



Process Costing

Chapter 9

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Similarities Between Job-Order and Process Costing

- ▶ Both systems assign material, labor and overhead costs to products and they provide a mechanism for computing unit product costs.
- ▶ Both systems use the same manufacturing accounts, including Manufacturing Overhead, Raw Materials, Work in Process, and Finished Goods.
- ▶ The flow of costs through the manufacturing accounts is basically the same in both systems.

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2

Differences Between Job-Order and Process Costing

- ▶ Process costing is used when a single product is produced on a continuing basis or for a long period of time. Job-order costing is used when many different jobs having different production requirements are worked on each period.
- ▶ Process costing systems accumulate costs by department or process. Job-order costing systems accumulated costs by individual jobs.
- ▶ Process costing systems compute unit costs by department or process. Job-order costing systems compute unit costs by job on the job cost sheet.

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3

Processing Departments

Any unit in an organization where materials, labor or overhead are added to the product.

The activities performed in a processing department are *performed uniformly* on all units of production. Furthermore, the output of a processing department must be *homogeneous*. Products in a process costing environment typically flow in a sequence from one department to another.

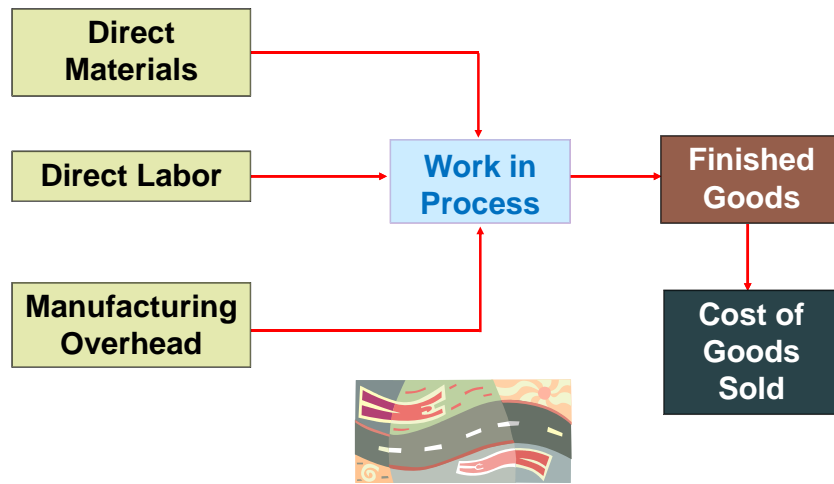


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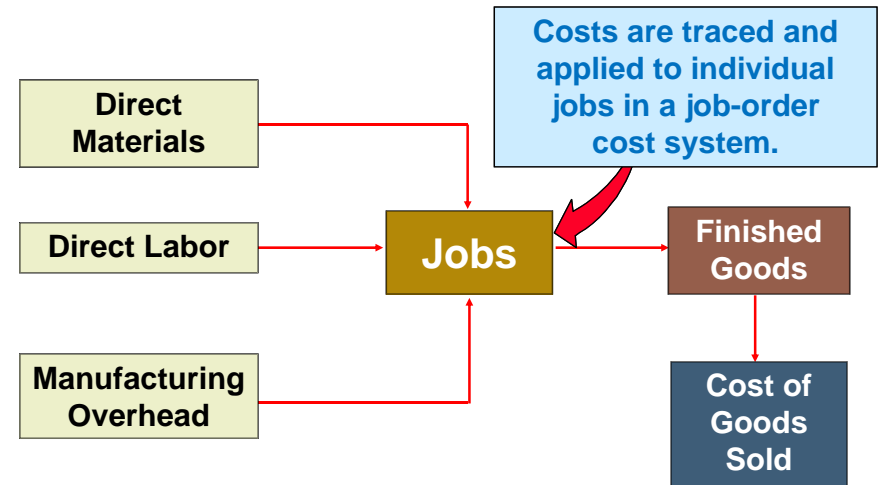
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4

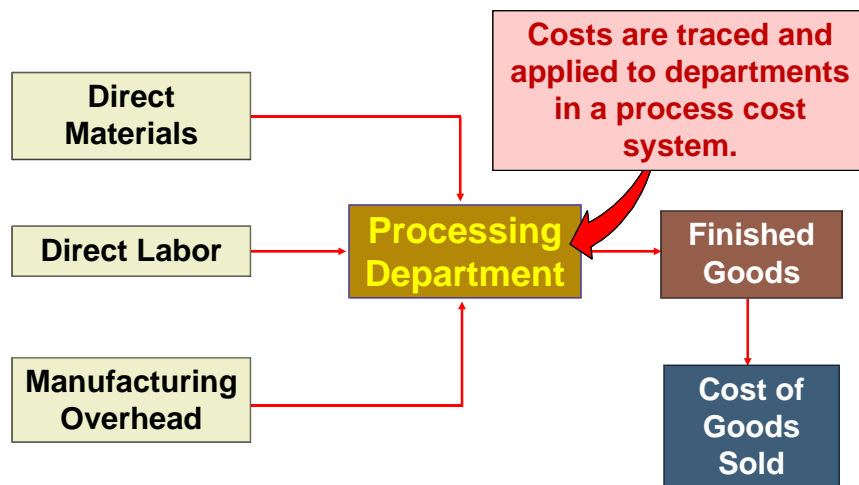
Comparing Job-Order and Process Costing



Comparing Job-Order and Process Costing



Comparing Job-Order and Process Costing

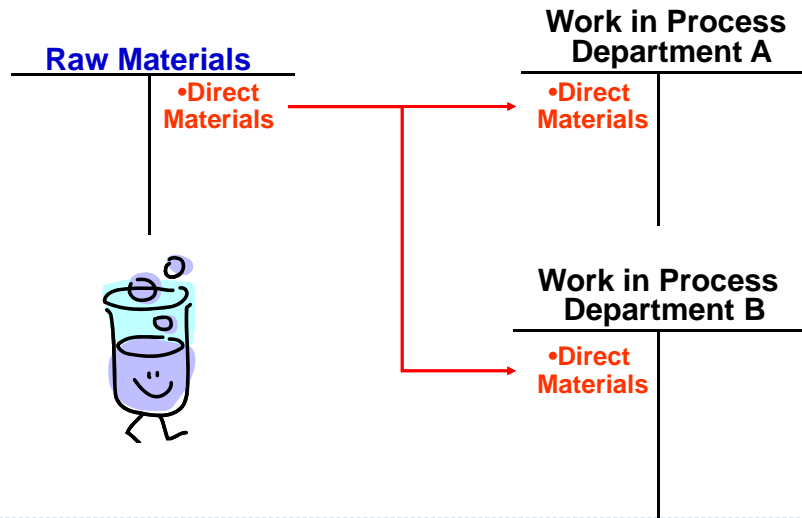


T-Account and Journal Entry Views of Process Cost Flows

For purposes of this example, assume there are two processing departments – Departments A and B. We will use T-accounts and journal entries.



Process Cost Flows: The Flow of Raw Materials (in T-account form)

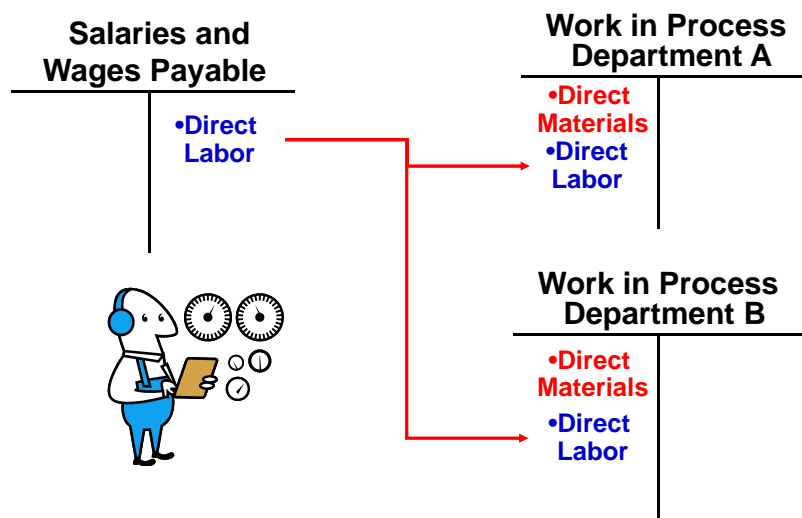


Process Cost Flows: The Flow of Raw Materials (in journal entry form)

GENERAL JOURNAL					Page 4
Date	Description	Post. Ref.	Debit	Credit	
	Work in Process - Department A		XXXXX		
	Work in Process - Department B		XXXXX		
	Raw Materials			XXXXX	
	<i>To record the use of direct material.</i>				



Process Cost Flows: The Flow of Labor Costs (in T-account form)

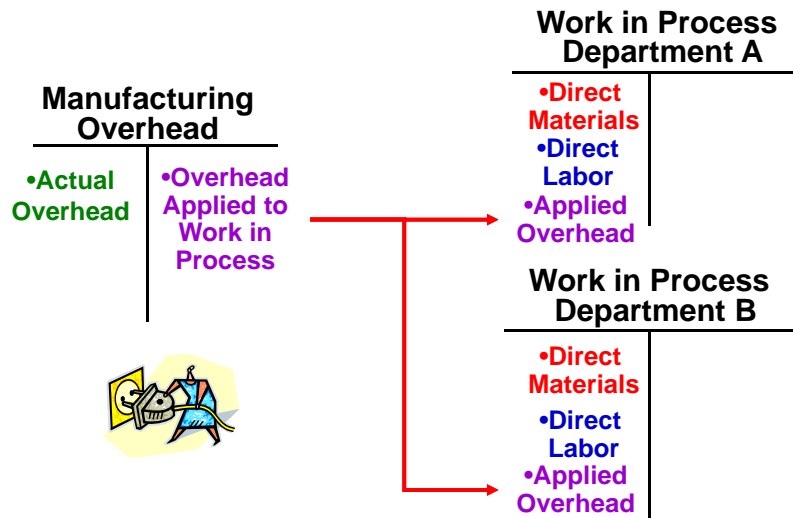


Process Costing: The Flow of Labor Costs (in journal entry form)

GENERAL JOURNAL					Page 4
Date	Description	Post. Ref.	Debit	Credit	
	Work in Process - Department A		XXXXX		
	Work in Process - Department B		XXXXX		
	Salaries and Wages Payable			XXXXX	
	<i>To record direct labor costs.</i>				



Process Cost Flows: The Flow of Manufacturing Overhead Costs (in T-account form)

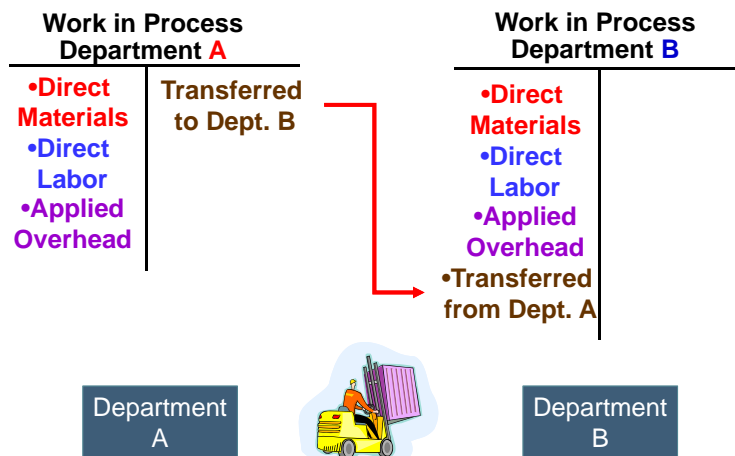


Process Cost Flows: The Flow of Manufacturing Overhead Costs (in journal entry form)

GENERAL JOURNAL				Page 4
Date	Description	Post. Ref.	Debit	Credit
	Work in Process - Department A		XXXXX	
	Work in Process - Department B		XXXXX	
	Manufacturing Overhead			XXXXX
	<i>To apply overhead to departments.</i>			



Process Cost Flows: Transfers from WIP-Dept. A to WIP-Dept. B (in T-account form)

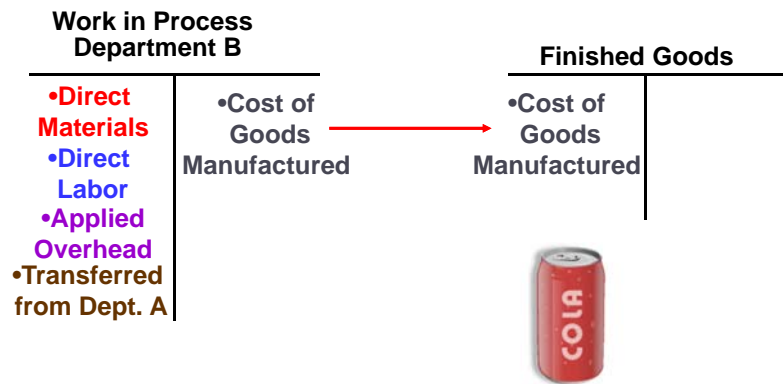


Process Cost Flows: Transfers from WIP-Dept. A to WIP-Dept. B (in journal entry form)

GENERAL JOURNAL				Page 4
Date	Description	Post. Ref.	Debit	Credit
	Work in Process - Department B		XXXXX	
	Work in Process - Department A			XXXXX
	<i>To record the transfer of goods from Department A to Department B.</i>			



Process Cost Flows: Transfers from WIP-Dept. B to Finished Goods (in T-account form)

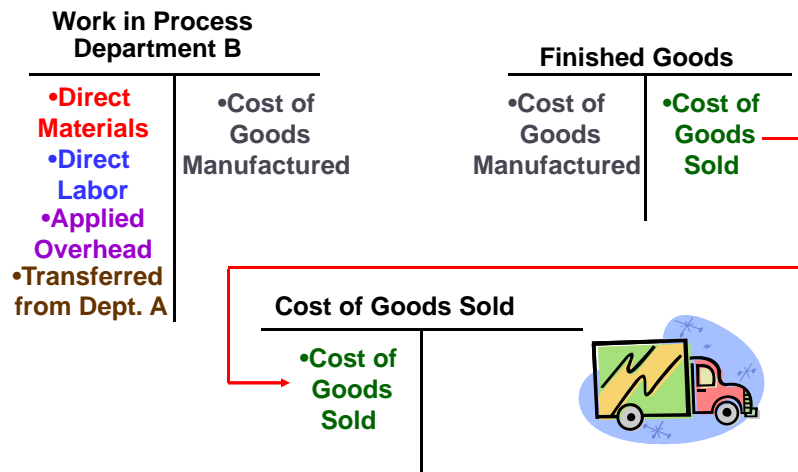


Process Cost Flows: Transfers from WIP-Dept. B to Finished Goods (in journal entry form)

GENERAL JOURNAL					Page 4
Date	Description	Post. Ref.	Debit	Credit	
	Finished Goods		XXXXX		
	Work in Process - Department B			XXXXX	
	<i>To record the completion of goods and their transfer from Department B to finished goods inventory.</i>				



Process Cost Flows: Transfers from Finished Goods to COGS (in T-account form)



Process Cost Flows: Transfers from Finished Goods to COGS (in journal entry form)

GENERAL JOURNAL					Page 4
Date	Description	Post. Ref.	Debit	Credit	
	Cost of Goods Sold		XXXXX		
	Finished Goods			XXXXX	
	<i>To record the transfer of finished goods inventory to cost of goods sold.</i>				



Equivalent Units of Production

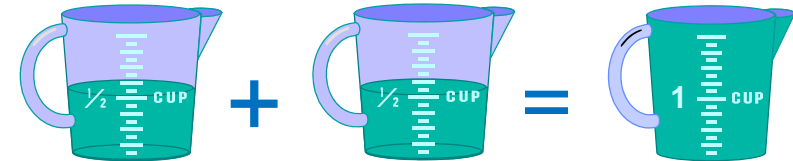
Equivalent units are the product of the number of partially completed units and the percentage completion of those units.



We need to calculate equivalent units because a department usually has some partially completed units in its beginning and ending inventory. These partially completed units complicate the determination of a department's output for a given period and the unit cost that should be assigned to that output.

Equivalent Units – The Basic Idea

Two half completed products are **equivalent to one complete product.**



So, 10,000 units 70% complete are **equivalent to 7,000 complete units.**

Calculating Equivalent Units

Equivalent units can be calculated two ways:

- 1 The First-In, First-Out Method – FIFO is covered in the appendix to this chapter.
- 2 The Weighted-Average Method – This method will be covered in the main portion of the chapter.



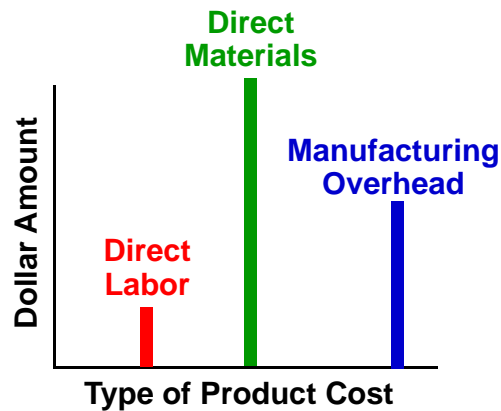
Equivalent Units of Production Weighted-Average Method

The weighted-average method . . .

1. Makes no distinction between work done in prior or current periods.
2. Blends together units and costs from prior and current periods.
3. Determines equivalent units of production for a department by adding together the number of units transferred out plus the equivalent units in **ending** Work in Process Inventory.

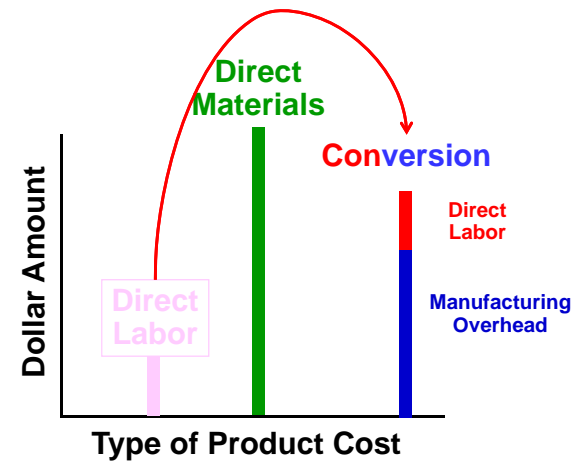


Treatment of Direct Labor



Direct labor costs may be small in comparison to other product costs in process cost systems.

Treatment of Direct Labor



Direct labor and manufacturing overhead may be combined into one classification of product cost called **conversion costs**.

Weighted Average

Weighted-Average – An Example

Smith Company reported the following activity in the Assembly Department for the month of June:

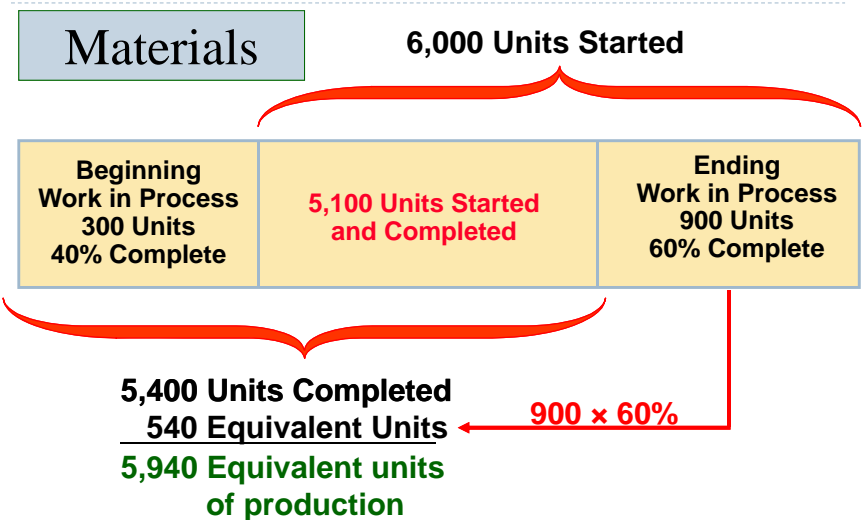
	Units	Percent Completed	
		Materials	Conversion
Work in process, June 1	300	40%	20%
Units started into production in June	6,000		
Units completed and transferred out of Department A during June	5,400		
Work in process, June 30	900	60%	30%

Weighted-Average – An Example

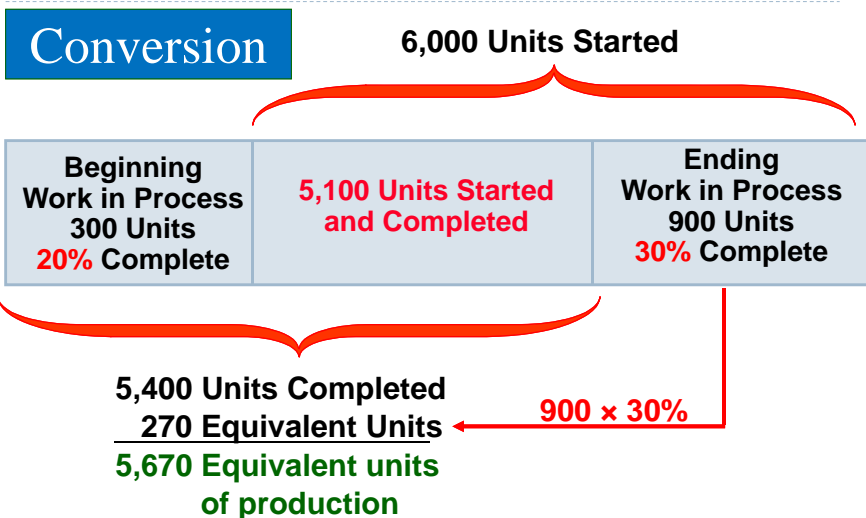
The first step in calculating the equivalent units is to identify the units completed and transferred out of Assembly Department in June (5,400 units)

	Materials	Conversion
Units completed and transferred out of the Department in June	5,400	5,400
	_____	_____
	=====	=====

Weighted-Average – An Example



Weighted-Average – An Example



Compute and Apply Costs

Beginning Work in Process Inventory:		400 units
Materials: 40% complete	\$	6,119
Conversion: 20% complete	\$	3,920
Production started during June		
Production completed during June	6,000 units	
Costs added to production in June		
Materials cost	\$	118,621
Conversion cost	\$	81,130
Ending Work in Process Inventory:		900 units
Materials: 60% complete		
Conversion: 30% complete		

Compute and Apply Costs

The formula for computing the cost per equivalent unit is:

$$\text{Cost per equivalent unit} = \frac{\text{Cost of beginning Work in Process Inventory} + \text{Cost added during the period}}{\text{Equivalent units of production}}$$



Compute and Apply Costs

Here is a schedule with the cost and equivalent unit information.

	Total Cost	Materials	Conversion
Cost to be accounted for:			
Work in process, June 1	\$ 10,039	\$ 6,119	\$ 3,920
Cost added in Assembly	199,751	118,621	81,130
Total cost	\$ 209,790	\$ 124,740	\$ 85,050
Equivalent units		5,940	5,670

Applying Costs

Assembly Department Cost of Ending WIP Inventory and Units Transferred Out			
	Materials	Conversion	Total
Ending WIP inventory:			
Equivalent units	540	270	

Reconciling Costs

Assembly Department Cost Reconciliation	
Costs to be accounted for:	
Cost of beginning Work in Process Inventory	\$ 10,039
Costs added to production during the period	199,751
Total cost to be accounted for	\$ 209,790

Reconciling Costs

Assembly Department Cost Reconciliation		
Costs to be accounted for:		
Cost of beginning Work in Process Inventory	\$	10,039
Costs added to production during the period		199,751
Total cost to be accounted for	\$	209,790
Cost accounted for as follows:		
Cost of ending Work in Process Inventory	\$	15,390
Cost of units transferred out		194,400
Total cost accounted for	\$	209,790

FIFO vs. Weighted-Average Method

The FIFO method (generally considered more accurate than the weighted-average method) differs from the weighted-average method in two ways:

1. The computation of equivalent units.
2. The way in which the costs of beginning inventory are treated.

Equivalent Units – FIFO Method

Let's revisit the Smith Company example. Here is information concerning the Assembly Department for the month of June.

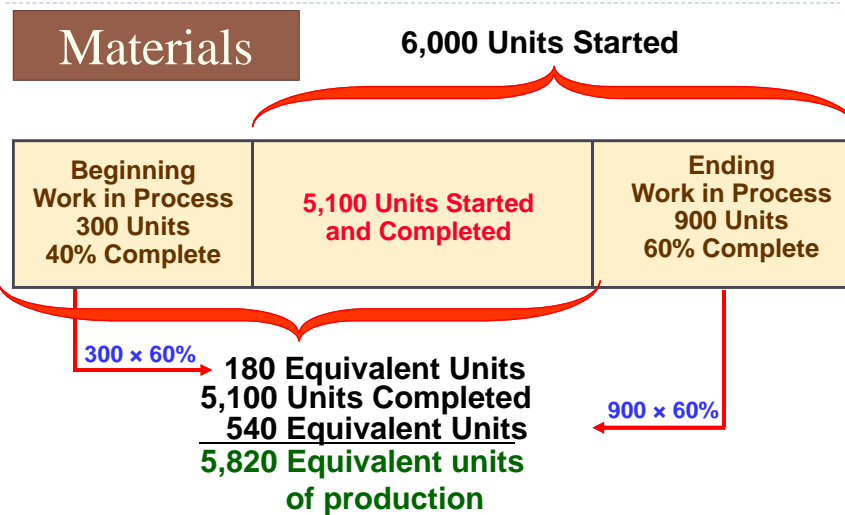
	Units	Percent Completed	
		Materials	Conversion
Work in process, June 1	300	40%	20%
Units started into production in June	6,000		
Units completed and transferred out of Department A during June	5,400		
Work in process, June 30	900	60%	30%

Equivalent Units – FIFO Method

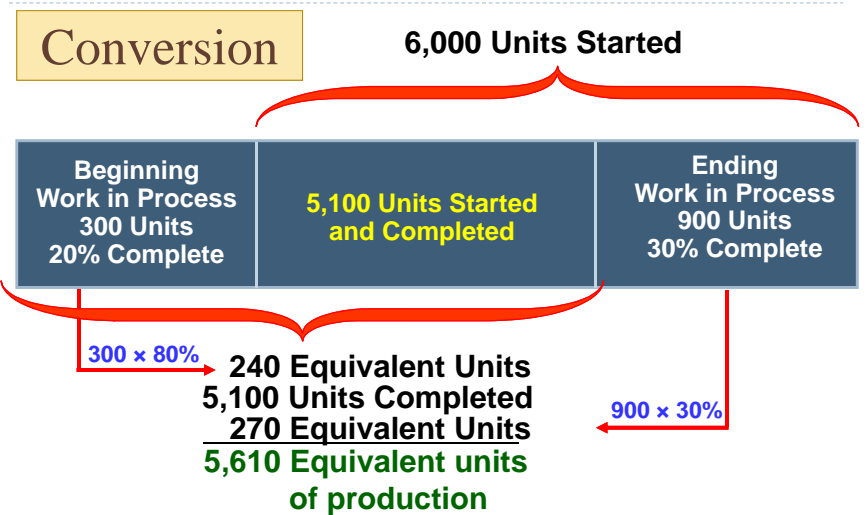
Step 1: Determine equivalent units needed to *complete* beginning Work in Process Inventory.

	Materials	Conversion
To complete beginning Work in Process:		
Materials: 300 units × (100% - 40%)	180	
Conversion: 300 units × (100% - 20%)		240

FIFO Example



FIFO Example



Equivalent Units: Weighted-Average vs. FIFO

As shown below, the equivalent units in beginning inventory are subtracted from the equivalent units of production per the weighted-average method to obtain the equivalent units of production under the FIFO method.

	Materials	Conversion
Equivalent units - weighted-average method	5,940	5,670
Less equivalent units in beginning inventory:		
300 units × 40%	120	
300 units × 20%		60
Equivalent units - FIFO method	5,820	5,610

Cost per Equivalent Unit - FIFO

The formula for computing the cost per equivalent unit under FIFO method is:

$$\text{Cost per equivalent unit} = \frac{\text{Cost added during the period}}{\text{Equivalent units of production}}$$



Cost per Equivalent Unit - FIFO

	Total Cost	Materials	Conversion
Cost added in June	\$ 199,751	\$ 118,621	\$ 81,130
Equivalent units		5,820	5,610
Cost per equivalent unit		\$ 20.3816	\$ 14.4617

$$\$118,600 \div 5,820$$

$$\$81,130 \div 5,610$$

$$\text{Total cost per equivalent unit} = \$20.3816 + \$14.4617 = \$34.8433$$

Applying Costs - FIFO

Step 1: Record the equivalent units of production in *ending* Work in Process Inventory.

Assembly Department Cost of Ending WIP Inventory			
	Materials	Conversion	Total
Ending WIP inventory: Equivalent units	540	270	

Reconciling Costs

Assembly Department Cost Reconciliation for June	
Costs to be accounted for:	
Cost of beginning Work in Process Inventory	\$ 10,039
Costs added to production during the period	199,751
Total cost to be accounted for	\$ 209,790
Cost accounted for as follows:	
Cost of ending Work in Process Inventory	\$ 14,911
Cost of units transferred out	194,879
Total cost accounted for	\$ 209,790

A Comparison of Costing Methods

In a lean production environment, FIFO and weighted-average methods yield similar unit costs.

When considering cost control, FIFO is superior to weighted-average because it does not mix costs of the current period with costs of the prior period.

