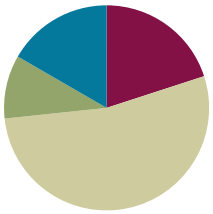
# Lesson 10

## Objective: Compare unit fractions by reasoning about their size using fraction strips.

**Related Topics:** More Lesson Plans for the Common Core Math

### Suggested Lesson Structure

| | |
|---|---|
| Fluency Practice | (12 minutes) |
| Application Problem | (6 minutes) |
| Concept Development | (32 minutes) |
| Student Debrief | (10 minutes) |
| **Total Time** | **(60 minutes)** |



## Fluency Practice (12 minutes)

- Sprint: Divide by Eight **3.OA.4** (9 minutes)
- Skip-Counting by Fourths on the Clock **3.G.2, 3.NF.1** (2 minutes)
- Greater or Less than 1 Whole **3.G.2, 3.NF.2** (1 minute)

### Sprint: Divide by Eight (9 minutes)

Materials: (S) Divide by Eight Sprint

### Skip-Counting by Fourths on the Clock (2 minutes)

T: (Hold or project a clock.) Let's skip-count by fourths on the clock starting with 1.

S: 1, 1:15, 1:30, 1:45, 2, 2:15, 2:30, 2:45, 3.

Continue with possible sequences:

- 1, 1:15, half past 1, 1:45, 2, 2:15, half past 2, 2:45, 3.
- 1, quarter past 1, half past 1, quarter 'til 2, 2, quarter past 2, half past 2, quarter 'til 3, 3.

### Greater or Less than 1 Whole (1 minute)

T: (Write $\frac{1}{2}$.) Greater or less than 1 whole?

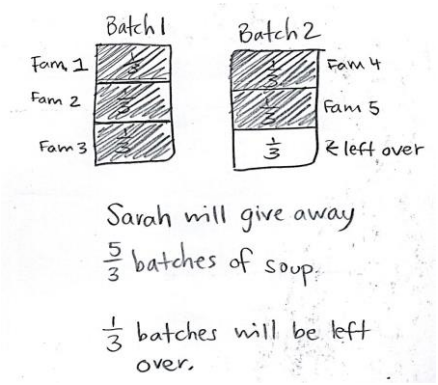
S: Less!

Continue with possible sequence: $\frac{3}{2}, \frac{5}{4}, \frac{3}{4}, \frac{3}{7}, \frac{5}{3}, \frac{5}{2}$. It may be appropriate for some classes to draw responses on personal boards for extra support.

## Application Problem (6 minutes)

Sarah makes soup. She divides each batch equally into thirds to give away. Each family that she makes soup for gets 1 third of a batch. Sarah needs to make enough soup for 5 families. How much soup does Sarah give away? Write your answer in terms of batches.

Bonus: What fraction will be left over for Sarah?




## Concept Development (32 minutes)

Materials: (S) Folded fraction strips (halves, thirds, fourths, sixths, and eighths) from Lesson 9, personal white boards, 1 set of <, >, = cards per pair

**NOTES ON MUTLIPLE MEANS OF ENGAGEMENT:**

Scaffold solving the application problem for students below grade level with step-by-step questioning. For example, ask, "How much soup does 1 family receive? (1 third of the batch of soup.) Two families? (2 thirds.) Three families? (3 thirds or 1 whole batch of soup.) Does Sarah have to make more than 1 batch? (Yes.) How much of the 2nd batch will she give? (2 thirds.) How much will remain?" (1 third.)

T: Take out the fraction strips you folded yesterday.

S: (Students take out strips folded into halves, thirds, fourths, sixths, and eighths.)

T: Look at the different units. Take a minute to arrange the strips in order from the largest to the smallest unit.

S: (Students place the fraction strips in order: halves, thirds, fourths, sixths and eighths.)

T: Turn and talk to your partner about what you notice.

MP.2 S: Eighths are the smallest even though the number '8' is the biggest. → When the whole is folded into more units, then each unit is smaller. I only folded 1 time to get halves, and they're the biggest.

T: Look at 1 half and 1 third. Which unit is larger?

S: 1 half.

T: Explain to your partner how you know.

S: I can just see 1 half is bigger on the strip. → When you split it between 2 people, the pieces are bigger than if you split it between 3 people. → There are fewer pieces, so the pieces are bigger.

Continue with other examples using the fraction strips as necessary.

T: What happens when we aren't using fraction strips? What if we're talking about something round, like a pizza? Is 1 half still bigger than 1 third? Turn and talk to your partner about why or why not.

S: I'm not sure. → Sharing a pizza between 3 people is not as good as sharing it between 2 people. I think pieces that are halves are still bigger. → I agree because the number of parts doesn't change even if the shape of the whole changes.

T: Let's make a model and see what happens. Draw 5 circles that are the same size to represent pizzas on your personal white board.

S: (Students draw.)

T: Estimate to partition the first circle into halves. Label the unit fraction.

S: (Students draw and label.)

T: Estimate to partition the second circle into thirds. (Model if necessary.) Label the unit fraction.

S: (Students draw and label.)

T: What's happening to our pieces the more we cut?

S: They're getting smaller!

T: So is 1 third still smaller than 1 half?

S: Yes!

T: Partition your remaining circles into fourths, sixths, and eighths. Label each one.

S: (Students draw and label.)

T: Compare your drawings to your fraction strips. Do you notice the same pattern as with your fraction strips?

Continue with other real world examples if necessary.

T: Let's compare unit fractions. For each turn, you and your partner will both choose any 1 of your fraction strips. Choose now.

S: (Students each choose a strip to play.)

T: Now compare unit fractions by folding to show only the unit fraction and then placing the appropriate symbol card (<, >, or =) on the table between your strips.

S: (Students fold, compare and place symbol cards.)

T: (Hold symbol cards face down.) I will flip one of my symbol cards to see if the unit fraction that is 'greater than' or 'less than' wins this round. If I flip 'equals' it's a tie. (Flip a card.)

Continue at a rapid pace for a few rounds.

**NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:**

This partner activity benefits ELLs as it includes repeated use of math language in a reliable structure (e.g., "__ is greater than __"). It also offers the ELL an opportunity to talk about the math with a peer, which may be more comfortable than speaking in front of the class or to the teacher.

## Problem Set (10 minutes)

Students should do their personal best to complete the Problem Set within the allotted 10 minutes. For some classes, it may be appropriate to modify the assignment by specifying which problems they work on first. Some problems do not specify a method for solving. Students solve these problems using the RDW approach used for Application Problems.

## Student Debrief (10 minutes)

**Lesson Objective:** Compare unit fractions by reasoning about their size using fraction strips.

The Student Debrief is intended to invite reflection and active processing of the total lesson experience.

Invite students to review their solutions for the Problem Set. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation to debrief the Problem Set and process the lesson.

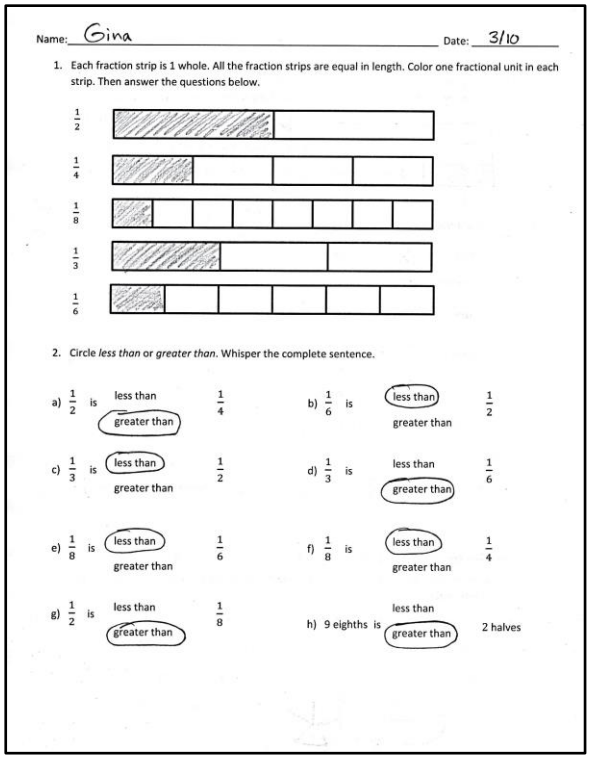
You may choose to use any combination of the questions below to lead the discussion.

- How did Problem 3 help you answer Problem 5?
- How are Problems 3 and 5 the same and different?

The next lesson builds understanding that unit fractions can only be compared when they refer to the same whole. In this debrief you may want to lay the foundation for that work by drawing students' attention to the models they drew for questions 3 and 5. Discussion might include reasoning about why the models they drew facilitated comparison within each problem.

### Exit Ticket (3 minutes)

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help you assess the students' understanding of the concepts that were presented in the lesson today and plan more effectively for future lessons. You may read the questions aloud to the students.



Name: Gina Date: 3/10

1. Each fraction strip is 1 whole. All the fraction strips are equal in length. Color one fractional unit in each strip. Then answer the questions below.

$\frac{1}{2}$ $\frac{1}{4}$ $\frac{1}{8}$ $\frac{1}{3}$ $\frac{1}{6}$

2. Circle *less than* or *greater than*. Whisper the complete sentence.

a) $\frac{1}{2}$ is less than / (greater than) $\frac{1}{4}$

b) $\frac{1}{6}$ is (less than) / greater than $\frac{1}{2}$

c) $\frac{1}{3}$ is (less than) / greater than $\frac{1}{2}$

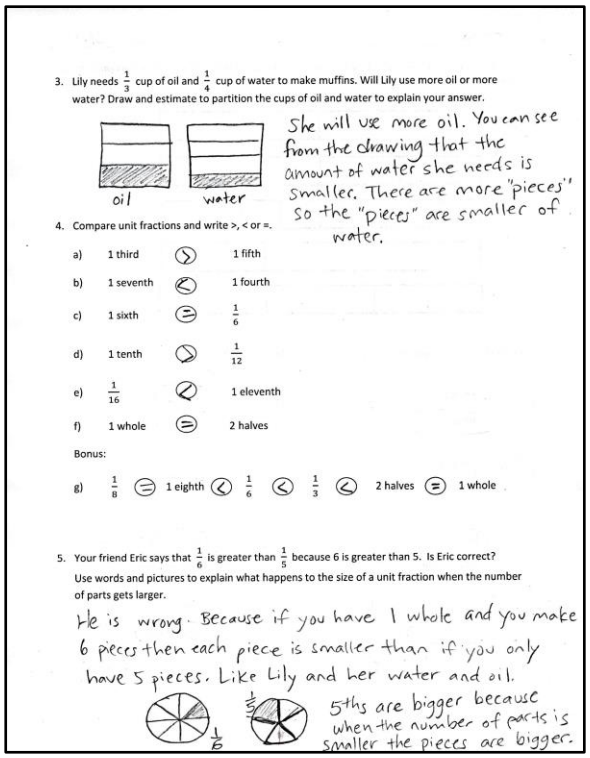
d) $\frac{1}{3}$ is less than / (greater than) $\frac{1}{6}$

e) $\frac{1}{8}$ is (less than) / greater than $\frac{1}{6}$

f) $\frac{1}{8}$ is (less than) / greater than $\frac{1}{4}$

g) $\frac{1}{2}$ is less than / (greater than) $\frac{1}{8}$

h) 9 eighths is less than / (greater than) 2 halves



3. Lily needs $\frac{1}{3}$ cup of oil and $\frac{1}{4}$ cup of water to make muffins. Will Lily use more oil or more water? Draw and estimate to partition the cups of oil and water to explain your answer.

oil water

She will use more oil. You can see from the drawing that the amount of water she needs is smaller. There are more "pieces" so the "pieces" are smaller of water.

4. Compare unit fractions and write >, < or =.

a) 1 third (>) 1 fifth

b) 1 seventh (<) 1 fourth

c) 1 sixth (=) $\frac{1}{6}$

d) 1 tenth (>) $\frac{1}{12}$

e) $\frac{1}{16}$ (<) 1 eleventh

f) 1 whole (=) 2 halves

Bonus:

g) $\frac{1}{8}$ (=) 1 eighth (<) $\frac{1}{6}$ (<) $\frac{1}{3}$ (<) 2 halves (=) 1 whole

5. Your friend Eric says that $\frac{1}{6}$ is greater than $\frac{1}{5}$ because 6 is greater than 5. Is Eric correct? Use words and pictures to explain what happens to the size of a unit fraction when the number of parts gets larger.

He is wrong. Because if you have 1 whole and you make 6 pieces then each piece is smaller than if you only have 5 pieces. Like Lily and her water and oil.

$\frac{1}{6}$ $\frac{1}{5}$

5ths are bigger because when the number of parts is smaller the pieces are bigger.

**A**

# Correct _____

Multiply or divide.

| | | | | | |
|---|---|---|---|---|---|
| 1 | 2 x 8 = | | 23 | __ x 8 = 80 | |
| 2 | 3 x 8 = | | 24 | __ x 8 = 16 | |
| 3 | 4 x 8 = | | 25 | __ x 8 = 24 | |
| 4 | 5 x 8 = | | 26 | 80 ÷ 8 = | |
| 5 | 1 x 8 = | | 27 | 40 ÷ 8 = | |
| 6 | 16 ÷ 8 = | | 28 | 8 ÷ 8 = | |
| 7 | 24 ÷ 8 = | | 29 | 16 ÷ 8 = | |
| 8 | 40 ÷ 8 = | | 30 | 24 ÷ 8 = | |
| 9 | 8 ÷ 8 = | | 31 | __ x 8 = 48 | |
| 10 | 32 ÷ 8 = | | 32 | __ x 8 = 56 | |
| 11 | 6 x 8 = | | 33 | __ x 8 = 72 | |
| 12 | 7 x 8 = | | 34 | __ x 8 = 64 | |
| 13 | 8 x 8 = | | 35 | 56 ÷ 8 = | |
| 14 | 9 x 8 = | | 36 | 72 ÷ 8 = | |
| 15 | 10 x 8 = | | 37 | 48 ÷ 8 = | |
| 16 | 64 ÷ 8 = | | 38 | 64 ÷ 8 = | |
| 17 | 56 ÷ 8 = | | 39 | 11 x 8 = | |
| 18 | 72 ÷ 8 = | | 40 | 88 ÷ 8 = | |
| 19 | 48 ÷ 8 = | | 41 | 12 x 8 = | |
| 20 | 80 ÷ 8 = | | 42 | 96 ÷ 8 = | |
| 21 | __ x 8 = 40 | | 43 | 14 x 8 = | |
| 22 | __ x 8 = 8 | | 44 | 112 ÷ 8 = | |

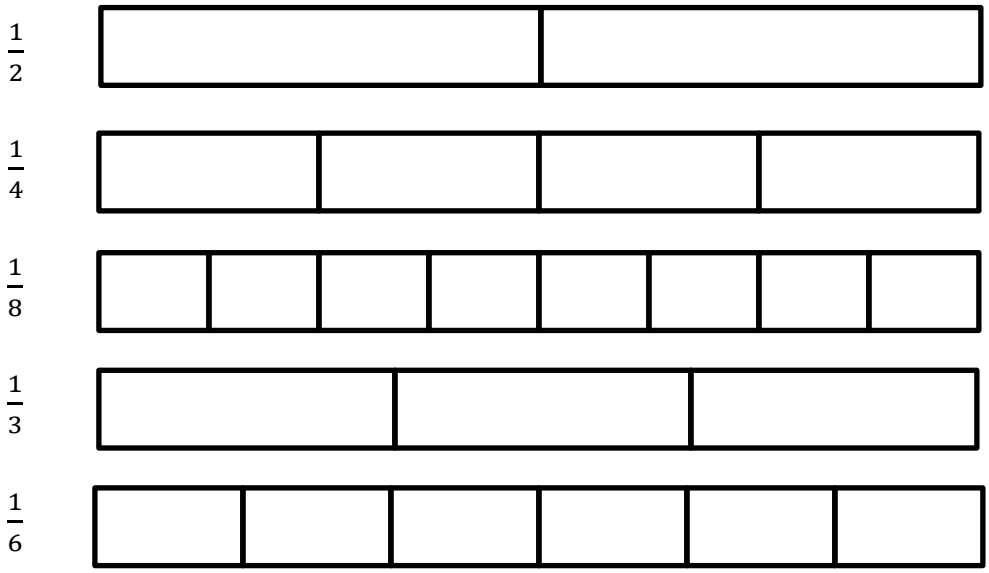
**B** Improvement _____ # Correct _____

Multiply or divide.

| | | | | | |
|---|---|---|---|---|---|
| 1 | 1 x 8 = | | 23 | __ x 8 = 16 | |
| 2 | 2 x 8 = | | 24 | __ x 8 = 80 | |
| 3 | 3 x 8 = | | 25 | __ x 8 = 24 | |
| 4 | 4 x 8 = | | 26 | 16 ÷ 8 = | |
| 5 | 5 x 8 = | | 27 | 8 ÷ 8 = | |
| 6 | 24 ÷ 8 = | | 28 | 80 ÷ 8 = | |
| 7 | 16 ÷ 8 = | | 29 | 40 ÷ 8 = | |
| 8 | 32 ÷ 8 = | | 30 | 24 ÷ 8 = | |
| 9 | 8 ÷ 8 = | | 31 | __ x 8 = 24 | |
| 10 | 40 ÷ 8 = | | 32 | __ x 8 = 32 | |
| 11 | 10 x 8 = | | 33 | __ x 8 = 72 | |
| 12 | 6 x 8 = | | 34 | __ x 8 = 56 | |
| 13 | 7 x 8 = | | 35 | 64 ÷ 8 = | |
| 14 | 8 x 8 = | | 36 | 72 ÷8 = | |
| 15 | 9 x 8 = | | 37 | 48 ÷ 8 = | |
| 16 | 56 ÷ 8 = | | 38 | 56 ÷ 8 = | |
| 17 | 48 ÷ 8 = | | 39 | 11 x 8 = | |
| 18 | 64 ÷ 8 = | | 40 | 88 ÷ 8 = | |
| 19 | 80 ÷ 8 = | | 41 | 12 x 8 = | |
| 20 | 72 ÷8 = | | 42 | 96 ÷ 8 = | |
| 21 | __ x 8 = 8 | | 43 | 13 x 8 = | |
| 22 | __ x 8 = 40 | | 44 | 104 ÷ 8 = | |

Name _____ Date _____

1. Each fraction strip is 1 whole. All the fraction strips are equal in length. Color one fractional unit in each strip. Then answer the questions below.




2. Circle *less than* or *greater than*. Whisper the complete sentence.

a. $\frac{1}{2}$ is less than / greater than $\frac{1}{4}$

b. $\frac{1}{6}$ is less than / greater than $\frac{1}{2}$

c. $\frac{1}{3}$ is less than / greater than $\frac{1}{2}$

d. $\frac{1}{3}$ is less than / greater than $\frac{1}{6}$

e. $\frac{1}{8}$ is less than / greater than $\frac{1}{6}$

f. $\frac{1}{8}$ is less than / greater than $\frac{1}{4}$

g. $\frac{1}{2}$ is less than / greater than $\frac{1}{8}$

h. 9 eighths is less than / greater than 2 halves

3. Lily needs $\frac{1}{3}$ cup of oil and $\frac{1}{4}$ cup of water to make muffins. Will Lily use more oil or more water? Draw and estimate to partition the cups of oil and water to explain your answer.

4. Compare unit fractions and write >, <, or =.

   a. 1 third ◯ 1 fifth

   b. 1 seventh ◯ 1 fourth

   c. 1 sixth ◯ $\frac{1}{6}$

   d. 1 tenth ◯ $\frac{1}{12}$

   e. $\frac{1}{16}$ ◯ 1 eleventh

   f. 1 whole ◯ 2 halves

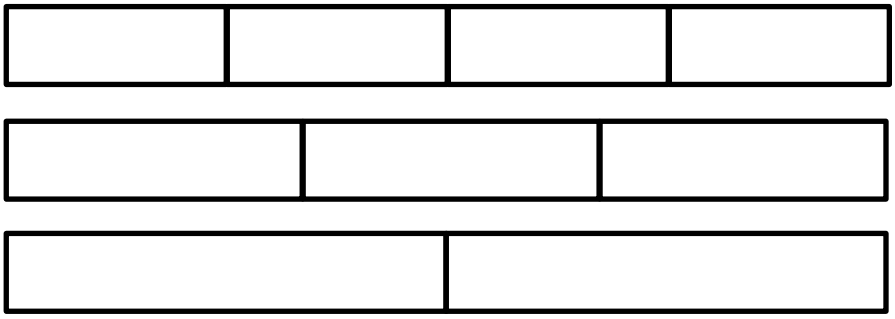
   Bonus:

   g. $\frac{1}{8}$ ◯ 1 eighth ◯ $\frac{1}{6}$ ◯ $\frac{1}{3}$ ◯ 2 halves ◯ 1 whole

5. Your friend Eric says that $\frac{1}{6}$ is greater than $\frac{1}{5}$ because 6 is greater than 5. Is Eric correct? Use words and pictures to explain what happens to the size of a unit fraction when the number of parts gets larger.

Name _____ Date _____

1. Each fraction strip is 1 whole. All the fraction strips are equal in length. Color one fractional unit in each strip. Then, circle the largest fraction and draw a star to the right of the smallest fraction.



2. Compare unit fractions and write >, <, or =.

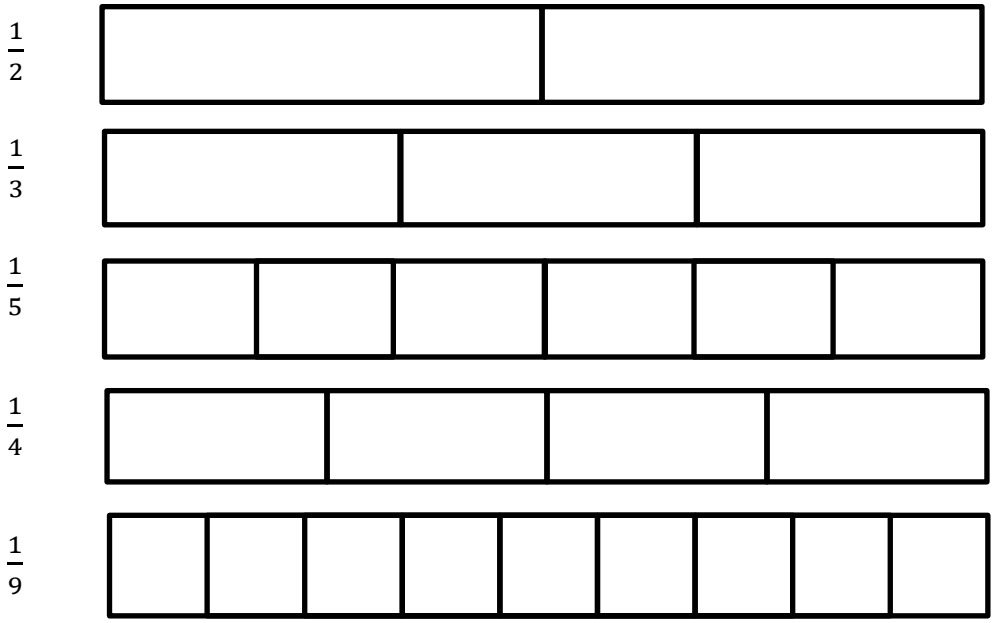
a. 1 eighth ◯ 1 tenth

b. 1 whole ◯ 5 fifths

c. $\frac{1}{7}$ ◯ $\frac{1}{6}$

Name _____ Date _____

1. Each fraction strip is 1 whole. All the fraction strips are equal in length. Color one fractional unit in each strip. Then answer the questions below.




2. Circle *less than* or *greater than*. Whisper the complete sentence.

a. $\frac{1}{2}$ is less than / greater than $\frac{1}{3}$

b. $\frac{1}{9}$ is less than / greater than $\frac{1}{2}$

c. $\frac{1}{4}$ is less than / greater than $\frac{1}{2}$

d. $\frac{1}{4}$ is less than / greater than $\frac{1}{9}$

e. $\frac{1}{5}$ is less than / greater than $\frac{1}{3}$

f. $\frac{1}{5}$ is less than / greater than $\frac{1}{4}$

g. $\frac{1}{2}$ is less than / greater than $\frac{1}{5}$

h. 6 fifths is less than / greater than 3 thirds

3. After his football game, Malik drinks $\frac{1}{2}$ liter of water and $\frac{1}{3}$ liter of juice. Did Malik drink more water or juice? Draw and estimate to partition. Explain your answer.

4. Compare unit fractions and write >, <, or =.

| | | | |
|---|---|---|---|
| a. | 1 fourth | ◯ | 1 eighth |
| b. | 1 seventh | ◯ | 1 fifth |
| c. | 1 eighth | ◯ | $\frac{1}{8}$ |
| d. | 1 twelfth | ◯ | $\frac{1}{10}$ |
| e. | $\frac{1}{15}$ | ◯ | 1 thirteenth |
| f. | 3 thirds | ◯ | 1 whole |

5. Write a word problem using comparing fractions for your friends to solve. Be sure to show the solution so that your friends can check their work.