LESSON 3

Design Division

In this lesson, students solve a problem involving two quantities at different unit prices by dividing fractions.

CCSS CONNECTIONS

- Extend previous understandings of division to divide unit fractions. **5.NF.B.7**
- Use ratio and rate reasoning to solve real-world and mathematical problems. **6.RP.A.3**
- Recognize and represent proportional relationships between quantities. **7.RP.A.2**

LANGUAGE SUPPORT

MATH TERMS

unit rate
divide the cost by the quantity to find price per unit

estimate
approximate answer

ACADEMIC LANGUAGE

dress fabric
fabric for the body and collar of the dress

budget
amount of money planned for spending

SET UP

Introduce Chapter 4 from *Math Meets Fashion*.

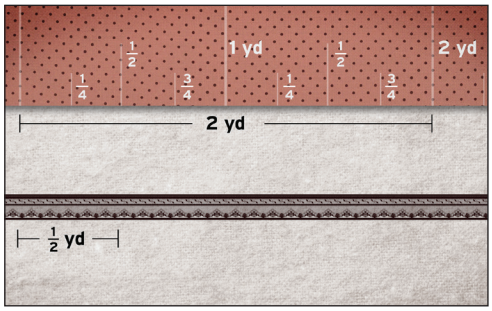
Ask questions to review Lesson 2 and connect to Lesson 3.

For example: ***How did we use unit conversions to solve the problem?*** (We converted Robin's 60 inches of fabric to its length in yards, and divided by the unit price per yard.)

What other costs should a designer consider when planning a budget? (cost of the fabric required; time spent on making the design; cost of any alterations)

Today, we'll use reasoning and proportional thinking to see how much fabric Jessalyn can afford to buy.

Play Chapter 4: Design Division.



[Pause at 01:09.]

PLAN

Create a plan to solve the problem.

Jessalyn needs to buy about 2 yards of dress fabric and $\frac{1}{2}$ yard of lace. The price of the dress fabric is $20 per yard. The lace costs $30 per yard. Jessalyn's budget is $50. How much of each fabric can she buy?

Read the problem aloud to students.

Ask students to analyze the two quantities. Then, guide students to work backwards.

For example: ***What is the unit price for each of the fabrics in the problem?*** (The dress fabric costs $20 per yard; the lace costs $30 per yard.)

How could Jessalyn begin solving the problem? (Find the cost of 2 yards of dress fabric and $\frac{1}{2}$ yard of lace; make an estimate.)

Point out that Jessalyn needs a length of dress fabric that is "about," or close to, 2 yards.

LESSON 3

Design Division, *continued*

STANDARDS FOR MATHEMATICAL PRACTICE	Make Use of Structure Students use the price per unit for each fabric to break down the quantities in the problem.	Use Tools Strategically Students use estimation and number sense to strategically assess the problem solution.

SOLVE

Have student pairs solve the problem as you circulate.

Encourage students to come up with multiple strategies, and represent the problem situation in different ways. Guide students to work backwards to check their work.

SUPPORT

Ask questions based on common errors to support student understanding.

- ***Which fabric does Jessalyn need more of, the dress fabric or the lace?***
- ***If 1 yard of the lace costs $30, how much does $\frac{1}{2}$ yard cost? How do you know?***
- ***Is $1\frac{3}{4}$ yards close to 2 yards? Was Jessalyn's estimate reasonable?***

EXTEND

Ask questions to encourage students to extend their thinking.

- ***Can you solve this problem using mental math?***
- ***How could you draw a model of the problem?***
- ***What if Jessalyn had a budget of $60? How much dress fabric will she be able to buy?***

SHARE

Have students present their solutions.

Ask students from each pair to explain their solutions to the class. Show at least two different approaches to solving the problem, and one incorrect solution. To extend classroom discussion, call on students to explain the reasoning of the student who is presenting.

Possible student work:

lace → $30 per yd

$\frac{1}{2}$ of $30 = $15

So, $\frac{1}{2}$ yd of lace costs $15.

$50 - $15 = $35

So, Jessalyn has $35 left in her budget for the dress fabric.

dress fabric → $20 per yd

Yards	Price
1	$20
2	$40
$\frac{1}{2}$	$10
$\frac{1}{4}$	$ 5

$20 + $10 + $5 = $35

1 yd + $\frac{1}{2}$ yd + $\frac{1}{4}$ yd = $1\frac{3}{4}$ yd

Play the Chapter 4 Solution from *Math Meets Fashion*.

Have students complete the Practice and Reflect sections on Student Page 2.

HOMEWORK IDEAS

Have students measure a garment!

Students should choose an item of clothing with two fabric types.

- ***Measure the length, width, and height.***
- ***How many different fabrics does the item have?***
- ***Can you estimate the amount of fabric used?***

Your Name _____

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PLAN

Create a plan to solve the problem with your partner.

SOLVE

Use your plan to solve the problem.

LESSON 3

Design Division, *continued*

PRACTICE

Apply your skills to solve another problem.

Jessalyn is making the same dress in a larger size. She needs to buy exactly 3 yards of dress fabric and $\frac{1}{2}$ yard of lace. The price of the dress fabric is $20 per yard. The lace costs $30 per yard. Jessalyn's budget is $76. Does she have enough money to buy both fabrics?

REFLECT

Explain how you made sense of the math.

How did you use proportional reasoning in your solution strategy?

I used proportional reasoning by _____

_____

_____

How did you use mental math to solve the problem?

I used mental math to solve the problem by _____

_____

_____

_____

SCORE 0 1 2 3

Your Name _____

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