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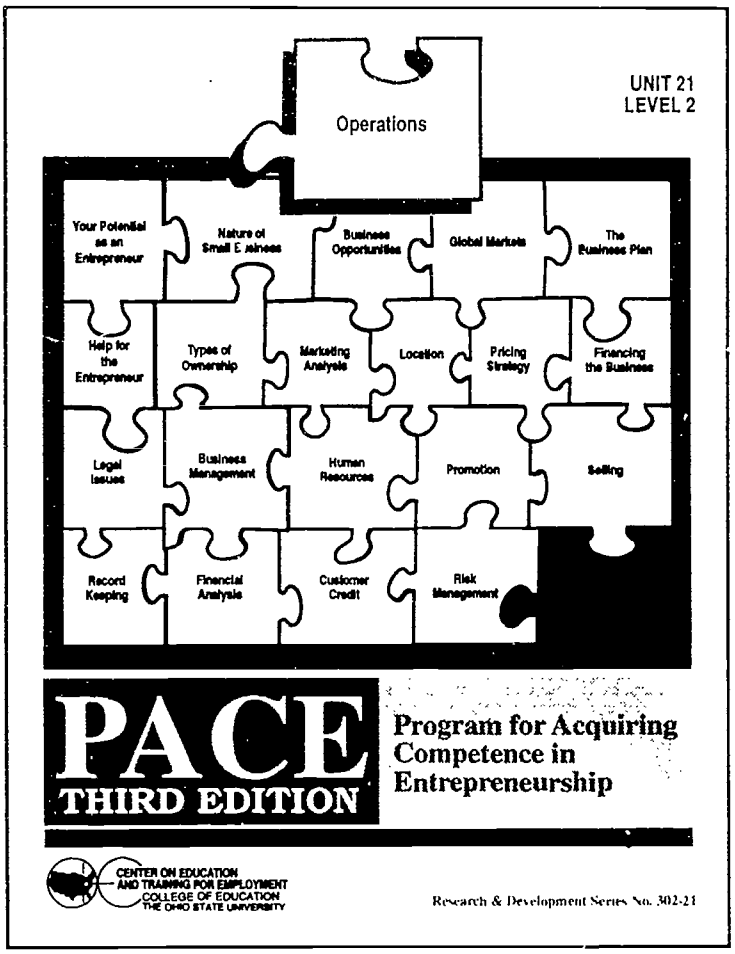
ABSTRACT

This instructor guide for a unit on operations in the PACE (Program for Acquiring Competence in Entrepreneurship) curriculum includes the full text of the student module and lesson plans, instructional suggestions, and other teacher resources. The competencies that are incorporated into this module are at Level 2 of learning--planning for a business in one's future. Included in the instructor's guide are the following: unit objectives, guidelines for using PACE, lists of teaching suggestions for each unit objective/subobjective, model assessment responses, and overview of the three levels of the PACE program. The following materials are contained in the student's guide: activities to be completed in preparation for the unit, unit objectives, student reading materials, individual and group learning activities, case study, discussion questions, assessment questions, and references. Among the topics discussed in the unit are the following: planning, organizing, and controlling as operational responsibilities for a small business; operations management; operations strategies; purchasing procedures for small businesses; purchase orders; inventory and inventory control options (perpetual and physical inventory); basic productive elements in operating a business; leasing versus buying; and ways of measuring productivity. (MN)



Objectives:

- Identify the operational responsibilities for a small business.
- Explain the purchasing procedures for a small business.
- Analyze the options for inventory control.
- Identify the operational use of computer systems.
- Describe the basic productive elements in operating a business.

INSTRUCTOR GUIDE

Unit 21

Operations

Level 2

HOW TO USE PACE

- Use the objectives as a pretest. If a student is able to meet the objectives, ask him or her to read and respond to the assessment questions in the back of the module.
- Duplicate the glossary from the *Resource Guide* to use as a handout.
- Use the teaching outlines provided in the *Instructor Guide* for assistance in focusing your teaching delivery. The left side of each outline page lists objectives with the corresponding headings (margin questions) from the unit. Space is provided for you to add your own suggestions. Try to increase student involvement in as many ways as possible to foster an interactive learning process.
- When your students are ready to do the *Activities*, assist them in selecting those that you feel would be the most beneficial to their growth in entrepreneurship.
- Assess your students on the unit content when they indicate they are ready. You may choose written or verbal assessments according to the situation. Model responses are provided for each module of each unit. While these are suggested responses, others may be equally valid.

Objectives	Teaching Suggestions
1. IDENTIFY THE OPERATIONAL RESPONSIBILITIES FOR A SMALL BUSINESS	
What are the operational responsibilities for a small business?	Develop a chart to show how planning, organizing, and controlling are related to the operational responsibilities for a small business (i.e., to purchasing, forecasting, process design, equipment maintenance, production, shipping, packaging, receiving, etc.).
What is operations management?	Define the concept of operations management from two viewpoints (i.e., as a function and as a set of decisions).
What are operations strategies?	Follow the guidelines presented in Table 1 to identify the extent that operations strategies affect small business.
2. EXPLAIN THE PURCHASING PROCEDURES FOR A SMALL BUSINESS	
What is purchasing?	Ask students to define purchasing in their own terms. Engage students in a discussion on the importance of reliable supplier relationships.
What are the purchasing procedures for a small business?	Invite a local entrepreneur to speak about steps and procedures involved in purchasing. Ask the speaker to explain the notions of purchase requisitions, *Just-in-Time*, tracking and receiving an order, as well as how these factors are effectively used in daily operations.
What is a purchase order?	Ask the guest entrepreneur to use a sample purchase order (PO) to explain the information that should be included in POs.
3. ANALYZE THE OPTIONS FOR INVENTORY CONTROL	
What is inventory?	Ask students to offer examples of inventory for various types of business operations (e.g., retail, manufacturing, wholesale, services, etc.).
What are the inventory control options?	Identify the two basic types of inventory (i.e., physical and perpetual) and ask students to explain these terms.
What is perpetual inventory?	Correct and clarify the explanations offered by students in regard to the concept of perpetual inventory.
What is physical inventory?	Refer to the above suggestion.

Objectives	Teaching Suggestions
Who controls the inventory?	Develop a chart to show various methods of inventory control (i.e., JIT, Gantt charts, scanners and electronic eye, etc.).
4. IDENTIFY THE OPERATIONAL USE OF COMPUTER SYSTEMS	
What are the operational uses of computer systems in inventory analysis?	Discuss various types of software (e.g., spreadsheet, word processing, graphics presentations, data base, operations customized software, etc.). Ask students to identify how the use of a computer enhances small business operations.
5. DESCRIBE THE BASIC PRODUCTIVE ELEMENTS IN OPERATING A BUSINESS	
What are the basic productive elements in operating a business?	Organize a field trip to a local small manufacturing business. Ask students to identify the productive elements (i.e., inputs and outputs) in the operations of that business.
Should you buy or lease?	Use a chart or overhead transparency to discuss advantages and disadvantages of buying versus leasing equipment.
How do you measure productivity?	Define the concept of productivity. Use simple numerical examples to explain how productivity is dependent upon inputs and outputs.

MODEL ASSESSMENT RESPONSES

1. Operations management can be defined both as a function and as a set of decisions.

   (a) As a function. Operations management is the management function that deals with activities related to production, purchasing, receiving, inventory control, packaging and shipping.

   (b) As a set of decisions. Operations management deals with the following steps that characterize a decision-making process: recognizing and defining the problem, collecting the information needed to analyze possible alternatives, choosing and implementing the most feasible alternative, and evaluating and making adjustments. Operations decisions are classified in three categories: strategic choices, design decisions, and operating decisions.

2. Purchasing decisions are critical for small business success regardless of whether the business is new or already established. Purchasing decisions affect other business operations such as production, finance, and marketing activities. Similarities in purchasing decisions may relate to receiving a request to place an order, placing, tracking, or receiving an order, etc. Differences might include selecting suppliers based on the needs and capabilities of the business, as well as market conditions.

3. Following the appropriate procedures to develop adequate purchase orders is directly related to the success of production, marketing, and financial activities. Information contained in purchase orders is critical to both suppliers and the business. Businesses cannot keep track of purchasing orders if the information provided on these records is not complete and accurate.

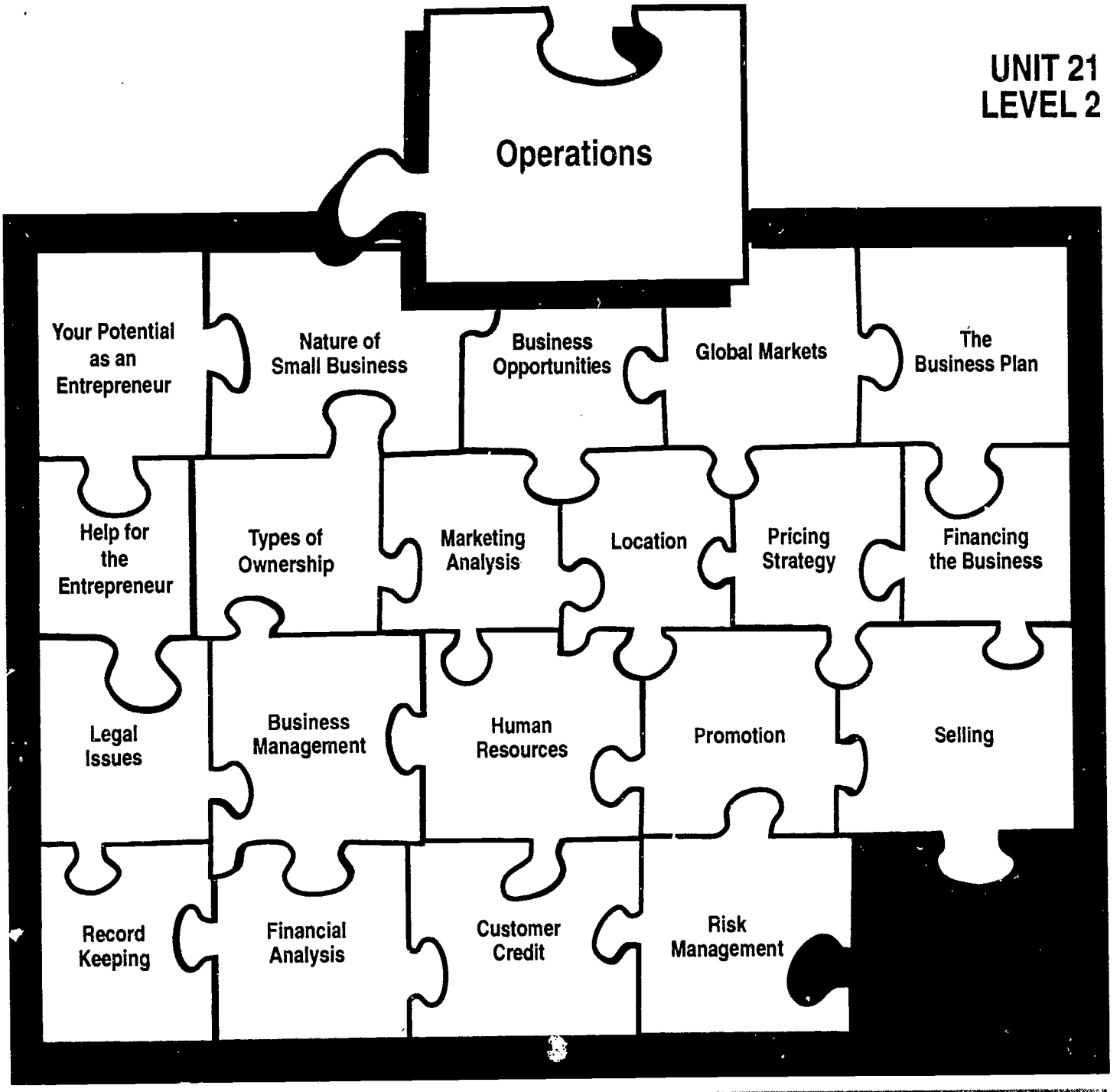
4. *Perpetual inventory* refers to inventory control systems based on maintaining continued records of receipt and withdrawal of inventory. Perpetual inventory records include the item, stock number, reorder point, and supplier. *Physical inventory* refers to inventory control systems based on actual items that are in stock at a certain point in time. To keep records of physical inventory, actual counts are made weekly, monthly, quarterly, yearly, etc.

5. Electronic inventory control systems using scanners and electronic eyes are becoming more and more popular. These types of inventory control help businesses to slash inventory costs, ensure prompt reordering, and better understand customer demand trends.

6. Computer-controlled inventory systems help businesses monitor, use, and develop information related to business operations. For example, database and inventory customized software assist in inventory control, marketing, financial analysis, etc. Word processing is used in all areas of business. Production, scheduling, process design, and other operations customized software, together with graphics presentations and spreadsheet software assist in a variety of operations and financial management decisions.

7. The basic productive elements in operations are inputs and outputs. Inputs refer to labor, energy, and capital that participate in the production process. Outputs refer to the production results (i.e., goods and services). The relationship between inputs and outputs is measured by productivity.

UNIT 21
LEVEL 2



PACE
THIRD EDITION

Program for Acquiring Competence in Entrepreneurship

CENTER ON EDUCATION AND TRAINING FOR EMPLOYMENT
COLLEGE OF EDUCATION
THE OHIO STATE UNIVERSITY

Research & Development Series No. 302-21

OPERATIONS

BEFORE YOU BEGIN . . .

1. Consult the *Resource Guide* for instructions if this is your first PACE unit.

2. Read What are the Objectives for this Unit on the following page. If you think you can meet these objectives now, consult your instructor.

3. These objectives were met at Level 1:

   - Define operations for a small business.
   - Identify the factors that affect purchasing.
   - Explain the importance of inventory control.
   - Identify the procedures to be followed in shipping and receiving.
   - Identify the considerations in production and packaging.

4. Look for these business terms as you read this unit. If you need help with the meanings, ask your instructor for a copy of the PACE Glossary contained in the *Resource Guide.*

   Infrastructure
   Inputs
   Just-in-time
   Operations management
   Outputs
   Perpetual inventory
   Physical inventory
   Productivity
   Purchase order (PO)
   Purchase requisition
   Purchasing agent
   Quality

OPERATIONS

WHAT ARE THE OBJECTIVES FOR THIS UNIT?

Upon completion of this unit you will be able to—

- identify the operational responsibilities for a small business,
- explain the purchasing procedures for a small business,
- analyze the options for inventory control,
- identify the operational use of computer systems, and
- describe the basic productive elements in operating a business.

WHAT IS THIS UNIT ABOUT?

This unit covers operations of both product- and service-oriented businesses. This unit will identify the operational responsibilities of a small business as well as explain the purchasing procedures for small businesses. The options for inventory control will be analyzed. The use of computers in the operations function will be discussed along with describing the basic productive elements in operating a business. The day-to-day activities that ensure the success of the business must be considered by the entrepreneur. Systems should be established to ensure that the business *operates* smoothly.

WHAT ARE THE OPERATIONAL RESPONSIBILITIES FOR A SMALL BUSINESS?

Planning, *organizing*, and *controlling* are functions of the operations of a business. This means putting everything in place according to time, costs, resources, and so forth. The operational responsibilities of a small business may include purchasing, forecasting requirements, process design or redesign of a product or service, and maintenance of the business. Operations systems are the basic management function of the business. Operations management is generating a product or service in the production system. Quality is also a responsibility of operations. Thus, productivity and quality

are the key responsibilities of operations for a small business.

WHAT IS OPERATIONS MANAGEMENT?

Operations management is important in achieving your business goals since it affects productivity both in manufacturing and service. There are two views of what operations management is. Operations management can be defined as a function and a set of decisions.

- Operations management as a function

  Operations management is only one of the functions of managing and running a business. It can be identified in every organization and is but one of several functions within an organization. Large companies generally assign each function to a separate department, which assumes responsibility for certain activities. However, many of these functions are interrelated. It is essential that top management coordinate them and establish an effective communication network to achieve organizational goals. In a small business they all become the responsibility of the entrepreneur or his or her assistant.

These functions consist of many disciplines and techniques. The *accounting* function collects, summarizes, and interprets financial information. The *marketing* function is responsible for generating demand for the company's output. The *finance* secures and invests the company's capital assets. *Human resources* hires and trains employees. *Distribution* transports inputs and outputs. And *Engineering* develops product and service designs and production methods. What might be an operations function in one business may not be in another. Each business is unique and different.

- Operations management as a set of decisions

  Decision making is also a part of operations management. Although the specifics of each situation vary, decision making generally involves the following steps:

  1. Recognize and clearly define the problem.
  2. Collect the information needed to analyze possible alternatives.
  3. Choose and implement the most feasible alternative.
  4. Evaluate and make adjustments.

What sets operations managers apart is the *type* of decision they must make by themselves or with others. Table 1 shows several key decision areas and a sample question about each.

Table 1 begins with the *strategic choices* that affect the future direction of the company. As an example, entrepreneurs must help decide which products or services to offer, what the company's competitive priorities will be, what the quality objectives and control methods will be, and whether to organize resources around products or processes.

Table 1
Operations Areas of Decision with Sample Questions

DECISION AREA	SAMPLE QUESTIONS
Strategic Choices	
Product and service plans	What products and services should we offer?
Competitive priorities	Should we excel on the basis of cost, quality, or flexibility?
Positioning strategy	Should we organize resources around products or processes?
Quality management	How do we get the whole organization committed to quality improvement?
Quality control	How do we best achieve our quality goals?
Design Decisions	
Process design	What processes should we use to make our products?
Technology management	Is it time to automate some of our processes?
Job design	Should our jobs be specialized or enlarged?
Capacity	What is the maximum reasonable size for our facility?
Location	Should we be followers or leaders in picking new store locations?
Layout	How should we physically arrange desks and equipment?
Operating Decisions	
Forecasting	How do we design the best forecasting system for our needs?
Materials management	Who should be our suppliers? How do we evaluate and support them?
Inventory	How much inventory do we need in our store? How should we control it?
Aggregate plans	What should be our output rates and staffing levels for this quarter? The year?
Master production scheduling	Should we make *to stock* or make *to order* our production?
Production control systems	When should we release new orders for production? In what quantities?

Next are the *design decisions* concerning the production system. Here the entrepreneur's recommendations and decisions often require long-term commitments. As an example, the owner must determine what the system's capacity should be and then decide what equipment and technologies to purchase, where to locate facilities, and how to organize operations and plan the company's physical layout.

Operating decisions, sometimes called the operations infrastructure, deal with operating the facility once it is in place. At this stage, the entrepreneur decides how to manage inventory, when to release purchase or production orders, which suppliers to deal with, how to schedule resources and maintain quality, and how to increase output levels over shorter periods of time.

WHAT ARE OPERATIONS STRATEGIES?

Operational strategy defines how operations will meet the organization's goals. Business and government leaders are recognizing the importance of each area of operation in the business, and the operations functions in particular. Global competition, and its link to the standard of living, are some reasons for this recognition. Operation strategies can be aggressive weapons in keeping the business ahead of its competition, saving time, money and quality for the customer.

WHAT IS PURCHASING?

Purchasing is the acquisition of needed goods or service. It is important that quantities, time, cost, and reliable sources are part of the responsibility of purchasing for any business. Initially, a good and trusting relationship should be developed between the small business owner and the companies or suppliers with whom the business is dealing. Many unforeseen difficulties may arise in purchasing items needed to manufacture a product or in offering a service. These difficulties may include delay due to weather, limited resources, transportation problems, or personnel problems. If the small business owner's sales are based on purchased items, these difficulties must be handled.

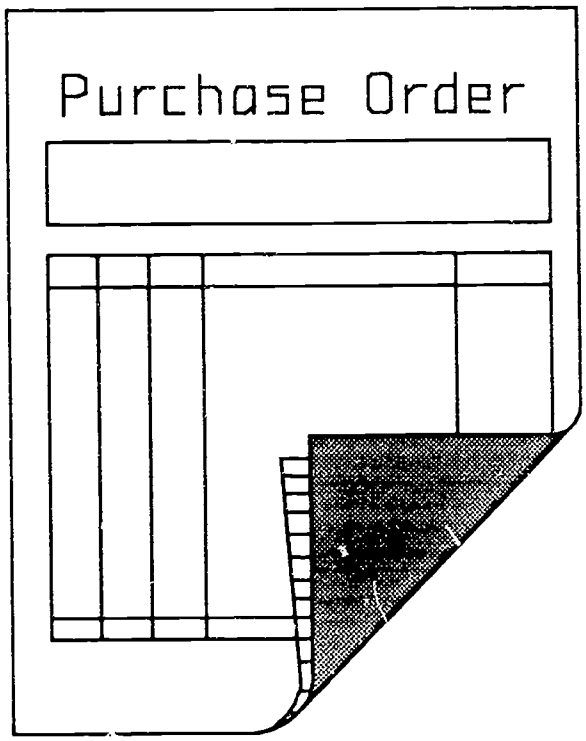
WHAT ARE THE PURCHASING PROCEDURES FOR A SMALL BUSINESS?

Arnold needs to find a supplier of food for his restaurant. He knows what foods to order but wants to get the best quality possible for a set amount that will allow him maximum profit. Arnold should try to find the best terms available when purchasing for the business. These terms are not just price, although this is one of the most important items to negotiate. Generally the procedures include the following steps.

1. **Receive a request to place an order.**

   The request, usually called a *purchase requisition*, includes the item description, quantity and quality desired, delivery date. At a manufacturing firm the

PURCHASING FACTORS



- **Buying the right quantity**
- **Buying the right quality**
- **Buying at the right time**
- **Buying from the right suppliers**
- **Buying at the right price**

purchasing agent normally receives authority to buy from the entrepreneur. Production is guided by the make-or-buy decisions that have been made in setting the process design. The purchasing agent typically makes important inputs into these decisions because this person is most aware of supplier capabilities and performance. At a retailing firm, deciding what to buy is the same as deciding what merchandise to sell—marketing and purchasing decisions are intermixed.

2. **Select a supplier.**

This step involves identifying suppliers capable of providing the items, grouping items that can be supplied from the same supplier, asking for bids on the needed items, evaluating the bids in terms of multiple criteria, and selecting a supplier. In some cases, a long-term contract has already been set up for this item, so this step is not necessary.

Another element in selecting a supplier is to find a supplier of quality goods who will give the firm the longest possible credit period so that cash availabilities can be maximized for the small business owner, especially in times of tight cash flow. Also, look for someone who will give a cash discount for early payment when your financial needs for cash are low and not too strained.

3. **Place the order.**

   The ordering procedure can be complex and time consuming, as with expensive one-time purchases, or as simple as a phone call for a standard item routinely ordered from the same supplier. In some high-usage situations, the supplier makes shipments daily or even on a shift-by-shift basis without being prompted by purchase orders. This is called a *Just-In-Time* or *JIT system* because it is designed to produce or deliver goods as needed, using minimal inventories.

   JIT focuses on reducing inefficiencies and unproductive time in the production process. It supports the concepts of continuous improvement and total quality control, as well as more employee involvement and inventory reduction. Other names for JIT include *zero inventory*, *material as needed*, and *continuous flow manufacturing*.

4. **Track the order.**

   Tracking includes routine follow-up of orders, so as to anticipate late deliveries or probable deviations from requested order quantities. Suppliers are contracted by letter, telex, fax, or telephone. Follow-up is particularly important for large purchases, when a delay is disruptive to production plans or when a delay could mean loss of customer goodwill and future sales.

5. **Receive the order.**

   Incoming shipments generally must be checked for quantity and quality, with notices going to the department placing the purchase requisition, inventory control, and accounting. In the small business these functions are usually handled by the same person. If the shipment is not satisfactory, purchasing must decide whether to return it to the company that sent it or keep it and work with it as it was received. Records on punctuality, quality, quantity deviations, and price must be updated as a part of supplier evaluation. Purchasing must coordinate closely with accounting so that suppliers are paid accurately and on time.

   It may be that the retail or wholesale order must be returned due to unsold merchandise or consumer problems with it. Having all information documented will speed the process a supplier follows in handling your returns effectively and efficiently.

WHAT IS A PURCHASE ORDER?

All businesses should have a system to keep track of purchases for the business. An easy way to do this is by using *purchase orders*, or *POs*, when making all company purchases.

A preprinted purchase order with numbers in sequence will allow you to keep your business orders organized. It will give your suppliers all the information they need in order to fill your order in an efficient manner.

Purchase orders should have the following information:

- Your *PO* reference number

- Your company name, address, and phone number
- Location where the goods should be shipped
- Location where the *invoice* should be sent
- Specific item(s) to be ordered (*Use reference number when possible.*)
- Quantity of specific items
- Prices as quoted
- Discounts as quoted, if applicable
- Total amount
- Payment terms
- Shipping orders
- Delivery date requested, if applicable

Following the appropriate procedures of business policy will allow you to operate in a professional manner. This will allow you business with them as they, in turn, do business with you. Figure 1 offers an example of a purchase order.

WHAT IS INVENTORY?

In a product-oriented business, inventory may consist of three types: raw materials, work in process, and finished goods depending upon the business type. If a business manufactures it's own product, it is concerned with all three: the raw materials needed to make the items, the items that are not yet finished also called *work in process*, and the inventory of finished items ready for sale. Automakers purchase raw materials from iron ore to radios to tires to put in cars. Radios, for example, are finished goods from the radio supplier but when they are received at the car assembly plant radios become inventory known as work in progress because they will become a part of a new product—a car.

In a retail sales business, the inventory will consist of completed items ready for sale. Inventory control begins at this point and is described as either physical or perpetual inventory.

WHAT ARE THE INVENTORY CONTROL OPTIONS?

Inventory control is necessary with every type of business. Controls are used with merchandise, supplies, raw materials, and parts. If these items are to be available when needed, you must have a system to keep them protected and in proper balance. The aim of inventory control is to keep the costs at a minimum while ensuring customer satisfaction and continuous production.

There are basically two types of inventory control systems used in business, *perpetual* and *physical*. Electronic inventory control systems are also important, and combinations of these inventory control systems are common.

XYZ COMPANY 1234 Apple Street St. Louis, Missouri 63123 (314) 555-1234					
PURCHASE ORDER No. 1258					
TO:		**Ship To:**			
Date Ordered	Date Required	Special Instructions	Terms	Ship Via	
Quantity Number	Stock Number	Description	Unit Price	Amount	
		Authorized by:			

Figure 1. A purchase order sample

WHAT IS A PERPETUAL INVENTORY?

When continuing records are kept of receipt and withdrawal, the process is called perpetual inventory. With this system, the business owner has a running tally on the current stock of an item. For each item, a record is kept as it is brought into the business, stocked, and sold. Records are maintained on perpetual inventory cards, pages, tags, or via electronic means. In retail operations, sales tickets, computers, or punched cards are often used to maintain perpetual inventory information.

There are several different types of records for keeping perpetual inventory, and a variety of information can be maintained with these records. You will find that typical

records include the item, the stock number, the reorder point, and the supplier.

When additional inventory is received, the number is added to the balance. When items are issued for use or are sold, the withdrawal is subtracted from the balance. The amount of inventory on hand for a particular item can be determined easily by looking at the balance on the record.

The development of cash registers, computers, and computer service networks with local computer banks has made maintaining perpetual inventory systems very easy for small businesses. At the end of the year, perpetual inventory records are added up and compared with the periodic physical inventory. Major differences may be investigated and perpetual inventory records then corrected.

WHAT IS A PHYSICAL INVENTORY?

A physical inventory is the actual items that are in stock. Whether your business is manufacturing, wholesaling, or retailing, the product you have on hand at any given moment is your physical inventory. In a jewelry store, it is all the stock in the store. This includes the earrings to the necklaces to all of the engagement and wedding rings. Jewelry stores are also carrying other items in their physical inventory that they think may appeal to their customers' wants and needs.

Physical inventories can be hard to keep track of unless proper steps are followed and maintained in order to ensure accuracy.

WHO CONTROLS THE INVENTORY?

Inventory control is a problem in most businesses because there is usually no clear understanding of who is responsible for the control. Another problem is that one person may consider keeping low inventories so that storage problems do not occur and another may keep too much inventory on hand which can create both a space and a cashflow problem.

One method of inventory control is called *Just-In-Time* or *JIT* inventory control. Although discussed earlier, a more complete explanation will be given now. This is a management system that eliminates keeping large amounts of inventory. The main idea in this system is to avoid the need for large storage facilities as well as avoid a problem for cashflow. The concept is to get the materials needed to make a product to the area where the product is being produced *just-in-time* for production needs.

Another method of inventory control is the Gantt Charts. Gantt Charts are a traditional device used for sequencing work on machines and monitoring progress. This was first devised by Henry L. Gantt in 1917. There are two basic forms of the chart: the *job* or *activity progress chart* and the *machine chart.*

Recent improvement in the electronic inventory system, such as electronic cash registers and personal computers, have made computer-based data about a firm's operations available to many small retailers. Grocery store *scanners*, for example, are as helpful in inventory control as they are in checkout.

At these scanner checkout lines, each item passes over an electric eye linked to a cash register and a scale. The *electronic eye* reads the UPC (Universal Product Code) symbol. The electronic eye also logs each outgoing item against inventory in the store or a centralized warehouse, warning the manager when a reorder is necessary.

WHAT ARE THE OPERATIONAL USES OF COMPUTER SYSTEMS IN INVENTORY ANALYSIS?

Computers are very much a part of all phases of the business in today's technological age. As mentioned above, the computer has made inventory control more effective and easier to monitor. Database software not only helps in inventory control, but is an extremely effective marketing tool in keeping track of customers or clients. Along with the use of the database software, the word processing software packages can merge sales letters with numerous preselected names and addresses to promote services or sale products.

Today, many companies can create their own sales catalogs, company manuals, and other printings required by individual businesses through the use of desktop publishing software. Engineering also has incorporated the use of computers in computerized drawings. Financial reports and cash flow schedules can be automatic, if daily or weekly data is keyed in to financial and spreadsheet software. Graphic representations in reports have upgraded the management decision process. With computer business planning available now in software, a complete in-depth business plan can be generated with much less capital used by the company.

WHAT ARE THE BASIC PRODUCTIVE ELEMENTS IN OPERATING A BUSINESS?

Productivity guides the management of a business and measures its success. This factor indicates how well labor, capital, materials, and energy are utilized. Productivity improvement is sought everywhere because it supports a higher standard of living, helps control inflation, and contributes to a stronger national economy. The simplest statement of productivity is that it is just the ratio of output to input. An increase in the ratio indicates greater production efficiency.

Whether a business manufactures a product or provides a service, there are operations involved that require efficiency in the activities of the entrepreneur and employees.

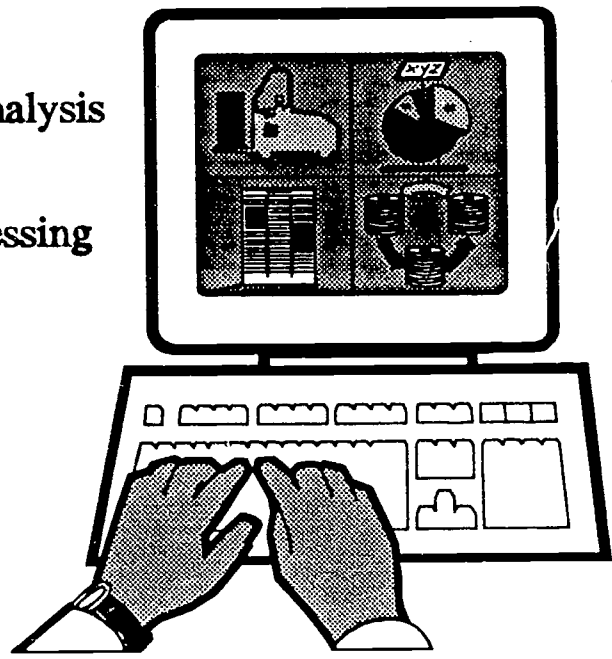
There are many types of operating systems that can be planned in advance of maximum use of inputs to provide the best possible outputs. For example, a car repair business had the following types of inputs and outputs:

INPUTS	OUTPUTS
Car parts	Rebuilt engines
Tools	Repaired automobile
Employees	Happy customers
Garage	Auto damage fixed

COMPUTER-CONTROLLED INVENTORY SYSTEMS

Financial analysis

Word processing



Desktop publishing

Database management

SHOULD YOU BUY OR LEASE?

Every business requires different equipment for successful operation. These generally can be divided into categories of office, sales, and production.

Small business owners should be alert to opportunities to buy good used equipment or to lease equipment. There are advantages to both buying and leasing equipment.

Advantages of buying equipment

- Unused and probably will last longer
- More advanced features if new
- Less expensive for long-term use
- Advantage of depreciation for taxes
- Often times very good prices if used

Advantages of leasing equipment

- No investment at the beginning of business
- Maintenance costs are often covered

- Lease only what you need
- New equipment can be substituted
- No problem in reselling

These are areas the entrepreneur needs to look at closely before making a final decision to buy or lease equipment. The pros and cons must be determined and good judgment used in reaching a decision.

HOW DO YOU MEASURE PRODUCTIVITY?

The basic productivity ratio, output divided by input, can be applied to almost any human endeavor. As a measure of production efficiency, the ratio commonly takes the form of output per hour but the preferred ratio is the one that best fits the mission, character, and resources of the organization.

When production inputs are constant and output goes up, resources are being applied more efficiently. This condition is ideal for scarce commodities such as food. Many times such productivity increases are listed as specific objectives in your business plan.

However, higher output caused by redesign of the product can lead to an unwanted surplus if the new version fails to gain market acceptance. An equivalent situation happens in the service sector when an agency provides a new service that increases output values, which complement existing measures but fails to satisfy consumer wants and needs.

Worker-hours is one measure of input for productivity studies. A productivity rise with a constant input indicates that labor has been more effective. This greater effectiveness could have resulted from working faster, applying more efficient methods, reducing waste, organizing better, using improved tools, or any number of other labor-management tactics.

The various factors that contribute toward input in the productivity ratio could be divided and subdivided into a large number of components. Subdividing is useful in analyzing costs, but the subfactors rarely exhibit independent effects. Their combined influence is similar to that found in agriculture; that is, an additional unit of water added to a field might raise output by two bushels, another unit of fertilizer might increase it by three bushels, or an additional unit of labor might add four more bushels, to provide a total output increase of nine bushels if applied independently. But when all are applied together, the output could be increased by 16 bushels as a result of the interaction between the inputs that mutually support each other.

Inputs and outputs are an integral part of the business and if not watched, can cause a great deal of trouble and concern for the entrepreneur.

ACTIVITIES

The following activities are designed to help you apply what you have learned in this unit.

INDIVIDUAL ACTIVITIES

A.

Determine how you can reduce the cost of buying and holding materials purchased from suppliers.

B.

Some people call inventory the *root of all evil.* It ties up money and lessens opportunities to improve productivity. The reasons that make inventory attractive are the same ones that stand in the way of substantial improvements in efficiency. Do *you* agree or disagree with this position? Why or why not?

GROUP ACTIVITIES

A.

Work in teams of four to six. Determine the best possible way to inventory your school's property and then complete the task by completing an inventory of one floor or level of the building.

B.

Work in teams of four to six. Use the acquisition process five steps (receive a request to place an order, select a supplier, place the order, track the order, and receive the order) to derive a plan which can be used to supply the operations for your new business venture. Remember to use each step in your execution of the process.

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CASE STUDY

"Commonwealth Woodworks" is a Massachusetts company that manufactures a wide range of architectural woodworking products. The custom cabinet shop manufactures cabinets, shelving, and wood trim for a variety of residential, commercial, and educational customers. These products usually are sold directly to building contractors and are built in accordance with plans and specifications from architects, interior designers, and owners. Raw materials are not ordered and work is not begun until "Commonwealth" has a firm order from the customer. Thus inventory control has never been a major problem for this division of the business.

Several years ago, Richard Sturdivant, the founder and president of "Commonwealth", wanted to capitalize on the building boom then in progress. He decided to expand his product line from custom cabinets and architectural woodwork by offering architectural *prehung* door units for use in the residential construction industry. Unlike his custom cabinet business, these door units are manufactured in quantity and sold through lumber dealers and home improvement center dealers that cater to both contractors and to the *do-it-yourselfers*.

In mid-December, Sturdivant made his initial forecast for next year. Commonwealth's finished inventory at the end of the year will be exactly the anticipated demand for the first week of next year. Sturdivant's inventory plan calls for Commonwealth to have minimum finished inventory at the end of each week equal to the anticipated demand for the following week. Any inventory not sold within a month after it is finished will incur a monthly holding cost equal to 10 percent of its value. Now, one year later, the inventory at the end of this year will be 10 to 15 times that which can be sold in 1 month. Sturdivant still thinks that contractors may want the doors and feels if the company does not have them in stock business will be lost.

DISCUSSION QUESTIONS

You are the vice-president of the company. There is no longer any room for storage of the doors. There are already several thousand doors made and no buyer for them.

1. What do you do?

2. How could operations planning protected you against this?

3. What part does inventory control play in this scenario?

4. Whose job should be lost and why?

ASSESSMENT

Read the following questions to check your knowledge of the topics presented in this unit. When you feel prepared, ask your instructor to assess your competency on them.

1. Define operations management.

2. Explain why purchasing procedures are important to the small business, a new business, and an established business. Are there any similarities? Are there any differences?

3. What role does a purchase order play in the business? Describe why it is important.

4. List and explain the inventory control options: perpetual and physical control systems.

5. Identify why electronic inventory control systems are now becoming popular in today's business market.

6. What is the role of the computer in the operations area?

7. Explain the basic productive elements in operations.

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PACE

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Units on the above entrepreneurship topics are available at the following levels:

* Level 1 helps you understand the creation and operation of a business
* Level 2 prepares you to plan for a business in your future
* Level 3 guides you in starting and managing your own business