

# **INFO 7225**

## **MODULE 2**

**Managerial Accounting**

**Topics 4-6**

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College of Engineering  
Northeastern University

1,000



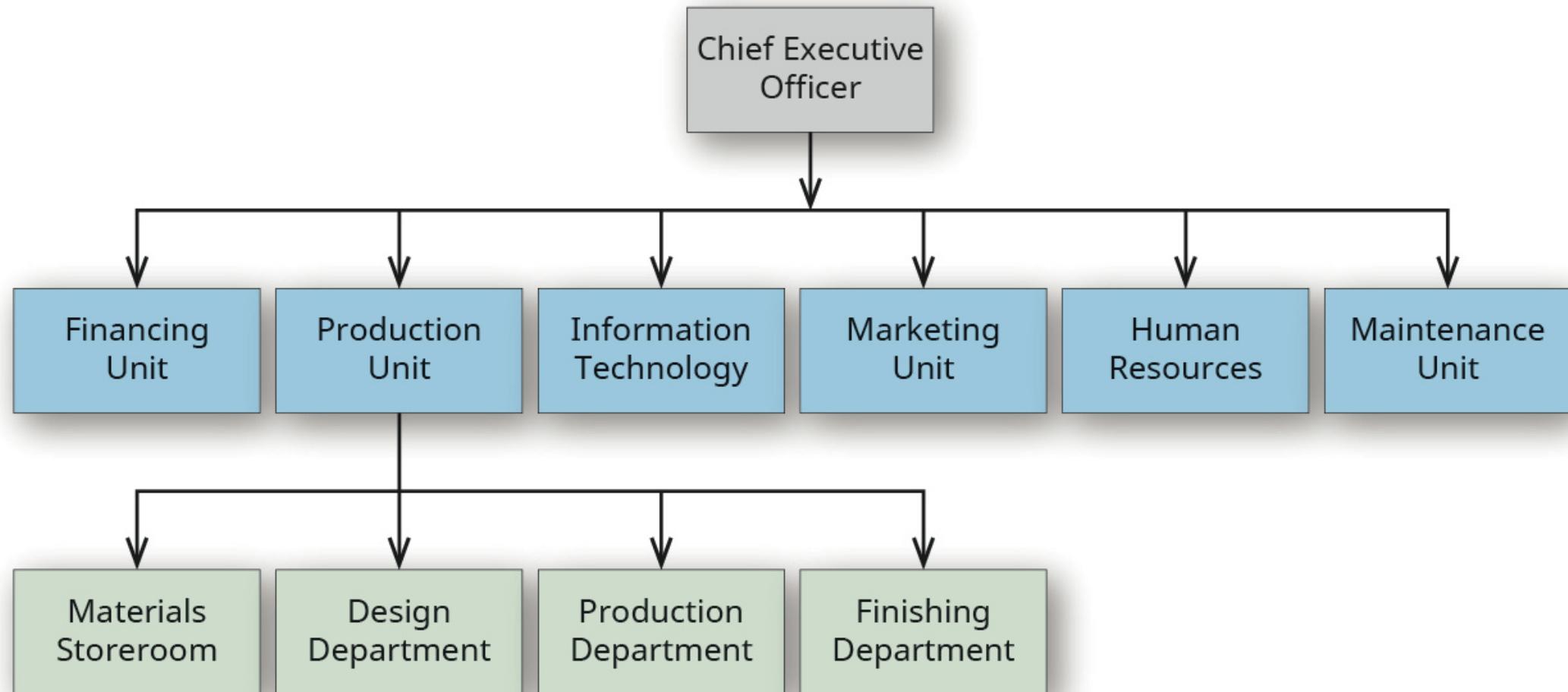
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# LEARNING OBJECTIVES

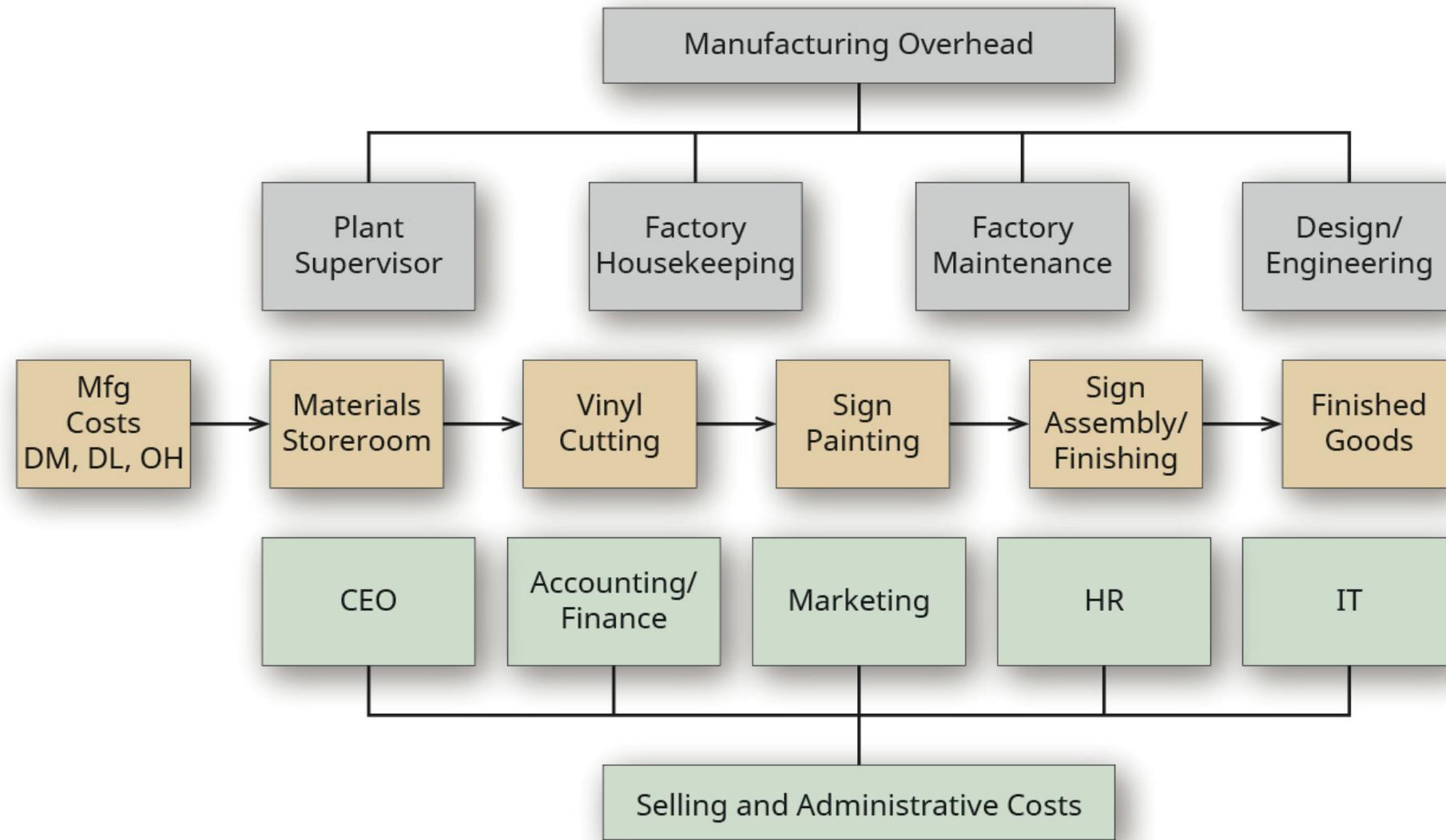
**After completing topics 4-6 of this module, you should be able to**

- Distinguish between job order costing and process costing;
- Compute the cost of a job using job order costing and process costing;
- Understand the concepts of activity-based costing.

# Organizational Chart for a Manufacturing Company



# Factory Layout for Dinosaur Vinyl and Manufacturing Costs



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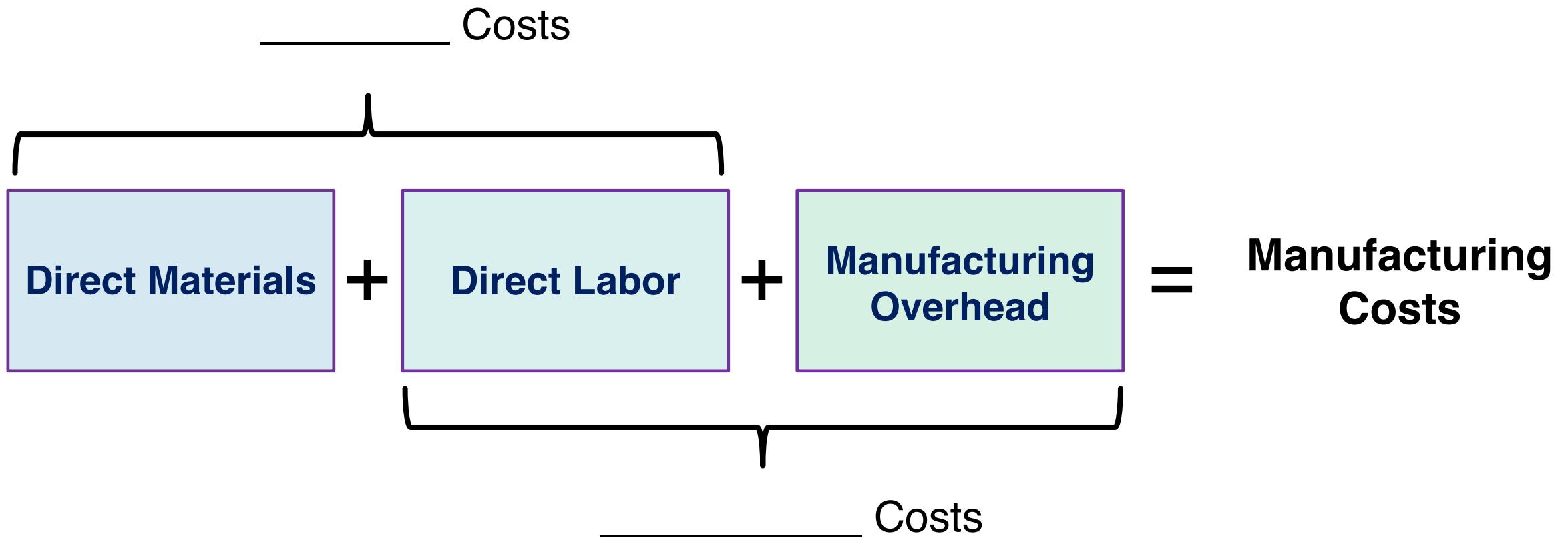
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# **Review:**

# **Manufacturing Costs (aka Product Costs)**

# Manufacturing Costs (also called Product Costs)



## Common Direct Materials by Industry

Industry	Direct Materials
Automotive	Iron, aluminum, glass, rubber
Cell phones	Glass, various metals, plastic
Furniture	Wood, leather, vinyl
Jewelry	Gold, silver, diamonds, rubies
Pharmaceuticals	Natural or synthetic biological ingredients

# Manufacturing Overhead

- Costs that support production but are not direct materials or direct labor are considered overhead.
- Manufacturing overhead has three components:

## **1) Indirect materials**

Materials used in production but not traced to specific products because the net informational value from the time and effort to trace the cost to each individual product produced is impossible or inefficient.

## **2) Indirect labor**

Labor costs of those employees associated with the manufacturing process, but whose contributions are not directly traceable to the final product, and

## **3) Overhead**

Costs that are necessary for production but not efficient to assign to individual product production. Examples of typical overhead costs are insurance, production facility electricity, warehouse rent, and depreciation of equipment.

# **Flow of Materials from Raw Materials to Finished Goods**



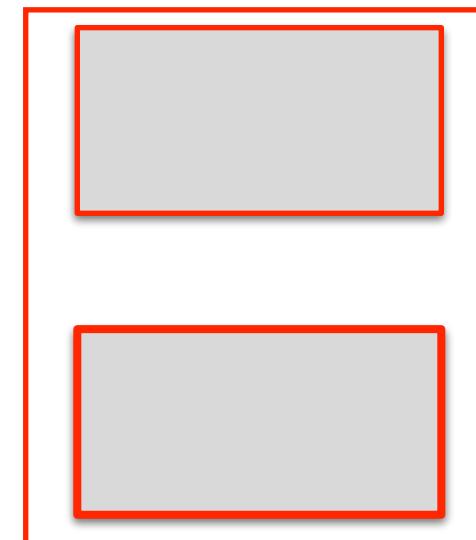
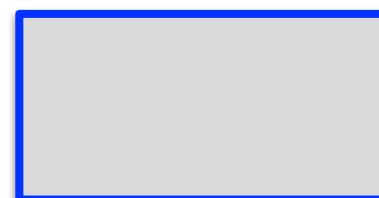
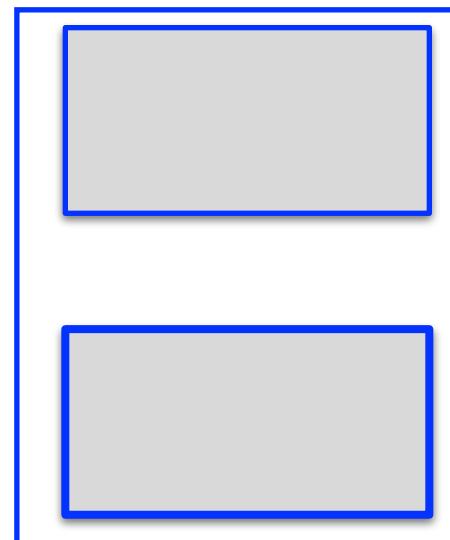
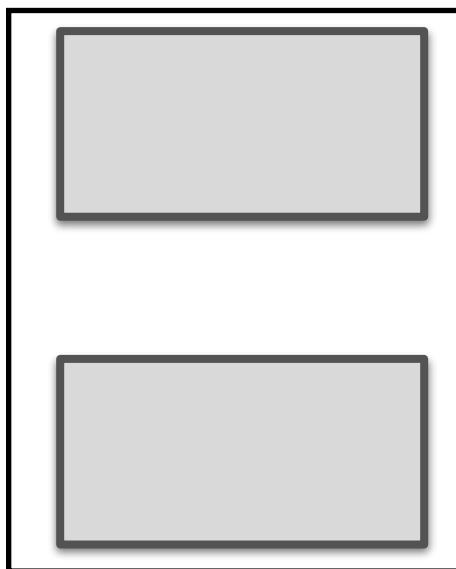
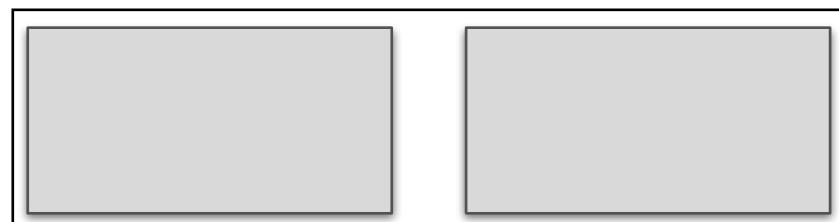
# Flow of Materials from Raw Materials to Finished Goods

**Raw Materials**

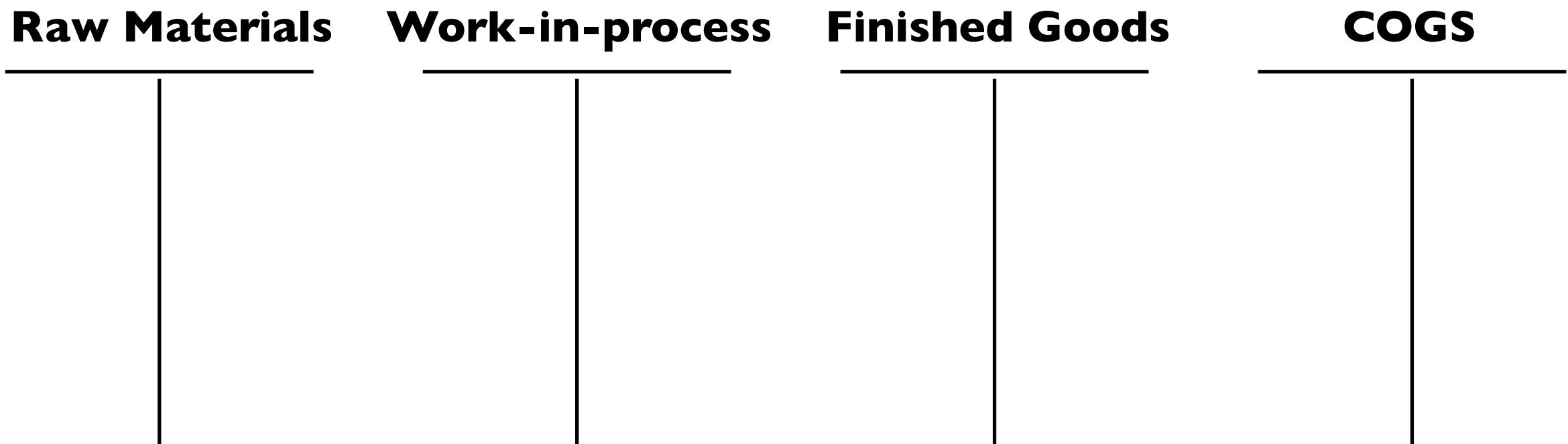
**Work-in-process**

**Finished Goods**

**COGS**



# **Flow of Materials from Raw Materials to Finished Goods**





# 4. Job Order Costing



# **Job Order Costing: Determining Primary Costs**

# Job Order Costing: Product Costs Traced to Each “Job”

MATERIALS REQUISITION FORM			
Dinosaur Vinyl, Inc.			
Material Requisition No.: <u>3392</u>			
Job No.: <u>MAC001</u>			
Date of Request: <u>4/5/2017</u>			
Date Needed: <u>4/5/2017</u>			
Description	Quantity	Unit Cost	Total Cost
Raw materials inventory: Vinyl	1	\$300	\$300
Raw materials inventory: Black ink	2	50	100
Raw materials inventory: Red ink	1	60	60
Raw materials inventory: Gold ink	1	60	60
Raw materials inventory: Grommets	12	10	120
Raw materials inventory: Framing wood	40	1.50	60
			\$700
Requested by: <u>John Ming</u>			Date: <u>4/5/17</u>
Authorized by: <u>Jula Clark</u>			Date: <u>4/5/17</u>

# RM Inventory: Beginning Balances and Purchases

Raw Materials Inventory: Vinyl	
Beginning inventory	1,000
4/2/2017	10,000
Balance	11,000

Raw Materials Inventory: Black Ink	
Beginning inventory	300
4/2/2017	500
Balance	800

Raw Materials Inventory: Red Ink	
Beginning inventory	300
Balance	300

Raw Materials Inventory: Gold Ink	
Beginning inventory	300
Balance	300

Raw Materials Inventory: Grommets	
Beginning inventory	120
Balance	120

Raw Materials Inventory: Framing Wood	
Beginning inventory	60
Balance	60

# Direct Materials Needed for Job MAC001

Item	Units	Cost per Unit	Item Cost	Total Cost
Production Department (Date 1)				
Vinyl	1	\$ 300	\$300	
Black ink	2	50	100	
Red ink	1	60	60	
Gold ink	1	60	60	\$520
Finishing Department (Date 3)				
Grommets	12	\$ 10	\$120	
Framing wood	40	1.50	60	180
Total Direct Materials				\$700

# **RM Inventory: Beginning Balances and Purchases**

Raw Materials Inventory: Vinyl	
Beginning inventory	1,000
4/2/2017	10,000
Balance	11,000

Raw Materials Inventory: Black Ink	
Beginning inventory	300
4/2/2017	500
Balance	800

Raw Materials Inventory: Red Ink	
Beginning inventory	300
Balance	300

Raw Materials Inventory: Gold Ink	
Beginning inventory	300
Balance	300

Raw Materials Inventory: Grommets	
Beginning inventory	120
Balance	120

Raw Materials Inventory: Framing Wood	
Beginning inventory	60
Balance	60

# **WIP Inventory**

# Direct Labor for Job MAC001

Item	Hours	Rate per Hour	Item Cost	Total Cost
Production Department (Date 2)				
Material Handler	1	\$15	\$15	
Print Technician	1	15	15	\$30
Finishing Department (Date 4)				
Production Assistant	1	\$18	\$18	
Production Assistant	1	18	18	<u>36</u>
Total Direct Labor				\$66

# Direct Labor for Job MAC001

Item	Hours	Rate per Hour	Item Cost	Total Cost
Production Department (Date 2)				
Material Handler	1	\$15	\$15	
Print Technician	1	15	15	\$30
Finishing Department (Date 4)				
Production Assistant	1	\$18	\$18	
Production Assistant	1	18	18	<u>36</u>
Total Direct Labor				\$66

## WIP Inventory

# Costs Accounted for in the Work in Process Inventory

	Work in Process Inventory
4/2/2017	520
4/5/2017	30
4/14/2017	180
4/15/2017	36



# **Job Order Costing Record Keeping: Job Cost Sheet**

# Job Order Costing Record Keeping:

## Individual Job Cost Sheets

### JOB COST SHEET Dinosaur Vinyl, Inc.

**Job No.:** 5416

**Customer No.:** 2501723

**Customer:** Macs & Cheese

**Date Started:** Dec. 22, 2018

**Units Ordered:** 1

**Date Completed:** Feb. 22, 2019

Direct Material	Units	Price	Amount
Vinyl	1	\$300	\$ 300
Black printing ink	2	50	100
Red printing ink	1	60	60
Gold printing ink	1	60	60
Grommets	12	10	120
Framing wood	40	1.5	60
Total Direct Materials			\$ 700

Direct Labor	Hours	Wage Rate	Amount
Material Handler	1	\$ 15	\$ 15
Print Technician	1	15	15
Production Assistants	2	18	36
Total Direct Labor			\$ 66

Manufacturing Overhead	Base Units	Rate	Amount
Direct Labor Cost			
Total Manufacturing Overhead			
Total Job Cost			
Total Revenue			



# **Job Order Costing: Determining Manufacturing Overhead Cost (Estimated)**

# Computing a Predetermined Overhead Rate

## Estimate MOH costs:

... uses the expenses from the prior two years to estimate the **overhead costs** for the upcoming year to be **\$250,000**:

	Annual Estimate
Indirect labor	\$ 5,000
Indirect materials	20,000
Utilities	75,000
Depreciation	90,000
Insurance	35,000
Interest expense	25,000
	<hr/>
	\$250,000

## Find a cost driver:

... also used its payroll records to estimate that it will spend **\$100,000 on direct labor**.

Using the predetermined overhead rate calculation, the overhead rate is:

$$\frac{\text{Estimated (budgeted) Overhead Cost } (\textcolor{brown}{\$250,000})}{\text{Expected (budgeted) Level of Activity } (\textcolor{brown}{\$100,000})}$$

# Journal Entry to Record Overhead Costs for Job MAC001

JOURNAL			
Date	Account	Debit	Credit
	<i>To apply overhead to Job MAC001</i>		

**JOB COST SHEET**  
**Dinosaur Vinyl, Inc.**

**Job No.:** 5416

**Customer No.:** 2501723

**Customer:** Macs & Cheese

**Date Started:** Dec. 22, 2018

**Units Ordered:** 1

**Date Completed:** Feb. 22, 2019

	<b>Units</b>	<b>Price</b>	<b>Amount</b>
			<hr/>
Direct Material			
Vinyl	1	\$300	\$ 300
Black printing ink	2	50	100
Red printing ink	1	60	60
Gold printing ink	1	60	60
Grommets	12	10	120
Framing wood	40	1.5	60
Total Direct Materials			<hr/> \$ 700
Direct Labor	<b>Hours</b>	<b>Wage Rate</b>	<b>Amount</b>
Material Handler	1	\$ 15	\$ 15
Print Technician	1	15	15
Production Assistants	2	18	36
Total Direct Labor			<hr/> \$ 66
Manufacturing Overhead	<b>Base Units</b>	<b>Rate</b>	<b>Amount</b>
Direct Labor Cost			<hr/> \$ 165
Total Manufacturing Overhead			<hr/> \$ 165
Total Job Cost			<hr/> \$ 931
Total Revenue			<hr/> \$2,000



# In-class Exercises

# THINK IT THROUGH (IN-CLASS EXERCISE 1)

## Allocating Costs

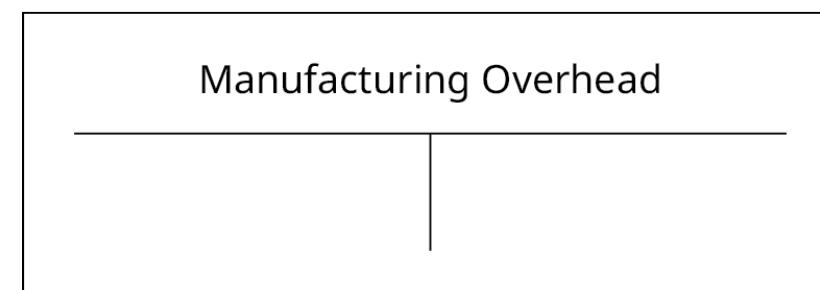
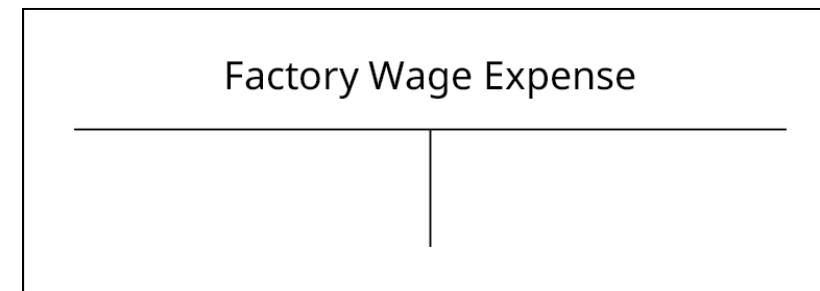
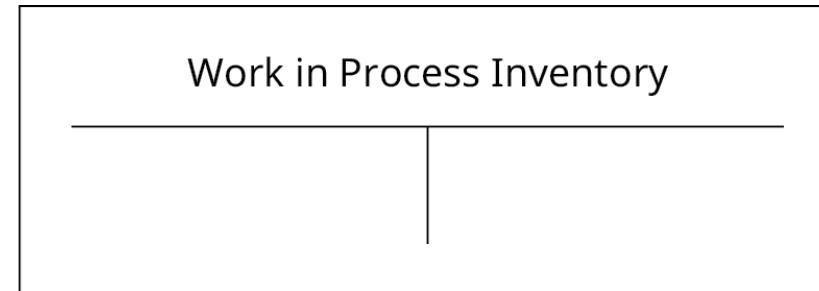
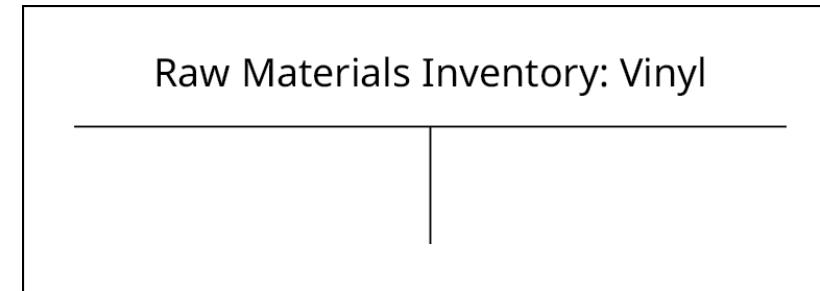
A manufacturing company has incurred these costs:

Purchase raw materials inventory	\$15,000
Issue raw materials inventory to Job A	3,000
Factory wage expense incurred	23,000
Factory wage allocated to Job A	2,000
Factory wage allocated to overhead	500
Manufacturing overhead incurred	7,500
Manufacturing overhead allocated to Job A	1,000

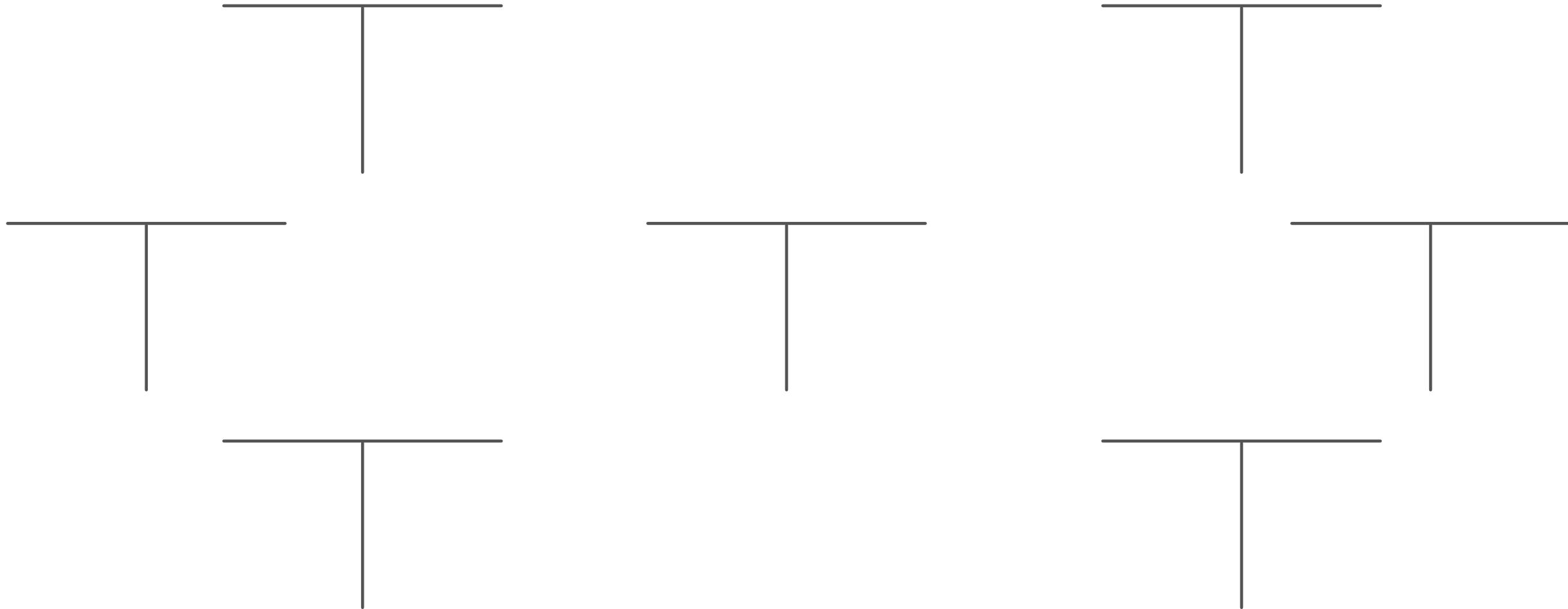
What is the cost allocated to Job A?

## In-class Exercise 2: Tracking the Flow with Selected T-Accounts

- A. Purchase raw materials inventory
- B. Factory wage expense incurred
- C. Issue raw materials inventory to Job P33
- D. Factory wage allocated to Job P33
- E. Factory wage allocated to overhead
- F. Job P33 completed
- G. Job P33 sold

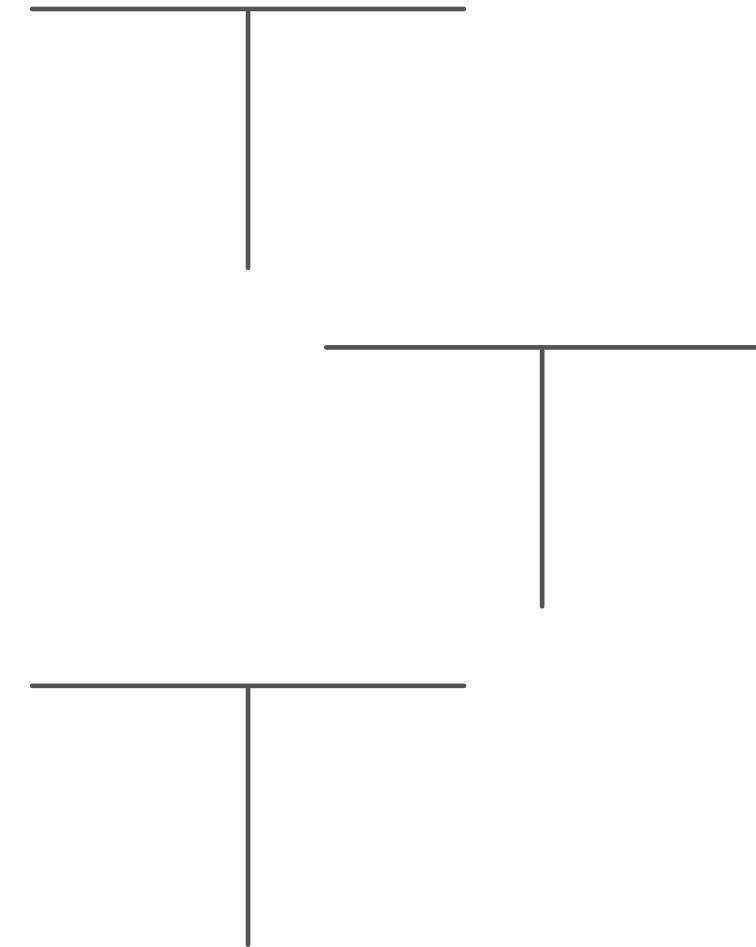
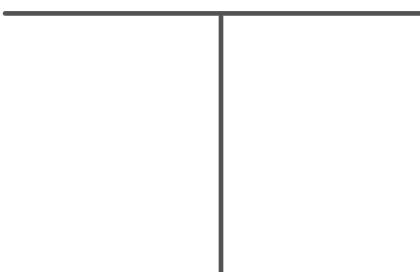
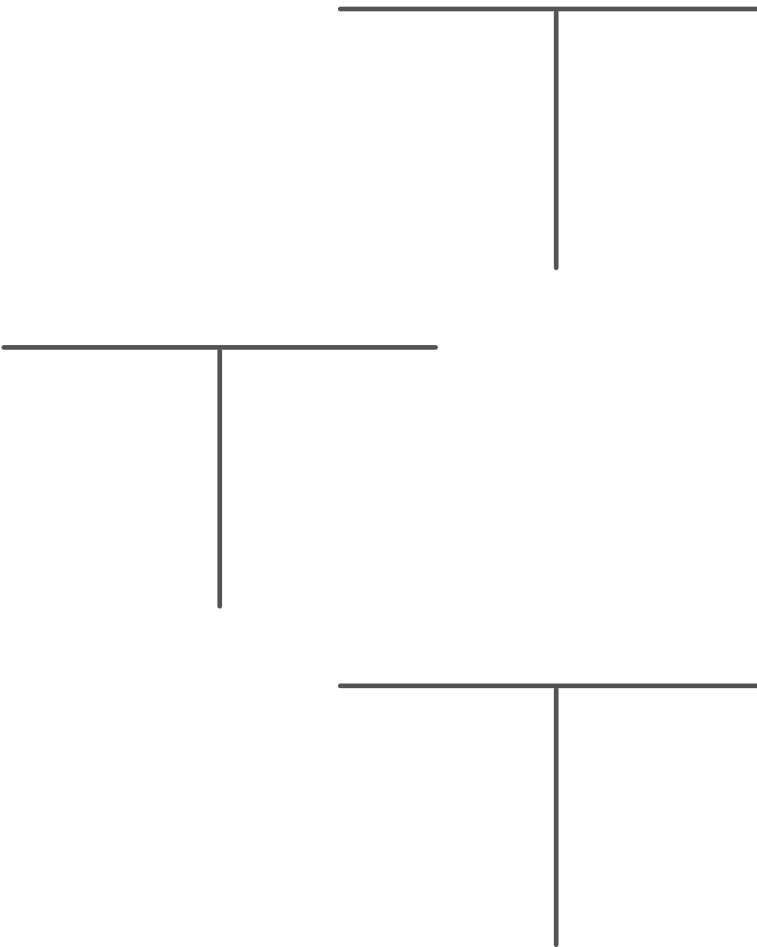


# Manufacturing Overhead Allocation = Actual Overhead Incurred



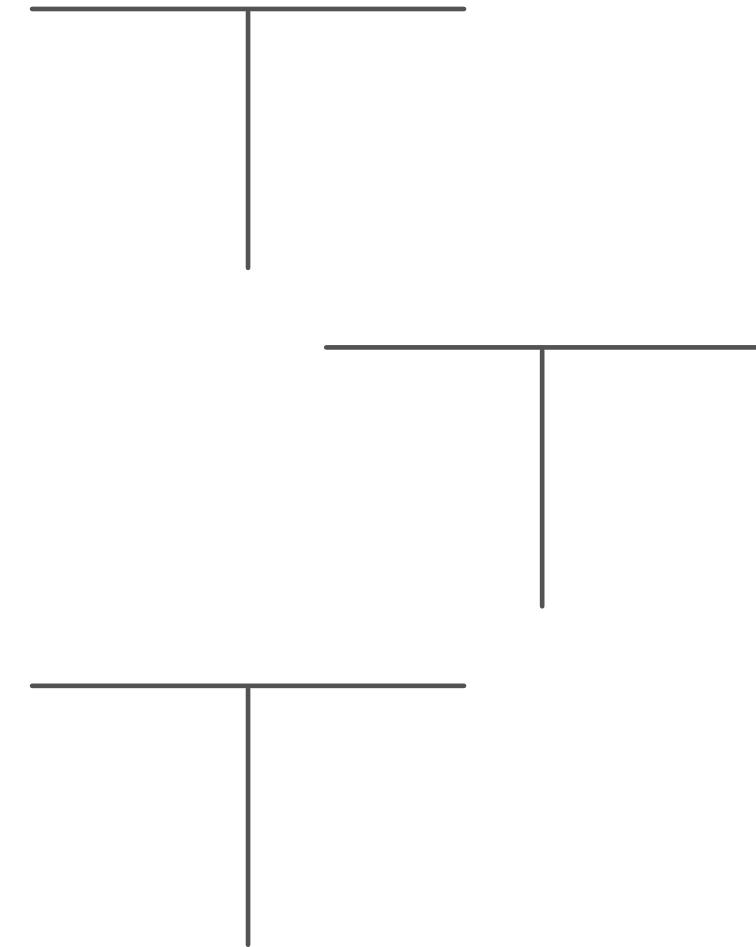
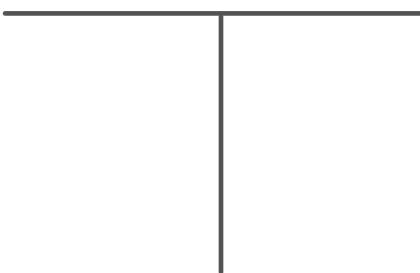
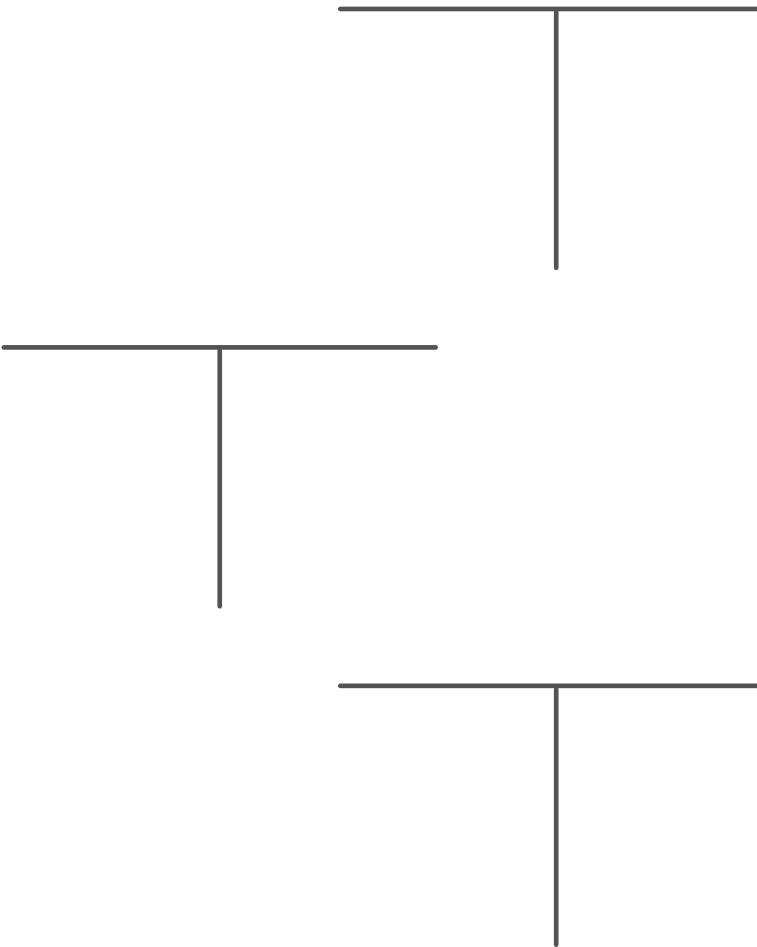
## Manufacturing Overhead Allocation

## Actual Overhead Incurred



## Manufacturing Overhead Allocation

## Actual Overhead Incurred



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# **5. Process Costing**



# **Job Order Costing vs. Process Costing**

# Job Order Costing versus Process Costing

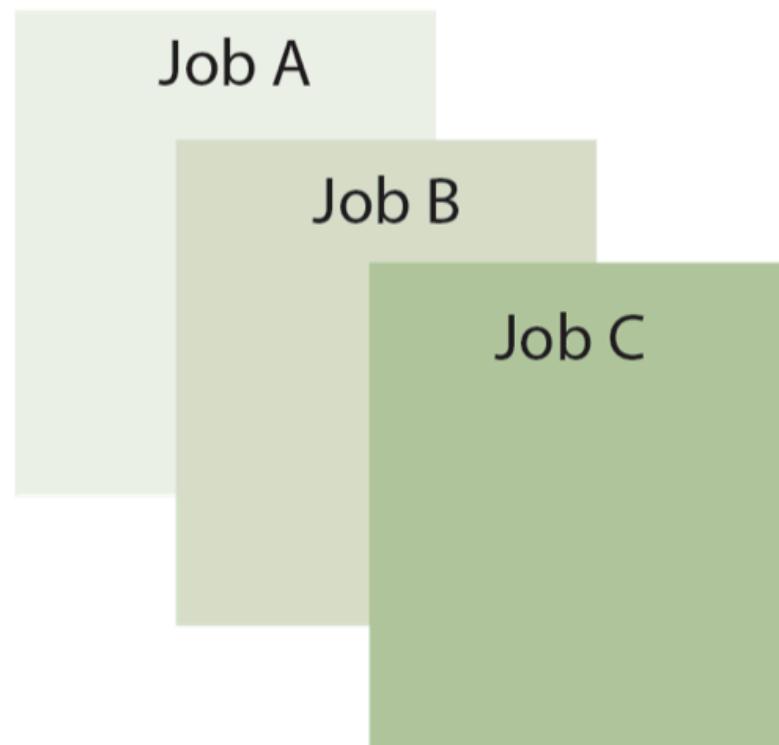
	<b>Job Order Cost System</b>	<b>Process Cost System</b>
Product type	Custom order	Mass production
Examples	Signs, buildings, tax returns	Folding tables, toys, buffet restaurants
Cost accumulation	Job lot	Accumulated per process
Work in process inventory	Individual job cost sheets	Separate work in process inventory department
Record keeping	Individual job cost sheets	Production cost report

## Job Order Costing versus Process Costing

	<b>Job Order Costing</b>	<b>Process Costing</b>
<b>Product costs</b>	Traced to the product and recorded on each job's individual job cost sheet.	Traced to departments or processes.
<b>Description</b>	Each department tracks its expenses and adds them to the job cost sheet. As jobs move from one department to another, the job cost sheet moves to the next department as well.	Each department tracks its expenses, the number of units started or transferred in, and the number of units transferred to the next department.
<b>Unit costs</b>	Computed using the job cost sheet.	Computed using the departmental costs and the equivalent units produced.
<b>Work in process inventory</b>	All incomplete jobs	Cost per unit and the equivalent units remaining to be completed.
<b>Finished goods inventory</b>	Includes the products completed but not sold	Number of units completed at the per unit cost.

## **Job Costing Environment**

Costs are accumulated  
by job on Job Cost Sheets



## **Process Costing Environment**

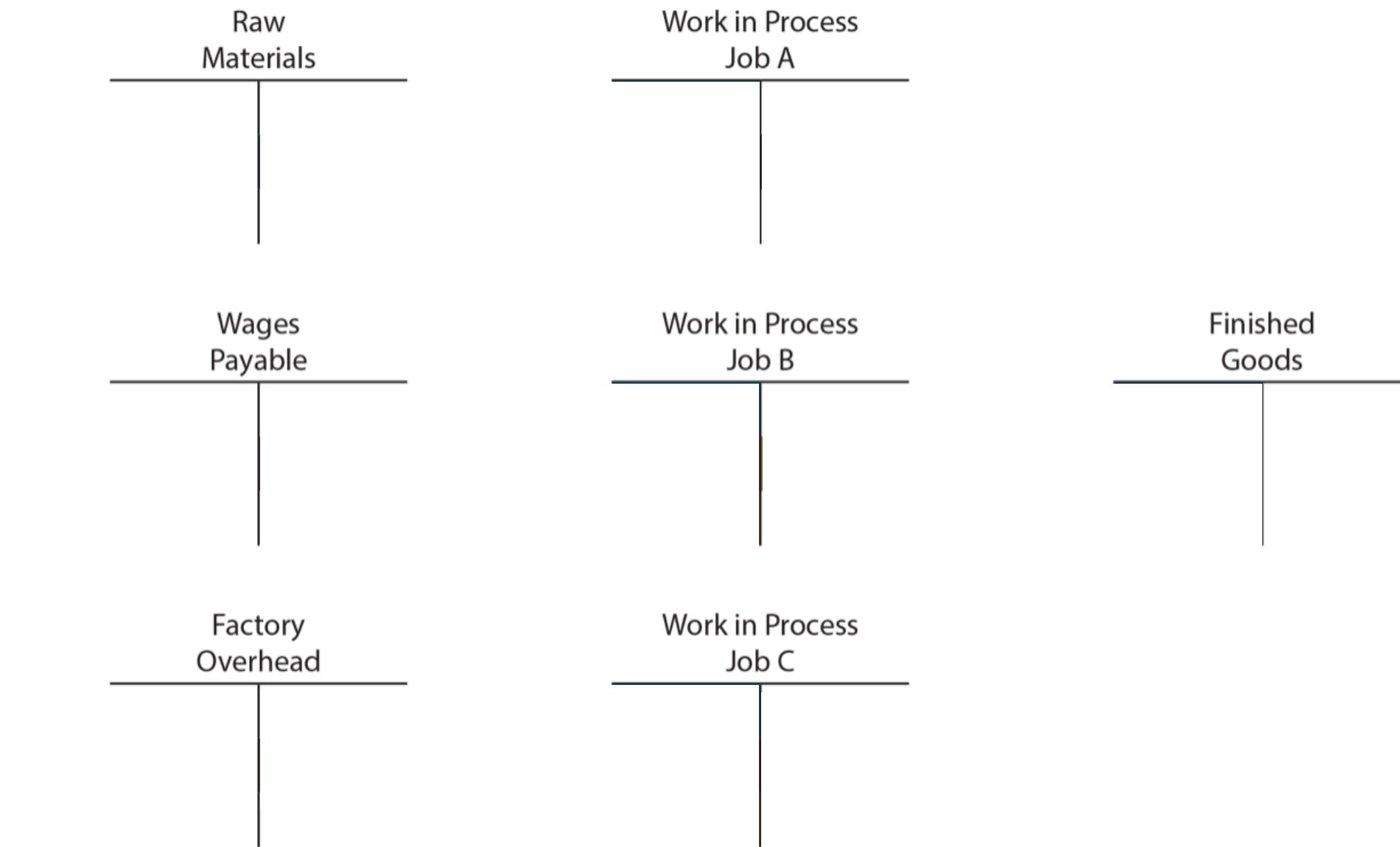
Costs are accumulated by department  
on Cost of Production Reports

Department A

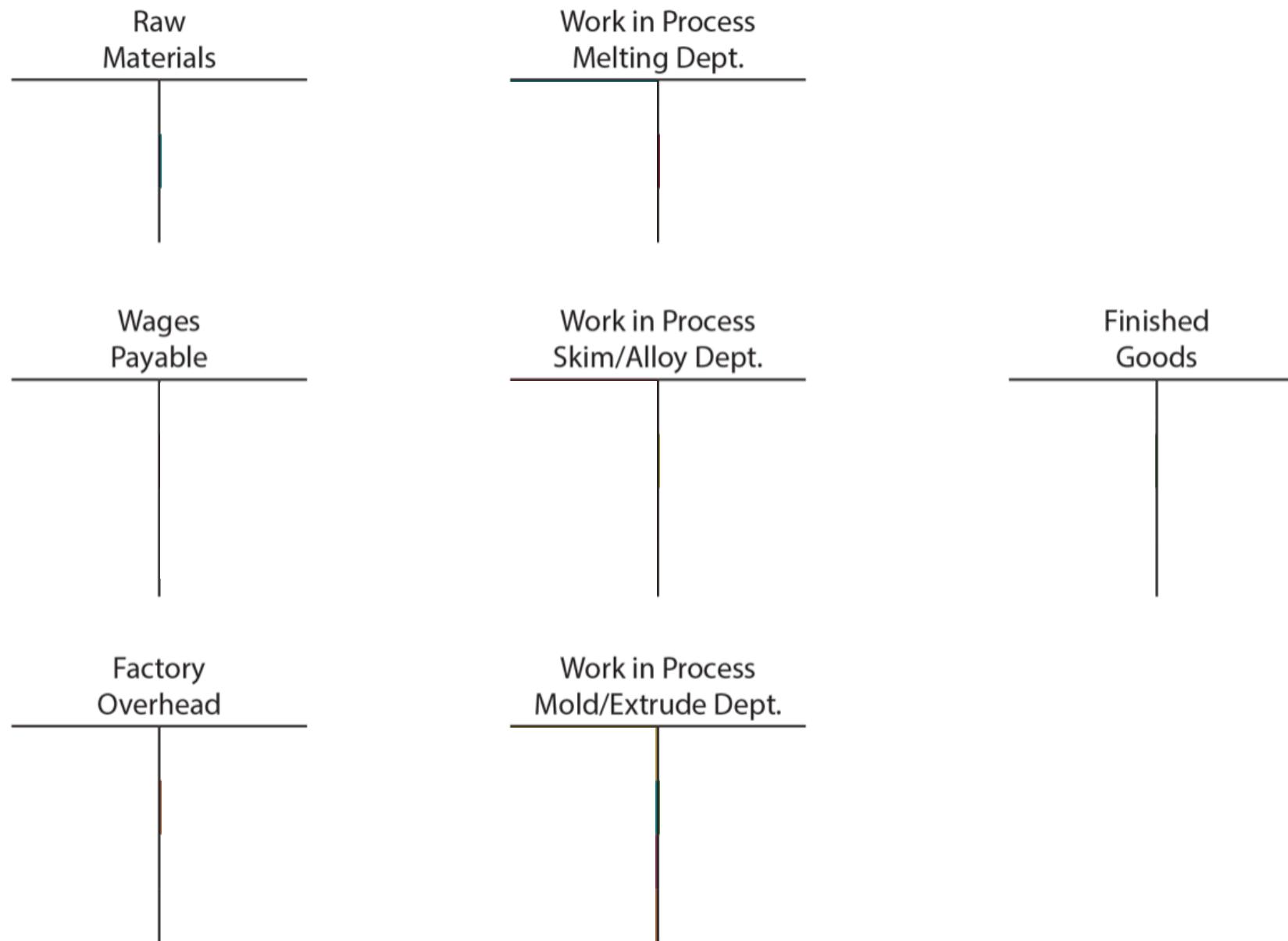
Department B

Department C

## Job Costing Flows



## Process Costing Flows



# Process Costing

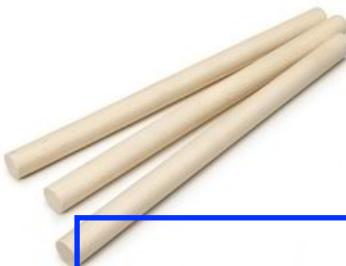
- Process costing is the optimal system for a company to use when the production process results in many similar units.
- It is used when production is continuous or occurs in large batches and it is difficult to trace a particular input cost to a specific individual product.
- In a “Production Cost Report”, the following information is reported:
  - 1) Cost per equivalent unit;
  - 2) Costs to units transferred to finished goods;
  - 3) Costs to partially completed units in the work in process (WIP) inventory.
- To prepare a “Production Cost Report”, follow the following four steps:
  1. Determine total units to assign costs;
  2. Compute equivalent units of production;
  3. Determine cost per equivalent unit;
  4. Allocate the costs to units transferred to finished goods and partially completed units in the work in process (WIP) inventory

# Equivalent Units (Weighted Average)

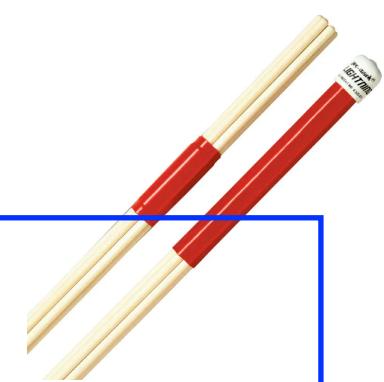
- Essentially, the concept of equivalent units involves expressing a given number of partially completed units as a smaller number of fully completed units.
- We do this because it is easier to account for whole units than parts of a unit. We are adding together partially completed units to make a whole unit.
  - For example, if we have \_\_ units \_\_\_\_ of the way complete, we can add them together to make \_\_ equivalent unit (= \_\_\_\_\_).
  - We can make this calculation easier by multiplying the units by a percentage of complete.

# Equivalent Units (Weighted Average)

- Under the weighted average method, equivalent units are calculated based on two things:
  1. Units completed and transferred out, and
  2. Units in ending work in process inventory.
- Units completed and transferred are \_\_\_\_\_ and will always be \_\_\_% complete for equivalent unit calculations for direct materials, direct labor and overhead.
- For units in ending work in process (WIP), we would take the units unfinished x a percent complete. The percent complete can be different for direct materials, direct labor or overhead.



# Rock City Percussion Manufacturing Process



## Shaping Department

- Direct material: wood
- Indirect material: water
- *Machines* (electricity); personnel (wage)
- Wood -> *cut* underwater -> dowels -> separate -> *shape* -> drumsticks

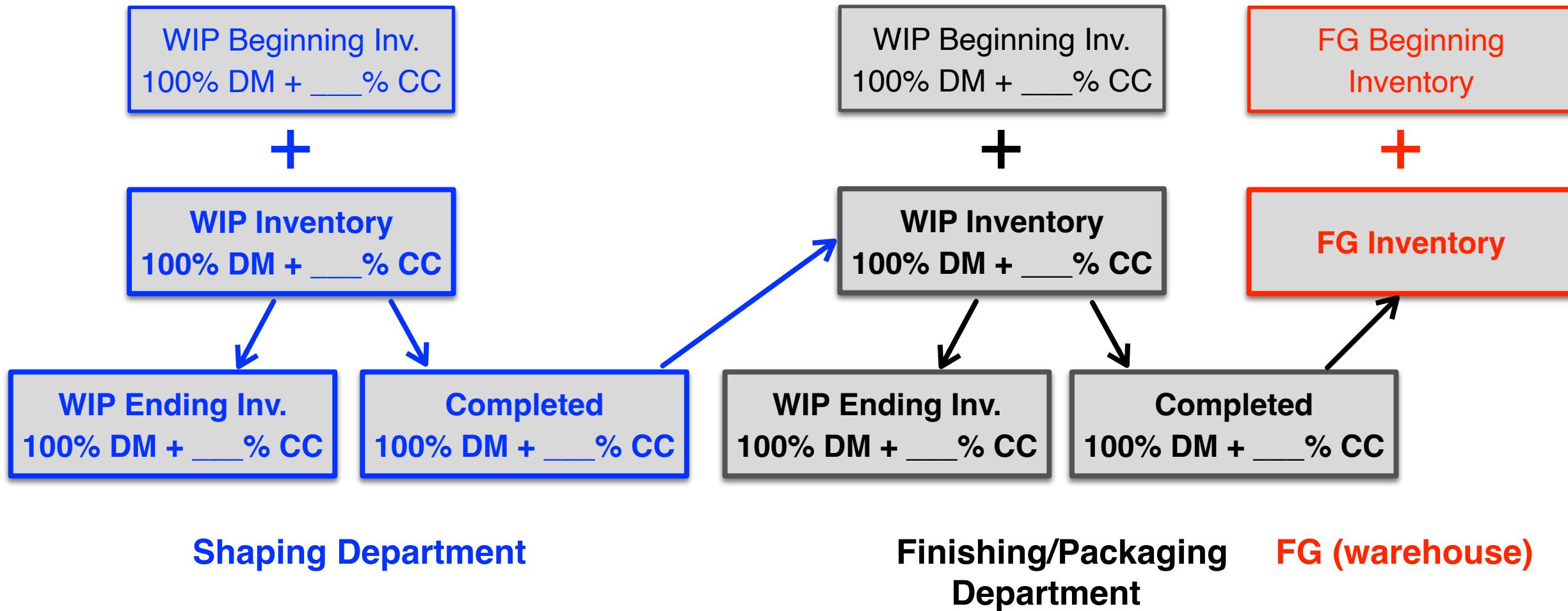


**Conveyer belt (one batch at a time)**

## Finishing/Packaging Department

- Direct material: packaging sleeves (basic size 5A stick); nylon, felt, and/or the ingredients (other types)
- DL and MOH: testing, weighing, and sound-matching the drumsticks into pairs; packaging

# Rock City Percussion Manufacturing Process



**EXAMPLE 1.** During the month, Rock City Percussion's shaping department requested \$10,179 in direct material and started into production 8,700 hickory drumsticks of size 5A. There was no beginning inventory in the shaping department, and 7,500 drumsticks were completed in that department and transferred to the finishing department. Wood is the only direct material in the shaping department, and it is added at the beginning of the process, so the work in process (WIP) is considered to be 100% complete with respect to direct materials. At the end of the month, the drumsticks still in the shaping department were estimated to be 35% complete with respect to conversion costs. All materials are added at the beginning of the shaping process.

While beginning the size 5A drumsticks, the shaping department incurred these costs in July:

Direct materials \$10,179; direct labor \$15,176; applied overhead \$7,000; total costs \$32,355 (= DM + DL + MOH).

Prepare a Production Cost Report for the shaping department using weighted-average method.

# Process Costing

Production Cost Report:	Units	DM (\$, % complete, or EU)	CC (\$, % complete, or EU)
1. Total costs incurred:			
Beginning WIP inventory (units and \$)			
Started into production this year (units and \$)			
2. Total equivalent units produced from those costs:			
Completed and transferred out (% complete)			
Completed and transferred out (# of EU)			
Ending WIP inventory (% complete)			
Ending WIP inventory (# of EU)			
Total equivalent units			
3. Costs per equivalent unit			
4a. Value of units completed and transferred out			
4b. Value of ending WIP inventory			

# Process Costing

Production Cost Report:	Units	DM (\$, % complete, or EU)	CC (\$, % complete, or EU)
1. Total costs incurred:			
Beginning WIP inventory (units and \$)			
Started into production this year (units and \$)			
2. Total equivalent units produced from those costs:			
Completed and transferred out (% complete)			
Completed and transferred out (# of EU)			
Ending WIP inventory (% complete)			
Ending WIP inventory (# of EU)			
Total equivalent units			
3. Costs per equivalent unit			
4a. Value of units completed and transferred out			
4b. Value of ending WIP inventory			

## Production Cost Report for the Shaping Department

Units to account for	Units		
Materials	Conversion	Total	
Beginning work in process			
Units started into production			
Total units to account for			
Work in process completion %			
Units accounted for	Materials	Conversion	Total
Completed and transferred out			
Ending work in process			
Total units to account for			
Costs to account for	Materials	Conversion	Total
Beginning work in process			
Incurred during the period			
Total costs to account for			
Equivalent units			
Cost per equivalent unit			
Value of ending work in process	Materials	Conversion	Total
Completed and transferred			
Total costs			

## Production Cost Report for the Shaping Department

Units to account for	Units		
Beginning work in process	—		
Units started into production	<u>8,700</u>		
Total units to account for	<u>8,700</u>		
Work in process completion %	100%	35%	
Units accounted for	Materials	Conversion	Total
Completed and transferred out	7,500	7,500	7,500
Ending work in process	<u>1,200</u>	<u>420</u>	<u>1,200</u>
Total units to account for	<u>8,700</u>	<u>7,920</u>	<u>8,700</u>
Costs to account for	Materials	Conversion	Total
Beginning work in process	\$ 0	\$ 0	\$ 0
Incurred during the period	<u>\$10,179</u>	<u>\$22,176</u>	<u>\$32,355</u>
Total costs to account for	<u>\$10,179</u>	<u>\$22,176</u>	<u>\$32,355</u>
Equivalent units	8,700	7,920	
Cost per equivalent unit	\$ 1.17	\$ 2.80	\$ 3.97
	Materials	Conversion	Total
Value of ending work in process	\$ 1,404	\$ 1,176	\$ 2,580
Completed and transferred	<u>8,775</u>	<u>21,000</u>	<u>29,775</u>
Total costs	<u>\$10,179</u>	<u>\$22,176</u>	<u>\$32,355</u>

## EXAMPLE 2 (Chapter 5, Problem Set A, Problem 5)

Materials are added at the beginning of a production process, and ending work in process inventory is 30% complete with respect to conversion costs. Use the information provided to complete a production cost report using the weighted-average method.

### Costs to Account For

Beginning inventory: materials	\$ 10,000
Beginning inventory: conversion	19,000
Direct materials	50,000
Direct labor	75,000
Applied overhead	<u>37,248</u>
Total costs to account for	\$191,248

### Units to Account For

Beginning work in process	5,000
Units started into production	20,000
Transferred out	19,000

# Process Costing

Production Cost Report:	Units	DM (\$, % complete, or EU)	CC (\$, % complete, or EU)
1. Total costs incurred:			
Beginning WIP inventory (units and \$)			
Started into production this year (units and \$)			
2. Total equivalent units produced from those costs:			
Completed and transferred out (% complete)			
Completed and transferred out (# of EU)			
Ending WIP inventory (% complete)			
Ending WIP inventory (# of EU)			
Total equivalent units			
3. Costs per equivalent unit			
4a. Value of units completed and transferred out			
4b. Value of ending WIP inventory			

## **EXAMPLE 3 (Chapter 5, Problem Set A, Problem 3)**

Pant Risers manufactures bands for self-dressing assistive devices for mobility-impaired individuals. Manufacturing is a one-step process where the bands are cut and sewn. This is the information related to this year's production:

<b>Units to Account For</b>	<b>Units</b>	<b>Materials</b>	<b>Conversion</b>
Beginning WIP inventory	500	500	250
Started	<u>20,500</u>		
To account for	21,000		

Ending inventory was 100% complete as to materials and 70% complete as to conversion, and the total materials cost is \$57,540 and the total conversion cost is \$36,036. Using the weighted-average method, what are the unit costs if the company transferred out 17,000 units? What is the value of the inventory transferred out and the value of the ending WIP inventory?

# Process Costing

Production Cost Report:	Units	DM (\$, % complete, or EU)	CC (\$, % complete, or EU)
1. Total costs incurred:			
Beginning WIP inventory (units and \$)			
Started into production this year (units and \$)			
2. Total equivalent units produced from those costs:			
Completed and transferred out (% complete)			
Completed and transferred out (# of EU)			
Ending WIP inventory (% complete)			
Ending WIP inventory (# of EU)			
Total equivalent units			
3. Costs per equivalent unit			
4a. Value of units completed and transferred out			
4b. Value of ending WIP inventory			

## **EXAMPLE 4 (Chapter 4, Problem Set A, Problem 13)**

The following events occurred during March for Ajax Company. Prepare a journal entry for each transaction.

- A. Materials were purchased on account for \$35,429.
  - B. Materials were requisitioned to begin work on Job C15 in the amount of \$25,259.
  - C. Direct labor expense for Job C15 was \$24,129.
  - D. Actual overhead was incurred on account of \$32,852.
  - E. Factory overhead was charged to Job C15 at the rate of 200% of direct labor.
  - F. Job C15 was transferred to finished goods at \$97,646.
  - G. Job C15 was sold on account for \$401,000.

## **EXAMPLE 4 (Chapter 4, Problem Set A, Problem 13)**

The following events occurred during March for Ajax Company. Prepare a journal entry for each transaction.

- A. Materials were purchased on account for \$35,429.
  - B. Materials were requisitioned to begin work on Job C15 in the amount of \$25,259.
  - C. Direct labor expense for Job C15 was \$24,129.
  - D. Actual overhead was incurred on account of \$32,852.
  - E. Factory overhead was charged to Job C15 at the rate of 200% of direct labor.
  - F. Job C15 was transferred to finished goods at \$97,646.
  - G. Job C15 was sold on account for \$401,000.

# SUMMARY

- The three components of manufacturing costs are \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.
- Job order costing is the optimal costing method for producing \_\_\_\_\_ goods or when it is easy to identify the cost \_\_\_\_\_ with the product. MOH is assigned to the individual jobs using \_\_\_\_\_.
- Process costing is the system of accumulating costs within each \_\_\_\_\_ for large-volume, mass-produced units. Process costing determines the cost per unit through the use of \_\_\_\_\_.

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# SUMMARY

- SG&A is treated as a \_\_\_\_\_ cost in traditional costing systems.
- Traditional methods is optimal when the manufacturing process is \_\_\_\_\_ driven and overhead increases based on traditional activity bases, such as direct labor hours, direct labor dollars, or machine hours.

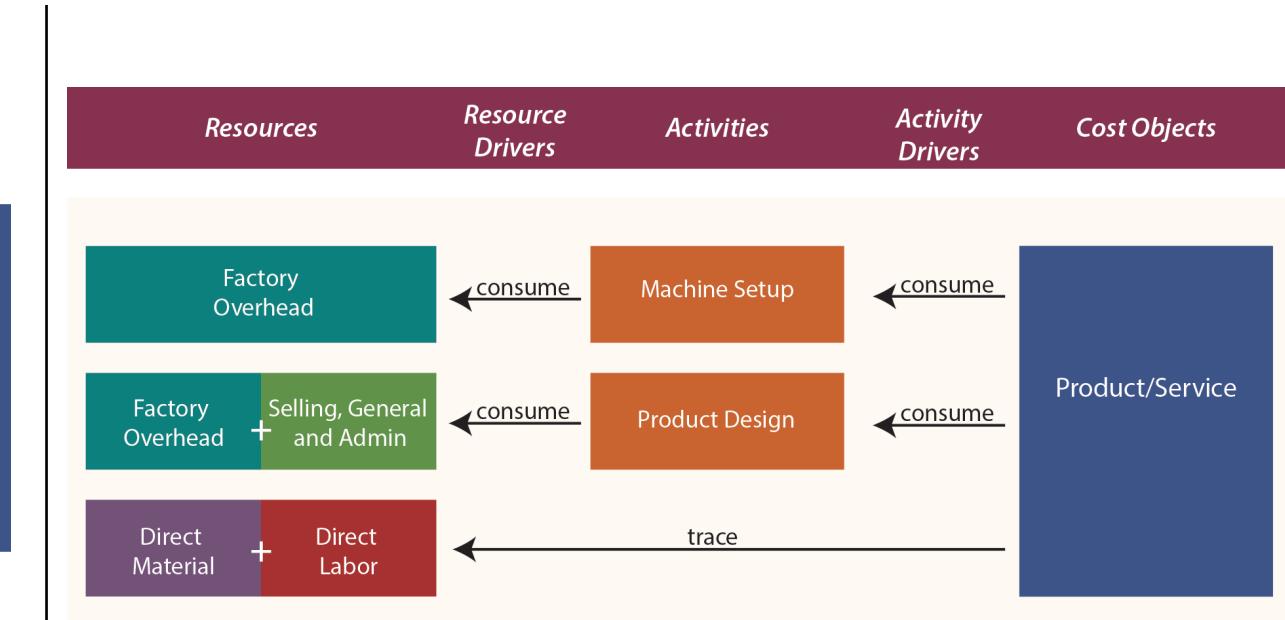
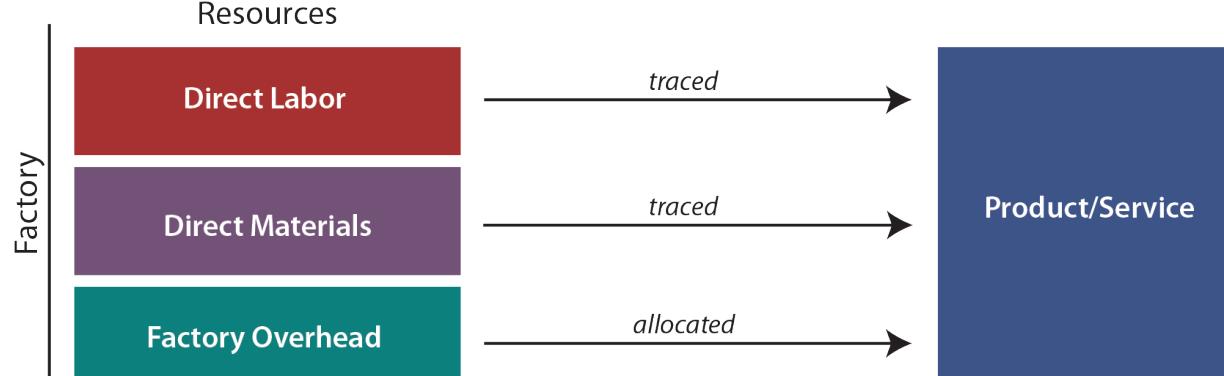
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# **6. Activity-Based Costing (ABC)**

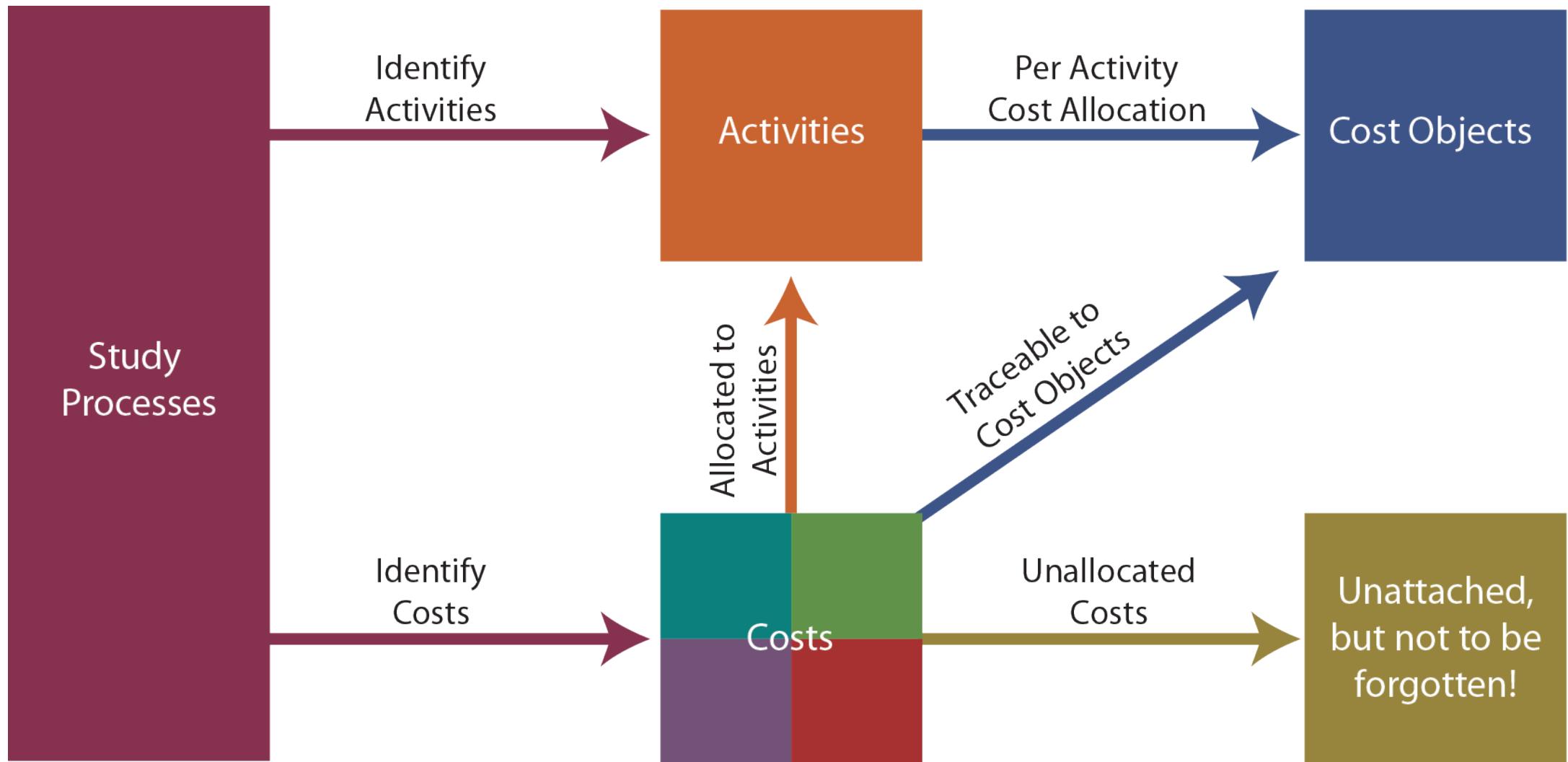
# Traditional Costing Methods vs. ABC Concepts



Traditional Costing Methods

ABC Concepts

# Steps to Develop an ABC System



## Example: Traditional Costing Methods

Golf and Music Enthusiast Company (GAME) developed two specialized products. The first product is GLASSESong, a pair of sunglasses with a built-in music player. The other is CAPlayer, a golf cap with a built-in music player having a very short unobtrusive cord from the cap to the speakers.

GAME has been employing **traditional costing methods** and applies factory overhead on the basis of labor costs. The products sell as fast as they can be produced so there is virtually no inventory. For a recent period CAPlayer sold 90,000 units and GLASSESong sold 110,000 units and each unit sells for \$60.

	CAPlayer	GLASSESong		
Direct material	\$3,000,000	\$4,400,000		
Direct labor	700,000	200,000		
Applied factory overhead (300% of direct labor)	<u>2,100,000</u>	<u>600,000</u>		
Product cost	<u><u>\$5,800,000</u></u>	<u><u>\$5,200,000</u></u>		
Revenue			Revenues	\$12,000,000
Product margin (traditional costing method)			CAPlayer cost	\$5,800,000
			GLASSESong cost	5,200,000
			SG&A	<u>600,000</u>
			Profit	<u><u>\$ 400,000</u></u>

# Activity-Based Costing (ABC):

## Study Processes and Costs | Identify Activities

**The consultant's study began with a review of the business, which revealed the following:**

1. Product costs were \$11,000,000 and SG&A \$600,000 as shown in the analysis.
2. The core components are the same for each device.
3. GLASSESong requires added material related to polarized lenses and CAPlayer requires added direct labor for sewing.
4. Both devices are produced in batches on the same automated assembly line, at the same pace, and through similar steps.

	CAPlayer	GLASSESong
Direct material	\$3,000,000	\$4,400,000
Direct labor	700,000	200,000
Applied factory overhead (300% of direct labor)	<u>2,100,000</u>	<u>600,000</u>
Product cost	<u><u>\$5,800,000</u></u>	<u><u>\$5,200,000</u></u>
CAPlayer cost per unit (\$5,800,000/90,000)	\$64.44	
GLASSESong cost per unit (\$5,200,000/110,000)		\$47.27

Cost Analysis	
Direct materials	\$ 7,400,000
Direct labor	900,000
Indirect labor	200,000
Indirect material	100,000
Factory maintenance	150,000
Robotics lease	2,000,000
Insurance	70,000
Other	180,000
Total Product Cost	<u><u>\$11,000,000</u></u>
Management salaries	\$ 430,000
Design and engineering	90,000
Business office rent	20,000
Accounting	60,000
Total SG&A Cost	<u><u>\$ 600,000</u></u>

5. Automated machinery is leased from Rebel Robotics, which bases its rental charges on a “units processed” basis.
6. There is one production line, and it must be “set up” for each production batch.
7. CAPlayers are produced in batches of 900 and GLASSESongs are produced in batches of 550 units. As a result CAPlayer required 100 setups ( $90,000 \text{ units} / 900 \text{ units per setup}$ ) and GLASSESong required 200 setups ( $110,000 \text{ units} / 550 \text{ units per setup}$ ).
8. A tech support department has been established to help customers download music to their devices. The CAPlayers are sold and supported only through the world’s 1,000 most exclusive golf courses. The golf pros at these courses usually call once to learn the product and require no further assistance.

9. The GLASSESong units are sold over the internet, and individual purchasers average one call per unit sold.

10. Both products were designed by an internal development team.

ACTIVITY	LEVEL	METRIC
Robotics	Unit Level	Number of units produced $(90,000 + 110,000 = 200,000)$
Production Setup	Batch Level	Number of setups $(100 + 200 = 300)$
Tech Support	Customer Level	Number of tech support calls $(1,000 + 110,000 = 111,000)$
Product Design	Product Level	Number of products designed $(1 + 1 = 2)$

# Activity-Based Costing (ABC):

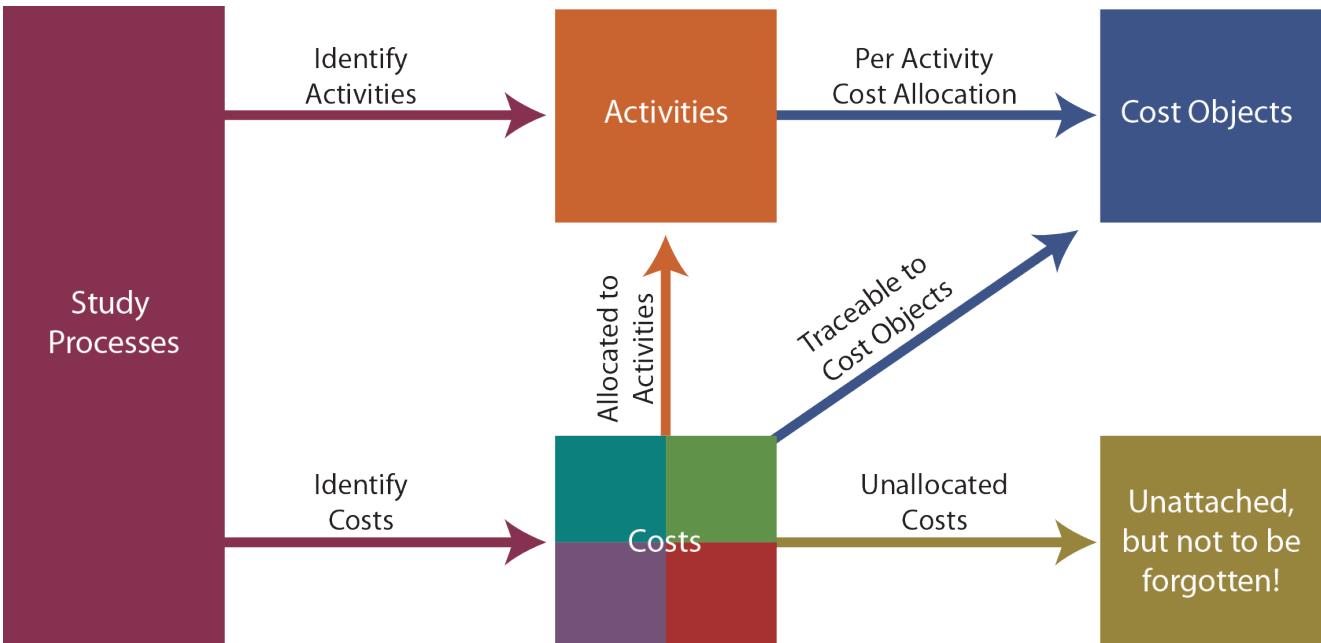
## Study Processes and Costs | Identify Activities

Cost Analysis	
Direct materials	\$ 7,400,000
Direct labor	900,000
Indirect labor	200,000
Indirect material	100,000
Factory maintenance	150,000
Robotics lease	2,000,000
Insurance	70,000
Other	<u>180,000</u>
<b>Total Product Cost</b>	<b><u>\$11,000,000</u></b>
Management salaries	\$ 430,000
Design and engineering	90,000
Business office rent	20,000
Accounting	<u>60,000</u>
<b>Total SG&amp;A Cost</b>	<b><u>\$ 600,000</u></b>

ACTIVITY	LEVEL	METRIC
Robotics	Unit Level	Number of units produced (90,000 + 110,000 = 200,000)
Production Setup	Batch Level	Number of setups (100 + 200 = 300)
Tech Support	Customer Level	Number of tech support calls (1,000 + 110,000 = 111,000)
Product Design	Product Level	Number of products designed (1 + 1 = 2)



	A	B	C	D	E	F	G	H	I	J	K	L
1	Cost Analysis		Activity Cost Pools									
2			Robotics	Production Setup	Tech Support	Product Design	Unallocated					
3	Product Costs											
4	Direct materials	\$7,400,000										
5	Direct labor	900,000										
6	Indirect labor	200,000										
7	Indirect material	100,000										
8	Factory maint.	150,000										
9	Robotics lease	2,000,000										
10	Insurance	70,000										
11	Other	180,000										
12												
13	SG&A											
14	Mgt. salaries	430,000										
15	Design and eng.	90,000										
16	Business off. rent	20,000										
17	Accounting	60,000										
18												



















	A	B	C	D	E	F	G	H	I	J	K	L
1	Cost Analysis		Activity Cost Pools									
2			Robotics		Production Setup		Tech Support		Product Design		Unallocated	
3	Product Costs											
4	Direct materials	\$7,400,000	0%	\$ 0	0%	\$ 0	0%	\$ 0	0%	\$ 0	0%	\$ 0
5	Direct labor	900,000	0%	0	0%	0	0%	0	0%	0	0%	0
6	Indirect labor	200,000	20%	40,000	65%	130,000	10%	20,000	5%	10,000	0%	0
7	Indirect material	100,000	12%	12,000	70%	70,000	10%	10,000	1%	1,000	7%	7,000
8	Factory maint.	150,000	24%	36,000	70%	105,000	0%	0	0%	0	6%	9,000
9	Robotics lease	2,000,000	100%	2,000,000	0%	0	0%	0	0%	0	0%	0
10	Insurance	70,000	30%	21,000	60%	42,000	10%	7,000	0%	0	0%	0
11	Other	180,000	10%	18,000	45%	81,000	5%	9,000	20%	36,000	20%	36,000
12												
13	SG&A											
14	Mgt. salaries	430,000			Revenues							
15	Design and eng.	90,000			CAPlayer cost							
16	Business off. rent	20,000			GLASSESong cost							
17	Accounting	60,000			SG&A							
18					Profit							









	A	B	C	D	E	F	G	H	I	J	K	L
1	Cost Analysis		Activity Cost Pools									
2			Robotics		Production Setup		Tech Support		Product Design		Unallocated	
3	Product Costs											
4	Direct materials	\$7,400,000	0%	\$ 0	0%	\$ 0	0%	\$ 0	0%	\$ 0	0%	\$ 0
5	Direct labor	900,000	0%	0	0%	0	0%	0	0%	0	0%	0
6	Indirect labor	200,000	20%	40,000	65%	130,000	10%	20,000	5%	10,000	0%	0
7	Indirect material	100,000	12%	12,000	70%	70,000	10%	10,000	1%	1,000	7%	7,000
8	Factory maint.	150,000	24%	36,000	70%	105,000	0%	0	0%	0	6%	9,000
9	Robotics lease	2,000,000	100%	2,000,000	0%	0	0%	0	0%	0	0%	0
10	Insurance	70,000	30%	21,000	60%	42,000	10%	7,000	0%	0	0%	0
11	Other	180,000	10%	18,000	45%	81,000	5%	9,000	20%	36,000	20%	36,000
12												
13	SG&A											
14	Mgt. salaries	430,000	10%	\$ 43,000	10%	\$ 43,000	10%	\$43,000	30%	\$129,000	40%	\$172,000
15	Design and eng.	90,000	30%	27,000	40%	36,000	10%	9,000	20%	18,000	0%	0
16	Business off. rent	20,000	0%	0	0%	0	20%	4,000	15%	3,000	65%	13,000
17	Accounting	60,000	5%	3,000	5%	3,000	15%	9,000	5%	3,000	70%	42,000
18				\$2,200,000		\$510,000		\$111,000		\$200,000		\$279,000

# Determine Per-Activity Rates

	Allocation Rates			
	Robotic Units	Production Setups	Tech Calls	Product Designs
CAPlayer	90,000	100		1
GLASSESong	110,000	200		1
Customers - Golf Courses			1,000	
Customers - Individuals			110,000	
Total Activity Quantity	200,000	300	111,000	2
Per Activity Allocation Rate				
Total Cost (from spreadsheet)	\$2,200,000	\$510,000	\$111,000	\$200,000
Total Activity Quantity	÷ 200,000	÷ 300	÷ 111,000	÷ 2
Activity Cost Per Measure	\$11	\$1700	\$1	\$100,000

# Apply Costs to Cost Objects

Product Profitability Analysis				
		CAPlayer	GLASSESong	TOTAL
Direct Material	Traceable	\$3,000,000	\$4,400,000	\$ 7,400,000
Direct Labor	Traceable	700,000	200,000	900,000
Robotics	\$11/unit	990,000	1,210,000	2,200,000
Production Setup	\$1,700/setup	170,000	340,000	510,000
Tech Support	\$1/call	1,000	110,000	111,000
Product Design	\$100,000/design	100,000	100,000	200,000
Total Traceable & Allocated Costs		<u>\$4,961,000</u>	<u>\$6,360,000</u>	<u>\$11,321,000</u>
Unallocated Costs				<u>279,000</u>
Total Costs				<u><u>\$11,600,000</u></u>

# Apply Costs to Cost Objects

Product Profitability Analysis				
		CAPlayer	GLASSESong	TOTAL
Direct Material	Traceable	\$3,000,000	\$4,400,000	\$ 7,400,000
Direct Labor	Traceable	700,000	200,000	900,000
Robotics	\$11/unit	990,000	1,210,000	2,200,000
Production Setup	\$1,700/setup	170,000	340,000	510,000
Tech Support	\$1/call	1,000	110,000	111,000
Product Design	\$100,000/design	100,000	100,000	200,000
Total Traceable & Allocated Costs		<u>\$4,961,000</u>	<u>\$6,360,000</u>	<u>\$11,321,000</u>
Unallocated Costs				<u>279,000</u>
Total Costs				<u><u>\$11,600,000</u></u>
Product Revenues		\$5,400,000	\$6,600,000	\$12,000,000
Total Traceable & Allocated Costs		<u>4,961,000</u>	<u>6,360,000</u>	<u>11,321,000</u>
Product Margin		<u>\$ 439,000</u>	<u>\$ 240,000</u>	<u>\$ 679,000</u>
Unallocated Costs				<u>279,000</u>
Entity Profit				<u><u>\$ 400,000</u></u>

# Example: Traditional Costing Methods vs. ABC Method

Golf and Music Enthusiast Company (GAME) developed two specialized products. The first product is GLASSESong, a pair of sunglasses with a built-in music player. The other is CAPlayer, a golf cap with a built-in music player having a very short unobtrusive cord from the cap to the speakers.

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Product cost	<u>\$5,800,000</u>	<u>\$5,200,000</u>		
Revenue			Revenues	\$12,000,000
Product margin (traditional costing method)			CAPlayer cost	\$5,800,000
			GLASSESong cost	5,200,000
			SG&A	<u>600,000</u>
			Profit	<u>\$ 400,000</u>
Product margin (ABC method)	\$439,000	\$240,000		

# SUMMARY

- Activity-based costing assigns overhead costs based on several \_\_\_\_\_ and the \_\_\_\_\_ that drive costs.
- Activity-based costing is optimal when the manufacturing process is \_\_\_\_\_ and overhead increased based on various activities that differ for each product.
- Process costing is the system of accumulating costs within each \_\_\_\_\_ for large-volume, mass-produced units. Process costing determines the cost per unit through the use of \_\_\_\_\_.



**Thank you!**

**Questions?**