LESSON 22: Model Fractions as Division

[Objective]

The student will work with modeling and interpreting fractions as division of the numerator by the denominator and solve word problems with division that have answers in the form of mixed numbers or fractions.

[Prerequisite Skills]

division of whole numbers, SOLVE, division equations

[Materials]

Student pages **S215 – S223**
Transparencies **T651, T653, T655, T657, T659, and T661**
Fraction Kits 1–3
Overhead fraction strips (2 sets)
Colored pencils

[Essential Questions]

1. What does a fraction represent?
2. What does a division sentence mean?
3. What are the steps for dividing when representing division as a fraction?

[Words For Word Wall]

quotient, fraction, division, groups, items, simplifed

[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, Algebraic Formula, Verbal Description, Pictorial Representation, Concrete Representation, Graphic Organizer

[Warm-Up] (5 minutes – (IP, I, WG) S215 (Answers are on T650.)

- Have students turn to S215 in their books to begin the Warm-Up. Students will complete division problems and practice the wording for division. 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] (60 minutes – M, WG, CP, GP, IP)

SOLVE Problem (3 minutes – WG, GP) T651, S216 (Answers on T652.)

Have students turn to S216 in their books, and place T651 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 interpret a fraction as division of whole numbers. They will use this knowledge to complete this SOLVE problem at the end of the lesson. **{SOLVE, Graphic Organizer}**

Representing Fractions as Division (12 minutes – M, GP, IP, CP, WG) T651, S216 (Answers on T652.)

6 minutes – M, GP, CP, WG: Have students turn to S216 in their books, and place T651 on the overhead. Have students work in partners. Have students take out Fraction Kits 1–3. Distribute colored pencils to each pair of students. Make sure partners know their designation as Partner A or Partner B. **{Verbal Description, Concrete Representation, Pictorial Representation, Graphic Organizer}**

MODELING

Representing Fractions as Division

Step 1: Direct students' attention to Problem 1.

- Partner A, identify the fraction. $\left(\frac{1}{2}\right)$

Have students place the 1 unit fraction strip on their desks as you model on the overhead.

Explain to the students that every **fraction** can be interpreted as a **division** problem with the fraction bar as the division symbol.

Model how to divide the 1 unit into 2 groups by placing the $\frac{1}{2}$ units underneath the 1 unit.

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

- Partner B, identify the value of each of the groups. $\left(\frac{1}{2}\right)$

Draw the pictorial model in the second column of the graphic organizer.

- Partner A, describe how the fraction could be written as a division problem. (1 ÷ 2) Record.

Step 2: Direct students' attention to Problem 2.

- Partner B, identify the fraction. $\left(\frac{1}{3}\right)$

Have students place the 1 unit fraction strip on their desks as you model on the overhead.

Model how to divide the 1 unit into 3 groups by placing the $\frac{1}{3}$ units underneath the 1 unit.

1 unit		
$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$

- Partner A, identify the value of each of the groups. $\left(\frac{1}{3}\right)$

Draw the pictorial model in the second column of the graphic organizer.

- Partner B, describe how the fraction could be written as a division problem. (1 ÷ 3) Record.

4 minutes – CP, IP: Have students work in partners to complete Problems 3–6 on S216. Make sure that students are modeling with the fraction strips as well as drawing the pictorial model. **{Verbal Description, Concrete Representation, Pictorial Representation, Graphic Organizer}**

2 minutes – WG: Have students come back together as a class and share their results. They should be able to justify their results using their fraction strips as needed. **{Verbal Description, Concrete Representation, Pictorial Representation, Graphic Organizer}**

Representing Fractions as Division with Quotients as Mixed Numbers

(12 minutes – M, GP, IP, WG, CP) T653, S217 (Answers on T654.)

6 minutes – M, GP, CP, WG: Have students turn to S217 in their books, and place T653 on the overhead. Have students work in partners. Make sure partners know their designation as Partner A or Partner B. **{Verbal Description, Pictorial Representation, Graphic Organizer}**

MODELING

Representing Fractions as Division with Quotients as Mixed Numbers

Step 1: Direct students' attention to Problem 1.

- Partner A, identify the problem. (4 ÷ 3)
- Partner B, what is the wording for this problem? (How many groups of 3 are in 4?) Record.
- Have students discuss possible models for the problem. (Answers may vary, but should show 4 **items** with a **group** of 3 circled.) Record.

Step 2: Direct students' attention to the Fraction column.

- Partner A, identify the fraction represented by the division problem. $\left(\frac{4}{3}\right)$ Record.
- Partner B, determine how many groups of 3 were circled in the model. (1) Record.
- Partner A, were there any shapes left after circling the group of 3? (Yes.)
- Partner B, how many shapes were left over? (1)
- Partner A, explain how this could be written as a fraction. $\left(\frac{1}{3}\right)$ Record next to the 1.
- Partner B, explain why the fraction is written as $\frac{1}{3}$. (Because, we have 1 out of a group of 3 left over.)

Step 3: Direct students' attention to Problem 2.

- Partner A, identify the problem. (7 ÷ 5)
- Partner B, what is the wording for this problem? (How many groups of 5 are in 7?) Record.
- Have students discuss possible models for the problem. (Answers may vary, but should show 7 items with a group of 5 circled.) Record.

Step 4: Direct students' attention to the Fraction column.

- Partner A, identify the fraction represented by the division problem. $\left(\frac{7}{5}\right)$ Record.
- Partner B, determine how many groups of 5 were circled in the model. (1) Record.
- Partner A, were there any shapes left after circling the group of 5? (Yes)
- Partner B, how many shapes were left over? (2)
- Partner A, explain how this could be written as a fraction. $\left(\frac{2}{5}\right)$ Record next to the 1.
- Partner B, explain why the fraction is written as $\frac{2}{5}$. (Because, we have 2 out of a group of 5 left over.)

4 minutes – CP, IP: Have students work in partners to complete Problems 3–6 on S217. **{Verbal Description, Pictorial Representation, Graphic Organizer}**

2 minutes – WG: Have students come back together as a class and share their results. They should be able to justify results with their pictorial models. **{Verbal Description, Pictorial Representation, Graphic Organizer}**

Division of Whole Numbers with Fraction and Mixed Number Quotients

(12 minutes – M, GP, IP) T655, S218 (Answers on T656.)

6 minutes – M, GP, CP, WG: Have students turn to S218 in their books, and place T655 on the overhead. Have students work in partners. Make sure partners know their designation as Partner A or Partner B. **{Verbal Description, Graphic Organizer}**

MODELING

Division of Whole Numbers with Fraction and Mixed Number Quotients

Step 1: Direct students' attention to Problem 1.

- Partner A, identify the problem. (12 ÷ 8)
- Partner B, what is the meaning of the problem? (12 divided by 8) Record.

Step 2: Direct students' attention to the Fraction column.

- Partner A, identify the fraction represented by the division problem. $\left(\frac{12}{8}\right)$ Record.
- Partner B, complete the division and determine the **quotient**. $\left(1\frac{4}{8}\right)$
- Partner A, can the fraction be **simplified**? (Yes.)
- Partner B, identify the simplified quotient. $\left(1\frac{1}{2}\right)$ Record.
- Partner A, determine which two whole numbers the answer falls between. (1 and 2) Record.

Step 3: Direct students' attention to Problem 2.

- Partner A, identify the problem. (9 ÷ 5)
- Partner B, what is the meaning of this problem? (9 divided by 5) Record.

Step 4: Direct students' attention to the Fraction column.

- Partner A, identify the fraction represented by the division problem. $\left(\frac{9}{5}\right)$ Record.
- Partner B, complete the division and determine the quotient. $\left(1\frac{4}{5}\right)$ Record.
- Partner A, can the fraction be simplified? (No.)
- Partner A, determine which two whole numbers the answer falls between. (1 and 2) Record**.**

4 minutes – CP, IP: Have students work in partners to complete Problems 3–6 on S218. **{Verbal Description, Graphic Organizer}**

2 minutes – WG: Have students come back together as a class and share their results. Discuss the conclusion at the bottom of S218. **{Verbal Description, Graphic Organizer}**

SOLVE Problem – Fraction as Division

(19 minutes – CP, WG, M, GP, IP) T657, T659, T661, S219, S220, S221 (Answers on T658, T660, T662.)

12 minutes – M, GP, CP, WG: Have students turn to S219 in their books, and place T657 on the overhead. Students will be completing the SOLVE problem from the beginning of the lesson using an equation. They will also complete a SOLVE problem using a pictorial model. **{Verbal Description, Pictorial Representation, Algebraic Formula, Graphic Organizer}**

MODELING

SOLVE Problem – Fraction as Division

Step 1: Review the S Step and complete the O Steps for the SOLVE problem.

Step 2: Direct students' attention to the L Step.

- Partner A, explain to Partner B the meaning of the L step. (Choose an operation or operations, and write a plan of action.)
- With your partner, refer back to the S step. What is the problem asking us to find? (the amount of trail mix each camper will have)
- Partner B, determine if the O step gives us the information about the amount of trail mix each camper will receive. (Yes, we know the total number of campers and the total amount of trail mix.)

Step 3: Explain to students that we have one unknown value in this problem.

- Partner A, identify the unknown value. (the amount of trail mix each camper will receive)
- Partner B, determine what operation we can use to determine the amount of trail mix per camper. (Division) Record.
- With your partner, decide how to set up the division plan using an equation. (Divide the total quantity of trail mix by the number of campers.)

Step 4: Now move to the V step of the SOLVE problem.

- Partner A, estimate about much trail mix each camper will receive. (less than 1 pound) Record your estimate.
- Partner B, explain how to write the equation to solve the problem using the plan from step L. ($12 \div 15 = p$)
- With your partner, determine how much trail mix each camper has. ($\frac{4}{5}$ of a pound)

Step 5: Now move to the E step of the SOLVE problem.

- Partner A, explain to Partner B how you know if the answer makes sense. (Yes, because we are looking for the amount of trail mix each camper will receive.) Record.
- Partner B, explain to Partner A how you know your answer is reasonable. (Yes, because it is close to our estimate of less than 1 pound.) Record.

- With your partner, determine if your answer is accurate. (Yes.) Record.
- With your partner, discuss your answer using a complete sentence. (Each camper will have $\frac{4}{5}$ of a pound of trail mix. Record.

Step 6: Have students turn to S220, and place T659 on the overhead. Complete the S and O Steps for the SOLVE problem.

Step 7: Direct students' attention to the L Step.

- Partner A, explain to Partner B the meaning of the L step. (Choose an operation or operations, and write a plan of action.)
- With your partner, refer back to the S step. What is the problem asking us to find? (the amount of pizza each girl will have)
- Partner B, determine if the O step gives us the information about the amount of pizza each girl will have. (Yes, we know the total number of pizzas and the total number of girls.)

Step 8: Explain to students that we will be using a pictorial model for this problem.

- Partner A, identify the unknown value. (the amount of pizza each girl will have)
- Partner B, identify the operation we can use to determine the amount of pizza per girl. (Division) Record.
- With your partner, decide how to set up the division plan using a pictorial model. (Draw a picture of each pizza. Divide the total number of pizzas by the number of girls.)

Step 9: Now move to the V step of the SOLVE problem.

- Partner A, estimate about how much pizza each girl will receive. (about half of a pizza) Record your estimate.

Explain to students that for this SOLVE problem they will use a pictorial model instead of an equation.

- Partner B, explain how to draw a model for the 3 pizzas. (Draw 3 circles.)
- With your partner, determine how to divide the pizzas. (Divide each pizza into 8 slices.)
- Carry out the plan. ($3 \div 8 = \frac{3}{8}$) Record.

Step 10: Now move to the E step of the SOLVE problem.

- Partner A, explain to Partner B how you know the answer makes sense. (Yes, because we are looking for the amount of pizza each girl will have.) Record.
- Partner B, explain to Partner A how you know your answer is reasonable. (Yes, because it is close to our estimate of about half of a pizza.) Record.
- With your partner, determine if your answer is accurate. (Yes.) Record.
- With your partner, discuss your answer using a complete sentence. (Each girl will have $\frac{3}{8}$ of a pizza.) Record.

5 minutes – CP, IP: Have students work in partners to complete the SOLVE problem on S221. **{Verbal Description, Pictorial Representation or Algebraic Formula, Graphic Organizer}**

2 minutes – WG: Have students come back together as a class and share their results. They should be able to exp lain their solution with an equation or pictorial model. **{Verbal Description, Pictorial Representation or Algebraic Formula, Graphic Organizer}**

If time permits... **(10 minutes – CP, IP) S222 (Answers on T663.)**

Have students complete the SOLVE problem on S222 in cooperative pairs.

[Closure] (2 minutes)

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

- What does a fraction represent? *(division of the numerator by the denominator)*
- What does a division sentence mean? *(How many groups of __ are in __ items?)*
- What are the steps for dividing when representing division as a fraction? *(Divide the numerator by the denominator and write the quotient as a fraction or mixed number.)*

[Homework] Assign S223 for homework. (Answers on T664.)

[Quiz Answers] T665 – T667

1. **C** 2. **B** 3. **A** 4. **D** 5. **B** 6. **D** 7. **A** 8. **A** 9. **B** 10. **B**

The quiz can be used at any time as extra homework or to see how students progress on understanding fractions as division.

Here is the key to **S215.**

Warm–Up

Directions: Solve the following problems.

1. 315 ÷ 7 = **45**

2. 168 ÷ 2 = **84**

3. 180 ÷ 5 = **36**

4. 744 ÷ 6 = **124**

5. 4,572 ÷ 3 = **1,524**

6. What do these problems mean if 18 ÷ 3 means "how many groups of 3 are in 18"?

256 ÷ 4 = **How many groups of 4 are in 256?**

736 ÷ 8 = **How many groups of 8 are in 736?**

7,785 ÷ 9 = **How many groups of 9 are in 7,785?**

TRANSPARENCY MASTER for S216

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

Brandon's scout troop is going on a camping trip. The 15 campers will be hiking and camping for 3 days. Each camper is responsible to bring a food item. Brandon volunteered to bring trail mix. His mom went to the store and purchased 12 pounds of trail mix. If she divides the trail mix into 15 equal bags, how much trail mix will each camper have?

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

_____.

Directions: Complete this page with your teacher and partner.

Fraction	Model	Division Problem
1. $\frac{1}{2}$		
2. $\frac{1}{3}$		
3. $\frac{1}{4}$		
4. $\frac{1}{5}$		
5. $\frac{1}{6}$		
6. $\frac{1}{8}$		

LESSON 22: Model Fractions as Division

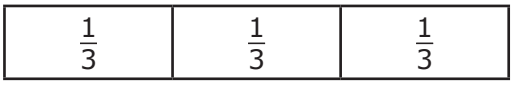
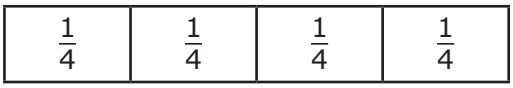
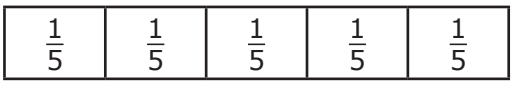
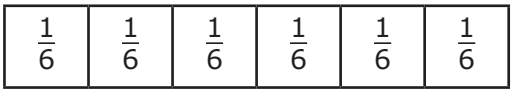
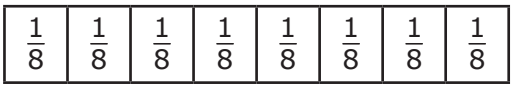
Here is the key to **S216**.

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

Brandon's scout troop is going on a camping trip. The 15 campers will be hiking and camping for 3 days. Each camper is responsible to bring a food item. Brandon volunteered to bring trail mix. His mom went to the store and purchased 12 pounds of trail mix. If she divides the trail mix into 15 equal bags, how much trail mix will each camper have?

S Underline the question.
This problem is asking me to find **the amount of trail mix each camper will have.**

Directions: Complete this page with your teacher and partner.

Fraction	Model	Division Problem
1. $\frac{1}{2}$		**1 ÷ 2**
2. $\frac{1}{3}$		**1 ÷ 3**
3. $\frac{1}{4}$		**1 ÷ 4**
4. $\frac{1}{5}$		**1 ÷ 5**
5. $\frac{1}{6}$		**1 ÷ 6**
6. $\frac{1}{8}$		**1 ÷ 8**

TRANSPARENCY MASTER for S217

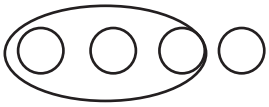
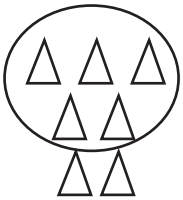
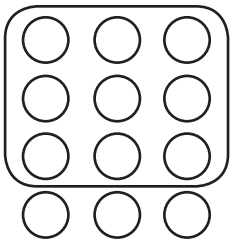
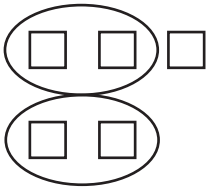
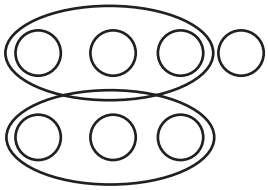
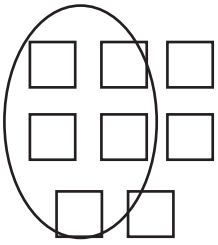
Directions: Complete this page with your teacher and partner.

Problem	Wording	Model	Fraction
1. 4 ÷ 3 =			
2. 7 ÷ 5 =			
3. 12 ÷ 9 =			
4. 5 ÷ 2 =			
5. 7 ÷ 3 =			
6. 8 ÷ 5 =			

LESSON 22: Model Fractions as Division

Here is the key to **S217**.

Directions: Complete this page with your teacher and partner.

Problem	Wording	Model	Fraction
1. 4 ÷ 3 =	**How many groups of 3 are in 4?**		$\frac{4}{3} = 1\frac{1}{3}$
2. 7 ÷ 5 =	**How many groups of 5 are in 7?**		$\frac{7}{5} = 1\frac{2}{5}$
3. 12 ÷ 9 =	**How many groups of 9 are in 12?**		$\frac{12}{9} = 1\frac{3}{9} = 1\frac{1}{3}$
4. 5 ÷ 2 =	**How many groups of 2 are in 5?**		$\frac{5}{2} = 2\frac{1}{2}$
5. 7 ÷ 3 =	**How many groups of 3 are in 7?**		$\frac{7}{3} = 2\frac{1}{3}$
6. 8 ÷ 5 =	**How many groups of 5 are in 8?**		$\frac{8}{5} = 1\frac{3}{5}$

TRANSPARENCY MASTER for S218

Directions: Complete this page with your teacher and partner.

Problem	Meaning	Fraction	Between what 2 whole numbers?
1. 12 ÷ 8 =			
2. 9 ÷ 5 =			
3. 11 ÷ 4 =			
4. 6 ÷ 22 =			
5. 3 ÷ 7 =			
6. 2 ÷ 8 =			

Conclusion: When the numerator is smaller than the denominator, the quotient will always be between _____ and _____.

Here is the key to **S218**.

Directions: Complete this page with your teacher and partner.

Problem	Meaning	Fraction	Between what 2 whole numbers?
1. 12 ÷ 8 =	**12 divided by 8**	$\frac{12}{8} = 1\frac{4}{8} = 1\frac{1}{2}$	**1 and 2**
2. 9 ÷ 5 =	**9 divided by 5**	$\frac{9}{5} = 1\frac{4}{5}$	**1 and 2**
3. 11 ÷ 4 =	**11 divided by 4**	$\frac{11}{4} = 2\frac{3}{4}$	**2 and 3**
4. 6 ÷ 22 =	**6 divided by 22**	$\frac{6}{22} = \frac{3}{11}$	**0 and 1**
5. 3 ÷ 7 =	**3 divided by 7**	$\frac{3}{7}$	**0 and 1**
6. 2 ÷ 8 =	**2 divided by 8**	$\frac{2}{8} = \frac{1}{4}$	**0 and 1**

Conclusion: When the numerator is smaller than the denominator, the quotient will always be between **0** and **1**.

TRANSPARENCY MASTER for S219

Directions: Complete the following SOLVE problem with your teacher.

Brandon's scout troop is going on a camping trip. The 15 campers will be hiking and camping for 3 days. Each camper is responsible to bring a food item. Brandon volunteered to bring trail mix. His mom went to the store and purchased 12 pounds of trail mix. If she divides the trail mix into 15 equal bags, how much trail mix will each camper have?

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 **S219**.

Directions: Complete the following SOLVE problem with your teacher.

~~Brandon's scout troop is going on a camping trip.~~ | The 15 campers | ~~will be hiking and camping for 3 days.~~ | ~~Each camper is responsible to bring a food item.~~ | Brandon volunteered to bring trail mix. | His mom went to the store and purchased 12 pounds of trail mix. | If she divides the trail mix into 15 equal bags, | how much trail mix will each camper have?

S Underline the question.
This problem is asking me to find **the amount of trail mix each camper will have.**

O Identify the facts.
Eliminate the unnecessary facts.
List the necessary facts. **15 campers, 12 pounds of trail mix, evenly divided**

L Choose an operation or operations. **Division**

Write in words what your plan of action will be. **Divide the total quantity of trail mix by the number of campers.**

V Estimate your answer. **Less than 1 pound**

Carry out your plan.

12 ÷ 15 = *p*

12 ÷ 15 = $\frac{12}{15}$ = $\frac{4}{5}$ of a pound

E Does your answer make sense? (Compare your answer to the question.) **Yes, because we are looking for the amount of trail mix each camper will receive.**

Is your answer reasonable? (Compare your answer to the estimate.) **Yes, because it is close to our estimate of less than 1 pound.**

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

Write your answer in a complete sentence. **Each camper will have $\frac{4}{5}$ of a pound of trail mix.**

TRANSPARENCY MASTER for S220

Directions: Complete the following SOLVE problem with your teacher.

Julie is having a party for her birthday. She has invited 7 friends from school. Julie is planning on playing games and watching a movie. Julie's mom is ordering 3 pizzas. If the 8 girls share the pizza equally, how much pizza will each girl have?

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 **S220**.

Directions: Complete the following SOLVE problem with your teacher.

~~Julie is having a party for her birthday.~~ | ~~She has invited 7 friends from school.~~ | ~~Julie is planning on playing games and watching a movie.~~ | Julie's mom is ordering 3 pizzas. | If the 8 girls | share the pizza equally, | how much pizza will each girl have?

S Underline the question.
This problem is asking me to find **the amount of pizza each girl will have.**

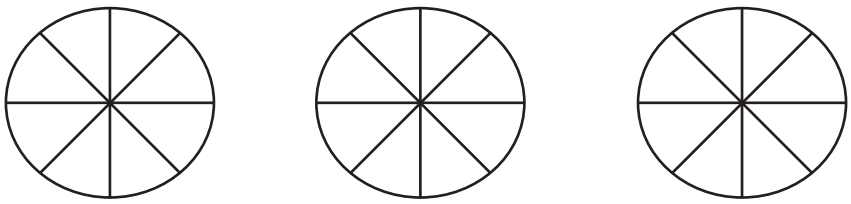
O Identify the facts.
Eliminate the unnecessary facts.
List the necessary facts. **8 girls, 3 pizzas, share pizzas evenly**

L Choose an operation or operations. **Division**

Write in words what your plan of action will be. **Draw a picture of each pizza. Divide the total number of pizzas by the number of girls.**

V Estimate your answer. **About half of a pizza.**

Carry out your plan.



3 ÷ 8 = $\frac{3}{8}$ of a pizza

E Does your answer make sense? (Compare your answer to the question.) **Yes, because we are looking for the amount of pizza each girl will have.**

Is your answer reasonable? (Compare your answer to the estimate.) **Yes, because it is close to our estimate of about half of a pizza.**

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

Write your answer in a complete sentence. **Each girl will have $\frac{3}{8}$ of a pizza.**

TRANSPARENCY MASTER for S221

Directions: Complete the following SOLVE problem with your partner.

Mrs. Jacobs is in charge of costumes for the school play. Her husband is working on the scenery for the play. She is making 8 costumes that are the same color. The art teacher told Mrs. Jacobs that if she bought 28 yards of material, it would be enough for the 8 costumes. How much material is needed for each costume?

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 **S221**.

Directions: Complete the following SOLVE problem with your partner.

~~Mrs. Jacobs is in charge of costumes for the school play.~~ | ~~Her husband is working on the scenery for the play.~~ | She is making 8 costumes that are the same color. | The art teacher told Mrs. Jacobs that if she bought 28 yards of material,| it would be enough for the 8 costumes.| How much material is needed for each costume?

S Underline the question.
This problem is asking me to find **the amount of material needed for each costume.**

O Identify the facts.
Eliminate the unnecessary facts.
List the necessary facts. **28 yards of material, 8 costumes, same amount of material for each costume**

L Choose an operation or operations. **Division**

Write in words what your plan of action will be. **Divide the total quantity of material by the number of costumes.**

V Estimate your answer. **About 3 yards**

Carry out your plan.

$28 \div 8 = m$

$28 \div 8 = \frac{28}{8} = 3\frac{4}{8} = 3\frac{1}{2}$ yards of material

E Does your answer make sense? (Compare your answer to the question.) **Yes, because we are looking for the amount of material for each costume.**

Is your answer reasonable? (Compare your answer to the estimate.) **Yes, because it is close to our estimate of about 3 yards.**

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

Write your answer in a complete sentence. **There are $3\frac{1}{2}$ yards of material needed for each costume.**

Here is the key to **S222**.

Directions: Complete the following SOLVE problem with your partner.

~~Jason and his brother have a mowing business.~~ | ~~Jason's uncle hired them to mow a large field he wants to use to race go-carts.~~ | The field has a total of 13 acres. | If the boys split the mowing job equally, | how many acres will each boy mow?

S Underline the question.
This problem is asking me to find **the number of acres each boy will mow.**

O Identify the facts.
Eliminate the unnecessary facts.
List the necessary facts. **13 total acres, 2 boys mowing, split the job equally.**

L Choose an operation or operations. **Division**
Write in words what your plan of action will be. **Divide the acres to be mowed by the number of boys mowing.**

V Estimate your answer. **About 6 acres**
Carry out your plan.

$13 \div 2 = b$

$13 \div 2 = \frac{13}{2} = 6\frac{1}{2}$ acres per boy

E Does your answer make sense? (Compare your answer to the question.) **Yes, I was looking for the number of acres each boy would mow.**
Is your answer reasonable? (Compare your answer to the estimate.) **Yes, it is close to my estimate of about 6 acres.**
Is your answer accurate? (Check your work.) **Yes**.

Write your answer in a complete sentence. **Each boy will mow $6\frac{1}{2}$ acres.**

Here is the key to **S223**.

Homework

Name _____ **Date** _____

~~Tanya has homework on Thursday evening.~~ | ~~She has 55 minutes to complete all of her homework.~~ | ~~She would like to finish on time so that she can watch her favorite television show.~~ | She has homework for math, history, and language arts. | If she spends an equal amount of time on all the subjects, | how many minutes will she spend on each subject?

S Underline the question.
This problem is asking me to find **the number of minutes Tanya will spend on each subject.**

O Identify the facts.
Eliminate the unnecessary facts.
List the necessary facts. **55 minutes total time, 3 subjects, equal time on each subject**

L Choose an operation or operations. **Division**

Write in words what your plan of action will be. **Divide the time to spend on homework by the number of subjects.**

V Estimate your answer. **About 20 minutes**

Carry out your plan.

$55 \div 3 = m$

$55 \div 3 = \frac{55}{3} = 18\frac{1}{3}$ minutes per subject

E Does your answer make sense? (Compare your answer to the question.) **Yes, I was looking for the number of minutes per subject.**

Is your answer reasonable? (Compare your answer to the estimate.) **Yes, it is close to my estimate of about 20 minutes.**

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

Write your answer in a complete sentence. **Tanya will spend $18\frac{1}{3}$ minutes on each subject.**

Name _____ Date _____

Quiz

Directions: Answer Questions 1 – 5 using the following word problem.

The drama club is selling cases of popcorn as a fundraiser. Danielle wants to win the prize for the most popcorn sales, since the prize is a trip to see a play in New York City. Danielle volunteers to sell 30 cases of popcorn. Danielle's family agrees to help her reach her goal. If there are 4 people in her family and they divide the popcorn equally, how many cases must each person sell?

1. Which of the following is the question for the S step?

A. How many people are in her family?
B. How many cases did Danielle volunteer to sell?
C. How many cases must each person sell?
D. How many total cases will the drama club sell?

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2. Which of the following gives all the facts for the O step?

A. need to sell 30 cases, 4 people in family
B. need to sell 30 cases, 4 people in family, dividing popcorn equally
C. need to sell 30 cases, trip to New York city
D. need to sell 30 cases, dividing popcorn evenly

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3. What operation could be used for the problem?

A. division
B. subtraction
C. multiplication
D. addition

---

4. What is a good estimate for the problem?

A. about 120 cases
B. about 40 cases
C. about 30 cases
D. about 7 cases

5. Which of the following is the E step in a complete sentence?

A. Each person must sell 4 cases of popcorn.

B. Each person must sell $7\frac{1}{2}$ cases of popcorn.

C. Each person must sell 8 cases of popcorn.

D. Each person must sell 30 cases of popcorn.

Directions: Answer Questions 6 - 10 using the following word problem.

Mrs. Townsend owns an ice cream shop. At the shop, she orders 32 gallons of ice cream every 3 days. She always orders chocolate, vanilla, and strawberry. All the other flavors vary from week to week. On average, how many gallons of ice cream does she use every day?

6. Which of the following is the question for the S step?

A. How many kinds of ice cream does she order?

B. How many gallons does she sell each week?

C. How many gallons does she sell in three days?

D. How many gallons does she use every day?

---

7. Which of the following gives all the facts for the O step?

A. uses 32 gallons, every 3 days, average amount per day

B. uses 32 gallons, every week, different flavors

C. every 3 days orders, orders chocolate, vanilla, strawberry

D. sells ice cream, uses 32 gallons

---

8. What operation could be used for the problem?

A. division

B. subtraction

C. multiplication

D. addition

9. What is a good estimate for the problem?

A. about 3 gallons
B. about 10 gallons
C. about 32 gallons
D. about 90 gallons

10. Which of the following is the E step in a complete sentence?

A. Mrs. Townsend uses 3 gallons every day.
B. Mrs. Townsend uses $10\frac{2}{3}$ gallons every day.
C. Mrs. Townsend uses 32 gallons every day.
D. Mrs. Townsend uses 96 gallons every day.