TEACHING NOTES

Terry Hansen: Sending Hay Around the World

Appropriate Grade Levels: *6 – 8*

Implementation Time:
One class period (45 minutes to one hour) required for basic exercise and for students to begin work on their memos and graphs..
An additional class period may be desired to debrief students.

Materials Needed:
Teaching notes for "Terry Hansen" case study
Student copies of "Terry Hansen"
Notepaper for students to use when calculating answers and writing memos
Graph paper for students to use when creating graphs

Career Pathway: *Business & Management*

Subject Area: *Mathematics*

Learner Outcome(s): What will happen for learners as a result of this lesson?
Students will explore a career opportunity in international trade. They will use problem solving approaches to investigate and understand mathematical contant. They will develop and apply a variety of strategies to solve a multistep, nonroutine problems. They will use their reading and listening skills to interpret and evaluate mathematical ideas. They will apply reasoning processes with special attention to spatial reasoning and reasoning with proportions and graphs. And they will demonstrate their knowledge of the pervasive use and power of reasoning as part of mathematics.

Washington State Essential Academic Learning Requirements: How will students learn?
- *Mathematics: Students will demonstrate their ability to perform basic mathematical operations on rational numbers, including their ability to work with percentages and ratios; will organize and display data in appropriate graphical forms; will demonstrate their ability to use mathematics to investigate a problem; will organize and interpret relevant information from multiple sources; will use reading, listening, and observation skills to access and extract mathematical information; and will investigate the use of mathematics within a career context.*
  (EALR's 1.1, 1.4, 2.1, 2.3, 3.1, 4.1, 5.3)
- *Communication: Students will demonstrate listening and observation skills to gain understanding; will practice communicating ideas clearly and effectively; will demonstrate communication strategies and skills to work effectively with others; and will analyze how communication is used in career settings.*
  (EALR's 1.1, 1.2, 1.3, 2.1, 2.2, 3.1, 3.2, 4.4)
- *Writing: Students will practice writing clearly and effectively. Students will practice writing for career applications, producing technical and non-technical documents using resources from career settings.*
  (EALR's 1.1, 1.2, 1.3, 2.4)

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Terry Hansen: Sending Hay Around the World

Procedure:
This lesson is designed to be taught in one or two sessions.

1. *<u>For session one</u>, distribute the students' version of the "Terry Hansen" case study to your class. Have the students work alone or divide them into groups of two or three.*

2. *Read aloud to them or let them read one section of the case study at a time. Don't let them read ahead. After each section, ask the students to brainstorm the answer to the question they have been asked. In the relevant sections, ask them to calculate the answers to the mathematical questions posed.*

3. *Finish by giving students the remainder of the class period to begin the written assignment, the memo to Terry's boss. Help them organize the mathematical information they have calculated into graphs. (Samples and answer key follow)*

Closure/Assessment:
Review students' written work both for basic writing skills as well as for students' ability to explain the steps Terry took in calculating his counter proposal, and for students' ability to synthesize this information into a coherent strategy.

Then, in small groups or as a whole group, have students review the steps they should follow when they are confronted with a problem and don't have enough information to decide what to do. Ask them to share personal experiences of having to gather information to solve a problem. What did they do? How did they use the information they gathered? What did they do right or wrong? What would they do if they were confronted with the same problem today?

Terry Hansen: Sending Hay Around the World

Part One - *Read to the bottom of this page then stop.*

Terry Hansen had a headache. He had a problem with a customer, and now he had to figure out how to solve it.

Terry Hansen was Director of Marketing for A.C.X. Trading. A.C.X. was a processor and exporter of high quality dairy feed products. That meant that A.C.X. bought hay from growers in Washington State and throughout the Western half of the United States as well as in Chile and Mexico, processed the hay into cattle feed, and then shipped it to customers around the world.

Hay was one of Washington State's largest exports, and Terry worked hard to make sure that A.C.X. was a big part of the picture. Because A.C.X. bought hay from growers throughout the North and South American West Coast, the company could always promise its customers fresh, high-quality feed for their dairy cattle. And, because A.C.X. had located its processing facilities near major ports, A.C.X. could quickly ship its hay to customers throughout Asia.

Today, though, Terry had to help an unhappy customer. This customer had a reputation as a very tough negotiator and just a difficult person in general. Terry had been pleased when A.C.X. had finally landed a sale with this customer, and had promptly responded to the sale by shipping five cargo containers full of hay. The customer had received the hay on schedule, but was now complaining that the hay was, "not what I wanted." The customer was insisting on a $1,500 refund.

Terry thought about what he should do. What were his options in dealing with the customer?

STOP

Terry Hansen: Teaching Notes for Part One

Getting basic information *is the first step to take in this or any problem when you don't know enough to solve the problem by yourself.*

First, make sure students understand Terry's role and his job. Ask students what they would do if they were in his shoes.

Then, prompt the students to discuss Terry's need for information.

He needs to know what the customer thought was wrong with the hay. And he needs to know what A.C.X. typically does in a situation like this.

Then, lead students in a discussion of Terry's options. What are his choices here?

He can refund the money. Or, he can refuse. What will each of these choices mean in terms of his relationship with the customer?

Part Two - *Read to the bottom of this page then stop.*

Terry talked with the customer, trying to learn what the customer thought was wrong with the hay. But he didn't get a clear answer. He then talked with colleagues about A.C.X.'s policies in situations like this, and decided he had two basic options:

He could just give the customer the $1,500 refund. But, in that case, the customer might just take the money and never come back. And, even if the customer did order more hay from A.C.X., the company would have set a bad precedent in its dealings with the customer. What would prevent the customer from requesting a refund with every order?

Alternatively, Terry could refuse to refund the customer's money. But then he knew the customer would never come back. And, he didn't want and unhappy customer out there saying bad things about A.C.X.

No, there had to be another option. As he thought, Terry realized he needed to learn some very crucial information.

STOP

Terry Hansen: Teaching Notes for Part Two

Terry has gathered the most basic information he needs, but now he really needs to dive in and do some research. What information hasn't he yet used?

Prompt the students to discuss the question of money. How can Terry make a decision about the $1,500 refund until he knows how much that $1,500 is of the customer's total order. Is it a lot? Or just a little?

How can Terry get this information?

Part Three - *Read to the bottom of this page then stop.*

Terry had talked with the customer and with his own colleagues at A.C.X. But he couldn't decide what to do until he knew more about the numbers involved. Was the $1,500 refund the customer was requesting a large or a small amount of money in the scope of the overall order?

Terry pulled out all the order information.

He learned that the customer had purchased five cargo containers of hay. Each container held 26 tons of hay. And each ton had been priced at $220.

That meant the customer had purchased _____ tons, for a total price of $_____.

The $1,500 refund the customer was requesting was _____ percent of the total order, or $_____ per ton.

Well, Terry thought. That is a little steep. Is there any way I can make the customer happy by paying the refund but lower the cost of the refund both as a percent of the total order and as the amount of money per ton ordered. Was there any way to do that?

STOP

Terry Hansen: Teaching Notes for Part Three

ANSWER KEY:

He learned that the customer had purchased five cargo containers of hay. Each container held 26 tons of hay. And each ton had been priced at $220.

That meant the customer had purchased __*130*_____ tons, for a total price of $____*28,600*_____.

The $1,500 refund the customer was requesting was ___*5.2*____ percent of the total order, or $__*11.54*_____ per ton.

Help students do the calculations needed to fill in the blanks. In particular, help them with the calculations needed to find the percent figure requested and make sure they understand what this number means.

Then, ask them how Terry can lower the cost of the refund as a percent of the total order. Should he lower the amount of the refund he pays? How would the customer react to that? Or increase the amount of hay on which the refund is based? What would that mean?

Part Four - *Read to the bottom of this page then stop.*

Terry spent some time looking at the numbers and then decided to call the customer with a counteroffer. A.C.X. would not only pay the customer's $1,500 refund, it would DOUBLE the refund to $3,000. But, A.C.X. would only do this if the customer would agree to purchase 15 more cargo containers of hay from A.C.X.

At 26 tons per container, this new order for 15 cargo containers would work out to _____ additional tons.

Added to the previous order for 5 cargo containers, the customer would now have purchased _____ tons total.

At a price of $220 per ton, the additional 15 cargo containers would cost the customer $_____.

Added to the previous order, the customer would now have a total bill of $_____.

The $3,000 refund would now constitute _____ percent of the total order.

It would result in a payment of $_____ per ton.

Terry looked at the numbers. It just might work. Not only was the cost per ton lower, but he would have guaranteed more business with the customer, a second chance to prove A.C.X.'s quality.

Now, he had to convince his boss… and then the customer.

TURN PAGE FOR ASSIGNMENT

Terry decided to write a one-page memo to his boss. In the memo, he would:

(a) explain the situation with the customer's request for a refund;
(b) present his counterproposal, showing the numbers he had worked out; and
(c) explain why he thought his proposal was a good one.

Terry knew his boss wasn't much for numbers, so he decided to make two graphs to accompany his memo.

The first graph would be a bar chart. It would compare (in absolute dollar terms) the $1,500 refund with the total price of the customer's original order and then would compare the $3,000 refund with the total price of the full order (the customer's original order plus the additional 15 containers Terry wanted the customer to purchase).

The second graph would be a line chart. It would show the refund in dollars per ton, comparing the $1,500 refund for the first order and the $3,000 refund for the new total order of 15 cargo containers worth of hay.

Terry Hansen: Teaching Notes for Part Four and Assignment

ANSWER KEY:

At 26 tons per container, this new order for 15 cargo containers would work out to ___*390*___ additional tons.

Added to the previous order for 5 cargo containers, the customer would now have purchased ____*520*___ tons total.

At a price of $220 per ton, the additional 15 cargo containers would cost the customer $____*85,800*___.

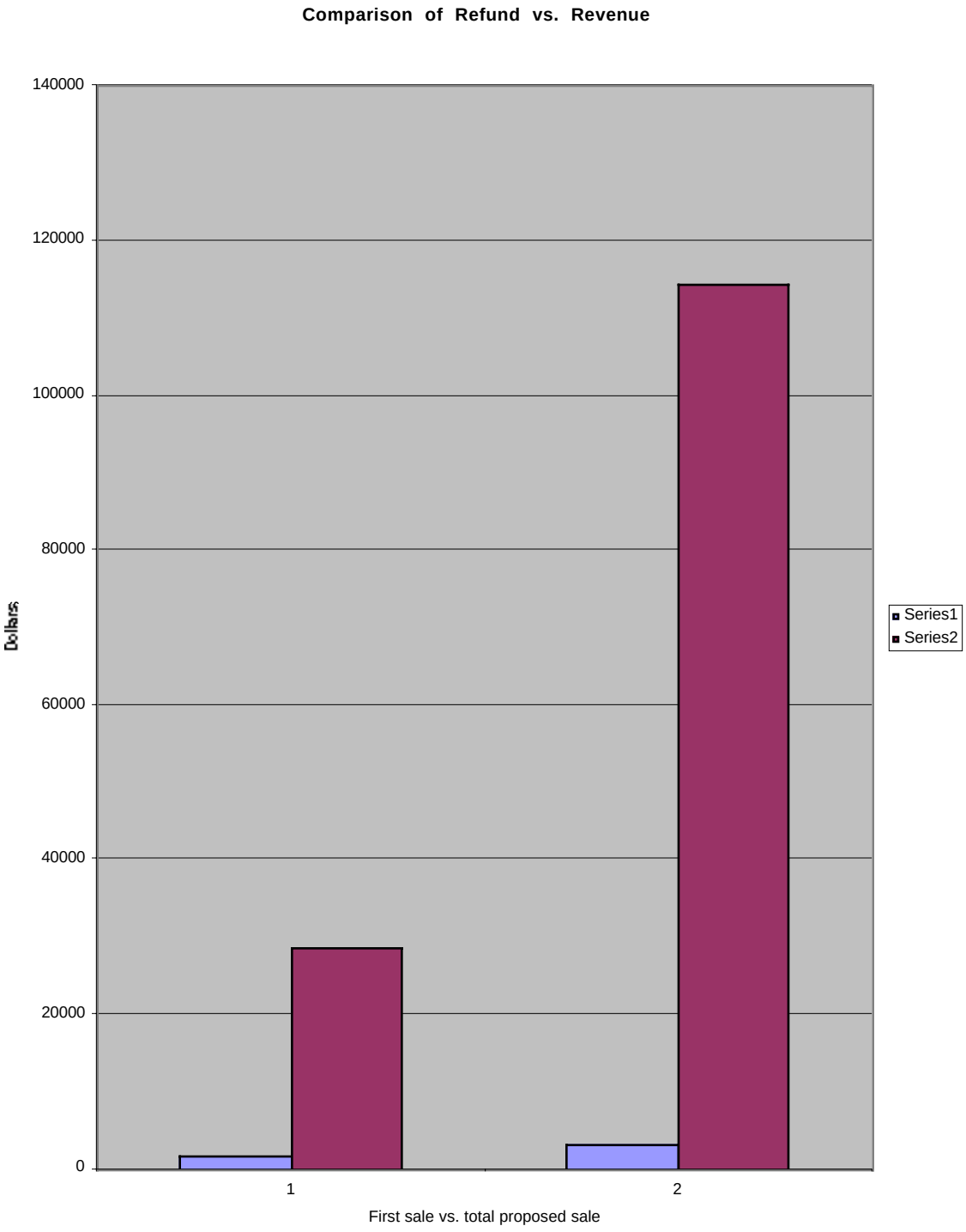
Added to the previous order, the customer would now have a total bill of $_____*114,400*_____.

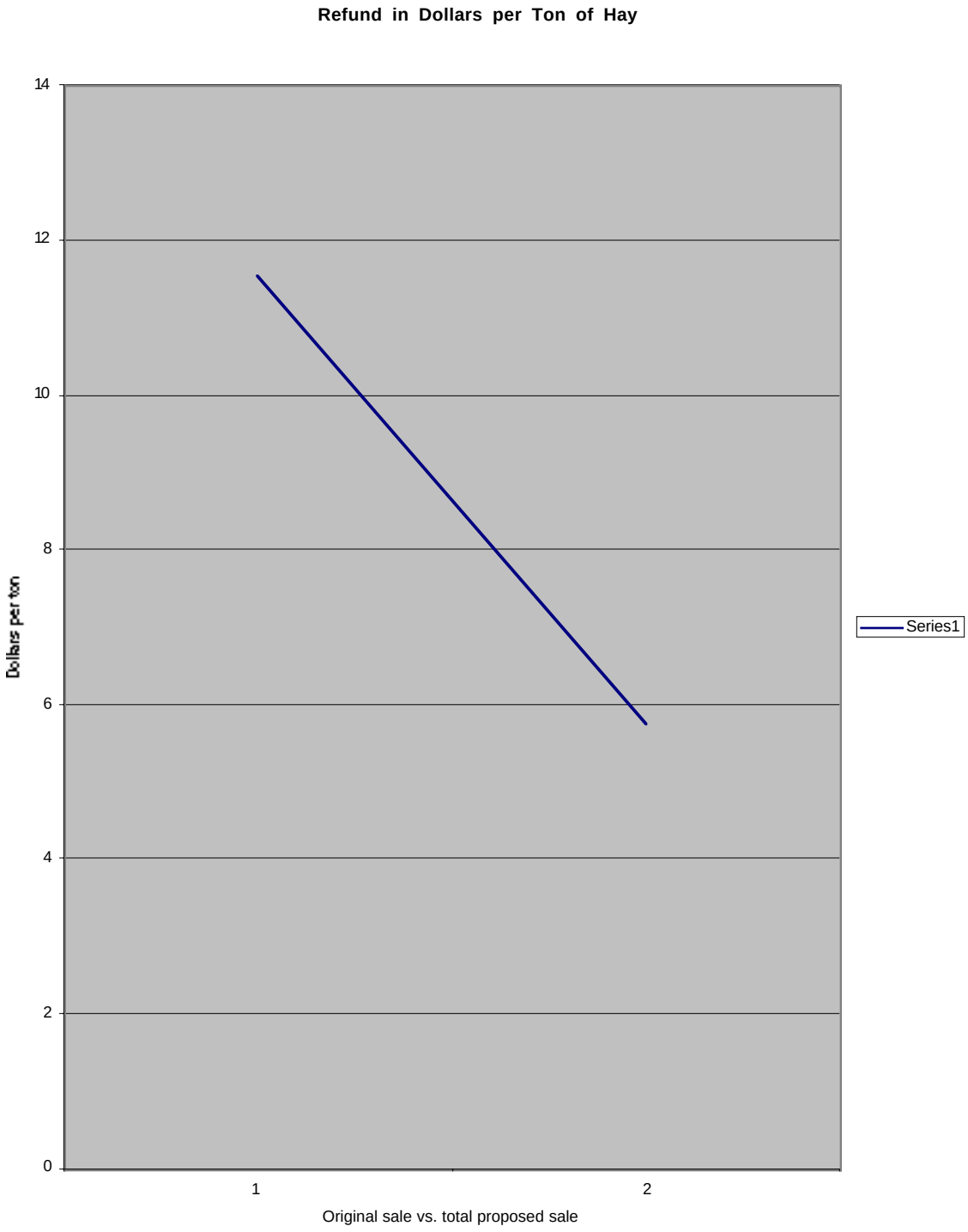
The $3,000 refund would now constitute __*2.6*_____ percent of the total order.

It would result in a payment of $__*5.77*___ per ton.

Ask each student to prepare the memo outlined in the case study. Assess the memos for the students' ability to explain the situation and Terry's proposal clearly, as well as for their ability to integrate Terry's numbers into their writing.

Samples of the requested graphs follow.


Comparison of Refund vs. Revenue
140000
120000
100000
80000
60000
40000
20000
0
Dollars
1
2
First sale vs. total proposed sale
Series1
Series2


Refund in Dollars per Ton of Hay
14
12
10
8
6
4
2
0
Dollars per ton
1
2
Original sale vs. total proposed sale
Series1