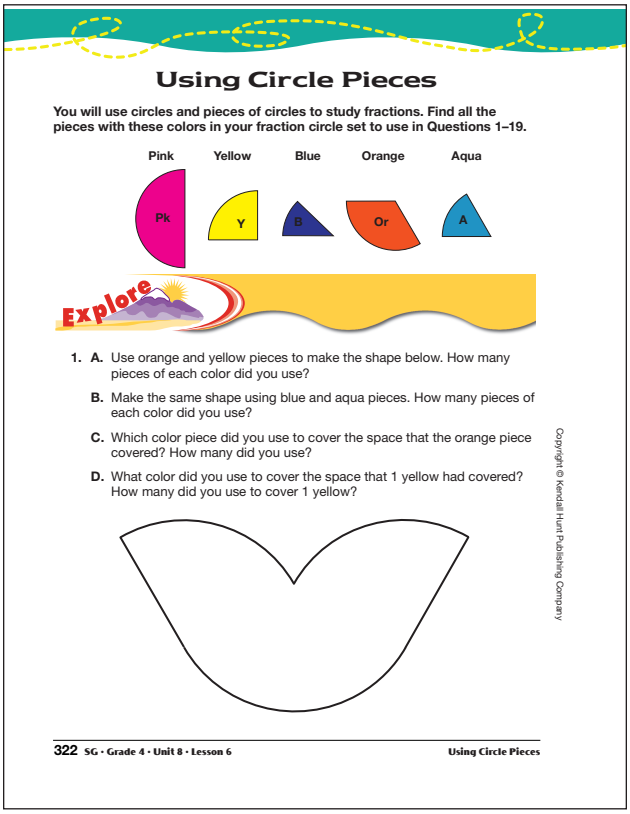

Using Circle Pieces

You will use circles and pieces of circles to study fractions. Find all the pieces with these colors in your fraction circle set to use in Questions 1–19.

Pink Yellow Blue Orange Aqua

Pk Y B Or A

Explore

1. **A.** Use orange and yellow pieces to make the shape below. How many pieces of each color did you use?
   B. Make the same shape using blue and aqua pieces. How many pieces of each color did you use?
   C. Which color piece did you use to cover the space that the orange piece covered? How many did you use?
   D. What color did you use to cover the space that 1 yellow had covered? How many did you use to cover 1 yellow?

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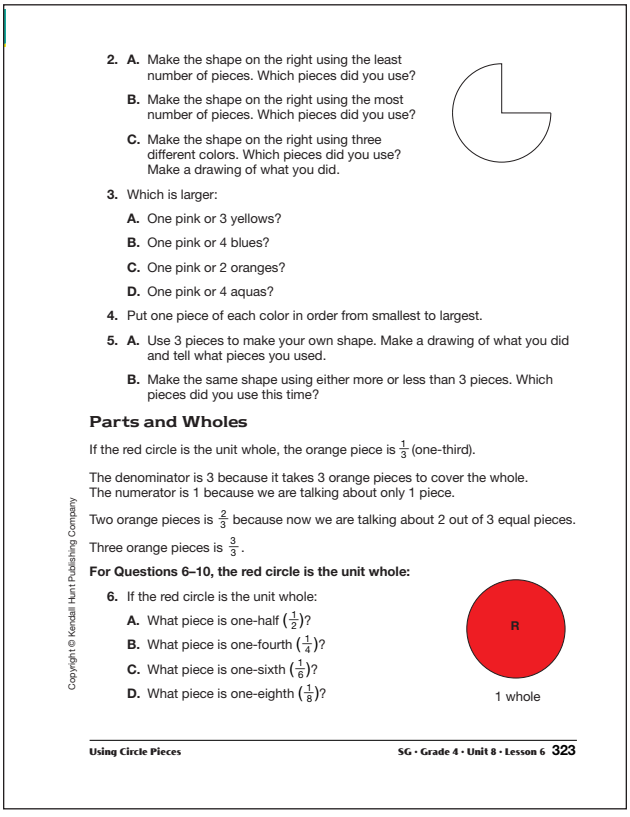
***Student Guide* - Page 322**



2. **A.** Make the shape on the right using the least number of pieces. Which pieces did you use?
   B. Make the shape on the right using the most number of pieces. Which pieces did you use?
   C. Make the shape on the right using three different colors. Which pieces did you use? Make a drawing of what you did.

3. Which is larger:
   A. One pink or 3 yellows?
   B. One pink or 4 blues?
   C. One pink or 2 oranges?
   D. One pink or 4 aquas?

4. Put one piece of each color in order from smallest to largest.

5. **A.** Use 3 pieces to make your own shape. Make a drawing of what you did and tell what pieces you used.
   B. Make the same shape using either more or less than 3 pieces. Which pieces did you use this time?

Parts and Wholes

If the red circle is the unit whole, the orange piece is $\frac{1}{3}$ (one-third).

The denominator is 3 because it takes 3 orange pieces to cover the whole.
The numerator is 1 because we are talking about only 1 piece.

Two orange pieces is $\frac{2}{3}$ because now we are talking about 2 out of 3 equal pieces.

Three orange pieces is $\frac{3}{3}$.

For Questions 6–10, the red circle is the unit whole:

6. If the red circle is the unit whole:
   A. What piece is one-half $(\frac{1}{2})$?
   B. What piece is one-fourth $(\frac{1}{4})$?
   C. What piece is one-sixth $(\frac{1}{6})$?
   D. What piece is one-eighth $(\frac{1}{8})$?

R

1 whole

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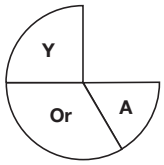
***Student Guide* - Page 323**

Student Guide

Using Circle Pieces

Questions 1–34 (SG pp. 322–330)

1. **A.** 1 orange and 2 yellow
   B. 2 aqua and 4 blue
   C. 2 aqua
   D. 2 blue
2. **A.** 1 pink and 1 yellow
   B. 6 blue pieces
   C. Possible response: 1 orange, 1 aqua, 1 yellow



3. **A.** 3 yellows
   B. same size
   C. 2 oranges
   D. 4 aquas
4. blue, aqua, yellow, orange, pink, red
5. **A–B.** Shapes will vary.
6. **A.** pink
   B. yellow
   C. aqua
   D. blue

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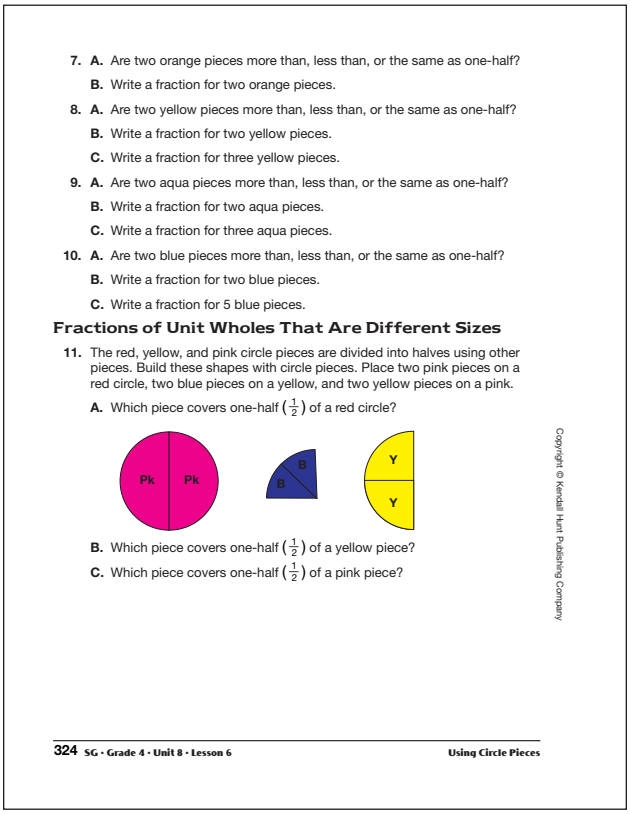
7. **A.** more than $\frac{1}{2}$
   B. $\frac{2}{3}$
8. **A.** same as $\frac{1}{2}$
   B. $\frac{2}{4}$
   C. $\frac{3}{4}$
9. **A.** less than $\frac{1}{2}$
   B. $\frac{2}{6}$
   C. $\frac{3}{6}$
10. **A.** less than $\frac{1}{2}$
    B. $\frac{2}{8}$
    C. $\frac{5}{8}$
11. **A.** pink
    B. blue
    C. yellow
12. **A.** orange
    B. aqua
13. **A.** blue
    B. blue
    C. yellow
    D. yellow
14. **A.*** No, the pieces are not the same size.
    B.* No, the pieces are not the same size.
15. **A.** $\frac{2}{6}$
    B. 6 aqua pieces will completely cover the red piece and all the pieces are the same size, so the denominator is 6; the question asked about 2 aqua pieces, so the numerator is 2.
    C. two-sixths
    D. $\frac{2}{3}$; 3 aqua pieces divides the pink piece into 3 equal parts, so the denominator is 3; the question asks about 2 aqua pieces, so the numerator is 2.
    E. two-thirds



7. **A.** Are two orange pieces more than, less than, or the same as one-half?
   B. Write a fraction for two orange pieces.
8. **A.** Are two yellow pieces more than, less than, or the same as one-half?
   B. Write a fraction for two yellow pieces.
   C. Write a fraction for three yellow pieces.
9. **A.** Are two aqua pieces more than, less than, or the same as one-half?
   B. Write a fraction for two aqua pieces.
   C. Write a fraction for three aqua pieces.
10. **A.** Are two blue pieces more than, less than, or the same as one-half?
    B. Write a fraction for two blue pieces.
    C. Write a fraction for 5 blue pieces.

Fractions of Unit Wholes That Are Different Sizes

11. The red, yellow, and pink circle pieces are divided into halves using other pieces. Build these shapes with circle pieces. Place two pink pieces on a red circle, two blue pieces on a yellow, and two yellow pieces on a pink.
    A. Which piece covers one-half ($\frac{1}{2}$) of a red circle?

    B. Which piece covers one-half ($\frac{1}{2}$) of a yellow piece?
    C. Which piece covers one-half ($\frac{1}{2}$) of a pink piece?

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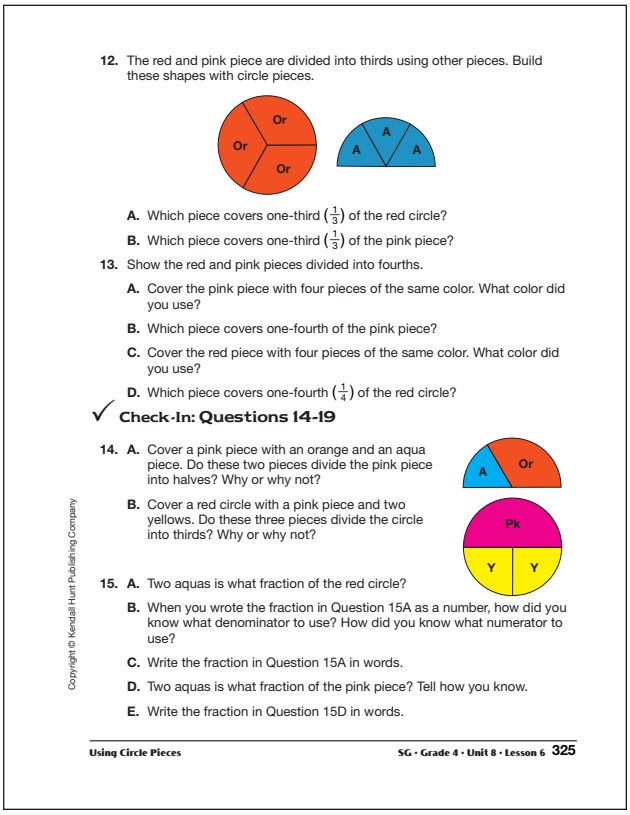
***Student Guide* - Page 324**



12. The red and pink piece are divided into thirds using other pieces. Build these shapes with circle pieces.

    A. Which piece covers one-third ($\frac{1}{3}$) of the red circle?
    B. Which piece covers one-third ($\frac{1}{3}$) of the pink piece?
13. Show the red and pink pieces divided into fourths.
    A. Cover the pink piece with four pieces of the same color. What color did you use?
    B. Which piece covers one-fourth of the pink piece?
    C. Cover the red piece with four pieces of the same color. What color did you use?
    D. Which piece covers one-fourth ($\frac{1}{4}$) of the red circle?

✓ **Check-In: Questions 14-19**

14. **A.** Cover a pink piece with an orange and an aqua piece. Do these two pieces divide the pink piece into halves? Why or why not?
    B. Cover a red circle with a pink piece and two yellows. Do these three pieces divide the circle into thirds? Why or why not?

15. **A.** Two aquas is what fraction of the red circle?
    B. When you wrote the fraction in Question 15A as a number, how did you know what denominator to use? How did you know what numerator to use?
    C. Write the fraction in Question 15A in words.
    D. Two aquas is what fraction of the pink piece? Tell how you know.
    E. Write the fraction in Question 15D in words.

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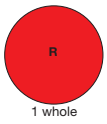
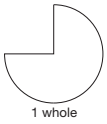
***Answers and/or discussion are included in the lesson.**

16. If the red circle is the unit whole, write a fraction for each of the following:



A. two blues
B. four aquas
C. three yellows
D. zero yellows
E. two oranges
F. four blues
G. one pink
H. two pinks

17. If the shape to the right is the unit whole:



A. How many blue pieces will cover the whole shape?
B. How many blue pieces will cover half the shape?
C. Write a fraction for four blue pieces.
D. What other pieces cover the same area as four blue pieces?
E. Write a fraction for one yellow piece.
F. Write a fraction for one pink piece.
G. Write a fraction for three yellow pieces.

18. A. If a blue piece is $\frac{1}{2}$, which piece is the unit whole? (Think: A blue piece covers half of what other piece?)

B. If a blue piece is $\frac{1}{4}$, which piece is the unit whole?
C. If a blue piece is $\frac{1}{8}$, which piece is the unit whole?

19. A. If an aqua piece is $\frac{1}{3}$, which piece is the unit whole?

B. If an aqua piece is $\frac{1}{6}$, which piece is the unit whole?
C. If an aqua piece is $\frac{1}{2}$, which piece is the unit whole?

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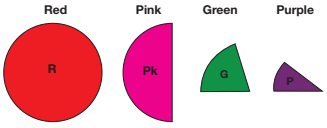
***Student Guide* - Page 326**

Use only the red circle and the pink, purple, and green pieces for Questions 20–24.



20. A. How many purple pieces cover a green piece?
B. One purple piece covers what fraction of a green piece?
C. How many purple pieces cover a pink piece?
D. A purple piece covers what fraction of a pink piece?
E. When you wrote your fraction for Question 20D, how did you know what denominator to use? How did you know what numerator to use?
F. How many purple pieces cover the red circle?
G. If the red circle is the unit whole, what fraction is a purple piece?

21. If the red circle is the unit whole:
A. Write a fraction for 2 green pieces.
B. Write a fraction for 5 purple pieces.
C. Write a fraction for 5 green pieces.
D. Write a fraction for 4 purple pieces.

22. Which two fractions in Question 21 cover the same area?

23. If the pink piece is the unit whole:
A. Write a fraction for 2 purple pieces.
B. Write a fraction for 5 purple pieces.

24. What is the unit whole:
A. If 4 purple pieces are $\frac{4}{5}$?
B. If 6 purple pieces are $\frac{6}{10}$?

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***Student Guide* - Page 327**

16. A. $\frac{2}{8}$ B. $\frac{4}{6}$
C. $\frac{3}{4}$ D. $\frac{0}{4}$
E. $\frac{2}{3}$ F. $\frac{4}{8}$
G. $\frac{1}{2}$ H. $\frac{2}{2} = 1$

17. A.* 6 blue
B.* 3 blue
C.* $\frac{4}{6}$
D.* 1 pink piece, 2 yellow pieces, or three aqua pieces.
E.* $\frac{1}{3}$
F.* $\frac{2}{3}$ or $\frac{4}{6}$
G.* $\frac{3}{3}$ or 1

18. A. 1 yellow piece
B. 1 pink piece
C. red circle

19. A. 1 pink piece
B. red circle
C. 1 orange piece

20. A. 2 purple pieces cover a green piece.
B. $\frac{1}{2}$
C. 5 purple pieces cover a pink piece.
D. $\frac{1}{5}$
E. 5 purple pieces completely cover the pink piece, so the denominator is 5; the question asks about 1 purple piece, so the numerator is 1.
F. 10 purple pieces cover the red circle.
G. $\frac{1}{10}$

21. A. $\frac{2}{5}$ B. $\frac{5}{10}$
C. $\frac{5}{5}$ or 1 D. $\frac{4}{10}$

22. $\frac{2}{5}$ and $\frac{4}{10}$; 2 green pieces and 4 purple pieces cover the same area.

23. A. $\frac{2}{5}$
B. $\frac{5}{5}$ or 1

24. A. 1 pink piece
B. 1 red circle

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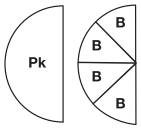
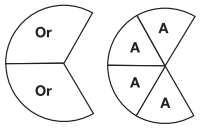
***Answers and/or discussion are included in the lesson.**

25. $\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}=\frac{4}{8}$ or $\frac{1}{2}$ or $4\times\frac{1}{8}=\frac{4}{8}$ or $\frac{1}{2}$



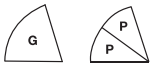
26. A. $\frac{1}{6}+\frac{1}{6}=\frac{2}{6}$ or $\frac{1}{3}$ or $2\times\frac{1}{6}=\frac{2}{6}$ or $\frac{1}{3}$

B. $\frac{1}{6}+\frac{1}{6}+\frac{1}{6}+\frac{1}{6}=\frac{4}{6}$ or $\frac{2}{3}$ or $4\times\frac{1}{6}=\frac{4}{6}$ or $\frac{2}{3}$

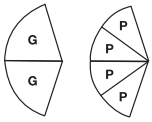


C. Yes. 4 aqua pieces cover the same area as 2 orange pieces.

27. A. $\frac{1}{10}+\frac{1}{10}=\frac{2}{10}$ or $\frac{1}{5}$ or $\frac{1}{10}\times 2=\frac{2}{10}$ or $\frac{1}{5}$



B. $\frac{1}{10}+\frac{1}{10}+\frac{1}{10}+\frac{1}{10}=\frac{4}{10}$ or $\frac{2}{5}$ or $\frac{1}{10}\times 4=\frac{4}{10}$ or $\frac{2}{5}$



C. Yes. 4 purple pieces cover the same area as 2 green pieces.

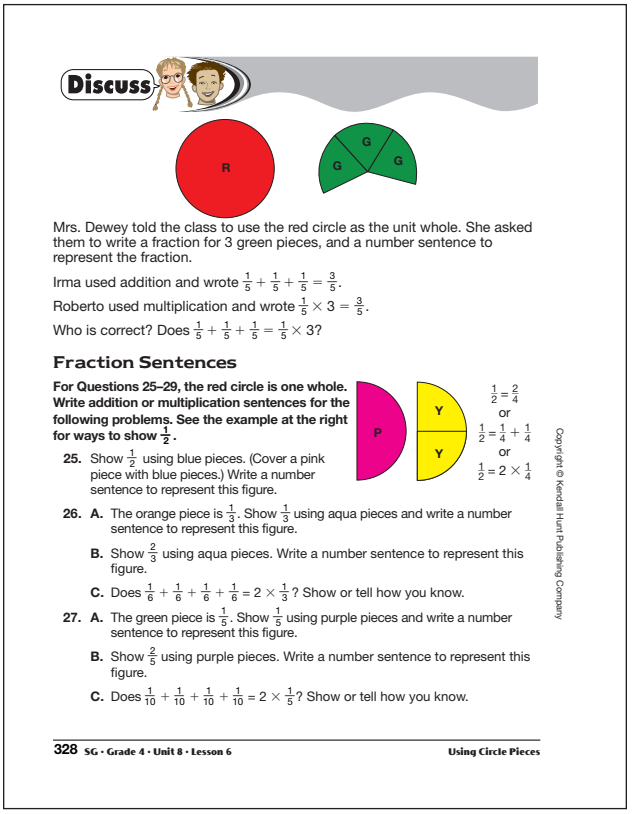
28. Answers will vary. One possible response: 1 yellow, 5 purple, 2 blue pieces. $\frac{1}{4}+\frac{5}{10}+\frac{2}{8}=1$

29. Answers will vary. One possible response is given for each.

A.* 1 yellow and 2 blues; $\frac{1}{4}+\frac{2}{8}=\frac{1}{2}$

B.* 1 pink and 2 blues; $\frac{1}{2}+\frac{2}{8}=\frac{3}{4}$

C.* 1 orange and 2 aquas; $\frac{1}{3}+\frac{2}{6}=\frac{2}{3}$



Discuss

Mrs. Dewey told the class to use the red circle as the unit whole. She asked them to write a fraction for 3 green pieces, and a number sentence to represent the fraction.

Irma used addition and wrote $\frac{1}{5}+\frac{1}{5}+\frac{1}{5}=\frac{3}{5}$.

Roberto used multiplication and wrote $\frac{1}{5}\times 3=\frac{3}{5}$.

Who is correct? Does $\frac{1}{5}+\frac{1}{5}+\frac{1}{5}=\frac{1}{5}\times 3$?

Fraction Sentences

For Questions 25–29, the red circle is one whole. Write addition or multiplication sentences for the following problems. See the example at the right for ways to show $\frac{1}{2}$.

25. Show $\frac{1}{2}$ using blue pieces. (Cover a pink piece with blue pieces.) Write a number sentence to represent this figure.

26. A. The orange piece is $\frac{1}{3}$. Show $\frac{1}{3}$ using aqua pieces and write a number sentence to represent this figure.

B. Show $\frac{2}{3}$ using aqua pieces. Write a number sentence to represent this figure.

C. Does $\frac{1}{6}+\frac{1}{6}+\frac{1}{6}+\frac{1}{6}=2\times\frac{1}{3}$? Show or tell how you know.

27. A. The green piece is $\frac{1}{5}$. Show $\frac{1}{5}$ using purple pieces and write a number sentence to represent this figure.

B. Show $\frac{2}{5}$ using purple pieces. Write a number sentence to represent this figure.

C. Does $\frac{1}{10}+\frac{1}{10}+\frac{1}{10}+\frac{1}{10}=2\times\frac{1}{5}$? Show or tell how you know.

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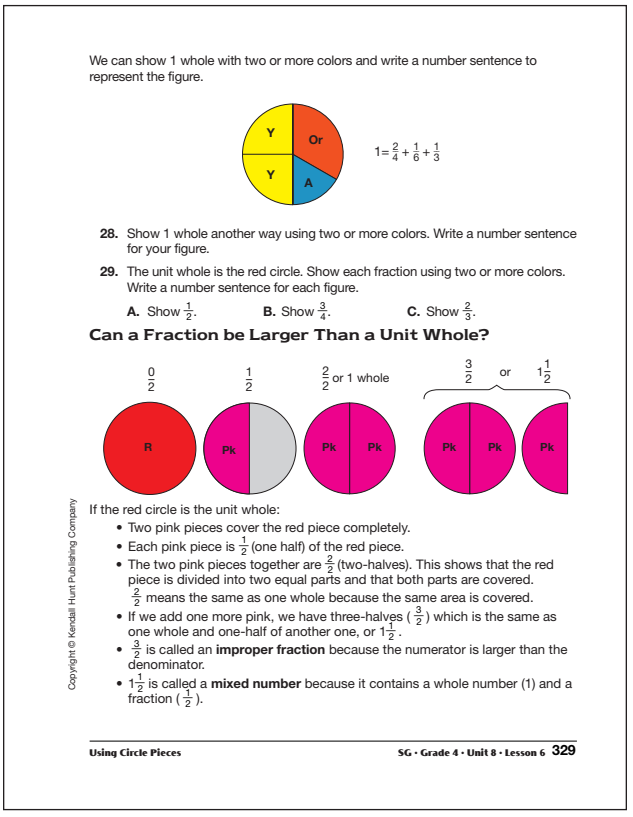
328 SG • Grade 4 • Unit 8 • Lesson 6 Using Circle Pieces

***Student Guide* - Page 328**



We can show 1 whole with two or more colors and write a number sentence to represent the figure.

28. Show 1 whole another way using two or more colors. Write a number sentence for your figure.

29. The unit whole is the red circle. Show each fraction using two or more colors. Write a number sentence for each figure.

A. Show $\frac{1}{2}$. **B.** Show $\frac{3}{4}$. **C.** Show $\frac{2}{3}$.

Can a Fraction be Larger Than a Unit Whole?

If the red circle is the unit whole:

- Two pink pieces cover the red piece completely.
- Each pink piece is $\frac{1}{2}$ (one half) of the red piece.
- The two pink pieces together are $\frac{2}{2}$ (two-halves). This shows that the red piece is divided into two equal parts and that both parts are covered. $\frac{2}{2}$ means the same as one whole because the same area is covered.
- If we add one more pink, we have three-halves ($\frac{3}{2}$) which is the same as one whole and one-half of another one, or $1\frac{1}{2}$.
- $\frac{3}{2}$ is called an **improper fraction** because the numerator is larger than the denominator.
- $1\frac{1}{2}$ is called a **mixed number** because it contains a whole number (1) and a fraction ($\frac{1}{2}$).

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Using Circle Pieces SG • Grade 4 • Unit 8 • Lesson 6 329

***Student Guide* - Page 329**

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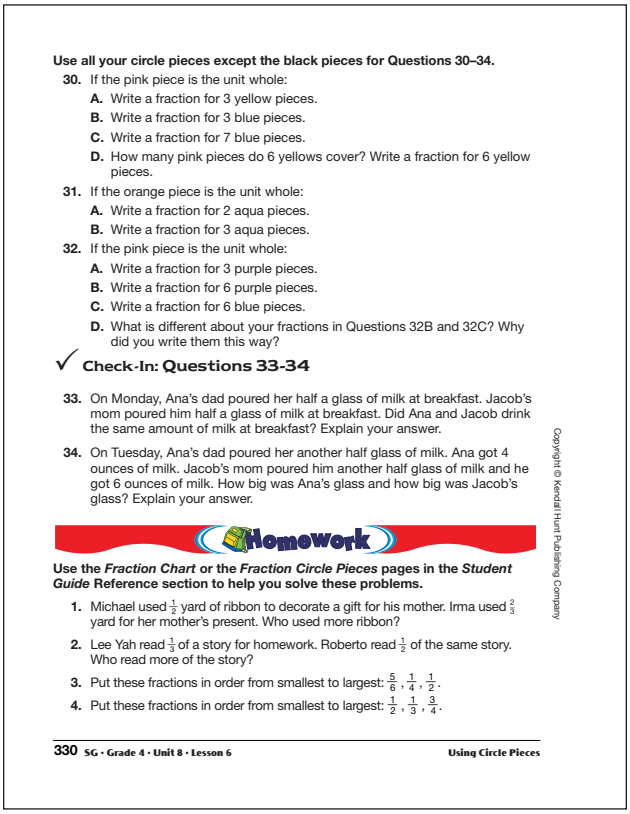

Use all your circle pieces except the black pieces for Questions 30–34.

30. If the pink piece is the unit whole:
- **A.** Write a fraction for 3 yellow pieces.
- **B.** Write a fraction for 3 blue pieces.
- **C.** Write a fraction for 7 blue pieces.
- **D.** How many pink pieces do 6 yellows cover? Write a fraction for 6 yellow pieces.

31. If the orange piece is the unit whole:
- **A.** Write a fraction for 2 aqua pieces.
- **B.** Write a fraction for 3 aqua pieces.

32. If the pink piece is the unit whole:
- **A.** Write a fraction for 3 purple pieces.
- **B.** Write a fraction for 6 purple pieces.
- **C.** Write a fraction for 6 blue pieces.
- **D.** What is different about your fractions in Questions 32B and 32C? Why did you write them this way?

✓ **Check-In: Questions 33-34**

33. On Monday, Ana's dad poured her half a glass of milk at breakfast. Jacob's mom poured him half a glass of milk at breakfast. Did Ana and Jacob drink the same amount of milk at breakfast? Explain your answer.

34. On Tuesday, Ana's dad poured her another half glass of milk. Ana got 4 ounces of milk. Jacob's mom poured him another half glass of milk and he got 6 ounces of milk. How big was Ana's glass and how big was Jacob's glass? Explain your answer.

Homework

Use the *Fraction Chart* or the *Fraction Circle Pieces* pages in the *Student Guide* Reference section to help you solve these problems.

1. Michael used $\frac{1}{3}$ yard of ribbon to decorate a gift for his mother. Irma used $\frac{2}{3}$ yard for her mother's present. Who used more ribbon?
2. Lee Yah read $\frac{1}{3}$ of a story for homework. Roberto read $\frac{1}{2}$ of the same story. Who read more of the story?
3. Put these fractions in order from smallest to largest: $\frac{5}{6}, \frac{1}{4}, \frac{1}{2}$.
4. Put these fractions in order from smallest to largest: $\frac{1}{2}, \frac{1}{3}, \frac{3}{4}$.

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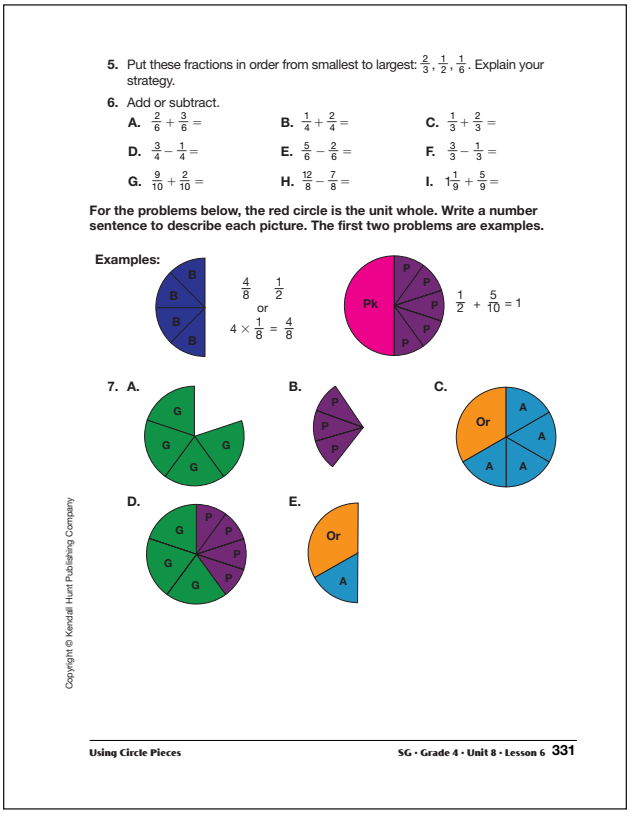
***Student Guide* - Page 330**



5. Put these fractions in order from smallest to largest: $\frac{2}{3}, \frac{1}{2}, \frac{1}{6}$. Explain your strategy.

6. Add or subtract.

A. $\frac{2}{6}+\frac{3}{6}=$	**B.** $\frac{1}{4}+\frac{2}{4}=$	**C.** $\frac{1}{3}+\frac{2}{3}=$
D. $\frac{3}{4}-\frac{1}{4}=$	**E.** $\frac{5}{6}-\frac{2}{6}=$	**F.** $\frac{3}{3}-\frac{1}{3}=$
G. $\frac{9}{10}+\frac{2}{10}=$	**H.** $\frac{12}{8}-\frac{7}{8}=$	**I.** $1\frac{1}{9}+\frac{5}{9}=$

For the problems below, the red circle is the unit whole. Write a number sentence to describe each picture. The first two problems are examples.

Examples:

7. A.

B.

C.

D.

E.

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***Student Guide* - Page 331**

30. A. $\frac{3}{2}$ or $1\frac{1}{2}$
B. $\frac{3}{4}$
C. $\frac{7}{4}$ or $1\frac{3}{4}$
D. 3 pink pieces; $\frac{6}{2}$

31. A. $\frac{2}{2}$ or 1
B. $\frac{3}{2}$ or $1\frac{1}{2}$

32. A. $\frac{3}{5}$
B. $\frac{6}{5}$ or $1\frac{1}{5}$
C. $\frac{6}{4}$ or $1\frac{2}{4}$
D. The denominators are different; 5 purple pieces completely cover the pink piece so the denominator is 5; 4 blue pieces completely cover the pink piece so the denominator is 4.

33.* We don't know because we don't know the sizes of the whole glasses.

34.* Ana's whole glass was double the amount of her half glass, $4 + 4 = 8$ ounces. Jacob's glass was double the amount of his half glass, $6 + 6 = 12$ ounces.

Homework

Questions 1–7 (SG pp. 330–331)

1. Irma used more ribbon. $\frac{2}{3} > \frac{1}{2}$

2. Roberto read more of the story. $\frac{1}{3} < \frac{1}{2}$

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

4. $\frac{1}{3}, \frac{1}{2}, \frac{3}{4}$

5. $\frac{1}{6}, \frac{1}{2}, \frac{2}{3}$; Explanations will vary. Possible response: $\frac{1}{6}$ is less than $\frac{1}{2}$ because if you divide a strip into six pieces, they will be smaller than a strip divided into halves. I looked on my chart and $\frac{2}{3}$ is larger than $\frac{1}{2}$, so $\frac{1}{6} < \frac{1}{2} < \frac{2}{3}$.

6. A. $\frac{5}{6}$ **B.** $\frac{3}{4}$ **C.** $\frac{3}{3}$ or 1
D. $\frac{2}{4}$ **E.** $\frac{3}{6}$ **F.** $\frac{2}{3}$
G. $\frac{11}{10}$ or $1\frac{1}{10}$ **H.** $\frac{5}{8}$ **I.** $1\frac{6}{9}$

7. A. $\frac{1}{5}+\frac{1}{5}+\frac{1}{5}+\frac{1}{5}=\frac{4}{5}$ or $4 \times \frac{1}{5} = \frac{4}{5}$
B. $\frac{1}{10}+\frac{1}{10}+\frac{1}{10}=\frac{3}{10}$ or $\frac{1}{10} \times 3 = \frac{3}{10}$
C. $\frac{1}{3}+\frac{4}{6}=1$
D. $\frac{3}{5}+\frac{4}{10}=1$
E. $\frac{1}{3}+\frac{1}{6}=\frac{1}{2}$

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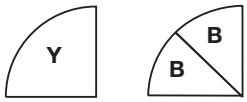
***Answers and/or discussion are included in the lesson.**

Teacher Guide

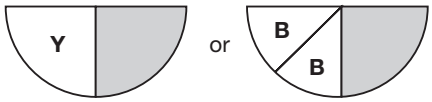
Circle Pieces Review

Questions 1–6 (TG pp. 1–2)

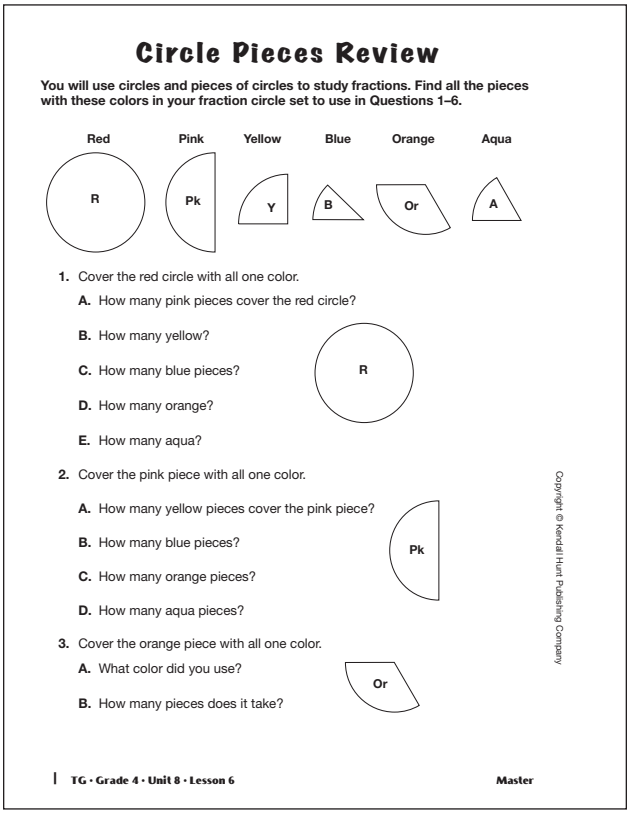
1. **A.** 2 pink pieces
   B. 4 yellow pieces
   C. 8 blue pieces
   D. 3 orange pieces
   E. 6 aqua pieces
2. **A.** 2 yellow pieces
   B. 4 blue pieces
   C. Orange pieces do not cover the pink piece evenly. 1 orange piece is too small and 2 orange pieces are too large.
   D. 3 aqua pieces
3. **A.** aqua
   B. 2 aqua pieces cover 1 orange piece
4. **A.** blue
   B. 2 blue pieces cover 1 yellow piece
   C.



5. **A–B.** 2 blue pieces or 1 yellow piece



6. **A.** Possible response: 1 yellow and 2 blue pieces
   B. 1 orange and 1 aqua piece



Circle Pieces Review

You will use circles and pieces of circles to study fractions. Find all the pieces with these colors in your fraction circle set to use in Questions 1–6.

Red | Pink | Yellow | Blue | Orange | Aqua

R | Pk | Y | B | Or | A

1. Cover the red circle with all one color.
   A. How many pink pieces cover the red circle?
   B. How many yellow?
   C. How many blue pieces?
   D. How many orange?
   E. How many aqua?

R

2. Cover the pink piece with all one color.
   A. How many yellow pieces cover the pink piece?
   B. How many blue pieces?
   C. How many orange pieces?
   D. How many aqua pieces?

Pk

3. Cover the orange piece with all one color.
   A. What color did you use?
   B. How many pieces does it take?

Or

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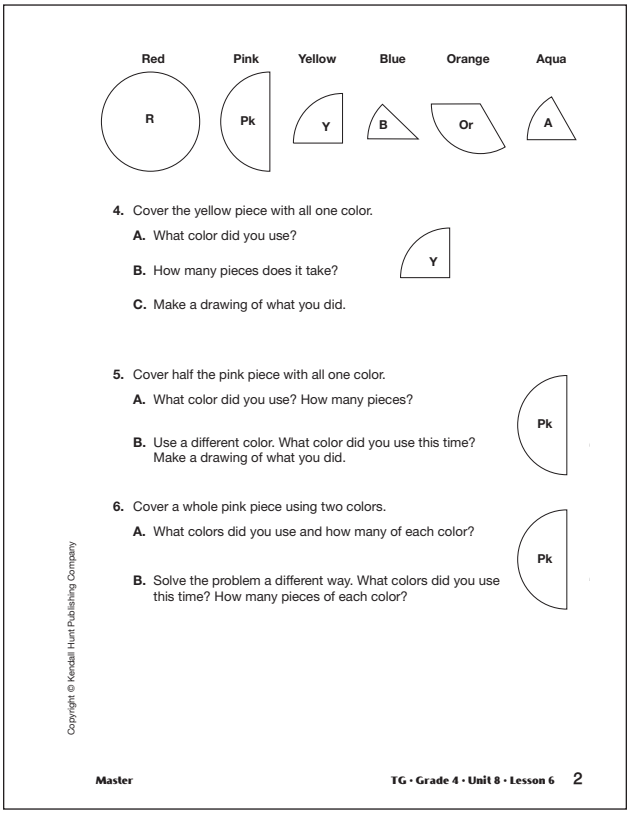
Teacher Guide - **Page 1**



Red | Pink | Yellow | Blue | Orange | Aqua

R | Pk | Y | B | Or | A

4. Cover the yellow piece with all one color.
   A. What color did you use?
   B. How many pieces does it take?
   C. Make a drawing of what you did.

Y

5. Cover half the pink piece with all one color.
   A. What color did you use? How many pieces?
   B. Use a different color. What color did you use this time? Make a drawing of what you did.

Pk

6. Cover a whole pink piece using two colors.
   A. What colors did you use and how many of each color?
   B. Solve the problem a different way. What colors did you use this time? How many pieces of each color?

Pk

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Teacher Guide - **Page 2**

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