

TEACHING NOTES

Jeanne Coen: Shipping Almonds

Appropriate Grade Levels: 6 – 12 (This lesson can be used as the start of a larger research project and career exploration for students in grades 9 – 12)

Implementation Time:

One class period (45 minutes to one hour) required for basic exercise.

An additional class period or more may be required if the teacher wishes to spend more time teaching students about spreadsheets and/or spreadsheet software.

Materials Needed:

Teaching notes for “Jeanne Coen” case study

Student copies of “Jeanne Coen”

Notepaper for small groups to use when brainstorming answers

Graph paper or access to computers with spreadsheet software for student spreadsheets

Career Pathway: Business & Management

Subject Area: Mathematics

What will happen for learners as a result of this lesson?

Students will explore a career opportunity in international trade. They will explore the application of mathematics in a career situation and demonstrate how mathematical ideas connect to real-life situations. They will learn the need for and then develop and manipulate a simple spreadsheet.

How will students learn?

- **Mathematics:** Students will gather information, organize and interpret information, and represent and share information. They will identify mathematical patterns and ideas in other disciplines, use mathematical thinking and modeling in other disciplines, recognize the extensive use of mathematics outside the classroom, and investigate the use of mathematics within an occupational/career area of interest.
- **Writing:** Students will practice writing clearly and effectively to explain technical information. Students will practice writing for career applications, producing technical and non-technical documents using resources from career settings.
- **Economics:** Students will observe major forms of business and related careers. Students will examine the importance of international trade and will investigate the interrelationships between California’s economy and other economic regions.

TEACHING NOTES

Jeanne Coen: Shipping Almonds

How will this lesson plan prepare students to be assessed? *This lesson plan will help prepare students for assessment exams in reading and mathematics. The spreadsheet exercise will permit students to demonstrate their ability to respond to a mathematics challenge by organizing and calculating mathematical information. The writing exercise will permit students to demonstrate their ability to interpret and explain mathematical information.*

Procedure:

This lesson is designed to be taught in one session, though additional classroom sessions may be desired if the teacher wishes to introduce students to the concepts of spreadsheets or to teach them to use spreadsheet software.

- 1. Distribute the students' version of the "Jeanne Coen" case study to your class. Divide the students 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, use the discussion questions included with the teaching notes to get students to brainstorm what Jeanne should do next.*
- 3. Finish by reviewing with students the basic concepts behind spreadsheets using the simple spreadsheet students constructed in Part Three of the case study. Ask students to develop at least one alternative way to organize the spreadsheet so as to get almonds to the most customers by the deadline. Discuss how they might do that. Then, ask them to write a short memo to the processing plant explaining the "instructions" their spreadsheet contains.*

Closure/Assessment:

Review students' spreadsheets and memos for basic writing and presentation skills, as well as for students' ability to explain the steps Jeanne and the processing plant must take to get almonds to the customers.

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 have many variables to consider. Ask them to share personal experiences of having to think through different alternatives to make a decision or 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?

Jeanne Coen: Shipping Almonds

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

Jeanne Coen barely had time to look through the stack of faxes that had just been put on her desk when one of her coworkers walked up with another stack, fresh off the fax machine. It was going to be a busy day.

Jeanne Coen worked as an International Customer Service Representative for the almond company, Blue Diamond Growers, in Sacramento, California. She had worked at Blue Diamond for 15 years.

Blue Diamond had been created in 1910 as a “cooperative” of 230 California almond growers. That is, the growers shared management and ownership responsibility for the company. Before 1910, almond growers sold their crops to independent dealers and had to negotiate on their own for a price. They didn’t feel they were treated fairly, so they united to form a bargaining organization called CAGE, for California Almond Growers Exchange, which later became Blue Diamond.

By the late 1990s, Blue Diamond had 4,000 growers as members. The company helped these growers market their almonds to all 50 states and over 90 foreign countries, making almonds California’s largest food export. In 1997, the state of California’s growers had harvested a record 744 million-pound crop of almonds.

Jeanne’s job was to coordinate almond shipments to other countries. Whenever a buyer in India or China or Japan wanted to purchase almonds, Jeanne got involved. She made sure Blue Diamond’s processing plant could fill the order and then arranged to have it shipped to the customer. September, harvest time, was particularly busy, so Jeanne knew she’d have to be very organized.

STOP

Jeanne Coen: Teaching Notes for Part One

Learning to organize information carefully, particularly when that information is needed to make a decision, is a very important skill to learn.

First, make sure students understand what Jeanne does and what Blue Diamond is.

Then ask students what kind of information they think Jeanne will need to coordinate almond sales to customers in other countries. Students may answer that Jeanne will need to know:

- *How many almonds each customer has ordered.*
- *Whether and how quickly Blue Diamond can produce those almonds.*
- *How and when those almonds can be shipped to the customer.*
- *How much the order will cost.*
- *How the customer will pay for the order.*
- *What kind of paperwork is needed to move a food product (the almonds) between countries. Do other countries allow our almonds to be sold there?*
- *Who she has to talk with – at Blue Diamond, at the shipping company, at the customer's office, at a bank or customs office, etc. – to get the order to the customer.*
- *How quickly the customer needs the almonds.*

Optional: *Lead students through a discussion of HOW Jeanne would get this information.*

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

Jeanne's job was pretty straightforward... most of the time. When she received an order from a customer – usually through a fax – Jeanne would process the order. First she would find out how long it would take Blue Diamond's processing plant to fill the order. Then she would book space on a ship going to the customer's country and arrange to get cargo containers filled with the customer's order from the Blue Diamond plant to the ship.

She would then send a fax or e-mail back to the customer confirming all the details and telling the customer when to expect delivery of the almond order. In addition to processing orders, Jeanne prepared contracts for new Blue Diamond customers, worked with customers' banks to arrange to get payment for their orders, prepared all the documentation needed to export the almonds out of the country, and tracked down these documents when customers needed them.

Even though she followed the same steps with each order, Jeanne had learned that no two orders were alike. There were always challenges to be solved. What if Blue Diamond's plant couldn't produce enough to get the order on the ship the customer had requested? What if the customer had credit problems that had to be resolved before almonds could be shipped? And what happened when Jeanne had to coordinate five to fifteen of these orders a day?

Today, for instance, Jeanne was going to need all her organizational skills. Among the stack of orders she had received that morning were four from buyers in India. The buyers all wanted "Inshell almonds," almonds still in the shell, and all four wanted their orders shipped to Nhava Sheva, an Indian port. Between them, the buyers wanted to purchase over 10,000 bags of almonds. And each, of course, wanted to be first in line to get their order filled and shipped.¹

Jeanne needed to make some calculations. How many pounds of almonds did each buyer want? How fast could the processing plant fill those orders? How many cargo containers would each order fill? She needed to organize a lot of information very quickly.

STOP

¹ Please note that while Jeanne Coen is a real person and this case study is based on her experiences, the four customers referred to in this report are all fictional. Also, many of the details about Blue Diamond's production capabilities are fictional, presented here for the purpose of allowing students to experiment with a spreadsheet.

Jeanne Coen: Teaching Notes for Part Two

Review with students what Jeanne has to do.

*Then ask them how they would **organize** all the needed information in a way that it can be **analyzed**.*

Lead students through a discussion of different ways Jeanne could organize all the information she needs for each of her four customers. Should she make a list? A chart? A picture?

*Then introduce the concept of the **spreadsheet** to students. (Ideally, students will have had at least some experience with the concept of spreadsheets and will know how to construct and manipulate simple spreadsheets on a computer.)*

*A **spreadsheet** is a table with rows and columns in which mathematical information can be calculated and manipulated. Over the last twenty years, spreadsheet software for personal computers has changed the process of using spreadsheets from one of calculating and filling in numbers by hand to one where a computer can be programmed to make calculations and to change values in the spreadsheets based on new information.*

Make sure that students understand that a spreadsheet can be a useful tool whether created by hand – on a piece of graph paper – or created on a computer. Then briefly review with them the main structural elements of a spreadsheet:

- *The fact that information in a spreadsheet is organized into rows and columns, with columns identified by numbers (A, B, C, D) and rows identified by numbers (1, 2, 3, 4).*
- *That a “cell” is the space where a row and column intersect and that each cell is named by the combination of column and row: for instance, A4 or C3.*
- *That individual rows and columns on a spreadsheet are labeled to make it easy to see what kind of information that row contains. For instance, Jeanne will want to label each of the rows in her spreadsheet with one of her customers so that she can easily organize the information for each customer.*

***OPTIONAL:** Ask students to sketch a quick outline for a spreadsheet design showing how they would organize it if they were Jeanne using the information she noted she’d need to collect.*

Part Three - Read to the bottom of the next page.

Jeanne decided to create a **spreadsheet** to track the customers' orders. A spreadsheet is a chart made up of rows and columns in which mathematical information can be calculated and moved around. Jeanne had a spreadsheet program on her office computer; but she knew that if she couldn't get to a computer she could also track the information by hand using graph paper.

Spreadsheets organize information in rows and columns. To keep track of where something is on a spreadsheet, the rows are generally labeled with numbers (1, 2, 3, etc.) while the columns are labeled with letters (A, B, C, etc.) Jeanne decided she would use the rows of the spreadsheet to track information about each of her four customers (called India Almonds, India Grocers, India Hotels, and India Foods). She would use the columns to track each category of information.

But what did she need to calculate? Jeanne decided she would need to track five different things:

Number of bags ordered. The first and most important piece of information she needed was already on each customer's order fax: how many bags of almonds they wanted to buy.

Number of pounds ordered. Blue Diamond shipped inshell almonds in 50-pound bags. To give her instructions to the processing plant, Jeanne would need to calculate how many pounds of almonds each customer had ordered.

Number of cargo containers needed. Jeanne knew a 40-foot-long cargo container could hold 45,000 pounds of inshell almond bags; a 20-foot-long cargo container could hold 22,500 pounds of the bags. How many 40-foot and 20-foot containers would her customers need? Customers could not share containers. Any load that would fill _ or less of a 40-foot container would be put into a 20-foot container.

TURN PAGE AND KEEP READING

Number of shifts needed to fill the orders. Blue Diamond’s processing plant could produce 90,000 pounds of inshell almonds total each day using two 10-hour shifts. If the plant did nothing else but fill these new orders for Jeanne, how many days of work would each order require? *(Please note that this information is just hypothetical, provided to make work on the spreadsheet more straightforward. It does not necessarily reflect Blue Diamond’s actual production capability.)*

The date each order would be ready. It was now Tuesday, September 14th. Jeanne knew the processing plant would be operating 20 hours a day, six days a week during the harvest season. That meant the plant would be processing almonds on Wednesday the 15th, Thursday the 16th, Friday the 17th, Saturday the 18th, Monday the 20th and so on. If Jeanne had the plant fill each customer’s order starting on September 15th in the order in which it had arrived at her desk, on what day would each order of almonds be ready to leave the plant? *(Again, please note that the production capabilities listed here are hypothetical, designed to make work on the spreadsheet more straightforward.)*

Jeanne created a spreadsheet. Then she made the calculations needed to fill it in.

	A	B	C	D	E	F
1	Customer	# bags	# pounds	# 40-ft ctrs.	# days in plant	Date done
2	Name	From order	(# bags * 50)	(# lbs/45,000)	(# lbs/90,000)	(start 9/15)
3	India Almonds	6,750				
4	India Grocers	1,800				
5	India Foods	450				
6	India Hotels	1,350				
7	TOTAL					

STOP

Jeanne Coen: Teaching Notes for Part Three

Allow students to complete their spreadsheets individually or in small groups or have the class as a whole work on completing the spreadsheet.

Make sure that students understand the calculations they need to make to fill in each cell.

If students are creating this spreadsheet on a computer rather than filling it in on paper, help them set up formulas to complete the needed calculations.

An answer key for the spreadsheet follows:

JEANNE COEN SPREADSHEET – ANSWER KEY

	A	B	C	D	E	F
1	Customer	# bags	# pounds	# 40-ft ctrs.	# days in plant	Date done
2	Name	From order	(# bags * 50)	(# lbs/45,000)	(# lbs/90,000)	(start 9/15)
3	India Almonds	6,750	337,500	7.50	3.75	18-Sep
4	India Grocers	1,800	90,000	2.00	1.00	20-Sep
5	India Foods	450	22,500	0.50	0.25	20-Sep
6	India Hotels	1,350	67,500	1.50	0.75	21-Sep
7	TOTAL	10,350	517,500	11.50	5.75	

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

Jeanne shook her head. Her spreadsheet had showed her she was going to have a problem filling the four India orders.

The cut-off date for cargo containers to be loaded onto the next ship leaving the Port of Oakland for Nhava Sheva was the following Tuesday, September 21st. Only containers that were loaded and able to leave the Blue Diamond processing plant by the end of the day on Monday, September 20th would be able to make the cut-off and get loaded onto the ship.

All four of Jeanne's customers had asked to have their almonds loaded on next Tuesday's ship. But as Jeanne studied her spreadsheet, she realized that at least one of the orders would not make that deadline.

What could she do? By the end of the day, she had to give instructions to the Blue Diamond processing plant; reserve the correct number of 40- and 20-foot containers; book the correct amount of space on next Tuesday's ship; and confirm the orders with her four customers.

How should she prioritize the orders? Should she fill them by size? Or should she attempt to meet at least part of each customer's order? That would mean that all four customers would receive some almonds but might not receive their full order. Which approach would be better?

Jeanne decided to change her spreadsheet to look at different ways to fill the orders. Then she would send instructions to the processing plant.

JEANNE COEN: Teaching Notes for Assignment

For their assignment, each student will create a new spreadsheet showing an alternative way to process the almonds so that all customers will get at least some of their order. Students will then write a memo explaining their proposal.

Review Jeanne's dilemma with students: due to the harvest rush, the Blue Diamond processing plant has received more orders from customers in India than can be produced in time to make the next ship going to Nhava Sheva.

What should Jeanne do?

NOTE: At this point, it is OK for a student to decide that the processing should proceed as outlined in the first spreadsheet, meaning that the last customer will have to wait to receive its almond order on the ship the following week. If any students decide that is the best option, they will not have to create a new spreadsheet but will have to clearly explain the first spreadsheet in a memo to the processing plant. (Memo instructions below.)

Other students may say that it would be better to serve all the customers, even if some customers received a partial order next week and the remainder of their order the week after that. If students take that line of reasoning, ask them to show on a spreadsheet how they would do that, remembering that customers' orders cannot be mixed and that Blue Diamond would not want to send a load of less than .5 of a 40-foot container (that is, a full 20-foot container).

Two different options for new spreadsheets follow:

Answer Key – Sample Spreadsheets

Option one -- take all 1.5 loads needed from biggest customer (India Almonds)

	A	B	C	D	E	F
1	Customer	# bags	# pounds	# 40-ft ctrs.	# days in plant	Date done
2	Name	from order	(# bags * 50)	(# lbs/45,000)	(# lbs/90,000)	(start 9/15)
3	India Almonds 1	5,400	270,000	6.00	3.00	17-Sep
4	India Grocers	1,800	90,000	2.00	1.00	18-Sep
5	India Foods	450	22,500	0.50	0.25	20-Sep
6	India Hotels	1,350	67,500	1.50	0.75	20-Sep
7	India Almonds 2	1,350	67,500	1.50	0.75	21-Sep
8	TOTAL	10,350	517,500	11.50	5.75	

Option Two: Distribute shortfall among all customers

	A	B	C	D	E	F
1	Customer	# bags	# pounds	# 40-ft ctrs.	# days in plant	Date done
2	Name	from order	(# bags * 50)	(# lbs/45,000)	(# lbs/90,000)	(start 9/15)
3	India Almonds 1	6,300	315,000	7.00	3.50	18-Sep
4	India Grocers 1	1,350	67,500	1.50	0.75	20-Sep
5	India Foods	450	22,500	0.50	0.25	20-Sep
6	Indian Hotels 1	900	45,000	1.00	0.50	20-Sep
7	India Almonds 2	450	22,500	0.50	0.25	21-Sep
8	India Grocers 2	450	22,500	0.50	0.25	21-Sep
9	India Hotels 2	450	22,500	0.50	0.25	21-Sep
10	TOTAL	10,350	517,500	11.50	5.75	

MEMO Assignment

After students have debated the pros and cons of how to distribute the almonds between the four customers and have experimented with their spreadsheets to see how different options would work, have them write a one-page memo to the manager of the Blue Diamond processing plant to explain the spreadsheet.

The memo should:

- 1. Note that the memo and attached spreadsheet contain instructions for processing and shipping inshell almonds to four customers in Nhava Sheva, India.*
- 2. Summarize the TOTAL order each of the four customers placed and then explain that it will not be possible to fill all four orders in time to meet the cut-off for next Tuesday's ship to Nhava Sheva.*
- 3. Explain the spreadsheet each individual student believes represents the best way to process and ship the almonds. This memo is what the plant will use as a guide, so students should clearly explain the who, when, where, and what of the order. (For instance, the plant should produce x bags of almonds on y date, put them in a z-size container and ship them to b customer.)*

The following "Tips on Writing Business Memos" may be helpful. A sample answer key (using option #1 above) follows.

Tips on Writing Business Memos

The memorandum (or memo) is a common form of business communication. Memos are written by everyone from junior executives and engineers to CEOs. Even in this age of e-mails, mastering the memo format is important, because good professional e-mails and good memos communicate information in exactly the same way.

Memo Format

Unlike letters, which include inside addresses, salutations, and complimentary closings, memos have just two sections: the heading and the body. A memo's heading includes the following information, usually organized like this:

Date: September 14, 1999
To: Blue Diamond Inshell processing plant
From: Jeanne Coen, International Customer Service Representative
Subject: Instructions for new orders

Note that the subject line of the memo should be short but accurate, since it often determines where or how the memo will be filed or even if it will be read.

Memo Content

A good business memo is informative but short. It should have a clear purpose. It should take the reader's needs and knowledge into account. And, it should be carefully organized.

The memo's purpose: Before you start writing, think about why you are writing your memo. What do you want your memo to accomplish? Are you just sharing information? Requesting a meeting so that you can discuss the memo in more detail? Requesting something more, such as money or staff? Make sure that your memo explains its purpose to the reader.

Your reader's needs: How much does your reader know about the issue you are discussing in your memo? Does your reader know a lot about it? Or nothing at all? If your reader knows nothing, you will need to begin the memo with a short summary to explain the issue you are writing about. If your reader knows a lot, you can probably skip the background (or just put it at the end of the memo) and move right into the things you want your reader to do.

Organizing the memo: Most memos begin with a one- or two-sentence introduction of the issue you are writing about and the reason you are writing (the memo's purpose). Then, depending on the reader's needs (see above) they either provide background information or go right into the list of issues to be covered.

Memo Style

Memos and e-mails are less formal than business letters. They can be more conversational in tone. However, don't ever put anything in a memo that you don't want to see again. Remember, even if a memo is informal, it is still a written document, and will be in someone's files or on their computer for months or years.

Sample Memo – Answer Key (using option #1 above – remember, students can use any option they wish for distributing the almonds; this answer key has been prepared to provide you with a sample so that you can assess students’ work.)

Date: September 14, 1999
To: Blue Diamond Inshell processing plant
From: Jeanne Coen, International Customer Service Representative
Subject: Instructions for new orders

Please find enclosed processing and shipping instructions for orders of Inshell almonds to four customers in India. These orders will all be shipped to Nhava Sheva.

Background on Orders

Four of our biggest customers from India placed orders for Inshell almonds today.

India Almonds ordered 6,750 bags.

India Grocers ordered 1,800 bags.

India Foods ordered 450 bags.

India Hotels ordered 1,350 bags.

All four asked that their orders make it to the Oakland port by the Tuesday cut-off for next week’s ship to Nhava Sheva. Unfortunately, their combined total orders are too great to fill in that limited amount of time. Rather than disappoint any single customer, I have prepared processing and shipping instructions that will allow us to fill all four customers’ orders, with India Almonds receiving a partial order on next week’s ship and the remainder of its order on the ship the week after.

Order Instructions

To fill the orders, I have ordered a total of 10 40-foot containers and 3 20-foot containers. I have reserved space on next Tuesday’s ship for 9 40-foot containers and 2 20-foot containers. I have reserved space on the following week’s ship for 1 40-foot container and 1 20-foot container.

1. Please process 5,400 bags (270,000 pounds) of Inshell almonds for **India Almonds (first order)**. Please complete processing by the end of the day on September 17. Please load that order into 6 40-foot containers and dispatch to Oakland Port.
2. Please process 1,800 bags (90,000 pounds) of Inshell almonds for **India Grocers**. Please complete processing by September 18. Please load that order into 2 40-foot containers and dispatch.
3. Please process 450 bags (22,500 pounds) of Inshell almonds for **India Foods**. Please complete processing on September 20. Please load that order into 1 20-foot container and dispatch.
4. Please process 1,350 bags (67,500 pounds) of Inshell almonds for **India Hotels**. Please complete processing by end of day on September 20. Please load that order into 1 40-foot container and 1 20-foot container and dispatch. Dispatch **MUST** be made by end of day on September 20 for items 1-4.
5. Please process 1,350 bags (67,500 pounds) of Inshell almonds for **India Almonds (second order)**. Please complete processing on September 21. Please load that order into 1 40-foot container and 1 20-foot container and dispatch for September 28 ship.