

Process Costing

Chapter 5

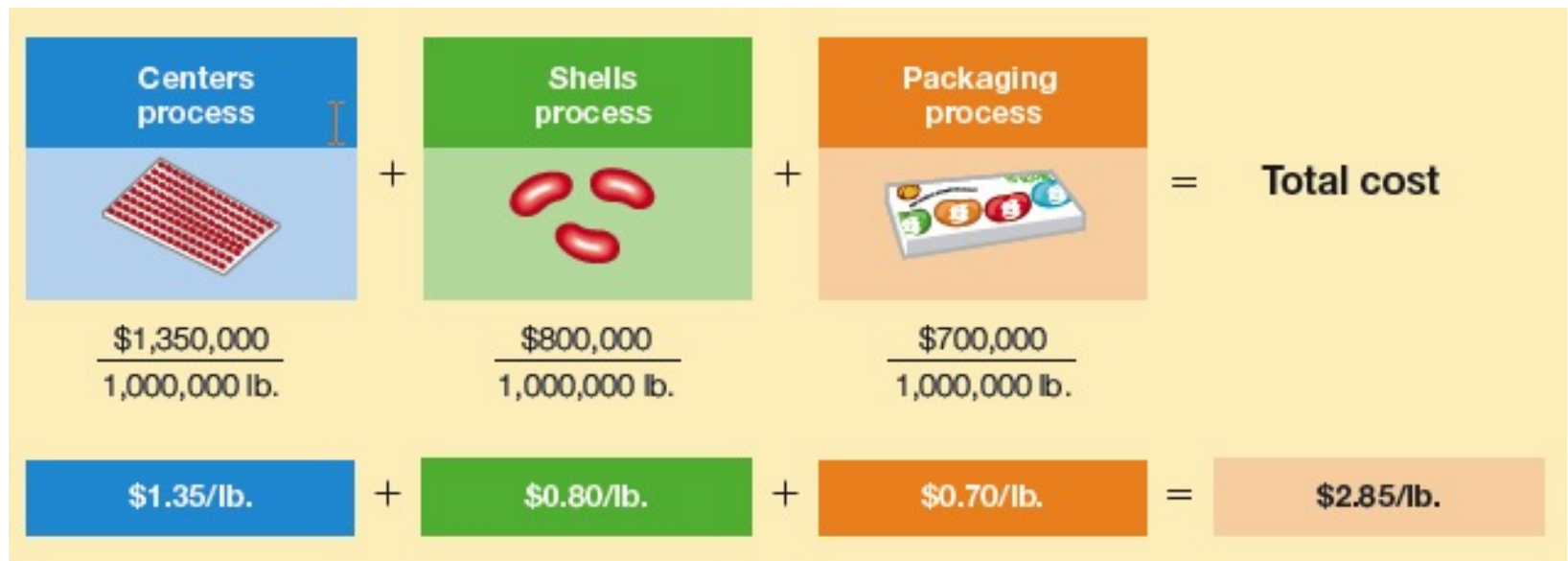


Objective 1

Distinguish between the flow of costs in process costing and job costing



What is Process Costing



Process Costing Benefits

- Benefits
 - Cost trends
 - Budget to actual
 - Pricing
 - Financial statements

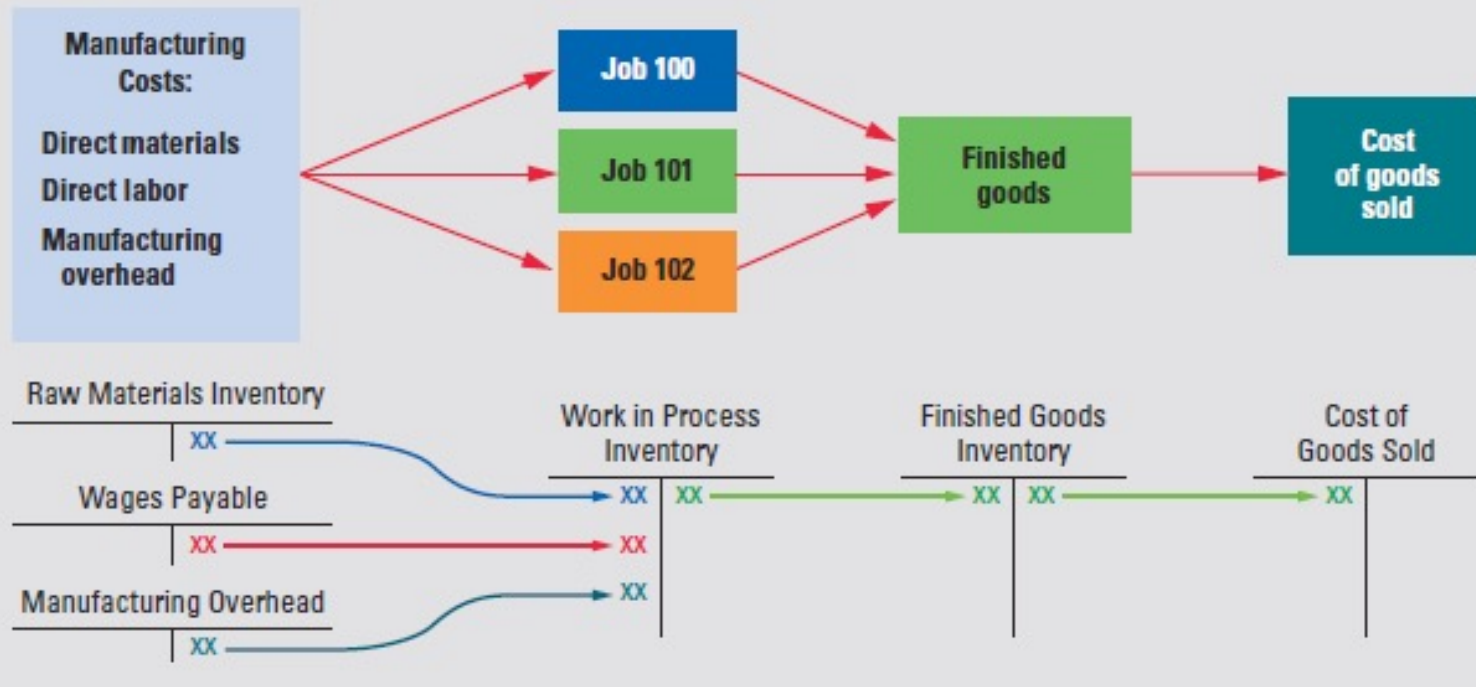
Ending inventory and Cost of Goods Sold

Job and Process Costing Differences?

- Job cost systems
 - Individual job cost records
 - Direct material, direct labor, and manufacturing overhead assigned to individual jobs
 - Cost of finished jobs flow into finished goods inventory
 - Cost of sold jobs flow out of finished goods inventory into cost of goods sold

Job Costing

PANEL A—JOB COSTING Life Fitness

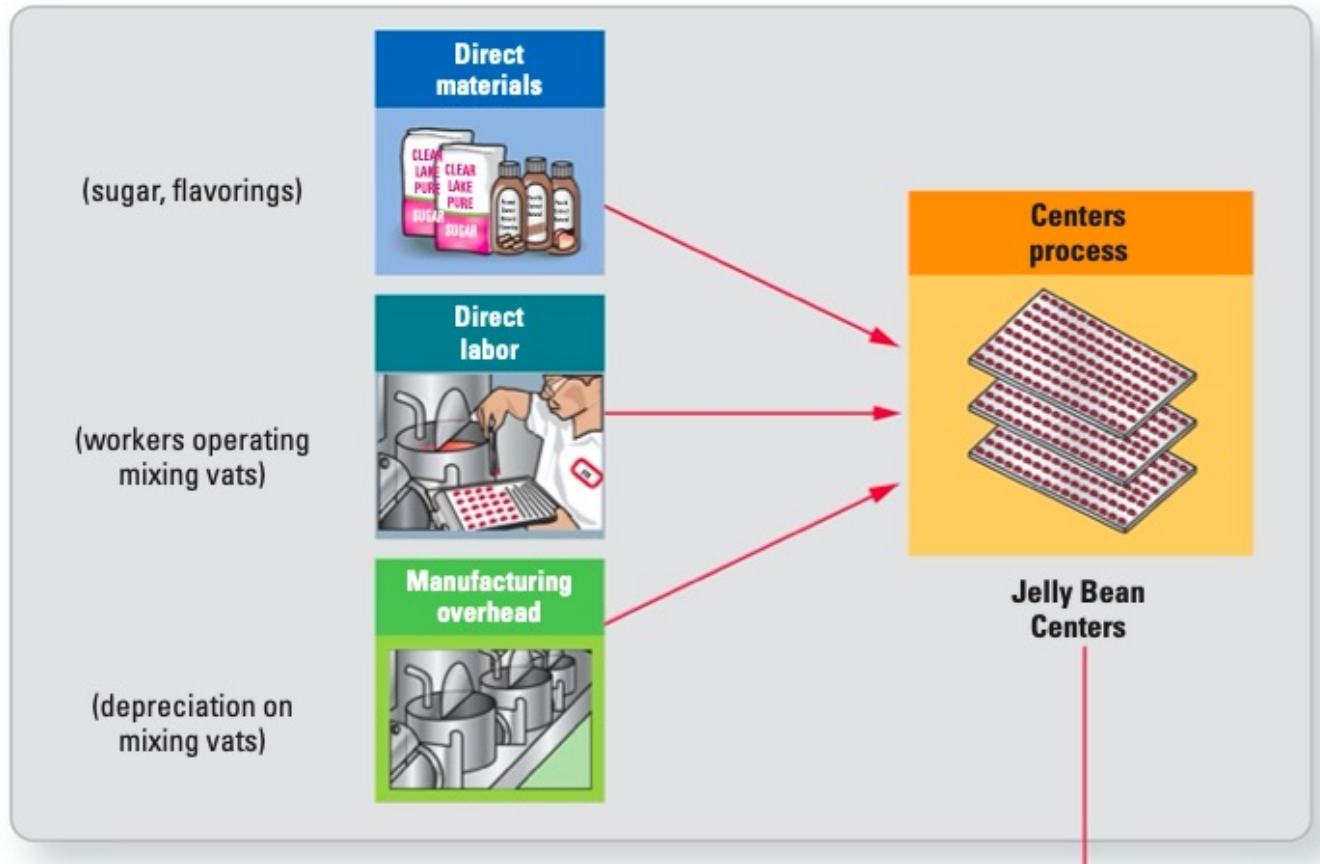


Job Costing and Process Costing Differences?

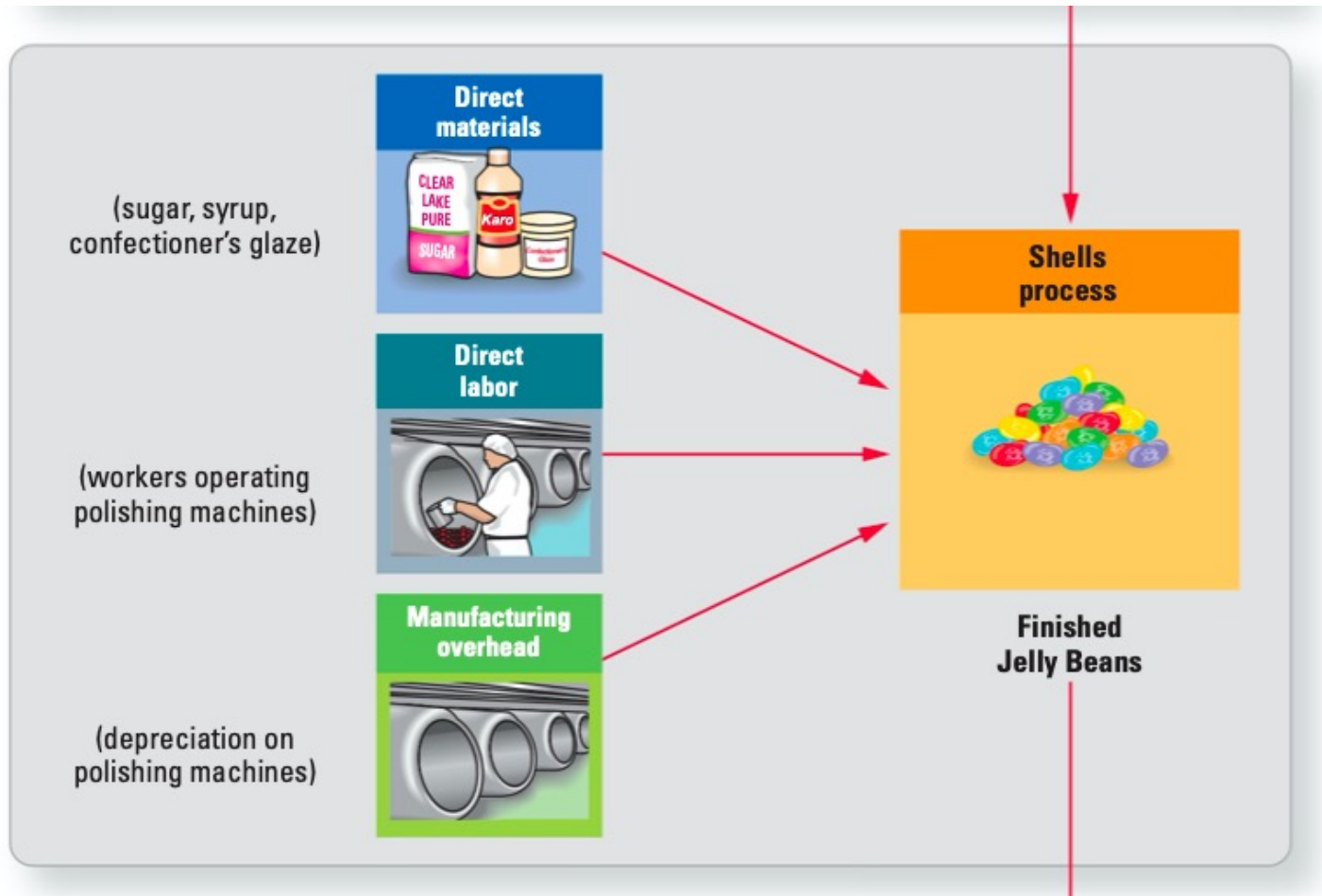
- Process cost systems
 - Series of manufacturing processes
 - Cost per process is accumulated and moved from one process to another process
 - Costs transferred to finished goods inventory only from the work in process inventory of the LAST manufacturing process
 - When units are sold, cost is transferred out of finished goods inventory into cost of goods sold

Process Costing

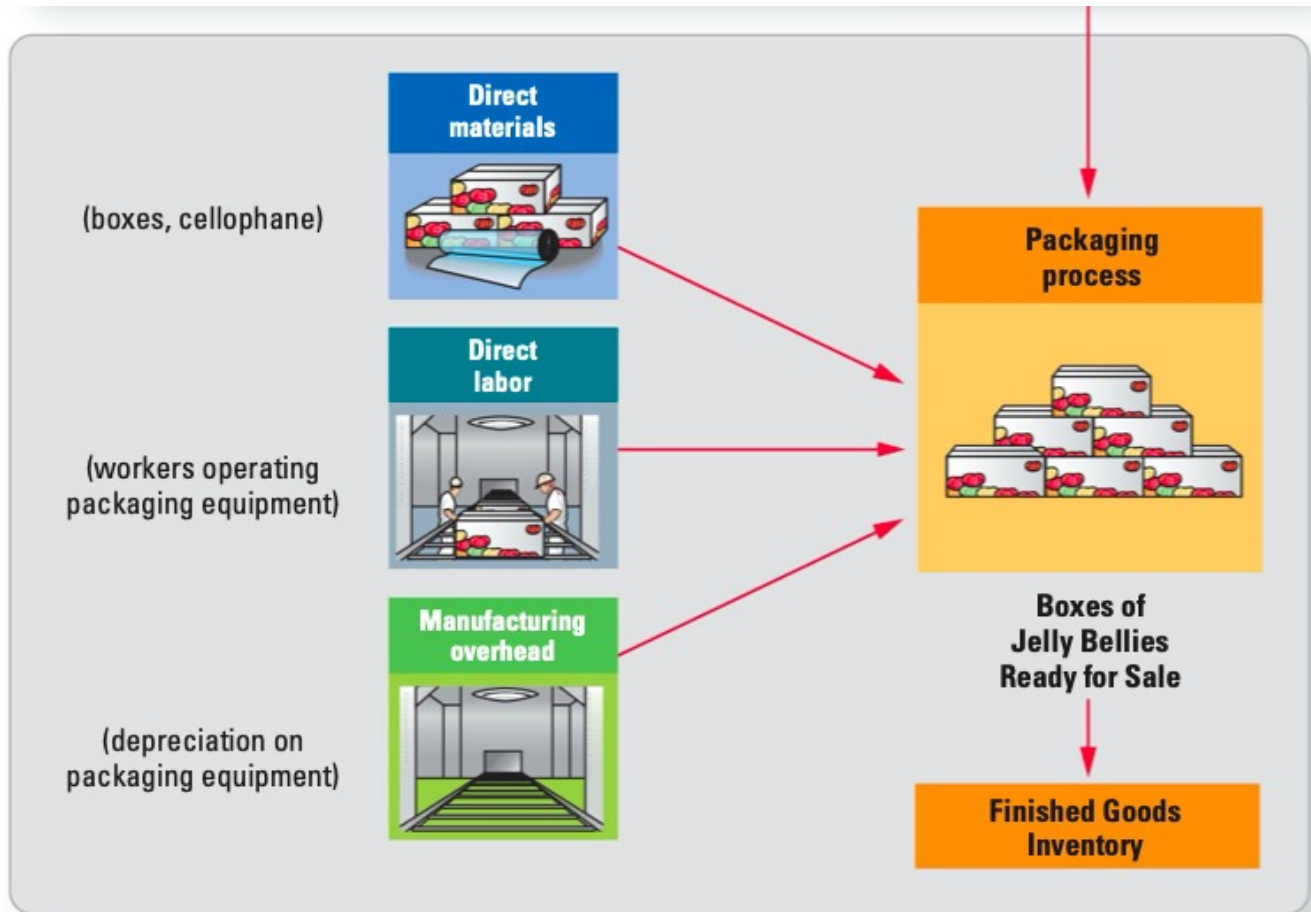
EXHIBIT 5-2 Flow of Costs in Production of Jelly Beans



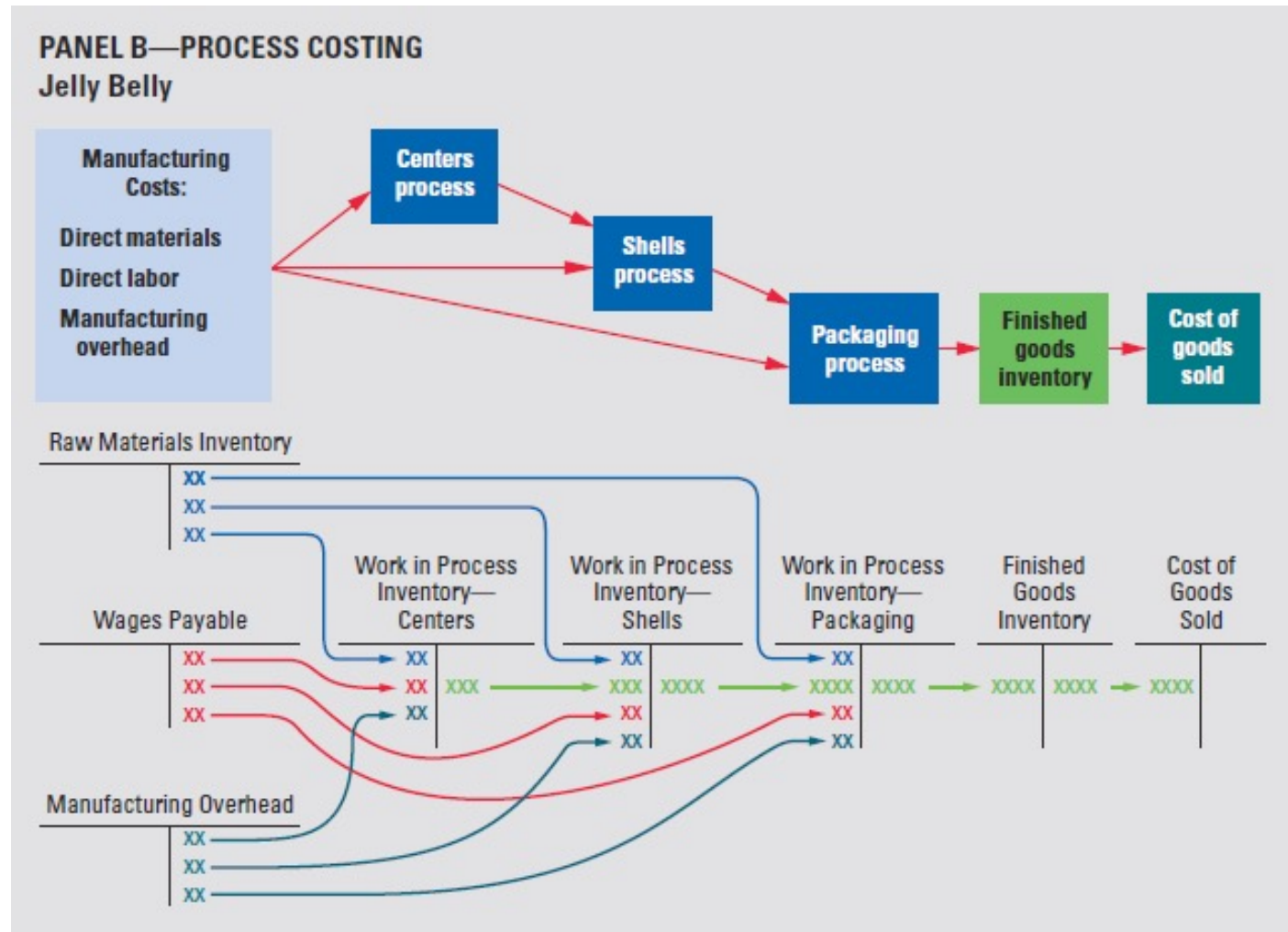
Process Costing



Process Costing



Process Costing



Process Costing

- Each process, there are separate work in process accounts.
- Each process has a material, wages, and overhead component.
- The costs are transferred to finished goods in the same manner as job costing.
- We accumulate the costs of each process and then assigning these costs to the units passing through the process.

Process Costing Rule of Thumb

In process costing, the manufacturing costs assigned to the product must always follow the physical movement of the product. Therefore, when units are physically transferred out of one process and into the next, the *costs* assigned to those units must *also* be transferred out of the appropriate Work in Process Inventory account and into the next.

Building Blocks of Process Costing

- Conversion costs

(convert direct materials into new finished products)

- Direct labor + manufacturing overhead

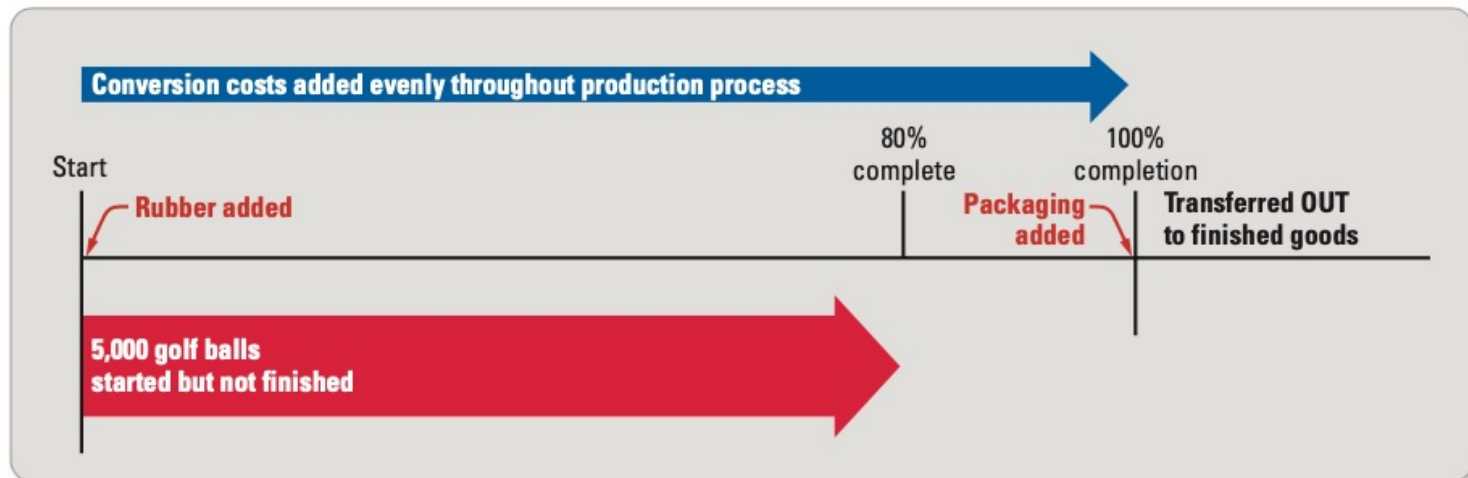
- Equivalent units

The amount of work done during a period in terms of fully completed units of output.

Building Blocks of Process Costing

- Getting each of 5,000 balls 80% of the way through the process takes about the same amount of work as getting 4,000 balls all the way through the process.

EXHIBIT 5-3 Callaway Production Plant Time Line



Building Blocks of Process Costing

- Number of physical units * Percentage of completion = Number of equivalent units

Building Blocks of Process Costing

- The direct materials are added at the beginning of the process, but conversion costs are incurred evenly throughout the process.
- 1) 5,000 equivalent units of rubber: $5,000 * 100\%$ of rubber
 - 2) 0 equivalent units of packaging materials: $5,000 * 0\%$ of packaging materials
 - 3) 4,000 equivalent units of conversion costs: $5,000 * 80\%$ converted

The Building Blocks of Process Costing

- Inventory flow assumptions

- Weighted average

Combines any beginning inventory units (and costs) with the current period's units (and costs) to get a weighted average cost.

- First-in, first-out (FIFO)

Require that any units in beginning inventory to be costed separately from any units started in the current period.

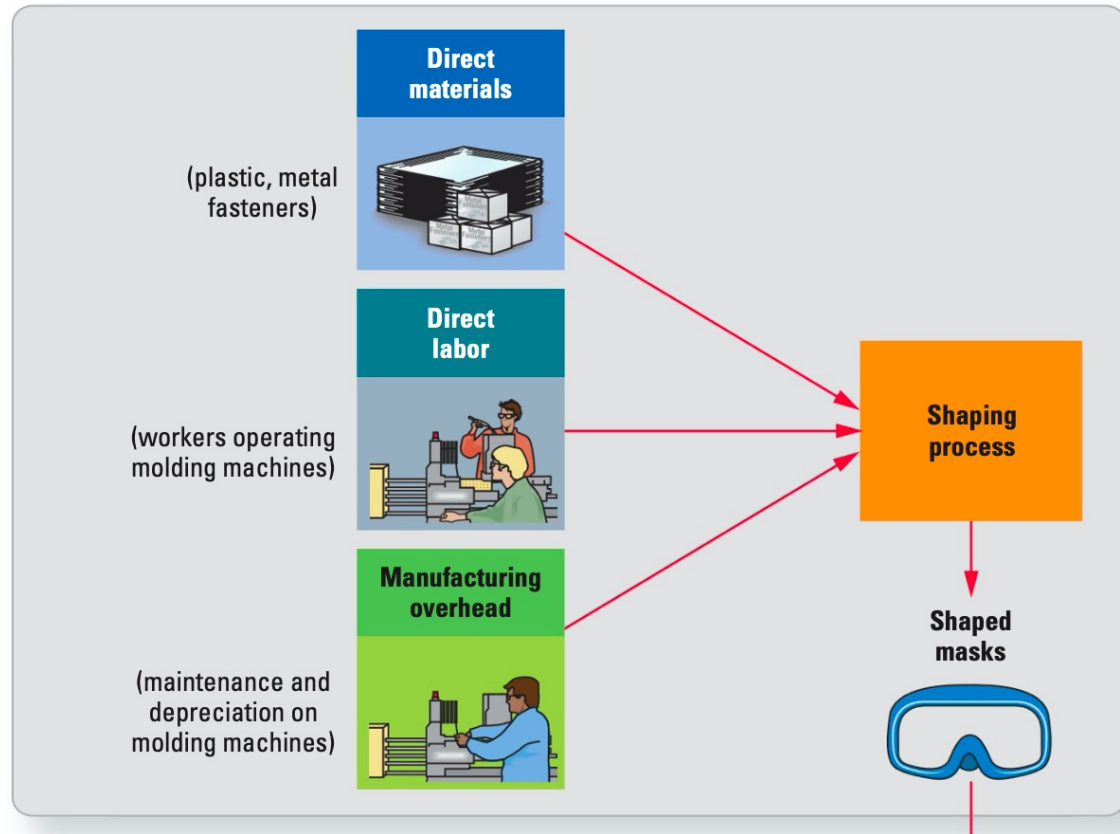
Objective 2

Use process costing in the first production department

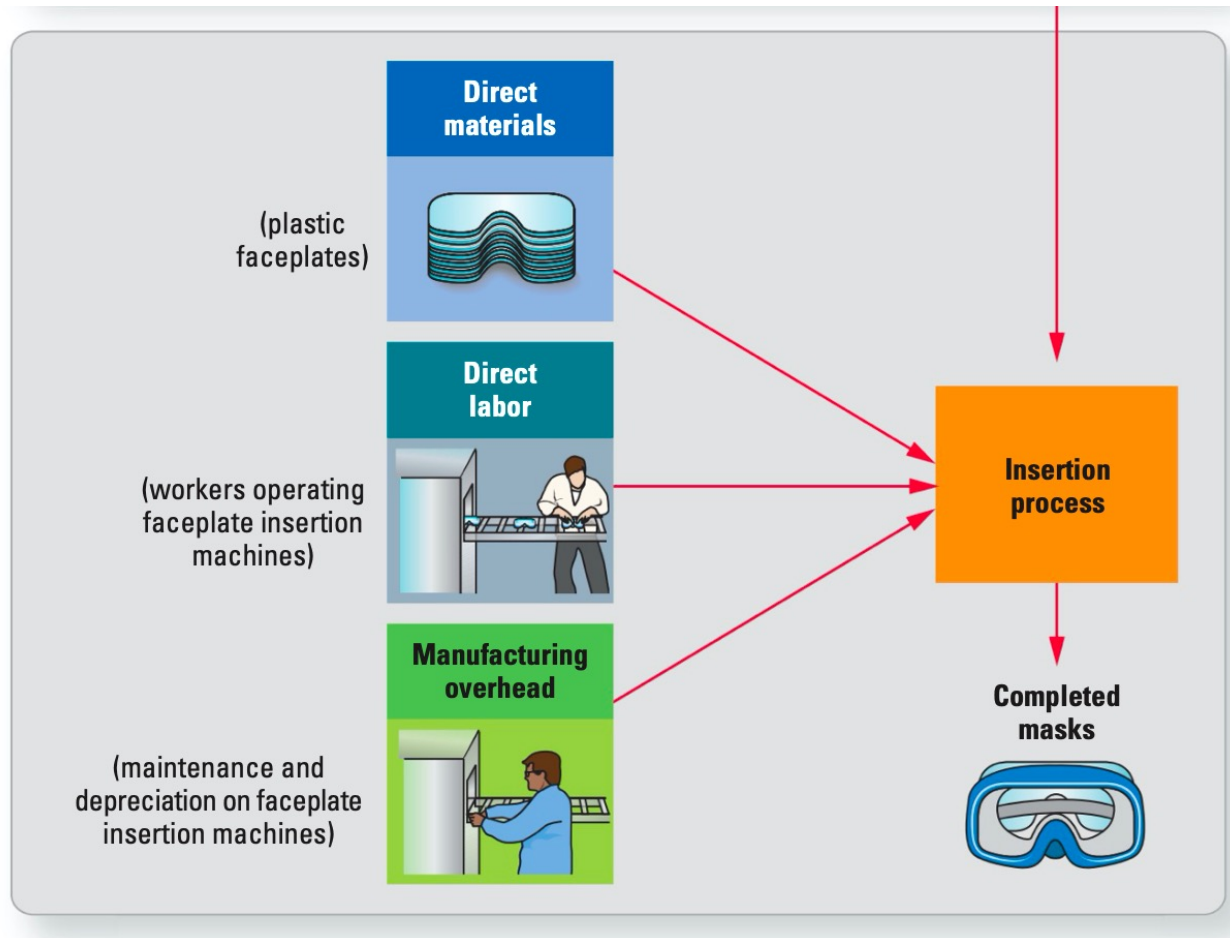


Process Costing Example

EXHIBIT 5-4 SeaView's Production Process



Process Costing Example



Process Costing Example

- Making 50,000 masks
- 40,000 completely shaped masks transferred to the Insertion Department/ 10,000 partially shaped masks remaining in the Shaping Department's ending work process inventory

Beginning work in process inventory		\$	0
Direct materials.....			140,000
Conversion costs:			
Direct labor	\$21,250		
Manufacturing overhead.....	<u>46,750</u>		
Total conversion costs			<u>68,000</u>
Total costs to account for.....			<u><u>\$208,000</u></u>

How Does Process Costing Work

- Using weighted average assumption
- Five steps to process costing:
 1. Summarize the flow of physical units.
 2. Compute output in terms of equivalent units.
 3. Summarize total costs to account for.
 4. Compute the cost per equivalent unit.
 5. Assign total costs to units completed and to units in ending work in process inventory.

Step 1: Summarize the Flow of Physical Units—Exhibit 5-5

- Total physical units to account for?
 - How many individual (physical) units were worked on (completed or not)
- Total physical units accounted for?
 - What happened to those products ? (Finished or still in process)

	A	B	C	D
1	Sea View Shaping Department	Step 1:	Step 2: Equivalent Units	
2	Month Ended October 31	Flow of Physical	Direct	Conversion
3	Flow of Production	Units	Materials	Costs
4	Units to account for:			
5	Beginning work in process, October 1	0		
6	Plus: Started in production during October	50,000		
7	Total physical units to account for	50,000		
8	Units accounted for:			
9	Completed and transferred out during October	40,000	40,000	40,000
10	Plus: Ending work in process, October 31	10,000	10,000	2,500
11	Total physical units accounted for	50,000		
12	Total equivalent units		50,000	42,500
13				

Now turn to S5-4

S5-4 Determine the physical flow of units (process costing Step 1)

(Learning Objective 2)

Babson Soda's Bottling Department had 19,000 units in the beginning inventory of Work in Process on September 1. During September, 100,000 units were started into production. On September 30, 29,000 units were left in ending inventory of Work in Process. Summarize the physical flow of units in a schedule.

S5-4 Determine the Physical Flow of Units (Process Costing Step 1)

Flow of Production	Step 1 Flow of Physical Units
Units to account for:	
Beginning work in process	19,000
Started in production during September 1	<u>100,000</u>
Total physical units to account for	Not given
Units accounted for:	
Completed and transferred out during September	Not given
Ending work in process, September 30	<u>29,000</u>
Total physical units accounted for	Not given

S5-4 Determine the Physical Flow of Units (Process Costing Step 1)

Flow of Production	Step 1 Flow of Physical Units
Units to account for:	
Beginning work in process	19,000
Started in production during September 1	<u>100,000</u>
Total physical units to account for	119,000
Units accounted for:	
Completed and transferred out during September	Not given
Ending work in process, September 30	<u>29,000</u>
Total physical units accounted for	Not given

S5-4 Determine the Physical Flow of Units (Process Costing Step 1)

Flow of Production	Step 1 Flow of Physical Units
Units to account for:	
Beginning work in process	19,000
Started in production during September 1	<u>100,000</u>
Total physical units to account for	119,000
Units accounted for:	
Completed and transferred out during September	Not given
Ending work in process, September 30	<u>29,000</u>
Total physical units accounted for	119,000

S5-4 Determine the Physical Flow of Units (Process Costing Step 1)

Flow of Production	Step 1 Flow of Physical Units
Units to account for:	
Beginning work in process	19,000
Started in production during September 1	<u>100,000</u>
Total physical units to account for	119,000
Units accounted for:	
Completed and transferred out during September	90,000
Ending work in process, September 30	<u>29,000</u>
Total physical units accounted for	119,000

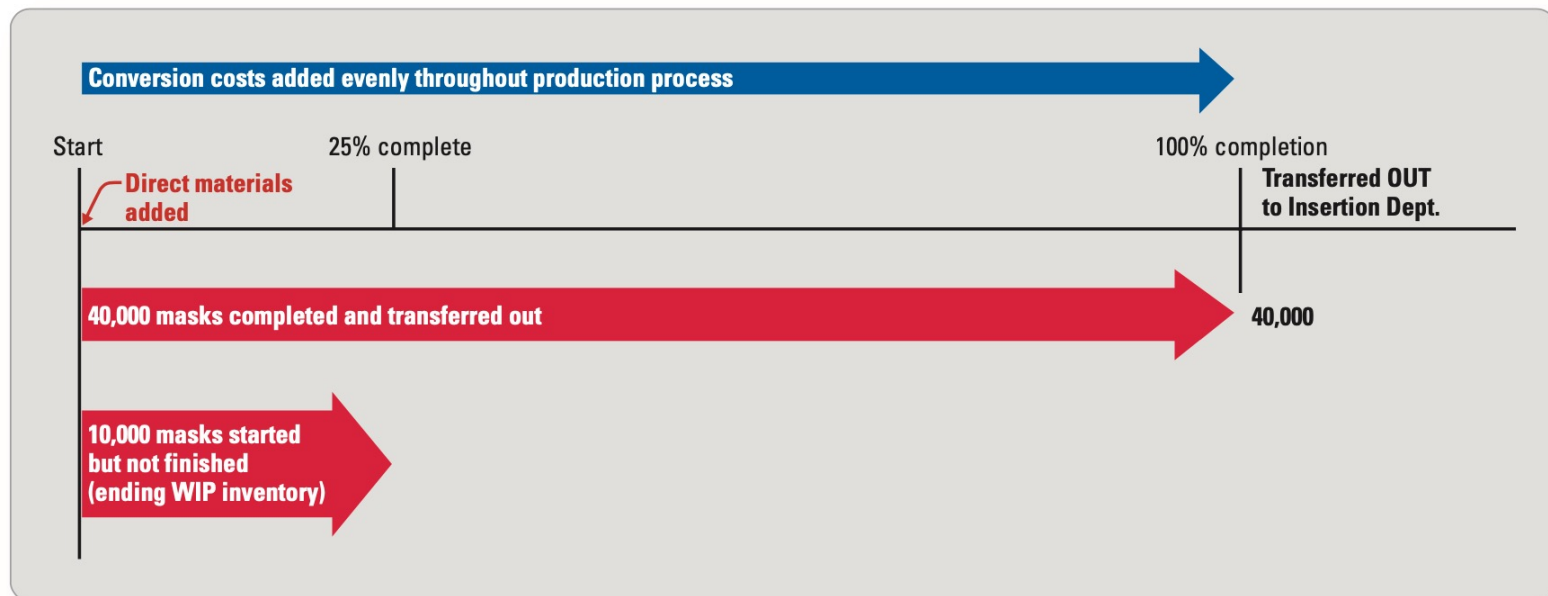
Step 2: Compute Output in Terms of Equivalent Units—Exhibit 5-5

	A	B	C	D
1	Sea View Shaping Department Month Ended October 31 Flow of Production	Step 1:	Step 2: Equivalent Units	
2		Flow of Physical Units	Direct Materials	Conversion Costs
3	Units to account for:			
4	Beginning work in process, October 1	0		
5	Plus: Started in production during October	50,000		
6	Total physical units to account for	50,000		
7				
8	Units accounted for:			
9	Completed and transferred out during October	40,000	40,000	40,000
10	Plus: Ending work in process, October 31	10,000	10,000	2,500
11	Total physical units accounted for	50,000		
12	Total equivalent units		50,000	42,500
13				

Step 2: Compute Output in Terms of Equivalent Units—Exhibit 5-5

- All direct materials are added at the beginning of the shaping process

EXHIBIT 5-6 SeaView's Shaping Department Time Line



Step 2: Compute Output in Terms of Equivalent Units—Exhibit 5-5

Number of Physical Units × Percentage of Completion = Equivalent units

40,000	×	100%	= 40,000 equivalent units of direct materials
40,000	×	100%	= 40,000 equivalent units of conversion costs

Number of Physical Units × Percentage of Completion = Equivalent units

10,000	×	100%	= 10,000 equivalent units of direct materials
--------	---	------	---

Number of Physical Units × Percentage of Completion = Equivalent units

10,000	×	25%	= 2,500 equivalent units of conversion costs
--------	---	-----	--

Step 2: Compute Output in Terms of Equivalent Units—Exhibit 5-5

- Total equivalent units of direct material
 $= 40,000 + 10,000 = 50,000$
- Total equivalent units of conversion costs
 $= 40,000 + 2,500 = 42,500$

S5-6

S5-6 Compute equivalent units (process costing Step 2) (*Learning Objective 2*)

The Frying Department of Crinkle Chips had 110,000 partially completed units in work in process at the end of March. All of the direct materials had been added to these units, but the units were only 68% of the way through the conversion process. In addition, 1,200,000 units had been completed and transferred out of the Frying Department to the Packaging Department during the month.

1. How many equivalent units of direct materials and equivalent units of conversion costs are associated with the 1,200,000 units completed and transferred out?
2. Compute the equivalent units of direct materials and the equivalent units of conversion costs associated with the 110,000 partially completed units still in ending work in process.
3. What are the total equivalent units of direct materials and the total equivalent units of conversion costs for the month?

S5-6

Step 2 Equivalent Units

	Direct Materials	Conversion Cost
--	---------------------	--------------------

Units to account for:

Beginning work in process

Started in production

Total physical units to account for

Units accounted for:

Completed and transferred out	1,200,000
-------------------------------	-----------

Ending work in process	<u>110,000</u>
------------------------	----------------

Total physical units accounted for	1,310,000
------------------------------------	-----------

Total equivalent units

S5-6 (cont.)

Step 2 Equivalent Units			
		Direct Materials	Conversion Cost
Units to account for:			
Beginning work in process			
Started in production			
Total physical units to account for			
Units accounted for:			
Completed and transferred out	1,200,000	1,200,000	1,200,000
Ending work in process	<u>110,000</u>	<u>110,000</u>	<u>74,800</u>
Total physical units accounted for	1,310,000		
Total equivalent units		1,310,000	1,274,800

Step 3: Summarize Total Costs to Account For—Exhibit 5-7

Beginning work in process inventory.....	\$	0
Direct materials.....		140,000
Conversion costs:		
Direct labor	\$21,250	
Manufacturing overhead.....	<u>46,750</u>	
Total conversion costs		<u>68,000</u>
Total costs to account for.....		<u><u>\$208,000</u></u>

	A	B	C	D
	Sea View Shaping Department Month Ended October 31 Step 3: Total Costs to Account For	Direct Materials	Conversion Costs	Total
1				
2	Beginning work in process, October 1	\$ 0	\$ 0	\$ 0
3	Plus: Costs added during October	140,000	68,000	\$ 208,000
4	Total costs to account for	<u>\$ 140,000</u>	<u>\$ 68,000</u>	<u>\$ 208,000</u>
5				

NOTE: Conversion costs of \$68,000 = \$21,250 of direct labor plus \$46,750 of MOH

Now turn to S5-7

S5-7 Summarize total costs to account for (process costing Step 3)

(Learning Objective 3)

MacIntyre Company's Work in Process Inventory account had a \$68,000 beginning balance on May 1 (\$43,000 of this related to direct materials used during April, while \$25,000 related to conversion costs incurred during April). During May, the following costs were incurred in the department:

Direct materials used	\$103,000
Direct labor	\$ 12,000
Manufacturing overhead allocated to the department	\$150,000

Summarize the department's "Total costs to account for." Prepare a schedule that summarizes the department's total costs to account for by direct materials and conversion costs.

S5-7

	Direct Materials	Conversion Costs	Total
Beginning work in process, May 1			
Costs added during May:			
Total costs to account for			

S5-7

	Direct Materials	Conversion Costs	Total
Beginning work in process, May 1	\$ 43,000	\$ 25,000	\$ 68,000
Costs added during May:	\$103,000	\$162,000	\$265,000
Total costs to account for	\$146,000	\$187,000	\$333,000

Step 4: Compute the Cost per Equivalent Unit—Exhibit 5-8

	A	B	C	D
1	Sea View Shaping Department Month Ended October 31 Step 4: Cost per Equivalent Unit	Direct Materials	Conversion Costs	
2	Total costs to account for (from Step 3)	\$ 140,000	\$ 68,000	
3	Divided by: Total equivalent units (from Step 2)	50,000	42,500	
4	Cost per equivalent unit	\$ 2.80	\$ 1.60	
5				

Step 5: Assign Total Costs to Units Completed and to Units in Ending Work in Process Inventory —Exhibit 5-9

	A	B	C	D
	Sea View Shaping Department Month Ended October 31 Step 5: Assigning Total Costs	Direct Materials	Conversion Costs	Total
1				
2	Completed and transferred out:			
3	Equivalent units completed and transferred out (from Step 2)	40,000	40,000	
4	Multiplied by: Cost per equivalent unit (from Step 4)	\$ 2.80	\$ 1.60	
5	Cost assigned to units completed and transferred out	\$ 112,000	\$ 64,000	\$ 176,000
6				
7	Ending work in process:			
8	Equivalent units in ending WIP (from Step 2)	10,000	2,500	
9	Multiplied by: Cost per equivalent unit (from Step 4)	\$ 2.80	\$ 1.60	
10	Cost assigned to units in ending WIP	\$ 28,000	\$ 4,000	\$ 32,000
11	Total costs accounted for			\$ 208,000
12				

Average Unit Cost

- The average cost of making one completely shaped unit:

$$\text{\$ } 176,000 / 40,000 = \text{\$ } 4.4$$

Another, $\text{\$ } 2.8 + \text{\$ } 1.6 = \text{\$ } 4.4$

- The average cost of *partially* shaped unit that is 25% on the way through the production process:

$$\text{\$ } 32,000 / 10,000 = \text{\$ } 3.2$$

Now turn to S5-10

S5-10 Assign costs (process costing Step 5) (*Learning Objective 3*)

Tristan Company produces its product using a *single* production process. For the month of August, the company determined its "cost per equivalent unit" to be as follows:

	Direct Materials	Conversion Costs
Cost per equivalent unit:	\$4.20	\$2.75

During the month, Tristan completed and transferred out 410,000 units to finished goods inventory. At month-end, 86,000 partially complete units remained in ending work in process inventory. These partially completed units were equal to 69,000 equivalent units of direct materials and 50,000 equivalent units of conversion costs.

1. Determine the total cost that should be assigned to the following:
 - a. Units completed and transferred out
 - b. Units in ending work in process inventory
2. What was the total costs accounted for?
3. What was Tristan's average cost of making one unit of its product?

S5-10

1. Determine the total cost that should be assigned to the following:

a. Units completed and transferred out

$$410,000 \times (4.20 + 2.75) = \$2,849,500$$

S5-10 (cont.)

1. Determine the total cost that should be assigned to the following:
 - a. Units completed and transferred out
 $410,000 \times (4.20 + 2.75) = \$2,849,500$
 - b. Units ending work in process inventory
 $(69,000 \times 4.20) + (50,000 \times 2.75) = \$427,300$

S5-10 (cont.)

1. Determine the total cost that should be assigned to the following:

a. Units completed and transferred out

$$410,000 \times (4.20 + 2.75) = \$2,849,500$$

b. Units ending work in process inventory

$$(69,000 \times 4.20) + (50,000 \times 2.75) = \$427,300$$

2. What was the total costs accounted for?

$$\$2,849,500 + \$427,300 = \$3,276,800$$

S5-10 (cont.)

1. Determine the total cost that should be assigned to the following:
 - a. Units completed and transferred out
 $410,000 \times (4.20 + 2.75) = \$2,849,500$
 - b. Units ending work in process inventory
 $(69,000 \times 4.20) + (50,000 \times 2.75) = \$427,300$
2. What was the total costs accounted for?
 $\$2,849,500 + \$427,300 = \$3,276,800$
3. What was Tristan's average cost of making one unit of its product?
 $\$4.20 + \$2.75 = \$6.95$

S5-8

S5-8 Compute the cost per equivalent unit (process costing Step 4)

(Learning Objective 3)

At the end of August, a company's mixing department had "Total costs to account for" of \$728,607. Of this amount, \$255,927 related to direct materials costs, while the remainder related to conversion costs. The department had 52,230 total equivalent units of direct materials and 45,450 total equivalent units of conversion costs for the month.

Compute the cost per equivalent unit for direct materials and the cost per equivalent unit for conversion costs.

S5-8

	Direct Materials	Conversion Costs
Total costs to account for	\$ 255,927	\$ 472,680
Divided by total equivalent units	<u>52,230</u>	<u>45,450</u>
Cost per equivalent unit	\$ 4.90	\$ 10.40

Objective 3

Prepare journal entries for a process costing system



Journal Entries Used in a Process Costing System

- Similar to job order system except:
 - The manufacturing costs (direct materials, direct labor, and manufacturing overhead) are assigned to *processing departments*, rather than *jobs*.
 - At the end of the month a journal entry must be made to transfer cost to the next processing department.

Example:

Direct materials were requisitioned for use by department 1.

Work in Process Inventory—Shaping	140,000	
Raw Materials Inventory		140,000
<i>(To record direct materials used by the Shaping Department in October)</i>		

Journal Entries Used

Labor time records show that \$21,250 of direct labor was used in department 1 during October, resulting in this journal entry:

Work in Process Inventory—Shaping	21,250	
Wages Payable		21,250
<i>(To record direct labor used in the Shaping Department in October)</i>		

Manufacturing overhead is allocated to the department using the company's predetermined overhead rate. Department's overhead rate is \$50 per machine hour and the department used 935 machine hours .

Work Process Inventory—Shaping	46,750	
Manufacturing Overhead		46,750
<i>(To record manufacturing overhead allocated to the Shaping Department in October)</i>		

T-Account

Work in Process Inventory—Department 1

Work in Process Inventory—Shaping

Balance, October 1		0
Direct materials	\$208,000	140,000
Direct labor		21,250
Manufacturing overhead		46,750

Work in Process Inventory—Insertion	176,000	
Work in Process Inventory—Shaping		176,000
<i>(To record transfer of cost out of the Shaping Department</i>		
<i>and into the Insertion Department)</i>		

Objective 4

Use process costing in a second or later production department



Process Costing in a Second or Later Processing Department

- Same five-step process
- Include cost of units transferred in when calculating equivalent units (EU) and cost per equivalent units (EU)
- Transferred-in costs: incurred in a previous process and are carried forward as part of the product's cost when it moves to the next process.

Step 1: Summarize Flow of Physical Units—Exhibit 5-12

Information about units:

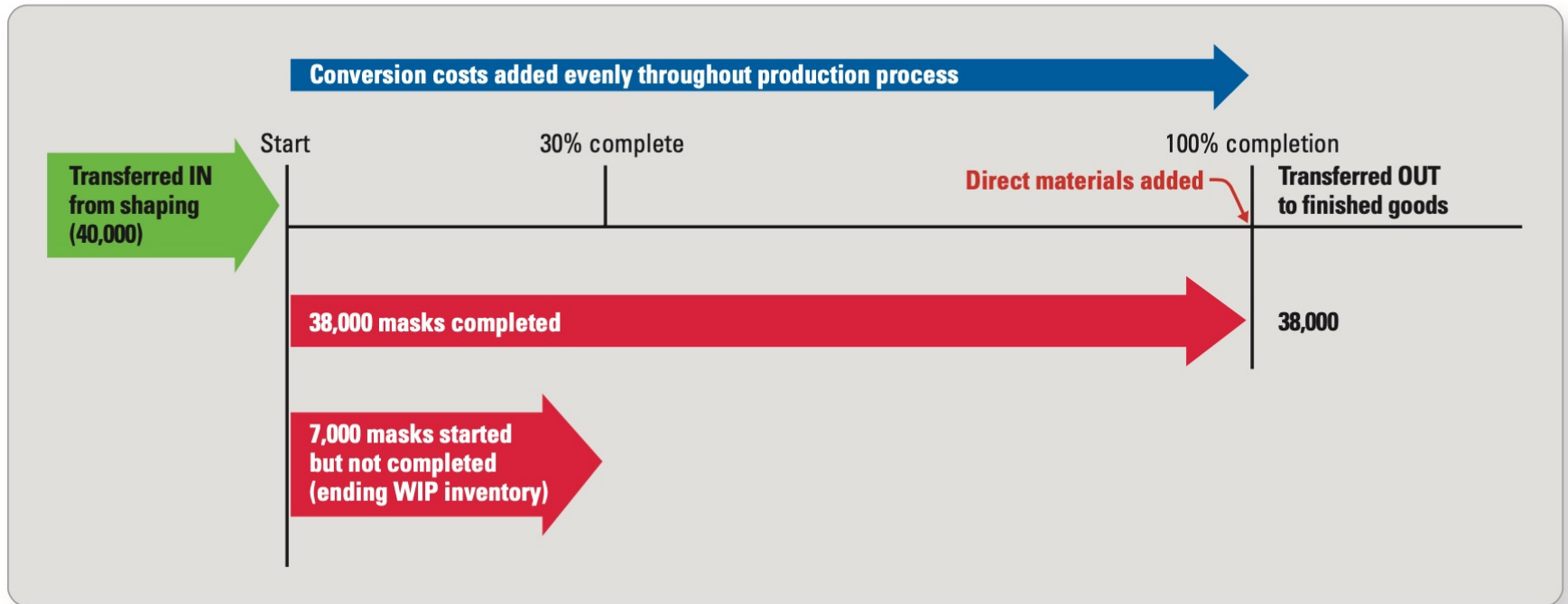
Beginning work in process, October 1 (0% complete as to direct materials, 60% complete as to conversion work)	5,000 masks*
Transferred in from Shaping Department during October (from Exhibit 5-6)	40,000 masks
Completed and transferred out to Finished Goods Inventory during October.....	38,000 masks
Ending work in process, October 31 (0% complete as to direct materials, 30% complete as to conversion work)	7,000 masks

Step 1: Summarize Flow of Physical Units—Exhibit 5-12

	A	B
1	Sea View Insertion Department	Step 1:
2	Month Ended October 31	Flow of Physical
	Flow of Production	Units
3	Units to account for:	
4	Beginning work in process, October 1	5,000
5	Plus: Transferred in during October	40,000
6	Total physical units to account for	45,000
7		
8	Units accounted for:	
9	Completed and transferred out during October	38,000
10	Plus: Ending work in process, October 31	7,000
11	Total physical units accounted for	45,000
12	Total equivalent units	
13		

Process Costing in a Second or Later Processing Department

EXHIBIT 5-10 SeaView's Insertion Department Time Line



Process Costing in a Second or Later Processing Department

- Transferred-in-costs are added at the very beginning of the insertion process.
- The direct materials are added at the end of the process rather than at the beginning of the process

Step 2: Compute Output in Terms of Equivalent Units—Exhibit 5-12

	A	B	C	D	E
1	Sea View Insertion Department	Step 1:	Step 2: Equivalent Units		
2	Month Ended October 31	Flow of Physical	Transferred-	Direct	Conversion
3	Flow of Production	Units	in	Materials	Costs
4	Units to account for:				
5	Beginning work in process, October 1	5,000			
6	Plus: Transferred in during October	40,000			
7	Total physical units to account for	45,000			
8	Units accounted for:				
9	Completed and transferred out during October	38,000	38,000	38,000	38,000
10	Plus: Ending work in process, October 31	7,000	7,000	0	2,100
11	Total physical units accounted for	45,000			
12	Total equivalent units		45,000	38,000	40,100
13					

See Exhibit 5-12 for additional details

Steps 3 and 4: Summarize Total Costs to Account For and Compute the Cost per Equivalent Unit— Exhibit 5-13

Information about costs:

Beginning work in process, October 1		
Transferred-in costs.....	\$ 22,000	
Conversion costs	<u>1,100*</u>	
Beginning balance		\$ 23,100
Transferred in from Shaping Department during October (from journal entry on page 262).....		\$176,000
Direct materials added during October in Insertion Department.....		\$ 19,000
Conversion costs added during October in Insertion Department:		
Direct labor.....	\$ 3,710	
Manufacturing overhead	<u>9,225</u>	
Conversion costs		<u>\$ 12,935</u>
Total costs to account for.....		<u><u>\$231,035</u></u>

Steps 3 and 4

Information about costs:

Beginning work in process, October 1		
Transferred-in costs.....	\$ 22,000	
Conversion costs	<u>1,100*</u>	
Beginning balance		\$ 23,100
Transferred in from Shaping Department during October (from journal entry on page 262).....		
		\$176,000
Direct materials added during October in Insertion Department.....		\$ 19,000
Conversion costs added during October in Insertion Department:		
Direct labor.....	\$ 3,710	
Manufacturing overhead.....	<u>9,225</u>	
Conversion costs		\$ 12,935
Total costs to account for.....		<u>\$231,035</u>

	A	B	C	D	E
1	Sea View Insertion Department Month Ended October 31 Steps 3 and 4				
2		Transferred- in	Direct Materials	Conversion Costs	Total
3	Beginning work in process, October 1 (Exhibit 5-11)	\$ 22,000	\$ 0	\$ 1,100	\$ 23,100
4	Plus: Costs added during October	176,000	19,000	12,935	207,935
5	Total costs to account for	\$ 198,000	\$ 19,000	\$ 14,035	\$ 231,035
6	Divided by: Total equivalent units (from Step 2)	45,000	38,000	40,100	
7	Cost per equivalent unit	\$ 4.40	\$ 0.50	\$ 0.35	
8					

Step 5: Assign Total Costs to Units Completed and to Units in Ending Work in Process Inventory— Exhibit 5-14

	A	B	C	D	E
1	Sea View Insertion Department				
2	Month Ended October 31				
3	Step 5: Assigning Costs				
4	Completed and transferred out:				
5	Equivalent units completed and transferred out (from Step 2)	38,000	38,000	38,000	
6	Multiplied by: Cost per equivalent unit (from Step 4)	\$ 4.40	\$ 0.50	\$ 0.35	
7	Cost assigned to units completed and transferred out	\$ 167,200	\$ 19,000	\$ 13,300	\$ 199,500
8	Ending work in process:				
9	Equivalent units in ending WIP (from Step 2)	7,000	0	2,100	
10	Multiplied by: Cost per equivalent unit (from Step 4)	\$ 4.40	\$ 0.50	\$ 0.35	
11	Cost assigned to units in ending WIP	\$ 30,800	\$ 0	\$ 735	\$ 31,535
12					
13	Total costs accounted for				\$ 231,035
14					

Unit Costs and Gross Profit

- \$199,500 should be transferred to the Finished Goods Inventory account for the 38,000 masks completed during the month.
- The cost of making one completed mask is \$5.25 ($\$199,500 / 38,000$ finished masks).
 - \$4.40 from the Shaping department
 - \$0.85 from the Insertion department ($\$0.5 + \0.35)

Gross Profit

Sales Revenue (per mask)	\$10.00
Less: Cost of Goods Sold (per mask)	<u>5.25</u>
Gross Profit (per mask)	<u><u>\$ 4.75</u></u>

Journal Entries

Work Process Inventory—Insertion	31,935	
Raw Materials Inventory		19,000
Wages Payable		3,710
Manufacturing Overhead		9,225
<i>(To record manufacturing costs incurred in the Insertion Department during October)</i>		

Work in Process Inventory—Insertion	176,000	
Work in Process Inventory—Shaping		176,000
<i>(To record the transfer cost out of the Shaping Department and into the Insertion Department)</i>		

Journal Entries

Finished Goods Inventory	199,500	
Work in Process Inventory—Insertion		199,500
<i>(To record transfer of cost out of the Insertion Department</i>		
<i>and into Finished Goods Inventory)</i>		

End of Chapter 5





This work is protected by United States copyright laws and is provided solely for the use of instructors in teaching their courses and assessing student learning. Dissemination or sale of any part of this work (including on the World Wide Web) will destroy the integrity of the work and is not permitted. The work and materials from it should never be made available to students except by instructors using the accompanying text in their classes. All recipients of this work are expected to abide by these restrictions and to honor the intended pedagogical purposes and the needs of other instructors who rely on these materials.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the publisher. Printed in the United States of America.