
    Carry out your plan.

E Does your answer make sense? (Compare your answer to the question.)

    Is your answer reasonable? (Compare your answer to the estimate.)

    Is your answer accurate? (Check your work.)

    Write your answer in a complete sentence.

Here is the key to **S149**.

Directions: Complete the following SOLVE problem with your teacher.

~~Dalton, Sherry, and Tyler worked on their homework after school.~~ | ~~They wanted to go out and play kickball after doing homework.~~ | Dalton spent $\frac{1}{2}$ of an hour on his homework, | Sherry spent $\frac{3}{4}$ of an hour on her homework, | and Tyler spent $\frac{2}{3}$ of an hour on his homework. | <u>Which student spent the most time on homework?</u>

S Underline the question.

This problem is asking me to find **the student who spent the most time on homework.**

O Identify the facts.

Eliminate the unnecessary facts. **N/A**

List the necessary facts. **Dalton - $\frac{1}{2}$ of an hour; Sherry – $\frac{3}{4}$ of an hour; Tyler - $\frac{2}{3}$ of an hour;**

L Choose an operation or operations. **N/A**

Write in words what your plan of action will be. **Draw a picture of each of the fractional parts and find the fraction that is the largest.**

V Estimate your answer. **Sherry**

Carry out your plan.

1 whole unit			
Dalton $\frac{1}{2}$			
Sherry $\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	
Tyler $\frac{1}{3}$	$\frac{1}{3}$		

Sherry spent the most time on homework.

E Does your answer make sense? (Compare your answer to the question.) **Yes, because we are looking for which student spent the most time on homework.**

Is your answer reasonable? (Compare your answer to the estimate.) **Yes, it matches our estimate.**

Is your answer accurate? (Check your work.) **Yes.**

Write your answer in a complete sentence. **Sherry spent the most time on homework.**

LESSON 15: Concept of Fractions

Here is the key to **S150**.

Work with a partner and record legal trades below. Find as many trades as you can in the time your teacher allows.

I GAVE Picture **Answers will vary.**	PARTNER GAVE ME BACK Picture **Answers will vary.**
Fraction	Fraction
=	

I GAVE Picture **Answers will vary.**	PARTNER GAVE ME BACK Picture **Answers will vary.**
Fraction	Fraction
=	

Which of the following are equivalent? Draw fraction strips and pictures to help you solve.

$\frac{4}{8} = \frac{3}{6}$ Equivalent? **yes**	$\frac{5}{6} = \frac{2}{3}$ Equivalent? **no**
$\frac{8}{10} = \frac{4}{5}$ Equivalent? **yes**	$\frac{3}{9} = \frac{1}{4}$ Equivalent? **no**

Draw equivalent fractions for each of the following.

$\frac{3}{12} =$ **Answers may vary.**	$\frac{2}{4} =$ **Answers may vary.**
$\frac{2}{5} =$ **Answers may vary.**	$\frac{3}{4} =$ **Answers may vary.**

Here is the key to **S151**.

Homework

Name _____   **Date** _____

Directions: Answer the following questions.

Which of the following are equivalent? Draw fraction strips to help you solve.

$\frac{1}{5} = \frac{2}{4}$	$\frac{2}{8} = \frac{1}{3}$	$\frac{1}{2} = \frac{4}{8}$
Equivalent? **no**	Equivalent? **no**	Equivalent? **yes**
$\frac{2}{3} = \frac{6}{9}$	$\frac{4}{8} = \frac{2}{5}$	$\frac{3}{5} = \frac{6}{10}$
Equivalent? **yes**	Equivalent? **no**	Equivalent? **yes**

Draw equivalent fractions for each of the following.

$\frac{4}{8} =$	$\frac{6}{12} =$	$\frac{3}{5} =$
Answers may vary.	**Answers may vary.**	**Answers may vary.**

Name _____   Date _____

Quiz

Draw pictures to help you solve.

1. $\frac{5}{10}$ is equivalent to

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

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

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

    D. $\frac{3}{4}$

2. $\frac{5}{6}$ is equivalent to

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

    B. $\frac{4}{6}$

    C. $\frac{10}{12}$

    D. $\frac{6}{6}$

3. $\frac{2}{10}$ is equivalent to

    A. $\frac{1}{5}$

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

    C. $\frac{3}{5}$

    D. $\frac{4}{5}$

4. $\frac{6}{6}$ is equivalent to

    A. $\frac{6}{9}$

    B. $\frac{10}{12}$

    C. $\frac{9}{9}$

    D. $\frac{7}{6}$

5. $\frac{1}{3}$ is equivalent to

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

    B. $\frac{2}{6}$

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

    D. $\frac{3}{6}$

6. $\frac{6}{8}$ is equivalent to

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

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

    C. $\frac{3}{4}$

    D. $\frac{2}{2}$

LESSON 15: Concept of Fractions

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7. $\frac{6}{12}$ is equivalent to

    A. $\frac{2}{9}$

    B. $\frac{3}{9}$

    C. $\frac{3}{6}$

    D. $\frac{4}{6}$

8. $\frac{7}{10}$ is equivalent to

    A. $\frac{1}{5} + \frac{3}{10}$

    B. $\frac{4}{6} + \frac{1}{5}$

    C. $\frac{3}{5} + \frac{1}{10}$

    D. $\frac{3}{5} + \frac{4}{10}$

9. $\frac{8}{9}$ is equivalent to

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

    B. $\frac{1}{3} + \frac{4}{9}$

    C. $\frac{5}{9} + \frac{1}{3}$

    D. $\frac{6}{6}$

10. $\frac{5}{8}$ is equivalent to

    A. $\frac{1}{2} + \frac{1}{8}$

    B. $\frac{3}{4} + \frac{1}{8}$

    C. $\frac{3}{4} + \frac{1}{4}$

    D. $\frac{4}{4}$