GLOBAL EDITION

Weygandt's MANAGERIAL ACCOUNTING

TOOLS FOR BUSINESS DECISION MAKING

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3 Process Costing

Learning Objectives

3.1	Discuss the uses of a process cost system and how it compares to a job order system.
3.2	Explain the flow of costs in a process cost system and the journal entries to assign manufacturing costs.
3.3	Compute equivalent units.
3.4	Complete the four steps to prepare a production cost report.

LEARNING OBJECTIVE 3.1

Discuss the uses of a process cost system and how it compares to a job order system.

Uses of Process Cost Systems

- Use to apply costs to ***similar*** products that are ***mass-produced*** in a ***continuous*** fashion.
- **Examples** include the production of Cereal, Paint, Manufacturing Steel, Oil Refining and Soft Drinks.

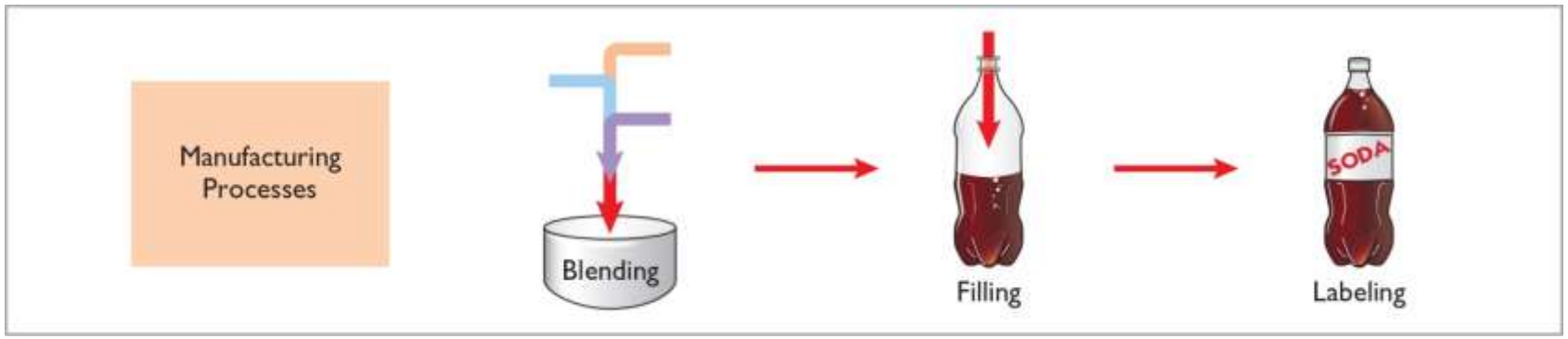


Illustration 3-1
Manufacturing processes

Use of Process Cost Systems

Examples of companies that primarily use either a process cost system or a job order cost system.

Process Cost System			Job Order Cost System		
Company	Product		Company	Product	
Back o' Bourke, Coca-Cola	Soft drinks		Young & Rubicam, J. Walter Thompson	Advertising	
ExxonMobil, Royal Dutch Shell	Oil		Disney, Warner Brothers	Movies	
Intel, Advanced Micro Devices	Computer chips		Center Ice Consultants, Ice Pro	Ice rinks	
Dow Chemical, DuPont	Chemicals		Kaiser, Mayo Clinic	Patient health care	

Illustration 3-2
Process cost and job order cost companies and products

Use of Process Cost Systems

Question

Which of the following items is *not* a characteristic of a process cost system:

a. Once production begins, it continues until the finished product emerges.

b. The focus is on continually producing homogenous products.

c. When the finished product emerges, all units have precisely the same amount of materials, labor, and overhead.

d. The products produced are heterogeneous in nature.

LO 1

Process Cost for Service Companies

Service companies that provide individualized, non-routine services will probably benefit from using a **job order** cost system.

Those that perform routine, repetitive services will probably be better off with a **process cost** system.

Similarities and Differences Between Job Order Cost and Process Cost Systems

Job Order Cost

- Costs assigned to **each job**.
- Products have **unique characteristics**.

Process Cost

- Costs tracked through a **series of connected manufacturing processes or departments**.
- Products are **uniform** or relatively homogeneous and produced in a **large volume**.

LO 1

Job Order Cost and Process Cost Flow

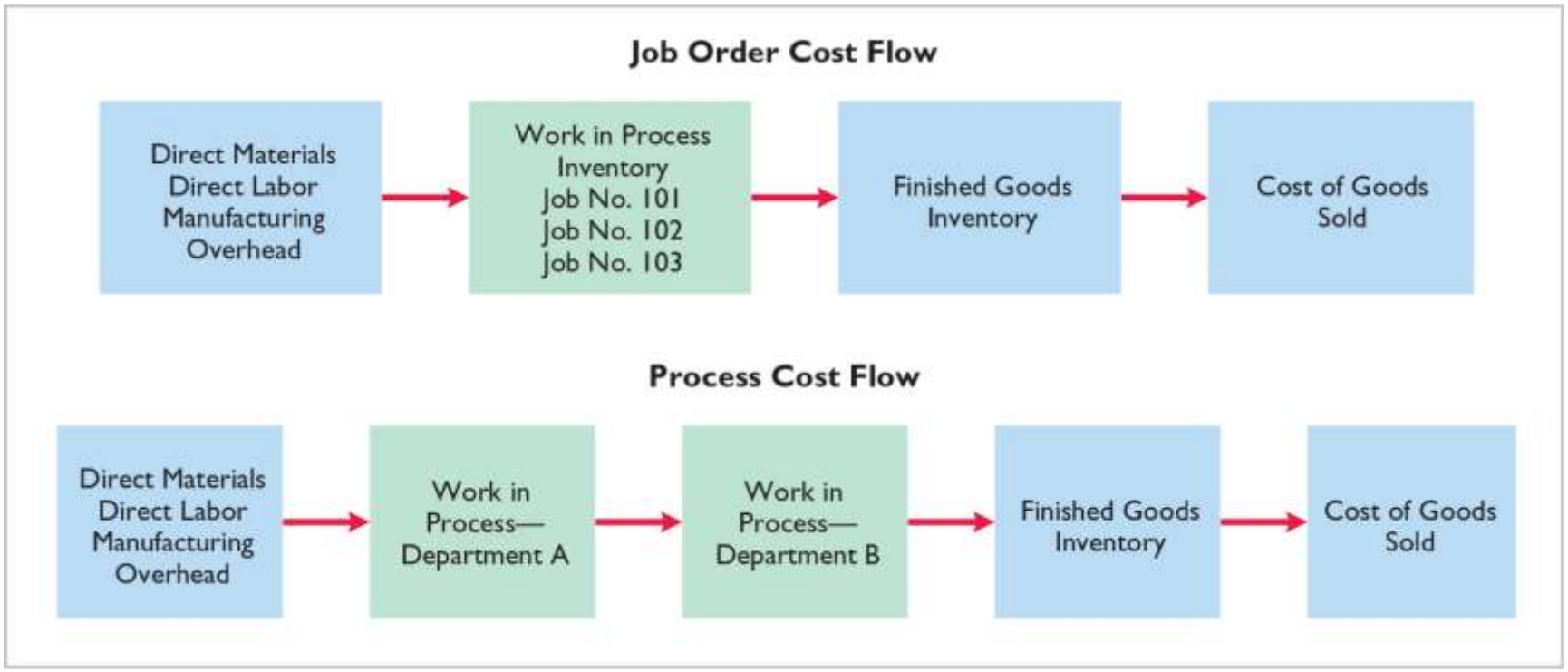


Illustration 3-3
Job order cost and process cost flow

LO 1

Job Order Cost and Process Cost Flow

Similarities

1. Manufacturing cost elements.
2. Accumulation of the costs of materials, labor, and overhead.
3. Flow of costs.

Differences

1. Number of work in process accounts used.
2. Documents used to track costs.
3. Point at which costs are totaled.
4. Unit cost computations.

LO 1

Job Order Cost and Process Cost Flow

Feature	Job Order Cost System	Process Cost System
Work in process accounts	One work in process account	Multiple work in process accounts
Documents used	Job cost sheets	Production cost reports
Determination of total manufacturing costs	Each job	Each period
Unit-cost computations	Cost of each job ÷ Units produced for the job	Total manufacturing costs ÷ Equivalent units produced during the period

Illustration 3-4
Job order versus process cost systems

Use of Process Cost Systems

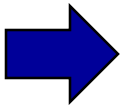
Question

Indicate which of the following statements is not correct:

a. Both a job order and a process cost system track the same three manufacturing cost elements – direct materials, direct labor, and manufacturing overhead.

b. In a job order cost system, only one work in process account is used, whereas in a process cost system, multiple work in process accounts are used.

c. Manufacturing costs are accumulated the same way in a job order and in a process cost system.



d. Manufacturing costs are assigned the same way in a job order and in a process cost system.

LO 1

DO IT! 3.1 Compare Job Order and Process Cost Systems

Indicate whether the following statements are **true** or **false**.

1. A law firm is likely to use process costing for major lawsuits.
2. A manufacturer of paintballs is likely to use process costing.
3. Both job order and process costing determine product costs at the end of a period of time, rather than when a product is completed.
4. Process costing does not keep track of manufacturing overhead.

LO 1

LEARNING OBJECTIVE 3.2

Explain the flow of costs in a process cost system and the journal entries to assign manufacturing costs.

Process Cost Flow

Ngg Wheels. manufactures roller blade and skateboard wheels that it sells to manufactures and retail outlets. Manufacturing consists of two processes: machining and assembly. The Machining Department shapes, hones, and drills the raw materials. The Assembly Department assembles and packages the parts.

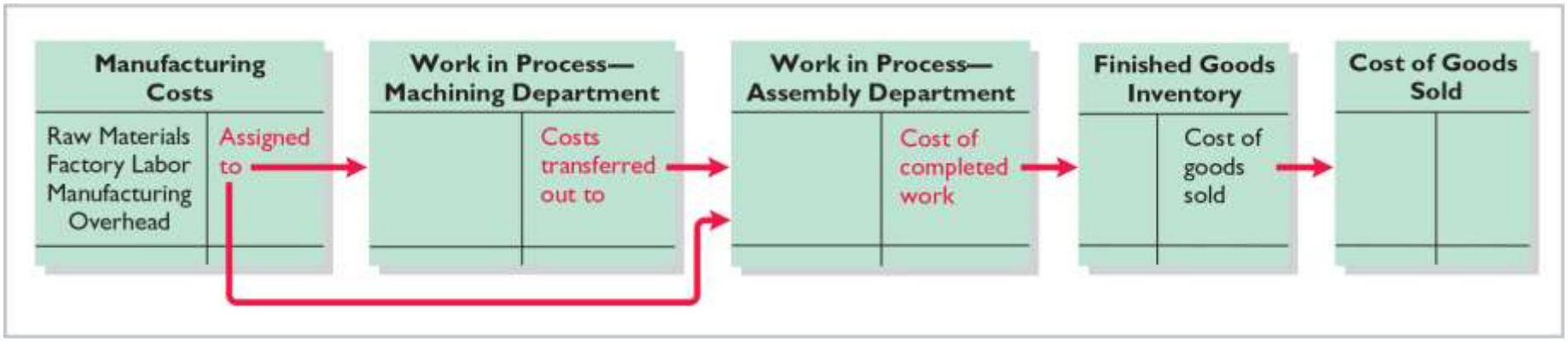


Illustration 3-5
Flow of costs in process cost system

LO 2

Assigning Manufacturing Costs

- Accumulation of the cost of materials, labor, and overhead is the **same** as in job order costing.
  - **Debit Raw Materials Inventory** for purchases of raw materials.
  - **Debit Factory Labor for factory labor incurred**.
  - **Debit Manufacturing Overhead** for overhead cost incurred.
- **Assignment** of the three manufacturing cost elements to **Work in Process** in a process cost system is different from a job order cost system.

LO 2

Assigning Manufacturing Costs

Material Costs

- A process cost system requires fewer material requisition slips than a job order cost system.
- Materials are used for processes and not specific jobs.
- Requisitions are for larger quantities of materials.
- **Journal entry to record materials used**:

Work in Process–Machining	XXXXX	
Work in Process–Assembly	XXXXX	
Raw Materials Inventory		XXXXX

LO 2

Assigning Manufacturing Costs

Factory Labor Costs

- Time tickets may be used in both systems.
- All labor costs incurred within a production department are a cost of processing.
- **The journal entry to record factory labor costs**:

Work in Process–Machining	XXXXX	
Work in Process–Assembly	XXXXX	
Factory Labor		XXXXX

Assigning Manufacturing Costs

Manufacturing Overhead Costs

- Objective of assigning overhead is to allocate overhead to production departments on objective and equitable basis.
- Use the activity that "drives" or causes the costs.
- Machine time used - primary driver.
- **Journal entry to allocate overhead**:

Work in Process–Machining	XXXXX	
Work in Process–Assembly	XXXXX	
Manufacturing Overhead		XXXXX

LO 2

Management Insight Caterpillar

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Choosing a Cost Driver

In one of its automated cost centers, **Caterpillar** (USA) feeds work into the cost center, where robotic machines process it and transfer the finished job to the next cost center without human intervention. One person tends all of the machines and spends more time maintaining machines than operating them. In such cases, overhead rates based on direct labor hours may be misleading. Surprisingly, some companies continue to assign manufacturing overhead on the basis of direct labor despite the fact that there is no cause-and-effect relationship between labor and overhead.

What is the result if a company uses the wrong "cost driver" to assign manufacturing overhead? (Go to the book's companion website for this answer and additional questions.)

LO 2

Assigning Manufacturing Costs

Transfers

Monthly Entry to transfer goods to next department:

Work in Process–Assembly	XXXXX	
Work in Process–Machining		XXXXX

Entry to transfer completed goods to Finished Goods:

Finished Goods Inventory	XXXXX	
Work in Process–Assembly		XXXXX

Entry to record Cost of Goods sold at the time of sale:

Cost of Goods Sold	XXXXX	
Finished Goods Inventory		XXXXX

Assigning Manufacturing Costs

Question

In making the journal entry to assign raw materials costs:

a. The debit is to Finished goods Inventory.

b. The debit is often to two or more work in process accounts.

c. The credit is generally to two or more work in process accounts.

d. The credit is to Finished Goods Inventory.

DO IT! 3.2 Manufacturing Costs in Process Costing

Lixum Ltd. manufactures ZEBO through two processes: blending and bottling. In June, raw materials used were Blending NT$540,000 and Bottling NT$120,000. Factory labor costs were Blending NT$360,000 and Bottling NT$150,000. Manufacturing overhead costs were Blending NT$180,000 and Bottling NT$75,000. The company transfers units completed at a cost of NT$570,000 in the Blending Department to the Bottling Department. The Bottling Department transfers units completed at a cost of NT$330,000 to Finished Goods. Journalize the assignment of these costs to the two processes and the transfer of units as appropriate.

DO IT! 3.2 Manufacturing Costs in Process Costing

Journalize the assignment of these costs to the two processes.

To Record **Materials** Used:

Work in Process–Blending	540,000	
Work in Process–Bottling	120,000	
Raw Materials Inventory		660,000

To Assign **Factory Labor** to Production:

Work in Process–Blending	360,000	
Work in Process–Bottling	150,000	
Factory Labor		510,000

LO 2

DO IT! 3.2 Manufacturing Costs in Process Costing

Journalize the assignment of these costs to the two processes.

To Assign **Overhead** to Production:

Work in Process–Blending	180,000	
Work in Process–Bottling	75,000	
Manufacturing Overhead		255,000

DO IT! 3.2 Manufacturing Costs in Process Costing

Journalize the transfer of units as appropriate.

To Record **Transfer of Units** to the Bottling Department:

Work in Process–Bottling	570,000	
Work in Process–Blending		570,000

To Record **Transfer of Units** to Finished Goods:

Finished Goods Inventory	330,000	
Work in Process–Bottling		330,000

LO 2

LEARNING OBJECTIVE 3.3

Compute equivalent units.

Illustration: Suppose you have a work-study job in the office of your college's president, and she asks you to compute the cost of instruction per full-time equivalent student at your college. The college's vice president for finance provides the information shown in Illustration 3-6.

Illustration 3-6
Information for full-time student example

Costs:	
Total cost of instruction	€9,000,000
Student population:	
Full-time students	900
Part-time students	1,000

Compute Equivalent Units

Illustration: Part-time students take 60% of the classes of a full-time student during the year. Illustration 3-7 shows the computation of the number of full-time equivalent students per year.

Illustration 3-7
Full-time equivalent unit computation

Full-Time Students	+	Equivalent Units of Part-Time Students	=	Full-Time Equivalent Students
	+		=	

Cost of instruction per full-time equivalent student =

Total cost of instruction		€9,000,000
Number of full-time equivalent students	÷	1,500
	€	6,000

Weighted-Average Method

- Considers the degree of completion (weighting) of units completed and transferred out and units in ending work in process.
- Most widely used method.
- Beginning work in process not part of computation of equivalent units.

Units Completed and Transferred out	+	Equivalent Units of Ending Work in Process	=	Equivalent Units of Production

Illustration 3-8
Equivalent units of production formula

Weighted-Average Method

Illustration: The output of Kori Company's Packaging Department during the period consists of 10,000 units completed and transferred out, and 5,000 units in ending work in process which are 70% completed.

Calculate the equivalent units of production.

Completed units		10,000
Work in process equivalent units	(5,000 x 70%)	3,500
		13,500

Refinements on the Weighted-Average Method

Illustration: Kellogg Company (USA) has produced Eggo® Waffles since 1970. Three departments produce these waffles: Mixing, Baking, and Freezing/Packaging. The Mixing Department combines dry ingredients, including flour, salt, and baking powder, with liquid ingredients, including eggs and vegetable oil, to make waffle batter.

Illustration 3-9 provides information related to the Mixing Department at the end of June. Note that separate unit cost computations are needed for materials and conversion costs whenever the two types of costs do not occur in the process at the same time.

Refinements Weighted-Average Method

Illustration: Information related to the Mixing Department at the end of June.

Mixing Department			
		Percentage Complete	
	Physical Units	Materials	Conversion Costs
Work in process, June 1	100,000	100%	70%
Started into production	800,000		
Total units	900,000		
Units transferred out	700,000		
Work in process, June 30	200,000	100%	60%
Total units	900,000		

Illustration 3-9
Information for Mixing Department

LO 3

Refinements Weighted-Average Method

Mixing Department		
	Equivalent Units	
	Materials	Conversion Costs
Units transferred out	700,000	700,000
Work in process, June 30		
200,000 × 100%	200,000	
200,000 × 60%		120,000
Total equivalent units	900,000	820,000

Illustration 3-10
Computation of equivalent units–Mixing Department

- Conversion costs are labor costs plus overhead costs.
- Beginning work in process is not part of the equivalent-units-of-production formula.

LO 3

Refinements Weighted-Average Method

Units Completed and Transferred Out—Materials	+	Equivalent Units of Ending Work in Process—Materials	=	Equivalent Units of Production—Materials
Units Completed and Transferred Out—Conversion Costs	+	Equivalent Units of Ending Work in Process—Conversion Costs	=	Equivalent Units of Production—Conversion Costs

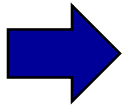
Illustration 3-11
Refined equivalent units of production formula

Compute Equivalent Units

Question

The Mixing Department's output during the period consists of 20,000 units completed and transferred out, and 5,000 units in ending work in process 60% complete as to materials and conversions costs. Beginning inventory is 1,000 units, 40% complete as to materials and conversion costs. The equivalent units of production are:

a. 22,600



b. 23,000

c. 24,000

d. 25,000

People, Planet, and Profit Insight General Electric

© Nicole Hofmann/iStockphoto

Haven't I Seen That Before?

For a variety of reasons, many companies, including **General Electric** (USA), are making a big push to remanufacture goods that have been thrown away. Items getting a second chance include cell phones, computers, home appliances, car parts, vacuum cleaners, and medical equipment. Businesses have figured out that profit margins on remanufactured goods are significantly higher than on new goods. As commodity prices such as copper and steel increase, reusing parts makes more sense. Also, as more governments initiate laws requiring that electronics and appliances be recycled rather than thrown away, the cost of remanufacturing declines because the gathering of used goods becomes far more efficient. Besides benefitting the manufacturer, remanufacturing provides goods at a much lower price to consumers, reduces waste going to landfills, saves energy, reuses scarce resources, and reduces emissions. For example, it was estimated that a remanufactured car starter results in about 50% less carbon dioxide emissions than making a new one.

Source: James R. Hagerty and Paul Glader, "From Trash Heap to Store Shelf," *Wall Street Journal Online* (January 24, 2011).

In what ways might the relative composition (materials, labor, and overhead) of a remanufactured product's cost differ from that of a newly made product? (Go to the book's companion website for this answer and additional questions.)

DO IT! 3.3 Equivalent Units

The fabricating department Outdoor Essentials has the following production and cost data for the current month.

Beginning Work in Process	Units Transferred Out	Ending Work in Process
-0-	15,000	10,000

Materials are entered at the beginning of the process. The ending work in process units are 30% complete as to conversion costs. Compute the equivalent units of production for (a) materials and (b) conversion costs.

DO IT! 3.3 Equivalent Units

The fabricating department has the following production and cost data for the current month.

Beginning Work in Process	Units Transferred Out	Ending Work in Process
-0-	15,000	10,000

Compute the equivalent units of production for **(a) materials** and (b) conversion costs.

Units transferred out	15,000
Ending work in process units	10,000
	25,000

DO IT! 3.3 Equivalent Units

The fabricating department has the following production and cost data for the current month.

Beginning Work in Process	Units Transferred Out	Ending Work in Process
-0-	15,000	10,000

Compute the equivalent units of production for (a) materials and **(b) conversion costs**.

Units transferred out	15,000
Equivalent unit in ending WIP (10,000 x 30%)	3,000
	18,000

LEARNING OBJECTIVE 3.4

Complete the four steps to prepare a production cost report.

A production cost report is the

- Key document used to understand activities.
- Prepared for **each** department and shows Production Quantity and Cost data.
- **Four steps** in preparation:

Step 1: Compute physical unit flow

Step 2: Compute equivalent units of production

Step 3: Compute unit production costs

Step 4: Prepare a cost reconciliation schedule

Production Cost Report

Flow of costs to make an Eggo® Waffle and the related production cost reports for each department.

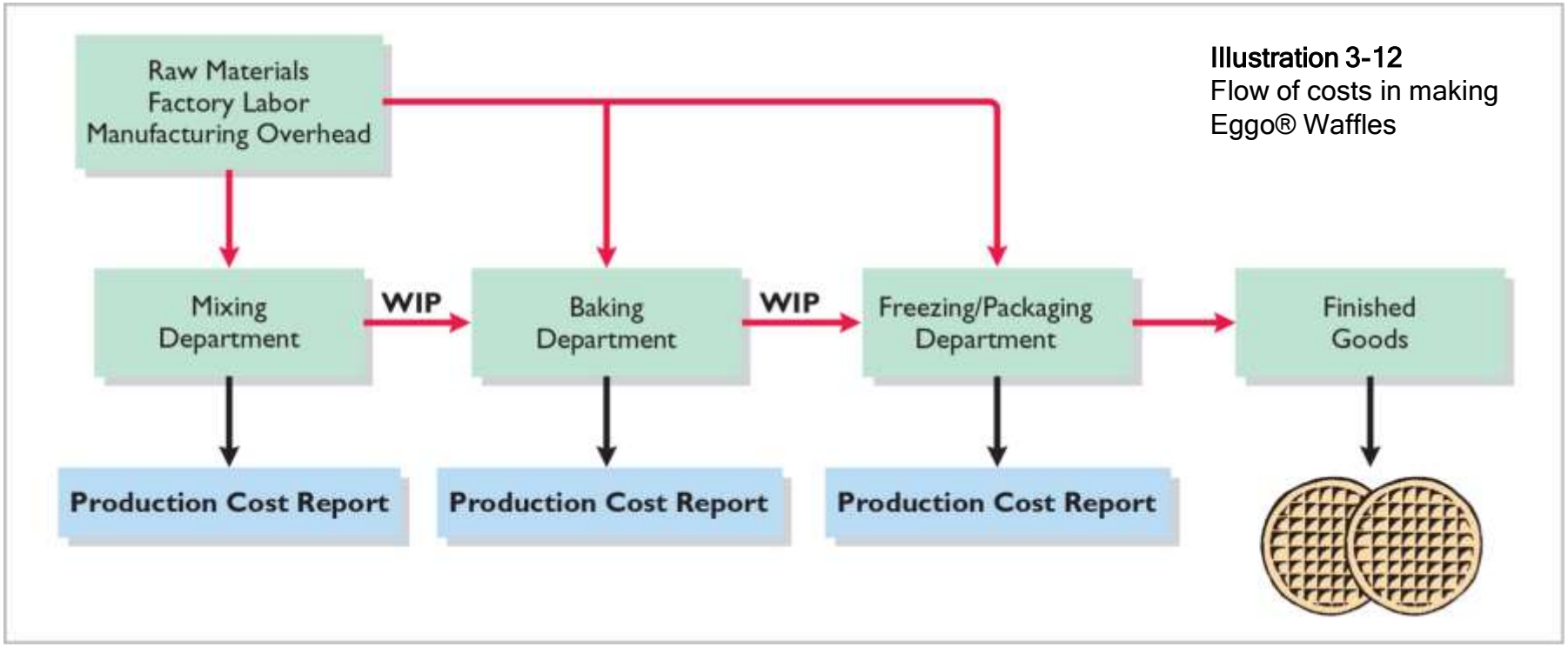


Illustration 3-12
Flow of costs in making Eggo® Waffles

LO 4

Mixing Department

Units	
Work in process, June 1	100,000
Direct materials: 100% complete	
Conversion costs: 70% complete	
Units started into production during June	800,000
Units completed and transferred out to Baking Department	700,000
Work in process, June 30	200,000
Direct materials: 100% complete	
Conversion costs: 60% complete	
Costs	
Work in process, June 1	
Direct materials: 100% complete	$ 50,000
Conversion costs: 70% complete	35,000
Cost of work in process, June 1	$ 85,000
Costs incurred during production in June	
Direct materials	$400,000
Conversion costs	170,000
Costs incurred in June	$570,000

Illustration 3-13
Unit and cost data–Mixing Department

LO 4

Production Cost Report

Compute the Physical Unit Flow (Step 1)

- **Physical units - actual units** to be accounted for during a period, regardless of work performed.
- **Total units to be accounted for - units started** (or transferred) into production during the period + **units in production at beginning** of period.
- **Total units accounted for - units transferred out** during period + **units in process at end** of period.

Production Cost Report

Compute the Physical Unit Flow (Step 1)

Mixing Department	
	Physical Units
Units to be accounted for	
Work in process, June 1	100,000
Started (transferred) into production	800,000
Total units	**900,000**
Units accounted for	
Completed and transferred out	700,000
Work in process, June 30	200,000
Total units	**900,000**

Illustration 3-14
Physical unit flow–Mixing Department

LO 4

Production Cost Report

Compute Equivalent Units of Production (Step 2)

Mixing Department

- Department adds materials at beginning of process and
- Incurs conversion costs uniformly during the process.

	Equivalent Units	
	Materials	**Conversion Costs**
Units transferred out	700,000	700,000
Work in process, June 30		
200,000 × 100%	200,000	
200,000 × 60%		120,000
Total equivalent units	**900,000**	**820,000**

Illustration 3-15
Computation of equivalent units–Mixing Department

LO 4

Production Cost Report

Compute Unit Production Costs (Step 3)

- Costs expressed in terms of equivalent units of production.
- When equivalent units of production are different for materials and for conversion costs, three unit costs are computed:
  1. Materials
  2. Conversion
  3. Total Manufacturing

Production Cost Report

Compute Unit Production Costs (Step 3)

Compute total materials cost related to Eggo® Waffles:

Illustration 3-16

Work in process, June 1	
Direct materials costs	
Cost added to production during June	
Direct material cost	
Total material costs	

Illustration 3-17

Total Materials Cost	÷	Equivalent Units of Materials	=	Unit Materials Cost
	÷		=	

LO 4

Production Cost Report

Compute Unit Production Costs (Step 3)

Compute total materials cost related to Eggo® Waffles:

Illustration 3-18

Work in process, June 1	
Conversion costs	
Costs added to production during June	
Conversion costs	
Total conversion costs	

Illustration 3-19

Total Conversion Costs	÷	Equivalent Units of Conversion Costs	=	Unit Conversion Cost
	÷		=	

LO 4

Production Cost Report

Compute Unit Production Costs (Step 3)

Illustration 3-19

Total Conversion Costs	÷	Equivalent Units of Conversion Costs	=	Unit Conversion Cost
$205,000	÷	820,000	=	$0.25

Compute total manufacturing costs per unit:

Illustration 3-20

Unit Materials Cost	+	Unit Conversion Cost	=	Total Manufacturing Cost per Unit
	+		=	

LO 4

Production Cost Report

Prepare a Cost Reconciliation Schedule (Step 4)

Kellogg charged total costs of $655,000 to the Mixing Department in June, calculated as shown in Illustration 3-21.

Illustration 3-21

Costs to be accounted for	
Work in process, June 1	$ 85,000
Started into production	570,000
Total costs	$655,000

LO 4

Production Cost Report

Prepare a Cost Reconciliation Schedule (Step 4)

Mixing Department
Cost Reconciliation Schedule

Costs accounted for		
Transferred out (700,000 × $0.75)		$525,000
Work in process, June 30		
Materials (200,000 × $0.50)	$100,000	
Conversion costs (120,000 × $0.25)	30,000	130,000
Total costs		**$655,000**

Illustration 3-22
Cost reconciliation schedule—
Mixing Department

LO 4

Prepare the Production Cost Report

Mixing Department

Home | Insert | Page Layout | Formulas | Data | Review | View

P18 fx

	A	B	C	D	E
1	**Mixing Department**				
2	**Production Cost Report**				
3	**For the Month Ended June 30, 2020**				
4			**Equivalent Units**		
5		Physical Units	Materials	Conversion Costs	
6	**Quantities**				
7	Units to be accounted for	Step 1		Step 2	
8	Work in process, June 1	100,000			
9	Started into production	800,000			
10	Total units	900,000			
11	Units accounted for				
12	Transferred out	700,000	700,000	700,000	
13	Work in process, June 30	200,000	200,000	120,000	(200,000 × 60%)
14	Total units	900,000	900,000	820,000	
15	**Costs**				
16	Unit costs Step 3		Materials	Conversion Costs	Total
17	Total cost	(a)	$450,000	$205,000	$655,000
18	Equivalent units	(b)	900,000	820,000	
19	Unit costs [(a) ÷ (b)]		$0.50	$0.25	$0.75
20	Costs to be accounted for				
21	Work in process, June 1				$ 85,000
22	Started into production				570,000
23	Total costs				$655,000
24	**Cost Reconciliation Schedule** Step 4				
25	Costs accounted for				
26	Transferred out (700,000 × $0.75)				$525,000
27	Work in process, June 30				
28	Materials (200,000 × $0.50)			$100,000	
29	Conversion costs (120,000 × $0.25)			30,000	130,000
30	Total costs				$655,000
31					

Illustration 3-23
Production cost report

Production Cost Report

Question

Largo Ltd. has unit costs of £10 for materials and £30 for conversion costs. If there are 2,500 units in ending work in process, 40% complete as to conversion costs and fully complete as to materials cost, the total cost assignable to the ending work in process inventory is:

a. £45,000.

b. £55,000.

c. £75,000.

d. £100,000.

Production Cost Report

Costing Systems – Final Comments

- Companies often use a combination of a process cost and a job order cost system.
- Called **operations costing**, this hybrid system is similar to process costing in its assumption that standardized methods are used to manufacture the product.
- At the same time, the product may have some customized, individual features that require the use of a job order cost system.

DO IT! 3.4 Cost Reconciliation Schedule

In March, Venter Manufacturing had the following unit production costs: materials R60 and conversion costs R90. On March 1, it had zero work in process. During March, Venter transferred out 12,000 units. As of March 31, 800 units that were 25% complete as to conversion costs and 100% complete as to materials were in ending work in process. Assign the costs to the units transferred out and in process.

Costs transferred out (12,000 x R150)		R1,800,000
Work in process, March 31		
Materials (800 x R60)	R48,000	
Conversion costs (200 x R90)	18,000	66,000
Total costs		R1,866,000

LO 4

LEARNING OBJECTIVE 3.5

Compute equivalent units using the FIFO method.

Equivalent Units Under FIFO

Equivalent units are the sum of the work performed to:

1. Finish the units of beginning work in process inventory.
2. Complete the units started into production during the period (referred to as the **units started and completed**).
3. Start, but only partially complete, the units in ending work in process inventory.

Equivalent Units Under FIFO

Assembly Department	
	Physical Units
Units to be accounted for	
Work in process, June 1 (40% complete)	500
Started (transferred) into production	8,000
Total units	**8,500**
Units accounted for	
Completed and transferred out	8,100
Work in process, June 30 (75% complete)	400
Total units	**8,500**

Illustration 3A-1
Physical unit flow–
Assembly Department

LO 5

Equivalent Units Under FIFO

Assembly Department			
Production Data	**Work Added Physical Units**	**Equivalent This Period**	**Units**
Work in process, June 1	500	60%	**300**
Started and completed	7,600	100%	**7,600**
Work in process, June 30	400	75%	**300**
Total	8,500		**8,200**

Illustration 3A-2
Computation of equivalent units–FIFO method

Equivalent Units Under FIFO

Illustration 3A-3
Unit and cost data—Mixing Department

Mixing Department	
Units	
Work in process, June 1	100,000
Direct materials: 100% complete	
Conversion costs: 70% complete	
Units started into production during June	800,000
Units completed and transferred out to Baking Department	700,000
Work in process, June 30	200,000
Direct materials: 100% complete	
Conversion costs: 60% complete	
Costs	
Work in process, June 1	
Direct materials: 100% complete	$ 50,000
Conversion costs: 70% complete	35,000
Cost of work in process, June 1	$ 85,000
Costs incurred during production in June	
Direct materials	$400,000
Conversion costs	170,000
Costs incurred in June	$570,000

LO 5

Equivalent Units Under FIFO

Compute the Physical Unit Flow (1)

Mixing Department	
	Physical Units
Units to be accounted for	
Work in process, June 1	100,000
Started (transferred) into production	800,000
Total units	**900,000**
Units accounted for	
Completed and transferred out	700,000
Work in process, June 30	200,000
Total units	**900,000**

Illustration 3A-4
Physical unit flow–Mixing Department

Equivalent Units Under FIFO

Compute the Physical Unit Flow (1)

Illustration 3A-5
Physical unit flow (FIFO)–Mixing Department

Mixing Department	
	Physical Units
Units to be accounted for	
Work in process, June 1	100,000
Started (transferred) into production	800,000
Total units	**900,000**
Units accounted for	
Completed and transferred out	
Work in process, June 1	**100,000**
Started and completed	**600,000**
	700,000
Work in process, June 30	200,000
Total units	**900,000**

LO 5

Equivalent Units Under FIFO

Compute Equivalent Units of Production (2)

Equivalent Units For Materials

Kellogg adds materials at the beginning of the process. 100% of the materials costs has been incurred on ending WIP.

Mixing Department—Materials

Production Data	Physical Units	Materials Added This Period	Equivalent Units
Work in process, June 1	100,000	–0–	–0–
Started and finished	600,000	100%	600,000
Work in process, June 30	200,000	100%	200,000
Total	900,000		800,000

Illustration 3A-6
Computation of equivalent units–materials

LO 5

Equivalent Units Under FIFO

Compute Equivalent Units of Production (2)

Equivalent Units For Conversion Costs

The Mixing Department required 30,000 equivalent units (100,000 units x 30%) of conversion costs to complete the beginning inventory. In addition, the 200,000 units of ending work in process were 60 percent complete in terms of conversion costs.

Illustration 3A-7

Mixing Department—Conversion Costs

Production Data	Physical Units	Work Added This Period	Equivalent Units
Work in process, June 1	100,000	30%	30,000
Started and finished	600,000	100%	600,000
Work in process, June 30	200,000	60%	120,000
Total	900,000		750,000

LO 5

Equivalent Units Under FIFO

Compute Unit Production Costs (3)

Under the FIFO method, the unit costs of production are based entirely on the production costs incurred during the month.

Direct materials	$400,000
Conversion costs	170,000
Total costs	$570,000

Illustration 3A-8
Costs incurred during production in June

LO 5

Equivalent Units Under FIFO

Compute Unit Production Costs (3)

Compute unit materials cost, unit conversion costs, and total unit cost.

(1)	Total Materials Cost	÷	Equivalent Units of Materials	=	Unit Materials Cost	
		÷		=		
(2)	Total Conversion Costs	÷	Equivalent Units of Conversion Costs	=	Unit Conversion Cost	
		÷		=		
(3)	Unit Materials Cost	+	Unit Conversion Cost	=	Total Manufacturing Cost per Unit	
		+		=		

**For homework problems, round unit costs to three decimal places.*

Illustration 3A-9
Unit cost formulas and computations–Mixing Department

Equivalent Units Under FIFO

Prepare a Cost Reconciliation Schedule (4)

Kellogg is now ready to determine the cost of goods transferred out of the Mixing Department to the Baking Department and the costs in ending work in process. The total costs charged to the Mixing Department in June are as shown in Illustration 3A-10.

Costs to be accounted for	
Work in process, June 1	$ 85,000
Started into production	570,000
Total costs	$655,000

Illustration 3A-10
Costs charged to Mixing Department

Equivalent Units Under FIFO

Illustration 3A-11
Cost reconciliation report

Prepare a Cost Reconciliation Schedule (4)

Mixing Department
Cost Reconciliation Schedule

Costs accounted for		
Transferred out		
Work in process, June 1		$ 85,000
Costs to complete beginning work in process		
Conversion costs (30,000 × $0.227)		6,810
Total costs		91,810
Units started and completed (600,000 × $0.727)		435,950*
Total costs transferred out		527,760
Work in process, June 30		
Materials (200,000 × $0.50)	$100,000	
Conversion costs (120,000 × $0.227)	27,240	127,240
Total costs		**$655,000**

*Any rounding errors should be adjusted in the "Units started and completed" calculation.

LO 5

Equivalent Units Under FIFO

Prepare the Production Cost Report

- Internal document for management that shows production quantity and cost data for a production department.
- Provides a basis for evaluating the productivity of a department.
- Managers can use the cost data to assess whether unit costs and total costs are reasonable.
- Top management can also judge whether current performance is meeting planned objectives.

Prepare the Production Cost Report

Mixing Department

	A	B	C	D	E
1	**Mixing Department**				
2	**Production Cost Report**				
3	**For the Month Ended June 30, 2020**				
4			Equivalent Units		
5		Physical Units	Materials	Conversion Costs	
6	**Quantities**				
7	Units to be accounted for	Step 1		Step 2	
8	Work in process (WIP), June 1	100,000			
9	Started into production	800,000			
10	Total units	900,000			
11	Units accounted for				
12	Completed and transferred out				
13	Work in process, June 1	100,000	0	30,000	
14	Started and completed	600,000	600,000	600,000	
15	Work in process, June 30	200,000	200,000	120,000	
16	Total units	900,000	800,000	750,000	
17	**Costs**				
18	Unit costs Step 3		Materials	Conversion Costs	Total
19	Costs in June (excluding beginning WIP)	(a)	$400,000	$170,000	$570,000
20	Equivalent units	(b)	800,000	750,000	
21	Unit costs [(a) ÷ (b)]		$0.50	$0.227	$0.727
22	Costs to be accounted for				
23	Work in process, June 1				$ 85,000
24	Started into production				570,000
25	Total costs				$655,000
26	**Cost Reconciliation Schedule** Step 4				
27	Costs accounted for				
28	Transferred out				
29	Work in process, June 1			$ 85,000	
30	Costs to complete beginning work in process				
31	Conversion costs (30,000 × $0.227)			6,810	$ 91,810
32	Units started and completed (600,000 × $0.727)*				435,950
33	Total costs transferred out				527,760
34	Work in process, June 30				
35	Materials (200,000 × $0.50)			100,000	
36	Conversion costs (120,000 × $0.227)			27,240	127,240
37	Total costs				$655,000
38	*Any rounding errors should be adjusted in the "Units started and completed"				
39					

Illustration 3A-12
Production cost report–FIFO method

Equivalent Units Under FIFO

FIFO and Weighted-Average

- Weighted-average is simple to understand and apply.
- In cases where prices do not fluctuate significantly, weighted-average will be very similar to FIFO.
- Conceptually, the FIFO method is superior because it measures current performance using only costs incurred in the current period.
- FIFO method provides current cost information, which the company can use to establish more accurate pricing strategies for goods manufactured and sold.

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