

Supply Chain Management

**Focus:**

**Overview:**

Supply chain management focuses on the production and delivery of goods from raw materials to the final product that is purchased by the consumer. This includes procurement of raw materials, transportation to deliver raw materials to a supplier who sells and ships the products to a manufacturer. A manufacturer can then sell and ship the products to a retailer, who would ultimately sell the product to a consumer. If the sale is online then transportation to the customer’s home also becomes part of the supply chain.

**Essential questions:**

What is supply chain management? Where do supply chain managers work? What skills do you need to have to be a successful supply chain manager? How is supply chain used in the manufacturing process? How is supply chain used in the retailing field? Does transportation play a part in the supply chain process? What role does inventory play in the supply chain? How do warehouses impact the supply chain?

**Objectives:**

* Explain what a supply chain management career involves and skills needed to do well in the career.
* Exhibit a basic understanding of what supply chain management is.

*This lesson is set up with a PowerPoint that can be shown to introduce students to what supply chain management is and what the career entails. There are options provided to reinforce the lesson and to teach some additional concepts.*

**Teaching Notes for PowerPoint presentation (Estimated Time: 15 – 20 minutes)**

The PowerPoint explains what supply chain management is (SCM). It starts out with a formal definition. The definition with the “rights” is commonly used in supply chain management and is easier for students to understand and remember.

The focus of the PowerPoint is to give students an idea of the different places that students generally work if they major in supply chain management. Four types of industries are covered: manufacturing, retailing, warehousing, and transportation. All of these industries have supply chain managers, but any industry that receives inventory is likely to have a supply chain manager. The focus of supply chain managers is cutting costs. Profits are equal to revenues minus expenses. Raising prices are how companies increase revenues. In economics you have learned that price is determined by supply and demand. If supply is low and demand is high, for example, then a higher price will be able to be charged. If you think about it, companies can only raise prices by so much to increase profits. Therefore the best option to increase profit is to decrease expenses. This is an area where supply chain managers can be helpful. A large part of the focus of the job is to look for ways to produce inventory at a cheaper rate. This cheaper rate can be through buying raw materials more cheaply, estimating demand better so that goods do not become obsolete before they are sold, or too many are not produced and sitting in a warehouse which raises costs. Being efficient and choosing the cheapest modes of transportation that can still the deliver the products on time can also help with reducing costs.

The PowerPoint ends by talking about the types of jobs that someone might do in supply chain management. There are many different types of jobs and these are only examples of the types of things people can do. It is an international field, so employees can work in other countries and also work in the US. It is a field where the US is a leader. Many students come from other countries to the US to learn about supply chain management because it is not taught as much internationally. There are also some examples of the types of skills needed to work in supply chain. A student does not have to be excellent in all of these areas to work in this field. The skills needed depend on the type of job. These are some general skills that have proven useful if a student is trying to determine what they would like to improve to prepare for supply chain management.

It should be noted that at the University of Arkansas we have more jobs offered to students in this field than we have of students. We could double our students and still not be able to meet all the demand in this field. Supply Chain is a relatively new field. As companies try to cut costs more supply chain managers will be needed in the future. We are one of the few universities to teach the major.

The following exercises are optional and the teacher should pick and choose the ones that reinforce what supply chain management is.

Option 1: Introductory videos to supply chain management (Estimated Time: 2 to 30 minutes)

Prepare: You will need a projector and an Internet connection to show videos.

<https://www.youtube.com/watch?v=Mi1QBxVjZAw>

What is Supply Chain Management? Time: 8:04 From Arizona State University. Have students guess what costs are involved in creating a bottle of water. Have them write a list on their own of everything that might be part of the cost of a bottle of water. Have students compare their list to other students (meet with two other groups). Then have students make a list on the board. Watch the video after the list has been compiled on the board. Students should make a list of items from the video that they did not originally list.

<https://www.youtube.com/watch?v=XEWsgIUiHyo>

Working in SCM at Biersdorf (the company that makes Nivea skin care products). Time: 2:31. Show students the video. Have them identify the four functions of SCM. They should pick a product and then think of the ways that it fits within the four functions. They could work in pairs to do this exercise and write down what they think.

<http://projects.flowingdata.com/walmart/>

This video shows the growth of Walmart since 1962. Time: 1:40. Walmart, Kmart, and Target all began in 1962. Discussion Questions: Have students answer – which of these companies is largest today? (Walmart) Which makes most profit? Profit is important because it is how a company funds its growth and pays shareholders. (Walmart) How was Walmart able to grow faster than Kmart and Target? Supply Chain Management. Part of supply chain management is making sure that the right product is at the right place at the right time. A big part of this strategy was Sam Walton’s idea of building stores in small towns instead of big cities. This strategy was actually at the insistence of his wife Helen Walton. Mrs. Walton wanted her children raised in a small town. Sam Walton built distribution centers where goods could be delivered via truck within a day’s drive. Other retailers did not follow this principle. Instead they built warehouses several days drive away. Walmart’s strategy hinged on making sure that products are delivered quickly from their distribution centers (private warehouses). This is supply chain management.

Option 2: E-commerce exercise (Estimated time: 5 minutes)

This PowerPoint allows students to have access to what e-commerce is and to gain an understanding of the importance for the future. There are a couple of questions that students can answer to create an opportunity for class discussion.

The following optional video about Amazon could be used to introduce e-commerce: <https://www.youtube.com/watch?v=zknLfU7GJIw> Amazon Time: 4:51 This video gives an inside view of Amazon.com’s warehouse and what happens when you buy something from Amazon. Amazon uses supply chain management principles to make sure goods are available to buy, then pack and deliver the product. Warehouses are also a part of supply chain management.

Option 3: Products (Estimated time: 20 to 45 minutes)

Prepare: You will need calculators – enough for each student or 1 calculator to show on the overhead.

Teach:

Calculator: Buy $1 calculators from Dollar General or Walmart. Loosen screws before providing them to students. Let students work in small groups to take apart the calculators and see how many parts are inside. Students should carefully lay them out. Ask students how could a company make a calculator that can do some challenging math, that is shipped all the way from China to the local Dollar General, and still make a profit at selling the calculators for $1? The answer is this is what supply chain management does. It comes up with the cheapest way to make products and transport them. The calculator is adapted from a presentation by Dr. Ted Farris at the Council of Supply Chain Management Educator’s conference. Tip for large class: If you have a document camera you could use one calculator and ask a student to break it apart and count the number of pieces inside. I found 31 pieces if you count every single item inside. Depending on how you count numbers could be different. As a reminder, each piece is a raw material that had to be shipped to the factory.

**Prepare:** You will need to purchase cookies or prepare a PowerPoint with pictures of foods.

Teach:

Cookies: Look at the cookie aisle in a store. There should be Walker Cookies from Scotland available. Cookies can be broken into smaller pieces. The cookies came all the way from Scotland. How were they able to get to the local grocery store without going bad? The answer is supply chain management. The cookies were shipped in a timely manner to prevent spoilage. Other foods could be examined and tasted. Also, pictures of food could be shown on a PowerPoint for students.

Shirt or jacket tags: Students look at the tags in their clothes to determine where their clothes were made. What does a shirt, for example, cost? How could a shirt come all the way from Vietnam, for example, for $25? Supply chain management again.

Bottled water: Students can drink small samples of water in a taste test to see which sample they prefer. Students can then discuss where the different water came from and the cost of each one.

Students can look at pretty much any product they have and see the country that it was made.

Option 4 – Making a t-shirt (Estimated Time – 10 – 15 minutes)

Prepare:

You will need to create notecards with each item listed for students to place in order. You will need access to a projector and the Internet to show videos.

Teach:

Place each of the following options on a notecard. Students should place the cards in order. The steps are in order below and should be mixed up before being provided to students. You want to explain to students that transportation is not just the five main modes of transportation, it also includes shipments once products have arrived at a warehouse. Anytime the goods are moved transportation is considered to have taken place. <http://www.npr.org/series/248799434/planet-moneys-t-shirt-project> -these videos can provide additional examples of the processes involved in making t-shirts.

Cotton picked

Transportation

Manufacturer 1 that turns cotton into fabric and thread

Transportation

Manufacturer 2 cuts fabric

Transportation

Manufacturer 2 sews fabric pieces together

Transportation

Product is located in a warehouse after manufacturing

Transportation

Product arrives at a warehouse after ocean shipment

Transportation

Product arrives at a retail store

Transportation

Product is stored in the store’s warehouse

Transportation

Product is moved to the retail floor

Product is sold

This is actually a small step process compared to many products. Note the role that transportation plays in the process. Each one of the steps represents a time when supply chain managers are involved with the product. If it takes so many steps to build a t-shirt, how many steps are involved in building a car or electronics? Each one of these steps involves the opportunity to involve supply chain management to lower costs. There can be variations in answers to this problem. Tip for a large class: Type up steps in random order on paper and have students put them in order.

Option 5 – Water: A Supply Chain Exercise (Estimated time: 25 - 45 minutes)

Prepare: Projector and access to the Internet to show videos. Gather enough cups so that each group has 6. You will need white paper and two other colors of paper cut into small squares. Alternatively you can use water bottles and a game board.

Teach:

This game simulates the manufacturing process in a small scale way. To help students to understand the importance and scarcity of water videos may be shown: <https://www.youtube.com/watch?v=iRGZOCaD9sQ> Time 4:03 or <https://www.youtube.com/watch?v=VIaw5mCjHPI> Time: 5:04. There is a manufacturer who produces bottled water at a spring. They purchase plastic bottles. For simplification, the label on the bottle, the bottle cap, and other costs are not added to limit complexity. After bottling the water the water is sent to a retailer who sells the water.

Three teams should be formed: the Manufacturer, Transportation, and the Retailer.

The manufacturer orders plastic bottles and transportation brings the bottles. The retailer orders bottled water and transportation brings the bottled water.

The manufacturer should have two plastic cups that cannot be seen through. The retailer should have two plastic cups that cannot be seen through. There should be white paper cut in small squares that represents empty bottles. Another color of paper should be cut in small squares to represent the bottled water. For the example we will use the color red. A third color should be used to represent the bottled water that is sold. For the example we will use the color blue. Each color will represent a dollar amount. The white is .25, the red is .50, and the blue is 1.00.

Note: This game can also be played by using pictures of bottled water (both full and empty) instead of using the colored paper system. Index cards or a board could be created as well.

Round one: The manufacturer is given information that the retailer wants 10 bottles of water. Transportation should deliver 10 white squares of paper to the manufacturer in cup 1. The manufacturer will take the white paper out and put in 10 of the red squares in cup 2. Transportation will pick up the red squares and deliver them to the retailer in cup 1. The retailer will transfer the red squares to cup 2. The retailer sells 10 bottles of water represented by blue paper and empties cup 2.

Debrief the students. Students should note that this is an example of a supply chain when everything goes well. The raw materials arrived at exactly the right time. The transportation was on time. The retailer received the water in exactly the time needed. How much revenue and profit did the manufacturer make? (Answer: Revenue: $5.00; Profit: $2.50). How much revenue and profit did the retailer make? (Answer: Revenue: $10.00; Profit: $5.00) For simplicity, transportation is not charged although it is not free.

Round two: In this round, the retailer again communicates they need 10 bottles of water. However this time only 5 are delivered as white squares. Therefore the manufacturer can only create 5 bottled waters (red squares in cup 2). Transportation comes to pick them up and take them to the retailer’s cup 1. The retailer transfers them to cup 2 and empties them.

Debrief the students. If the retailer wanted 10 bottles of water and only received 5 what does this mean for the retailer? Their sales and related profit are lowered. What was the revenue and profit for the retailer? (Answer: Revenue: $5.00; Profit: $2.50) Also, they could lose consumer goodwill as the consumer is encountering empty shelves and not receiving the products that they wanted. What does this mean for the manufacturer? Their sales and profits also decreased. If they cannot meet the demand for their customers they could also lose customers. What is the revenue and profit for the manufacturer? (Answer: Revenue: $2.50; Profit: $1.25).

Round three: Suppose the retailer wanted 10 bottles of water. The manufacturer received 20 bottles (white paper squares originally and then produced 20 red) and delivered 20 to the retailer. The retailer received 20 pieces of red paper in cup 1. In cup 2, they took out 10 pieces of blue paper to represent the sale of 10 bottles, but 10 pieces of blue paper remains. What does this mean for the retailer and the manufacturer?

Debrief the students. First, the manufacturer delivered more than was ordered. In this case the retailer accepted the order. In most cases the retailer will not accept extra product that is not ordered. The manufacturer could lose a client. The retailer now has inventory that they must hold in their warehouse that did not sell. This will increase their costs.

Round four: The retailer orders 10 bottles of water. The manufacturer requests the empty bottles but the transportation never brings them. The manufacturer was unable to produce the water and could not send it to the retailer. What does this mean?

Debrief the students. If the transportation does not deliver the needed raw materials, then the manufacturer could not produce the product or deliver it to their customer, the retailer. The manufacturer will lose a sale and most likely a customer. The retailer will have no product to sell. This means they have no revenue or profit from the product. What if the manufacturer is able to produce the water, but cannot arrange transportation to the retailer? The retailer still loses sales and now the manufacturer must store the water in their warehouse which increases costs. If the transportation is late, then products may not be able to be made or delivered on time therefore sales for both the manufacturer and the retailer would be lost.

Round five: After seeing the scenarios, the students can now play the game. Each team should be given cards for each round and should not communicate. At the end of the game the teams should state what happens. Note: This portion of the game can be played on another day.

Note: If a shipment is Late add $2.00 to the cost. If a shipment never shows up the entire cost should be charged to the party expecting the shipment. This is because most freight is shipped FOB Origin meaning that the sale is complete once the item leaves seller’s shipping dock. This means that the buyer owns the merchandise once it leaves the seller’s shipping dock and should be added to the cost. In the real world the transportation company would have to provide information on lost or damaged merchandise and perhaps reimburse for the cost of the goods, but this becomes too complex for the game.

|  |  |  |  |
| --- | --- | --- | --- |
| Transportation | Manufacturer | Transportation | Retailer |
| On time | Receives 10 bottles from the supplier Makes 10 to send to the retailer | On time | Receives 10 from the manufacturer and sells 10 bottles to the consumer |
| On time | Receives 5 bottles from the supplier and makes 5 bottles to send to the supplier | Late | Receives 5 bottles from the manufacturer but sells only 2 bottles to the consumer |
| On time | Receives 20 bottles from the supplier and makes 10 bottles to send to the retailer. | On time | Receives 10 bottles from the manufacturer and sells 10 bottles to the consumer. |
| Late | Receives 15 bottles from the supplier and makes 15 bottles to send to the retailer | On time | Receives 15 bottles from the manufacturer and sells 10 bottles to the consumer. |
| Never shows | Receives 0 bottles from the supplier and receives 0 bottles from the supplier. | Never shows | Receives 0 bottles from the manufacturer and sells 0 bottles to the consumer. |
| On time | Receives 10 bottles from the supplier and makes 10 bottles for the retailer. | Never shows | Receives 0 bottles from the manufacturer and sells 0 bottles to the consumer. |
| On time | Receives 9 bottles from the supplier and makes 9 bottles for the retailer. | On time | Receives 9 bottles from the manufacturer and sells 9 bottles to the consumer. |
| Late | Receives 10 bottles from the supplier and makes 10 bottles for the retailer. | Late | Receives 8 bottles from the manufacturer and sells 4 bottles to the consumer. |
| On time | Receives 10 bottles from the supplier and makes 10 bottles for the retailer. | On time | Receives 10 bottles from the manufacturer and sells 10 bottles to the consumer. |
| On time | Receives 7 bottles from the supplier and makes 7 bottles for the retailer. | On time | Receives 7 bottles from the manufacturer and sells 5 bottles to the consumer. |

How many bottles were produced and how many bottles were sold? Were there any bottles still on hand? What caused the excess inventory? (Answer: Late arrivals by transportation, no shows on transportation, and ordering from the manufacturer was incorrect by the retailer, and the manufacturer sometimes received incorrect order quantities). Students may also calculate overall profit and revenue for each row, or overall profit or revenue. Answer for overall profit for each: Manufacturer: $14 and Retailer: $16.50

Option: Students could also be assigned a type of transportation to add complexity to the assignment.

Option 6 – Quiz “Is Supply Chain a Career for You?” (Estimated Time: 5 – 20 minutes)

Prepare: Copy and paste the questions into PowerPoint or a word document. Have the students answer questions, then give them the key to grade responses.

Teach:

<http://www.owlguru.com/career/supply-chain-managers/quiz/> This website contains more information on the top personality characteristics needed for supply chain managers. They are dependability, analytical thinking, attention to detail, initiative, and integrity. There is also more information related to specifically what a supply chain manager does. As you will see it involves inventory that we discussed in the PowerPoint and also explains how supply chain works with all other parts of the business. Supply chain managers often make forecasts or predictions of demand for products . There is a quiz that can help a student determine if this is a career that they might like. The questions on the quiz are listed below:

In this career quiz, there are 10 questions that will analyze if the Supply Chain Managers career is right for you.

There are 3 answers to each question: Dislike, Okay and Like.

Answer **“Dislike”** if you tell yourself “Ugh… Sounds boring” or “I’m not sure”  
Answer **“Okay”** if you tell yourself “Umm… I think I will be okay with that”  
Answer **“Like”** if you tell yourself “Yes, I’m interested”

| **Question** | **Dislike** | **Okay** | **Like** |
| --- | --- | --- | --- |
| You’re interested in production and processing like raw materials, production processes, quality control, and other techniques for maximizing the manufacture and distribution of goods. |  |  |  |
| You’re interested in business and management principles like strategic planning, coordination of people and resources, leadership technique and production methods. |  |  |  |
| Confer with supply chain planners to forecast demand or create supply plans that ensure availability of materials or products. |  |  |  |
| Monitor forecasts and quotas to identify changes or to determine their effect on supply chain activities. |  |  |  |
| You like starting up and carrying out projects. |  |  |  |
| You like leading people and making many decisions. You don’t mind risk taking and dealing with business. |  |  |  |
| You like following set procedures and routines. |  |  |  |
| You like working with data and details more than with ideas. |  |  |  |
| You like work that includes practical, hands-on problems and solutions. |  |  |  |
| You like dealing with plants, animals, and real-world materials like wood, tools, and machinery. You like working outside, and hate paperwork or working closely with others. |  |  |  |

Your Results

Now count how many points you have.  
Dislike = 0 point  
Okay = 1 point  
Like = 2 points

Results:

Here are your results.  
00 to 09 points = You will not like this career  
10 to 15 points = You are the right person for the job  
16 to 20 points = You are perfect for this career

It is totally ok if someone isn’t meant for the career. It is good to know about and explore careers as you might work with a supply chain manager at some point and it is good to know what a career entails.

**Option 7 – True/False (Estimated Time: 10 to 15 minutes)**

**Prepare:** Read the questions aloud to the students. Give each student two notecards if desired that they can write true or false on.

**Teach:**

Have students either hold up a sign/notecard that says true/false or a hand to represent true/false. These questions are from the PowerPoint.

1. Supply Chain Management is the oversight of materials, information, and finances as they move in a process from supplier to manufacturer to wholesaler to retailer to consumer. (Answer: True)
2. Getting a product to the right place at the right time in the right quantity is a part of supply chain management. (Answer: True)
3. Supply chain managers try to get raw materials at the highest price possible. (Answer: False. They try to get products at the lowest price possible).
4. A forecast is the name for the predictions that a retailer makes about how much of a product will be purchased. (Answer: True)
5. Pipelines are not one of the five modes of transportation. (Answer: False – pipelines are one of the modes).
6. All products are stored in warehouses at least twice in their lives. (Answer: False – they are stored at least once in a warehouse. Many probably are stored multiple times.)
7. The purpose of the warehouse is to manufacture goods. (Answer: False – it is to store goods).
8. Supply chain management is really all about managing all the aspects involved with inventory. (Answer: True).
9. Supply chain managers will save companies 1 billion dollars in the next few years. (Answer: False. They will save 3 trillion dollars.)
10. Ability to make decisions and strong information system skills are good skills to have in supply chain management. (Answer: True).

**Option 8 – Video Exercise (Estimated Time: 10 – 20 minutes)**

**Prepare:** You will need a projector and access to the Internet to show the videos in class.

**Teach:**

Below are three videos about three different ways the supply chain is used. All students should watch the videos. Different students should be assigned to note how they see supply chain used and how it might be able to be improved.

<https://www.youtube.com/watch?v=ElYNhGbOTOQ> Starbucks Time: 2:01. How Starbucks uses the supply chain.

Lean Manufacturing: <https://www.youtube.com/watch?v=P-bDlYWuptM> The Toyota Production System Time: 4:14 This system shows how defects are caught and eliminated in the production process for Toyota cars. Part of supply chain management is running factories, and also making sure the factories and good produced are efficient in terms of time and money for a quick delivery to customers.

Fast Fashion: <https://www.youtube.com/watch?v=qhCM0F81vEg> Zara Time: 3:02 This video shows how clothes must be quickly delivered. Supply chain management makes sure that the clothes are produced in time and transportation makes sure they are delivered in time.