



Teaching Guide

For

Shipping Auto Parts for Toyota

**Illinois Transportation, Distribution and Logistics
Math and Science Project**

2007

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Acknowledgements

We would like to recognize the following people for their contribution to this module:

Steve Bowns, Service Manager, Bob Dennison Ford

Bill Mcnamara, Parts Manager, Bob Dennison Ford

Otis Kindle, Bloomington High School

Jim Pierce, Lincoln Land Community College

Problem Solving Activity

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Scenario Focus

Primary Career Pathway: Transportation Operations

Occupation/Job Titles Related to this Scenario: Service Parts Manager, Parts Distributor, Distribution Manager, Warehouse Manager, Toyota Manager/Owner

Recommended Teaching Subject Areas: Industrial Technology, Math

Teacher/Writer Information

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Scenario Problem Statement and Performance Elements

A customer came in today with a damaged radiator in their 2004, 4 cylinder, Toyota Camry. The part number is 164000-h131 and it weighs 17lbs and is shipped in a box with dimensions of 24x34x7. We need to ship this radiator to the Bloomington, IL Toyota dealership as soon as we can to start fixing their car. The part is on backorder at the Aurora, IL distribution facility. We can wait for the backorder to come in from Aurora, IL, but it will take 6 days to ship it here. There are three possible faster options in the shipment of this part...

- 1) Kansas City, Missouri has the part in stock and ready to be shipped today.
- 2) Cincinnati, Ohio also has the part in stock and ready to be shipped today.
- 3) Another option is to find another Toyota dealership in the state with the part in stock and send a service technician go pick it up, today.

You may choose one of the three options above, your own solution, or you may choose to wait 6 days for the backordered part. Using internet searches, other CITED sources, and the attached materials, please write a business report and present this to the class on which option is the best for Toyota and the customer and why. **You will need to show the mathematics you will be using.**

TDL Cluster Knowledge and Skills and Performance Elements

- Develop routes to meet service and time requirements at lowest cost.
- Develop transportation plans (e.g., report, memo, tables) including routing and scheduling.
- Present transportation plans (e.g. business meeting).
- Determine origin and destination points for routing.
- Determine load levels and transportation requirements for goods and/or people.
- Determine availability of qualified operators and required transportation equipment.

Illinois Learning Standards:

Math - Stage I

- Solve problems involving multiple rates, measures, and conversions. (7C)
- Calculate by an appropriate method the length, width, height, perimeter, area, volume, surface area, angle measures, or sums of angle measures of common geometric figures, or combinations of common geometric figures. (7C)
- Represent and explain mathematical relationships using symbolic algebra. (8A)
- Justify the results of symbol manipulations, including those carried out by technology. (8A)
- Identify essential quantitative relationships in a situation and determine the class or classes of functions (e.g., linear, quadratic) that might model the relationships. (8A)
- Represent relationships arising from various contexts using algebraic expression. (8A)
- Students who meet the standard can organize, describe and make predictions from existing data. (10A) (*Data Analysis*)

Language Arts: Stage I

- Students who meet the standard can speak effectively using language appropriate to the situation and audience. (4B)

What I Want Students to Know	What I Want Students to be Able to Do
<ul style="list-style-type: none"> • Definitions for logistics and distribution. • Understand the role of logistics and distribution in the automotive industry. • Career opportunities in logistics and distribution • Major types of distribution channels • Major costs of distribution • What happens if you send an employee to pick up the product in a neighboring town? 	<ul style="list-style-type: none"> • Determine most appropriate type of transportation operations for the product • Calculate cost of transportation for specific products. • Read Maps and plan routes between two or more destinations. • Use Internet to plan routes between two or more destinations. • Write a business report. • Make a presentation with visuals (poster or PowerPoint).

Objectives:

- Learn about the role of logistics and distribution within the automotive industry.
- Acquire the skills needed to develop a distribution plan for a part that is needed and on backorder at the existing distribution center.
 - Describe the major types of distribution for the physical distribution of products.
 - Describe and calculate the major types of costs in the physical distribution of products.
 - Research different types of distribution types and their costs.
 - Read and interpret maps and estimate mileage between two locations.
 - Use computers (map-quest, etc.) to estimate mileage between two locations.
 - Identify and describe all possible routes between a location of origin and multiple locations to where you must travel; then select the lowest cost route.
 - Think of other possible solutions to the problem and have evidence to support those ideas.
- Prepare a written business report.
- Deliver an oral presentation of the distribution plan.

Measurement Criteria for an acceptable solution:

1. Carrier selected represented the most cost effective means for delivering products.
2. Identified on map the distribution locations and how far they are from the destination.
3. Evaluated alternative locations and determined service level and cost differences.
4. Researched different distribution types and cost and time.
5. Used computers (map-quest etc.) to estimate mileage between two locations.
6. All calculations were correct using formulas, maps, and charts provided.
7. Business report included a cover letter, introduction stating the purpose of the report, documentation to support recommendations, a detailed explanation of costs, and tables, charts and spreadsheets to more clearly communicate recommended distribution plan.
8. Presentation presented the information with visual aids, PowerPoint, and/or handouts and met the 7 requirements of effective business presentations:
 - Evidence of students being prepared
 - Started on time and kept the presentation under 10 minutes
 - Dressed in business attire
 - Showed enthusiasm and confidence
 - Showed good speech etiquette—eye contact, respect
 - Spoke distinctly without grammatical errors or slang.
 - Asked if there were any questions at the end and answered questions they best they could with an open mind to other students suggestions.

Teacher Notes:

Students should have a prior knowledge of working with the order of operations, distance formula, and solving problems. Students may need more information on the transportation and distribution of parts. This can be done right along with the scenario. Resources for this are in the Tool Box Bibliography in the appendix.

Please review the materials needed prior to starting the problem solving activity so that you can make copies or obtain items needed. Notify students of the date that presentations will be made. Give students the opportunity to

make their own cause and effect connections as various consequences present it.

Use discretion in providing Toyota employee contact information. Try to have students ask you questions, then if you have more questions you may call me, Brooke Merker or Steve Bowns at Toyota. When students have questions, first direct them to use reliable Internet resources instead of contacting the Toyota dealership. You may want to use a local dealership as a business partner. This would be advantageous; particularly if the students could visit the service department or if you could utilize someone from the service department as a guest speaker.

Time Required to Complete Problem: 6 hours

Types of Materials included in this Module:

1. Lesson plans for each topic with discussion questions and student activities.
2. Copy of student handouts with reading assignments and activities for duplication.
3. Copy of material describing problem for students.
4. Evaluation with measurement criteria and scoring guide.
5. Teacher materials to assist in evaluation of problem and possible solution steps.
6. Glossary of terms related to this module.
7. Toolbox Bibliography.

Support Materials and Resources Necessary for Completion of Scenario:

- Computer access to internet and map programs (mapquest, yahoo)
- Handouts (see each lesson)
- Websites (see each lesson)
- Software such as Excel, PowerPoint
- Calculators
- Distribution DVD—What in the World is the Global Supply Chain? (Available from CSCMP, Council of Supply Chain Management Professionals, 2805 Butterfield Rd., #200, Oak Brook, IL 60523 or www.cscmp.org.)

Lesson 1

TOPIC	Introduction to Transportation, Logistics & Distribution	TIME ESTIMATE	1 hour
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OBJECTIVES
<ul style="list-style-type: none"> • Students will be able to define transportation. • Students will be able to explain how products get from the manufacturer to the store.

MATERIALS & RESOURCES
<ul style="list-style-type: none"> • DVD on Transportation: "What in the World is the Global Supply Chain?" • Copies of Chapter 1 of text, "A Practical Guide to Transportation and Logistics by Michael B. Stroh. • Handout #1 • Handout #2

LESSON DESCRIPTION & ACTIVITIES		
Steps	No. of Minutes	ACTIVITIES
1	20	<ul style="list-style-type: none"> • Introduction to TDL • Show video of a distribution center and/or service department or visit some websites and/or take students to a car dealership or service shop. • Brainstorm with student's things they noticed in the video or field trip. Make a list of these on the board.
2	20	<ul style="list-style-type: none"> • Distribute copies of Chapter 1 if the text "A Practical Guide to Transportation and Logistics by Michael B Stroh, Have students read pages 3-25. Discuss any questions the students might have.-may be homework if you run out of time. • Have students discuss and answer the questions on Handout 1, Transportation Questions in groups of three.
3	20	<ul style="list-style-type: none"> • As a class, discuss the answers to the questions • Distribute Handout 2, Review of Mathematics Concepts Worksheet for Homework.

Transportation Questions

As a small group answer the following questions and be prepared to discuss them as a class.

1. What is domestic transportation?
2. What are three types of transportation in the US?
3. Why do you need a Bill of Lading?
4. How could you get something shipped at a cheaper price than the quote you are given?
5. What is air transportation?
6. What are some things that could be bad about shipping by air?
7. Brainstorm other ways in which you think products are shipped to the customer or store.
8. Brainstorm some ways to find out about shipping in your community.

Review of Mathematics Concepts Worksheet

1. If a bus travels 55 mph and travels for 5.6 hours, how many miles did it go?
Use $d=rt$.
2. If a person travels for work for 240 miles, and gets paid 40.9c per mile, how much did they make?
3. Solve for x ; $18 = 2x + 6$
4. Michael has 1 liter of a mixture containing 69% of boric acid. How much water must be added to make the mixture 50% boric acid? (Represent your answer as a fraction).
5. If a triangle has legs of 3 and 6, find the hypotenuse. Round to the nearest 10th. Use the Pythagorean Theorem!!!!!!!!!!!!
6. In a shipment of 100 tires, 1/10 of them are defective. What is the ratio of defective bulbs over non-defective bulbs?
7. If you have gone 4.8 miles in 24 minutes, what was your average speed, in miles per hour?
8. A box of Goldfish crackers contains $4\frac{1}{2}$ cups of goldfish. At most, how many persons can you serve from this box of goldfish if each serving must be at least $\frac{2}{3}$ a cup?

Lesson 2

TOPIC	Overview of TDL	TIME ESTIMATE	1 hour
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OBJECTIVES

- Students will be able to understand warehousing and logistics.
- Students will have an understanding of the shipping problem.

MATERIALS & RESOURCES

- Handout #3
- Handout #4
- Handout #5
- Websites: www.mapquest.com and www.wikipedia.org

Lesson Description & Activities

Steps	No. of Minutes	ACTIVITIES
1	20	<ul style="list-style-type: none"> • Distribute Handout 3, Warehousing and Logistics, and have students' complete questions. • Have students work in pairs by searching on computer for the terms, "Logistics" and "Warehousing." Suggested website: http://en.wikipedia.org/wiki/Main_Page.
2	25	<ul style="list-style-type: none"> • Assign students to group and distribute practice problems, Handout 4. • Introduce websites of Map Quest and Toyota. • As a class, go to the websites and discuss solutions and how to use websites as resources. • Allow time for groups to work through activities related to Handout 4. (May want to work through the first question together as a class.)
3	15	<ol style="list-style-type: none"> 1. Provide background information on the Toyota Shipping Auto Parts Module and distribute Handout 5, The Problem. 2. Read the scenario together as a class and answer any questions the students may have about the assignment.

Warehousing and Logistics

Go to http://en.wikipedia.org/wiki/Main_Page and search for the terms, Logistics and Warehousing.

Once you have done this, please answer the following question?

1. What is a warehouse?
2. What are warehouses used for?
3. List two other things you learned about warehouses from your Internet search.
4. What is Logistics?
5. How is warehousing and logistics related?

In Class Practice Problem-

- 1) Use online resources (Map quest) to figure out how many miles it is from Morton to St. Louis, MO.
- 2) Use online resources (Map quest) to figure out how many miles it is from Morton to Aurora, IL.
- 3) If you drove 55 mph in a truck how long would it take you to get to each location?
- 4) If you drove 70 mph how long would it take you?
- 5) If were delivering pumpkins in a truckload and it cost you 45 cents per mile to get to Aurora from Morton how much would it cost you to get there?
- 6) If you were delivering pumpkin flavored fudge and needed a refrigerated truck (so it would cost more than the normal pumpkin truck) from Morton to St. Louis, how much would it cost you if you had to pay the company 70 cents per mile?
- 7) If you wanted to ship the fudge by plane from Morton to St. Louis it would cost \$2.20 per mile, but it would take half the time. How much would it cost you and how long would it take?
- 8) Which is better for shipping the fudge to St. Louis? The plane or the truck and why? (There is not one correct answer!!!)

Bob Dennison Toyota Dealership

1508 Morrissey
Bloomington, IL 61701

To: Purchasing Manager (Student)

From: Steve Bowns, Service Manager

A customer came in today with a damaged radiator in their 2004, 4 cylinder, Toyota Camry. The part number is 164000-h131 and it weighs 17lbs and is shipped in a box with dimensions of 24x34x7. We need to ship this radiator to the Bloomington, IL Toyota dealership as soon as we can to start fixing their car. The part is on backorder at the Aurora, IL distribution facility. We can wait for the backorder to come in from Aurora, IL, but it will take 6 days to ship it here. There are three possible faster options in the shipment of this part...

- 1) Kansas City, Missouri has the part in stock and ready to be shipped today.
- 2) Cincinnati, Ohio also has the part in stock and ready to be shipped today.
- 3) Another option is to find another Toyota dealership in the state with the part in stock and send a service technician go pick it up, today.

You may choose one of the three options above, your own solution, or you may choose to wait 6 days for the backordered part. Using internet searches, other CITED sources, and the attached materials, please write a business report and present this to the class on which option is the best for Toyota and the customer and why. You will need to show the mathematics you will be using.

Lesson 3

TOPIC	Review of Transportation	TIME ESTIMATE	2 hours
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OBJECTIVES

Students will develop a plan to address their solution to the scenario.

MATERIALS & RESOURCES

- Handout #5 from previous lesson
- Handout #6
- Websites: <http://en.wikipedia.org/wiki/Transportation>

Lesson Description & Activities

Steps	No. of Minutes	ACTIVITIES
1	30	<ul style="list-style-type: none"> • Have students go to the web and read the article on Transportation at http://en.wikipedia.org/wiki/Transportation. Discuss how this relates to what they are working on for Toyota. • Distribute Handout 6, Thinking Through a Distribution and Transportation Problem. Review steps and expectations with students.
2	30	<ul style="list-style-type: none"> • In their groups, students should talk about how they plan to reach a solution to the scenario in Handout 5. Each group may ask questions. Have one member assigned as the Secretary to take notes. Make sure as the teacher to use group work strategies to make sure they are working.
3	45-60	<ul style="list-style-type: none"> • Provide class time for the students to work on their possible solutions.

4	Optional	<ul style="list-style-type: none">• <u>Teacher Note:</u> If students have any experience with making electronic spreadsheets, all math formulas and problems can be done with Excel or other spreadsheet software.• <u>Optional Activity:</u> If students need more work on math skills; teacher could come up with other situations or problems, Jeopardy game or have students work in teams/or groups at the board to get the answer. Points could be assigned for each right answer.
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Thinking Through a Distribution and Transportation Problem.

When working on the problem there are some things you need to make sure you are doing.

1. Make sure to figure out how many miles from each location to Bloomington, using **map quest** or a similar website. Read and interpret maps and estimate mileage between two locations.
2. Research different transportation methods and costs from each location.
3. Carrier selected has a reasonable time for shipment.
4. Identify on a map the distribution locations and how far they are from the destination.
5. Describe and calculate the major types of costs in the physical distribution of products.
6. Think of other possible solutions to the problem and have evidence to support those ideas.
7. All calculations were correct using formulas, maps, and charts provided.
8. Business report included a cover letter, introduction stating the purpose of the report, documentation to support recommendations, a detailed explanation of costs, and tables, charts and spreadsheets to more clearly communicate recommended distribution plan.
9. Presentation presented the information with visual aids, PowerPoint, and/or handouts.
10. The presentation met the 6 requirements of effective business presentations:
 - Evidence of students being prepared
 - Started on time and kept the presentation under 10 minutes.
 - Dressed as they were in a business setting.
 - Showed good speech etiquette.
 - Spoke distinctly without grammatical errors or slang.
 - Asked if there were any questions at the end and answered questions the best they could with an open mind to other student's suggestions.

Lesson 4

TOPIC	Writing a Business Report	TIME ESTIMATE	3 hours
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OBJECTIVES
<ul style="list-style-type: none"> • Students will understand and be able to write a business report. • Students will develop and present an oral report based on the business report.

MATERIALS & RESOURCES
<ul style="list-style-type: none"> • Handout #7 • Computer with access to word processing and presentation software

Lesson Description & Activities		
Steps	No. of Minutes	ACTIVITIES
1	20	<ul style="list-style-type: none"> • Distribute Handout 7, Writing a Business Report. • Discuss Handout 7 as a class and as any questions students may have.
2	100	<ul style="list-style-type: none"> • Allow time for students to prepare the report.
3	40	<ul style="list-style-type: none"> • Have students make presentations to the class and let the class ask questions about their solution and make suggestions.
4	20	<ul style="list-style-type: none"> • Allow time for student reflection on the module. What did you learn new as a result of this activity? How is math important in this career? • Discuss various careers in logistics and distribution that would be associated with this problem.

Writing a Business Report

Your business report should clearly and effectively communicate to your audience the purpose, methods, and results of your project.

In developing and evaluating your business report, you should focus on three issues:

- Purpose and content
- Organization and structure
- Communication clarity and accuracy

Purpose and Content

The first step in developing or evaluating your business report is to make sure that you have clearly defined the purpose of the report and have addressed the needs and requirements of your audience.

You should start by developing a clear statement of the purpose of the report and a listing of the major topics and types of information that must be included.

With your team:

1. Develop a clear and concise statement of the purpose of the report.
2. Develop a list of the major topics and types of information that must be included to meet the requirements of the customer.

Organization and Structure

The second step is make sure that your have organized your report in the most effective way. In general, reports should have four major parts:

- Introduction to the Report—The introduction should state the purpose of the report and should summarize what is described in the report.
- Body of the Report—The body of the report should contains the major sections that address all major issues and summarize all required information that may include graphs, charts, tables, and figures.
- Summary of the Report—The summary of the report should summarize the body of the report and major conclusions and recommendations

- Appendix Materials---The report may contain appendix materials that support or provide background information for major sections in the body of the report.

Communication Clarity and Accuracy

You should start by developing an outline of your report that shows the content and sequencing of each major section of your report. This outline should contain titles for each section and a list of bulleted statements that summarize the purpose and content. It should also list any graphs, charts, tables and figures.

As you are developing your outline, you should ask:

- Do the report sections organize information logically? Does the information under each section belong there?
- Do the report sections contain all of the necessary information? Do the sections contain information that is not necessary?
- Are the report sections sequenced in the most effective order?
- Do the section titles clearly communicate the purpose and content of the sections?

Activity:

With your team,

1. Develop a draft outline of your report.
2. Critique and revise your outline.
3. The next step is to write and edit your report. In writing and editing your report, you should make sure that you are communicating clearly and are presenting accurate information. Remember, business reports should be short and to the point. They should communicate information effectively and efficiently. Here are some tips.
 - Write your report using short sentences and paragraphs.
 - Use supporting charts, graphs, tables, and figures to better convey your information whenever possible.
 - Use consistent report formats for easy reading.
 - Make sure your report does not contain spelling or grammatical errors.
 - Make sure your report does not contain inaccurate information or math errors.

With your group, do the following:

1. Write your first draft of each section including any graphs, tables, and figures.
2. Evaluate the clarity and accuracy of your first draft using the five tips and develop a second draft.

Evaluating Your Draft Report

The final step in developing your business report is to conduct a final review and editing of your report before submitting it to your customer.

Activity: Check your work.

Purpose and Content

- Do you clearly communicate the purpose of the report?
- Does the report contain all of the information needed to meet the requirements of the customer?

Organization and Structure

- Does the report contain an introduction that summarizes the purpose and contents of the report?
- Is the body of the report divided into sections that logically group related information?
- Does each section contain all of the necessary information?
- Does any section contain information that is not necessary?
- Are the sections properly sequenced?
- Do the section titles clearly communicate the purpose and content of each section?
- Does the report have a final section that summarizes the conclusions and recommendations of the project?

Communication Clarity and Accuracy

- Does the report contain long sentences and paragraphs?
- Does the report effectively use supporting charts, graphs, tables, and figures to better convey your information?
- Does the report use consistent report formats for easy reading?
- Does the report contain spelling or grammatical errors?
- Does the report contain inaccurate information or math errors?

Teacher

Assessment Materials

FINAL EVALUATION

Problem Statement to be Solved:

A customer came in today with a damaged radiator in their 2004, 4 cylinder, Toyota Camry. The part number is 164000-h131 and it weighs 17lbs and is shipped in a box with dimensions of 24x34x7. We need to ship this radiator to the Bloomington, IL Toyota dealership as soon as we can to start fixing their car. The part is on backorder at the Aurora, IL distribution facility. We can wait for the backorder to come in from Aurora, IL, but it will take 6 days to ship it here. There are three possible faster options in the shipment of this part...

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You may choose one of the three options above, your own solution, or you may choose to wait 6 days for the backordered part. Using internet searches, other CITED sources, and the attached materials, please write a business report and present this to the class on which option is the best for Toyota and the customer and why. You will need to show the mathematics you will be using.

Measurement Criteria that would describe an acceptable solution

- Carrier selected represented the most cost effective means for delivering products.
- Identified on map the distribution locations and how far they are from the destination.
- Evaluated alternative locations and determined service level and cost differences.
- Researched different distribution types and cost and time.
- Used computers (map-quest etc.) to estimate mileage between two locations.
- All calculations were correct using formulas, maps, and charts provided.
- Business report included a cover letter, introduction stating the purpose of the report, documentation to support recommendations, a detailed explanation of costs, and tables, charts and spreadsheets to more clearly communicate recommended distribution plan.

- Presentation presented the information with visual aids, PowerPoint, and/or handouts and met the 7 requirements of effective business presentations.

Scoring Guide

Activity	Point Value	Points Received
Carrier selected represented the most cost effective means for delivering products.	10	
Identified on map the distribution locations and how far they are from the destination.	5	
Evaluated alternative locations and determined service level and cost differences.	10	
Researched different distribution types and cost and time.	10	
Used computers (map-quest etc.) to estimate mileage between two locations.	5	
All calculations were correct using formulas, maps, and charts provided.	10	
Business report included a cover letter, introduction stating the purpose of the report, documentation to support recommendations, a detailed explanation of costs, and tables, charts and spreadsheets to more clearly communicate recommended distribution plan	20	
The presentation met the 7 requirements of effective business presentations:	15	
Total Points	85	

Solution Checker

Sample Solution for Toyota Module

NOTE TO TEACHER-This sample solution is if the package weighed 100 lbs and was not fragile.

Sources: www.fedex.com and Steve Bowns at Toyota

Shipping from Kansas City to Bloomington...

Weight of Bumper in box...105 lbs

Miles from Bloomington to Kansas City...403

Cost for shipping from Kansas City (www.FedEx.com/us)...

Rate Results

Ship from: KANSAS CITY, MO 64101 Ship to: BLOOMINGTON, IL 61701 Transit Miles: 403				
Vehicle type	Cargo van	12' Straight truck	20' Straight truck	48' - 53' Tractor trailer
Pickup	90 min	90 min	90 min	90 min
Transit time	8 hrs 42 min	8 hrs 42 min	8 hrs 42 min	8 hrs 42 min
Base charge	\$806.00	\$963.17	\$1047.80	\$1309.75
Fuel surcharge	\$153.14	\$183.00	\$199.08	\$248.85
Total charge	\$959.14	\$1146.17	\$1246.88	\$1558.60

Shipping from Cincinnati to Bloomington...

Miles from Bloomington to Cincinnati...283

Cost for shipping from Cincinnati

Rate Results

Ship from: CINCINNATI, OH 45201 Ship to: BLOOMINGTON, IL 61701 Transit Miles: 283				
Vehicle type	Cargo van	12' Straight truck	20' Straight truck	48' - 53' Tractor trailer
Pickup	60 min	90 min	90 min	90 min
Transit time	6 hrs 6 min	6 hrs 6 min	6 hrs 6 min	6 hrs 6 min
Base charge	\$523.55	\$717.00	\$780.00	\$975.00
Fuel surcharge	\$99.47	\$136.23	\$148.20	\$185.25
Total charge	\$623.02	\$853.23	\$928.20	\$1160.25

We cannot use FedEx same day because our package weighs over 70 lbs.

Analysis of sending a service department worker.

Need to travel 85 miles to the Toyota dealership in Peoria. Need to pay 40.9cents per mile (government rate), also the lost production would be about \$300 for two hours calculated by talking with the service department manager, so the total cost is \$334.79 and we can get the part in two hours. This would be the best solution because it is the fastest and most cost efficient. To save the company the most money our group would like to send someone from the office to get the part. We know there is a loss of production, but when talking with Steve Bowns at Toyota we also learned that this month, July is a slow month and we can take the time to do this.

APPENDIX

GLOSSARY of TERMS Related to this Scenario

Commodity rate

A freight rate developed for a specific commodity for movement between two specified points.

Dimensional Weight

The practice of an air carrier charging more for bulky freight than for dense freight.

Distribution channel

The complete sequence of producers, wholesaler, and retailers involved in bringing a product from the producer to the consumers

Distribution costs

The direct costs for handling and storing products at distribution centers and transporting products from manufacturers to stores and consumers.

Materials management

The planning and management of the distribution of raw materials and supplies to where they are used to produce products and merchandise, usually a manufacturing facility, and moving them through the company until these materials become finished products.

Physical distribution management

The planning and management of the distribution of finished products and merchandise from manufacturers or their wholesalers to stores and consumers.

Toolbox Bibliography

1. How do I inform students about transportation, distribution, and logistics?
A Practical Guide to Transportation and Logistics by Michael B Stroh, 2006, Demount, NJ: Logistics Network.

"What in the World is the Global Supply Chain?" DVD from Council of Supply Chain Management Professionals. Oak Brook, IL or www.cscmp.org.
2. Instructional Strategies and Help for Math Teachers
This website offers a resource for teachers to search for any kind of mathematics games, help, and worksheets. This resource has many algebra reviews, which can help in the implantation of the module.

<http://www.mathforum.com/te/>
3. How can I define terms Transportation, Distribution, and Logistics in a way students can understand?
Wikipedia is a website which allows students to have access to an online encyclopedia. This is a great resource in letting students' research information and definitions on their own.

www.wikipedia.com
4. How can I help students review mathematical topics as they will be presented in TDL module?
Teachers can go to the following website to look up topics in mathematics and print worksheets to use for students to review. It really saves time in planning and writing new worksheets.

www.edhelper.com