TEACHING NOTES

John Korvell: Managing Logistics in Cosmopolis

Appropriate Grade Levels: *6 – 8 (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 is required if the teacher wishes to spend more time teaching students about flow charts and other methods of organizing information.

Materials Needed:
Teaching notes for "John Korvell" case study
Student copies of "John Korvell"
Notepaper for small groups to use when brainstorming answers
Large sheets of paper for students' flow charts

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 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 a complex flow chart.

Washington State Essential Academic Learning Requirements: How will students learn?
- *Mathematics: Students will gather informaiton, 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.*
  (EALR's 4.1, 4.2, 4.3, 5.2, 5.3)
- *Writing: Students will practice writing clearly and effectively in a variety of forms for different audiences and purposes. 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)
- *Economics: Students will observe major forms of business and related careers, comparing the different roles and responsibilities people hold within a business organization. Students will examine the importance of international trade and will investigate the interrelationships between Washington State's economy and other economic regions.*
  (EALR's 1.1, 1.2, 1.5)

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Procedure:
This lesson is designed to be taught in one session, though an additional classroom session may be desired if the teacher wishes to introduce students to the concepts of flow charts and other ways of representing information.

1. *Distribute the students' version of the "John Korvell" 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, ask each group of students to brainstorm the answer to the question they have been asked. Then, use the questions in the teachers' version of the case study to guide them through a discussion of what John should do at each point.*

3. *Finish by reviewing with students the basic concepts behind flow charts using Part Three of the case study. Discuss how John might organize his information and major decision points by using a flow chart. Then explain the flow chart assignment to students and have each student create a flow chart (either in class or as homework).*

Closure/Assessment:
Review students' flow chart for basic writing and presentation skills, as well as for students' ability to explain the steps John must take in gathering and analyzing the information he needs to set a price for his product.

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?

John Korvell: Managing Logistics in Cosmopolis

Part One - *Read aloud to students or have them read it. Stop at bottom of this page.*

John Korvell hung up the phone with a smile. He was about to make a big sale!

John was a Sales, Planning and Logistics Manager for the Weyerhaeuser Company. He had worked for Weyerhaeuser for nine years, and spent his time working with a very important but not very well-known product: wood pulp.

Wood pulp is used by companies all over the world to make paper, tissue, and disposable diapers. During the 1990s, Weyerhaeuser was the world's leader in producing wood pulp. Weyerhaeuser manufactured over two million metric tons of wood pulp each year at its eight US mills.

John's mill in Cosmopolis, Washington, manufactured wood pulp for photographic paper and disposable diapers, as well as for other products not generally associated with wood: acetate for photo film, clear toothbrush handles, rayon for cloth, food additives, and pharmaceuticals.

John's possible big sale was with one of these more unusual pulp products. A Japanese textile firm was interested in buying five years' worth of a special kind of pulp used to make rayon. If John's mill could produce the pulp for the right price, the deal would be complete.

Now John had to learn how much this special order would cost him to produce. Then he would know if he could make the sale. The Cosmopolis mill didn't make this special kind of pulp everyday. It would require special raw materials and different steps to manufacture. And, John would have to ship the pulp to Japan.

John decided to make a list of all the things he needed to know.

STOP

John Korvell: 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.*

Before information can be organized and the decision made, though, there are several steps that must be taken:

First, you must identify what the decision is you must make. In this case, John needs to know what it will cost him to produce the pulp so that he will know if he can meet the customer's price requirements.

Then, you must identify the information that will help you make your decision. In John's case, he must learn a number of pieces of information, all of which will help him determine how much it will cost his company to fill the pulp order for his potential new customer. Knowing how much the pulp will cost him to make will help him then decide whether or not he can meet the customer's price requirements.

Lead students through a discussion of what John needs to decide and what kind of information he must have to make his decision. Students may answer that John needs the following information:

- *Information about the raw materials or supplies he will need to make the rayon pulp and how much the raw materials will cost.*
- *What he will have to do to the machines in the mill to produce the rayon pulp.*
- *How much it will cost to make the rayon pulp in the mill.*
- *How much it will cost to ship the pulp to Japan.*

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

Part Two - *Read aloud to students or have them read it. Stop at bottom of next page.*

John decided he needed to learn the answers to four sets of questions.

1. Which raw materials would he need for the rayon pulp, how much would he need of each raw material, and how much would each cost him to buy?

2. Which of the machines in the mill would have to be changed to produce the rayon pulp, how long would that take, and how much would that cost?

3. Once the mill was ready, how long would it take to produce the rayon pulp, how many millworkers would it require, and how much would that cost?

4. When the pulp was ready, how much would it cost to ship it from Cosmopolis through the Port of Seattle to his customer in Japan?

Finding answers to these questions would not be difficult. But, with each question, John realized that there were decision points that would affect the cost of the pulp.

For instance, he knew it would be much cheaper to order five years' worth of raw materials all at once. But then he would need to pay to store them, and while that wouldn't cost very much for a small amount of chemical additive, it would cost a lot –maybe even more than the amount he would save – for the bulkier materials he needed.

He knew that actually manufacturing the wood pulp would be cheapest if he could schedule it during a time his mill was not too busy. But that would depend on how flexible his customer was willing to be. If the Japanese textile company had firm deadlines, he might have to interrupt other projects at the mill… and that would cost more.

TURN PAGE AND KEEP READING

And, John knew that the same thing would apply to shipping the finished pulp to Japan. If he could commit to a schedule well ahead of time, that would save him money. But, he didn't know if his customer might have a sudden, urgent need for the pulp. Then, John would have to hurry to ship it to Japan and he would have to pay extra to change the shipping schedule.

He had a lot of information to organize. What should he do?

STOP

John Korvell: Teaching Notes for Part Two

*Once students understand the decision they need to make and the information they need to use to make the decision, they can then **organize** that information in a way that it can be **analyzed.***

Lead students through a discussion of different ways John could think about all the information – and all the decision points – he has to consider. Should he make a list? A chart? A picture?

*Then introduce the concept of the **flow chart** to students.*

*A **flow chart** is a picture that shows the steps in a process so that people can focus on what should happen when. Flow charts show the choices a person can make each time there is a decision to be made. Flow charts are particularly good for helping people focus on complicated processes without getting lost in the details.*

Flow charts have been used to organize information for a very long time. In fact, flow charts have been used for so long that no one individual is specified as the "father of the flow chart." The reason for this is obvious. A flow chart can be customized to fit any need or purpose. For this reason, flow charts can be used to: map out a computer program, plan the steps needed in a scientific experiment, organize a factory to manufacture something, or help a new employee learn what to do on the job.

Ask students if they have ever used a flow chart to solve a problem. Then, move to Part Three of this case study for a simple introduction to flow charting.

Part Three - *Read aloud to students or have them read to the bottom of the next page.*

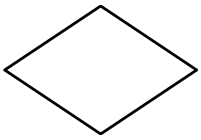
John decided to make a **flow chart** to track the things he needed to do and the choices he needed to make. John knew that just as a good table can collect and organize information, **a good flow chart can organize a process**, or the order in which things have to happen.

And, John knew that a good flow chart would help him see how a decision point – whether or not his new customer had a flexible schedule, for instance – was related to the actions he would take – whether, for instance, he needed to produce the rayon pulp immediately (if the customer's schedule wasn't flexible) or whether he could produce the rayon pulp when the mill was not busy (if the customer's schedule was flexible).

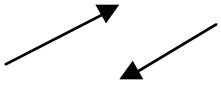
John reviewed the basics of flow charting before he got started. He knew that flow charts use three basic symbols:

A rectangle is used to mark a basic step in the process:

A diamond is used to mark a decision point that has a 'yes' or 'no' answer:



Arrows show the direction of the process:

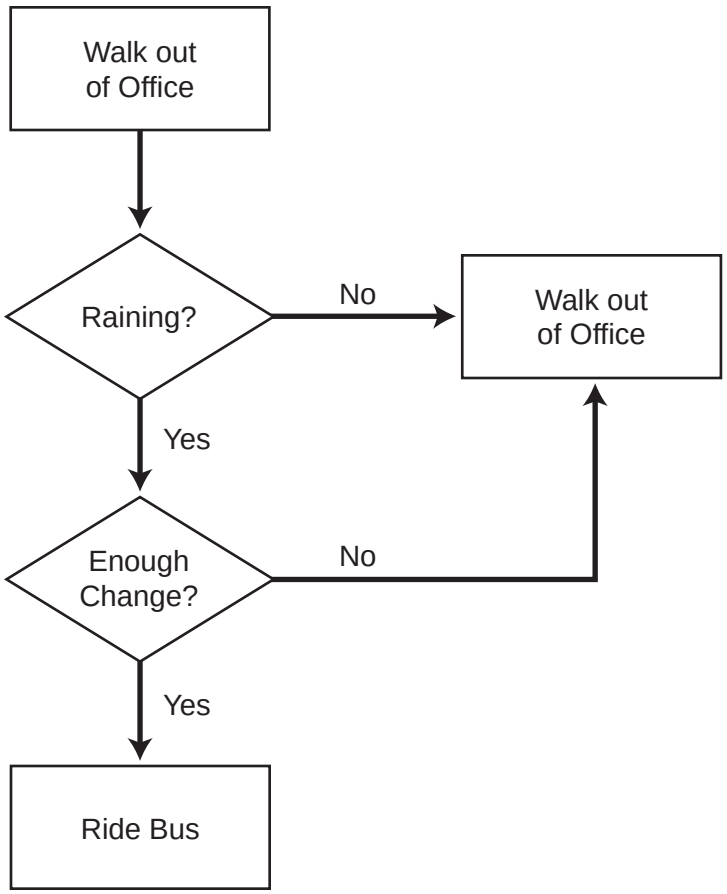


John knew that a flow chart should start in the upper left corner of the page and move right and down as he moved through steps in the process. He also knew that whenever he came to a decision point – a point in the process where he needed to know the answer to a question – he could use the flow chart to show the different actions he would take if the answer was 'yes' or if the answer was 'no.'

TURN PAGE AND KEEP READING

Before tackling the difficult question of figuring out the cost of manufacturing the rayon pulp, John decided to practice with a simple flow chart.

John thought about the decisions he would make about traveling home from work that evening. He had ridden his bicycle to work that morning, and would ride it home again in the evening… but only if it wasn't raining. If it was raining, he would prefer to take the bus… but only if he had enough change for bus fare. If he didn't, he would have to ride home in the rain. How would that process look?



Now, it was time to create a flow chart for the rayon pulp.

Assessment/Closure – *For their assignment, each student will create a flow chart showing all the information John must consider in determining how much it will cost to produce the rayon pulp.*

John Korvell: Teaching Notes for Assignment

Review the basics of flow charting with students. Make sure they understand why and when a flow chart would be used. If you wish, have them work in small groups to create several more simple flow charts – about simple decisions such as what to eat for breakfast or what kind of coat to wear to school.

Then ask them to make a flow chart for John Korvell's pulp process. Ask them to include three basic steps in their flow chart, with all the needed decision points:

1. Purchasing raw materials and making the decision whether to buy raw materials in bulk or just buy them as needed.

2. Getting the plant ready to produce the rayon pulp and then producing it.

3. Shipping the pulp to Japan.

When the flow charts are complete, ask students to present their flow chart by describing the steps and decision points.