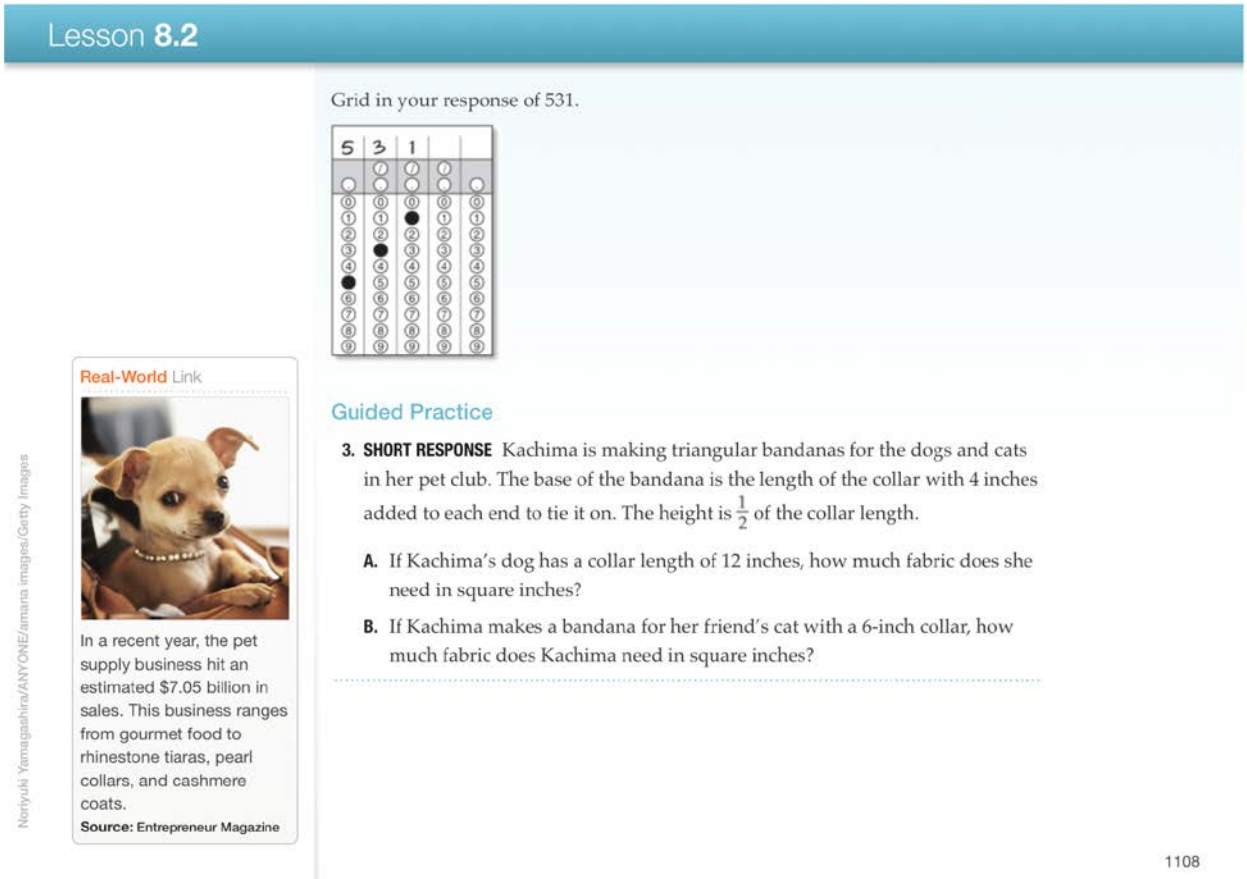
**Activity #2: Experience #1 & #2 Guide**

**(60 minutes)**

**Experience #1**

Experience #1 exposes the participants to a “typical real world problem” from a current math textbook (page picture below). This is an example of what Boaler and Meyer refer to as a “pseudo real world problem.” In these problems all the information is given and all the given information is used to answer a predetermined question.

*<u>THE PROBLEM</u>*



Lesson 8.2

Grid in your response of 531.

Real-World Link

In a recent year, the pet supply business hit an estimated $7.05 billion in sales. This business ranges from gourmet food to rhinestone tiaras, pearl collars, and cashmere coats.

**Source:** Entrepreneur Magazine

Noriyuki Yamagashira/ANYONE/amana images/Getty Images

Guided Practice

**3. SHORT RESPONSE** Kachima is making triangular bandanas for the dogs and cats in her pet club. The base of the bandana is the length of the collar with 4 inches added to each end to tie it on. The height is $\frac{1}{2}$ of the collar length.

**A.** If Kachima's dog has a collar length of 12 inches, how much fabric does she need in square inches?

**B.** If Kachima makes a bandana for her friend's cat with a 6-inch collar, how much fabric does Kachima need in square inches?

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Making Animal Bandanas

Kachima is making triangular bandanas for the dogs and cats in her pet club. The base of the bandana is the length of the collar with 4 inches added to each end to tie it on. The height is 1/2 of the collar length. If Kachima’s dog has a collar length of 12 inches, how much fabric does she need in square inches? If Kachima makes a bandana for her friend’s cat with a 6-inch collar, how much fabric does Kachima need in square inches?

**NOTE:** You may wish to use alternative problems to better fit your audience. These can be found at the following link:

http://blog.mrmeyer.com/category/pseudocontextsaturday/

**Experience #2**

Experience #2 is intended to expose participants to a real world problem that could be classified as a modeling problem. The launch of the problem is a video (included below) news broadcast about money recovered from a large drug bust. The video is intended to engage participants in formulating questions and creating models and methods for solving their own questions.

The intended question of focus should be how to find an estimate of the amount of money. The method for solving is intentionally left open to allow for multiple approaches to be discussed. Several possible methods are described following the problem set up.

*THE PROBLEM*

How Much Money?

A drug bust in Mexico netted possibly the most money ever seized. (The linked video shows the television news story. The pictures following the video allow participants to more closely examine the confiscated money.)

Drug Bust News Story Video

**How much money is that?**

Picture 1

Picture 2

Picture 3

A few notes about the money:

**Possible Solutions and Assumptions**

- All of the United States bills are $100 bills.
- Foreign currency in front of the United States bills are ignored..
- Main stack of bills is 11 rows with a slightly less high 12th row in the front (from pictures 1 & 3).

Discussion of possible ways count the money may be valuable. Some possible methods with advantages and disadvantages given below:

- Count each bill, one at a time.
  - Advantage: very accurate if you don't lose track of the running total
  - Disadvantage: very time consuming
- Count the bills using an electric bill counter.
  - Advantage: potentially the most accurate if you don't lose track of the running total
  - Disadvantage: also very time consuming as you can only put stacks of up to 130 bills at a time
- Hire multiple people to count them for you.
  - Advantage: potentially faster than the previous two methods but still time consuming
  - Disadvantage: they could steal your money and you have to pay them
- Estimate how much money is in the pile based on its weight
  - Advantage: should take less time than counting the individual bills
  - Disadvantage: limited accuracy as the scale may not be precise and the bills' weight may change from handling
- Estimate how much money is in the pile based on volume
  - Advantage: by far the fastest method
  - Disadvantage: limited accuracy

Possible methods to use to find volume

- Find the amount of money in one stack of bills and multiply it by the number of stacks.
- Find the amount of money in one layer of bills and multiply it by the number of layers.
- Find the amount of money in one row of bills and multiply it by the number of rows.
- Find the amount of money in one column of bills and multiply it by the number of columns.
- Find area in square units of one layer of bills and divide it by the area of one bill, then multiply it by the number of layers.

*Sample Solution:*

- The pile has 34 columns of bills (from picture 2).

  To estimate height, the largest stack of paper with a typically known count is a ream of paper. A possible estimate of the highest stacks of money is about 15 reams of paper.

  Reams of copy paper hold 500 sheets while reams of cardstock often hold 250 sheets.

  The money itself is used and likely crinkled so an estimate that it is between the thickness of copy paper and cardstock but closer to copy paper would be reasonable. So a ream of paper is about 400 bills.

Multiplying this all together: 340 stacks * 15 reams tall * 400 bills per ream * $100 per bill gives a total for the main stack of $204 million

- Shorter single row of bills in the front

  From Picture 2 that it is also 34 columns across giving us 34 stacks of bills.

  The stacks on the left half appear to be about two reams of paper shorter than the main pile of money behind it.

  The stacks on the right half appear to be about two reams of paper short than the left half.

  The averaging of the two is about 12 reams of paper tall.

  Multiplying this all together:
  34 stacks * 12 reams tall average * 400 bills per ream * $100 per bill
  gives a total for the main shorter single row of bills of $16,320,000.

- Thus, the grand total I have is $220,320,000.

**Note:** A large margin of error in these estimates. The news anchor says "200 million" while according to this article from the Los Angeles Times, states there was $205.6 million in cash.

Other possible follow-up challenges might include:
- find the weight of the money (at least 4,500 pounds)
- find the number of security vehicles needed to transport the money (approx. 25)

**Follow-Up Discussion Questions:**

See Discussion Questions in the Professional Development Module Facilitator's Guide, Activity #2.