

CHAPTER 21

Process Cost Accounting

ASSIGNMENT CLASSIFICATION TABLE

<u>Study Objectives</u>	<u>Questions</u>	<u>Brief Exercises</u>	<u>Exercises</u>	<u>A Problems</u>	<u>B Problems</u>
1. Understand who uses process cost systems.	1, 2		1		
2. Explain the similarities and differences between job order cost and process cost systems.	2, 3, 4, 5		1		
3. Explain the flow of costs in a process cost system.	6			3A	3B
4. Make the journal entries to assign manufacturing costs in a process cost system.	6, 7	1, 2, 3	2, 4	3A	3B
5. Compute equivalent units.	10, 11, 12, 13	5, 10	3, 5, 6, 7, 8, 9, 10, 11, 13	1A, 2A, 4A, 5A, 6A	1B, 2B, 4B, 5B, 6B
6. Explain the four steps necessary to prepare a production cost report.	8, 9, 14, 15, 18	4, 6, 7, 8, 9	3, 5, 6, 7, 8, 9, 10, 11, 13	1A, 2A, 4A, 5A	1B, 2B, 4B, 5B
7. Prepare a production cost report.	16, 17, 19, 20		7, 12, 13	1A, 2A, 4A, 5A, 6A	1B, 2B, 4B, 5B, 6B
8. Explain just-in-time (JIT) processing.	21				
9. Explain activity-based costing (ABC).	22, 23				
*10. Apply activity-based costing to specific company data.	24	11	14, 15	7A	

***Note:** All **asterisked** Questions, Exercises, and Problems relate to material contained in the appendix to the chapter.

ASSIGNMENT CHARACTERISTICS TABLE

Problem Number	Description	Difficulty Level	Time Allotted (min.)
1A	Complete four steps necessary to prepare a production cost report.	Simple	30–40
2A	Complete four steps necessary to prepare a production cost report.	Simple	30–40
3A	Journalize transactions.	Moderate	20–30
4A	Assign costs and prepare production cost report.	Moderate	20–30
5A	Determine equivalent units and unit costs and assign costs.	Moderate	20–30
6A	Compute equivalent units and complete production cost report.	Moderate	15–25
*7A	Assign overhead to products using ABC.	Moderate	40–50
1B	Complete four steps necessary to prepare a production cost report.	Simple	30–40
2B	Complete four steps necessary to prepare a production cost report.	Simple	30–40
3B	Journalize transactions.	Moderate	20–30
4B	Assign costs and prepare production cost report.	Moderate	20–30
5B	Determine equivalent units and unit costs and assign costs.	Moderate	20–30
6B	Compute equivalent units and complete production cost report.	Moderate	15–25

BLOOM'S TAXONOMY TABLE

Correlation Chart between Bloom's Taxonomy, Study Objectives and End-of-Chapter Exercises and Problems

Study Objective	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
1. Understand who uses process cost systems.	Q21-2	E21-1	Q21-1			
2. Explain the similarities and differences between job order cost and process cost systems.	Q21-2 Q21-3	Q21-4 Q21-5 E21-1				
3. Explain the flow of costs in a process cost system.	Q21-6		P21-3A P21-3B	P21-3A P21-3B		
4. Make the journal entries to assign manufacturing costs in a process cost system.	Q21-6		Q21-7 BE21-1 BE21-2	BE21-3 P21-3A P21-3B P21-3B		
5. Compute equivalent units.	Q21-10 Q21-11		Q21-12 Q21-13 BE21-5 BE21-10 E21-3 E21-5 E21-6 E21-7	E21-8 E21-9 E21-10 E21-11 E21-13 P21-1A P21-2A P21-4A P21-5A P21-6A P21-1B P21-2B P21-1A		
6. Explain the four steps necessary to prepare a production cost report.	Q21-8	Q21-9	Q21-14 Q21-15 Q21-18 BE21-4 BE21-6 BE21-7 BE21-8 BE21-9 E21-3	E21-5 E21-6 E21-7 E21-8 E21-9 E21-10 E21-11 E21-13 P21-1A	P21-2A P21-4A P21-5A P21-1B P21-2B	
7. Prepare a production cost report.	Q21-16 Q21-17 Q21-19	Q21-16 Q21-20	E21-7 E21-12 E21-13 P21-1A P21-2A	P21-4A P21-5A P21-6A P21-1B P21-2B		
8. Explain just-in-time (JIT) processing.		Q21-21				
9. Explain activity-based costing (ABC).		Q21-22	Q21-23			
*10. Apply activity-based costing to specific company data.	Q21-24		BE21-11 E21-14	E21-15 P21-7A		
Broadening Your Perspective		Real-World Focus Exploring the Web		Managerial Analysis Decision Making Across the Organization	Decision Making Across the Organization Real-World Focus Communication	Ethics Case All About You

ANSWERS TO QUESTIONS

1. (a) Process cost.
(b) Process cost.
(c) Job order.
(d) Job order.
2. The primary focus of job order cost accounting is on the individual job. In process cost accounting, the primary focus is on the processes involved in producing homogeneous products.
3. The similarities are: (1) all three manufacturing cost elements—direct materials, direct labor, and overhead—are the same; (2) the accumulation of the costs of materials, labor, and overhead is the same; and (3) the flow of costs is the same.
4. The features of process cost accounting are: (1) separate work in process accounts for each process, (2) production cost reports, (3) product costs computed for each accounting period, and (4) unit costs computed based on total manufacturing costs.
5. Mel is correct. The flow of costs is the same in process cost accounting as in job order cost accounting. The method of assigning costs, however, is significantly different.
6. (a) (1) Materials are charged to production on the basis of materials requisition slips.
(2) Labor is usually charged to production on the basis of the payroll register or departmental payroll summaries.
(b) The criterion used in assigning overhead to processes is to identify the activity that “drives” or causes the cost. In many companies this activity is machine time, not direct labor.
7. The entry to assign overhead to production is:

July 31	Work in Process—Machining	15,000	
	Work in Process—Assembly	12,000	
	Manufacturing Overhead.....		27,000
8. To prepare a production cost report, four steps are followed: (a) compute the physical unit flow, (b) compute equivalent units of production, (c) compute unit costs of production, and (d) prepare a cost reconciliation schedule.
9. Physical units to be accounted for consist of units in process at the beginning of the period plus units started (or transferred) into production during the period. Units accounted for consist of units completed and transferred out during the period plus units in process at the end of the period.
10. Equivalent units of production measure the work done during the period, expressed in fully completed units.
11. Equivalent units are the sum of: (1) units completed and transferred out and (2) equivalent units of ending work in process.
12. Units started into production were 9,600, or (9,000 + 600).

Questions Chapter 21 (Continued)

- 13.**
- | | Equivalent Units | |
|------------------------|------------------|-----------------|
| | Materials | Conversion Cost |
| Units transferred out | 12,000 | 12,000 |
| Work in process | | |
| 800 X 100% | 800 | |
| 800 X 20% | | 160 |
| Total equivalent units | 12,800 | 12,160 |
- 14.** Units transferred out were 3,300
- | | |
|-------------------------------|-------|
| Units to be accounted for | |
| Work in process (beginning) | 500 |
| Started into production | 3,000 |
| Total units | 3,500 |
| Units accounted for | |
| Completed and transferred out | 3,300 |
| Work in process (ending) | 200 |
| Total units | 3,500 |
- 15.** (a) The cost of the units transferred out is \$126,000, or (14,000 X \$9).
 (b) The cost of the units in ending inventory is \$9,000, or [(2,000 X \$3) + (500 X \$6)].
- 16.** (a) Eve is incorrect. The report is an internal report for management.
 (b) There are four sections in a production cost report: (1) number of physical units, (2) equivalent units determination, (3) unit costs, and (4) cost reconciliation schedule.
- 17.** The production cost report provides the basis for evaluating: (1) the productivity of a department, (2) whether unit and total costs are reasonable, and (3) whether management's predetermined production and cost goals are being met.
- 18.** The per unit conversion cost is \$8.75. [Conversion costs = \$6,000 – \$3,200 = \$2,800. Equivalent units for conversion costs are 320 (800 X 40%); \$2,800 ÷ 320 = \$8.75.]
- 19.** Operations costing is similar to process costing in that standardized methods are used to manufacture the product. At the same time, the product may have some individual features that require the use of a job order cost system.
- 20.** In deciding which system to use, a cost-benefit tradeoff occurs. In a job order system, detailed information related to the cost of the product is involved. The cost of implementing this system is often expensive. In a process cost system, an average cost of the product will suffice and therefore the cost to implement is less. In summary, the cost of implementing the system must be balanced against the benefits provided from the additional information.
- 21.** (a) Just-in-time processing has a "just-in-time" philosophy and a "pull" approach.
 (b) There are three important elements in JIT processing:
 (1) A company must have dependable suppliers who are willing to deliver on short notice exact quantities of raw materials according to precise quality specifications.
 (2) A multiskilled workforce must be developed.
 (3) A total quality control system must be established.

Questions Chapter 21 (Continued)

22. (a) The principal differences are:

	<u>Activity-Based Costing</u>	<u>Traditional Costing</u>
(1) Primary focus	Activities performed in making products	Units of production
(2) Bases of allocation	Multiple cost drivers	Single unit-level bases
(3) Total product costs	Sum of costs of activities performed in making product	Direct materials plus direct labor plus manufacturing overhead

(b) There are two assumptions that must be met in using ABC:

- (1) All overhead costs related to the activity must be driven by the cost driver used to assign costs to products.
- (2) All overhead costs related to the activity should respond proportionally to changes in the activity level of the cost driver.

23. An appropriate cost driver for each activity is:

<u>Activity</u>	<u>Cost Driver</u>
Materials handling	Number of requisitions
Machine setups	Number of setups
Factory machine maintenance	Machine hours used
Factory supervision	Number of employees
Quality control	Number of inspections

***24.** (a) ABC involves the following steps:

- (1) Identify the major activities that pertain to the manufacture of specific products.
- (2) Accumulate manufacturing overhead costs by activities.
- (3) Identify the cost driver(s) that accurately measure(s) each activity's contribution to the finished product.
- (4) Assign manufacturing overhead costs for each activity to products using the cost driver(s).

(b) The principal advantages of ABC are:

- (1) More accurate product costing is achieved.
- (2) Control over overhead costs is enhanced.
- (3) Better management decisions can be made in: (a) setting selling prices, (b) deciding whether to discontinue or expand a product line, and (c) deciding whether to make or buy a product component.

SOLUTIONS TO BRIEF EXERCISES

BRIEF EXERCISE 21-1

Mar. 31	Raw Materials Inventory.....	45,000	
	Accounts Payable.....		45,000
31	Factory Labor	50,000	
	Wages Payable		50,000

BRIEF EXERCISE 21-2

Mar. 31	Work in Process—Assembly Department.....	24,000	
	Work in Process—Finishing Department.....	21,000	
	Raw Materials Inventory		45,000
31	Work in Process—Assembly Department.....	30,000	
	Work in Process—Finishing Department.....	20,000	
	Factory Labor.....		50,000

BRIEF EXERCISE 21-3

Mar. 31	Work in Process—Assembly Department.....	60,000	
	(\$30,000 X 200%)		
	Work in Process—Finishing Department.....	40,000	
	(\$20,000 X 200%)		
	Manufacturing Overhead		100,000

BRIEF EXERCISE 21-4

	January	March	July
Beginning work in process	0	0	0
Started into production	<u>40,000</u>	<u>48,000</u>	<u>56,000</u>
Total units	<u>40,000</u>	<u>48,000</u>	<u>56,000</u>
Transferred out	30,000	40,000	40,000
Ending work in process	<u>10,000</u>	<u>8,000</u>	<u>16,000</u>
Total units	<u>40,000</u>	<u>48,000</u>	<u>56,000</u>

BRIEF EXERCISE 21-5

	<u>Materials</u>	<u>Conversion Costs</u>
January	40,000 (30,000 + 10,000)	34,000 (30,000 + 4,000)
March	48,000 (40,000 + 8,000)	46,000 (40,000 + 6,000)
July	56,000 (40,000 + 16,000)	44,000 (40,000 + 4,000)

BRIEF EXERCISE 21-6

Total materials costs \$32,000	÷	Equivalent units of materials 10,000	=	Unit materials cost \$3.20
Total conversion costs \$54,000	÷	Equivalent units of conversion costs 12,000	=	Unit conversion cost \$4.50
Unit materials cost \$3.20	+	Unit conversion cost \$4.50	=	Total manufacturing cost per unit \$7.70

BRIEF EXERCISE 21-7

<u>Assignment of Costs</u>	<u>Equivalent Units</u>	<u>Unit Cost</u>		
<u>Transferred out</u>				
Transferred out	40,000	\$13.00		\$520,000
<u>Work in process, 4/30</u>				
Materials	5,000	\$ 4.00	\$20,000	
Conversion costs	2,000	\$ 9.00	<u>18,000</u>	<u>38,000</u>
Total costs				<u>\$558,000</u>

BRIEF EXERCISE 21-8

Total materials costs \$15,000	÷	Equivalent units of materials 20,000	=	Unit materials cost \$0.75
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BRIEF EXERCISE 21-8 (Continued)

Total conversion costs*	÷	Equivalent units of conversion costs	=	Unit conversion cost
\$47,500		19,000		\$2.50

*\$29,500 + \$18,000

BRIEF EXERCISE 21-9

Costs accounted for				
Transferred out	(18,000 X \$3.25)			\$58,500
Work in process				
Materials	(2,000 X \$.75)	\$1,500		
Conversion costs	(1,200 X \$2.50)	<u>3,000</u>		<u>4,500</u>
Total costs				<u>\$63,000</u>

BRIEF EXERCISE 21-10

	<u>Materials</u>	<u>Conversion Costs</u>
Units transferred out	8,000	8,000
Work in process, November 30		
Materials (5,000 X 100%)	5,000	
Conversion costs (5,000 X 40%)		<u>2,000</u>
Total equivalent units	<u>13,000</u>	<u>10,000</u>

*BRIEF EXERCISE 21-11

Machine setups	\$120,000 ÷ 1,000 = \$120 per setup
Machining	\$300,000 ÷ 25,000 = \$12 per machine hour
Inspections	\$70,000 ÷ 2,000 = \$35 per inspection

SOLUTIONS TO EXERCISES

EXERCISE 21-1

1. True.
2. True.
3. False. Companies that produce soft drinks, *oil*, and computer chips would all use process cost accounting.
4. False. In a *job order* cost system, costs are tracked by individual jobs.
5. False. Job order costing and process costing track *the same three* manufacturing cost elements.
6. True.
7. True.
8. False. In a process cost system, *multiple* work in process accounts *are* used.
9. False. In a process cost system, costs are summarized in a *production cost report for each department*.
10. True.

EXERCISE 21-2

(a)	April 30	Work in Process—Cooking	21,000	
		Work in Process—Canning	6,000	
		Raw Materials Inventory		27,000
	30	Work in Process—Cooking	8,500	
		Work in Process—Canning	7,000	
		Factory Labor		15,500
	30	Work in Process—Cooking.....	29,500	
		Work in Process—Canning.....	25,800	
		Manufacturing Overhead		55,300
	30	Work in Process—Canning.....	53,000	
		Work in Process—Cooking.....		53,000

EXERCISE 21-3

(a) Work in process, May 1	400
Started into production	<u>1,100</u>
Total units to be accounted for	1,500
Less: Transferred out	<u>1,200</u>
Work in process, May 31	<u>300</u>

(b)	<u>Equivalent Units</u>	
	<u>Materials</u>	<u>Conversion Costs</u>
Units transferred out	1,200	1,200
Work in process, May 31		
300 X 100%	300	
300 X 40%		<u>120</u>
	<u>1,500</u>	<u>1,320</u>

	<u>Direct</u>	<u>Conversion Costs</u>
	<u>Materials</u>	
Work in process, May 1	\$2,040	\$1,550
Costs added	<u>5,160</u>	<u>4,390</u>
Total materials cost	<u>\$7,200</u>	<u>\$5,940</u>

$\$7,200 \div 1,500 = \4.80

(c) $\$5,940 \div 1,320 = \4.50

(d) Transferred out (1,200 X \$9.30) \$11,160

(e) Work in process	
Materials (300 X \$4.80)	\$1,440
Conversion costs (120 X \$4.50)	<u>540</u>
	<u>\$1,980</u>

EXERCISE 21-4

1.	Raw Materials Inventory	62,500	
	Accounts Payable		62,500
2.	Factory Labor	56,000	
	Wages Payable.....		56,000
3.	Manufacturing Overhead	70,000	
	Cash.....		40,000
	Accounts Payable		30,000
4.	Work in Process—Cutting.....	15,700	
	Work in Process—Assembly.....	8,900	
	Raw Materials Inventory		24,600
5.	Work in Process—Cutting.....	29,000	
	Work in Process—Assembly.....	27,000	
	Factory Labor		56,000
6.	Work in Process—Cutting (1,680 x \$15).....	25,200	
	Work in Process—Assembly (1,720 x \$15).....	25,800	
	Manufacturing Overhead		51,000
7.	Work in Process—Assembly.....	67,600	
	Work in Process—Cutting.....		67,600
8.	Finished Goods Inventory.....	134,900	
	Work in Process—Assembly.....		134,900
9.	Cost of Goods Sold	150,000	
	Finished Goods Inventory.....		150,000
	Accounts Receivable	200,000	
	Sales		200,000

EXERCISE 21-5

(a)	<u>January</u>	<u>May</u>
Units to be accounted for		
Beginning work in process	0	0
Started into production	<u>9,000</u>	<u>21,000</u>
Total units	<u>9,000</u>	<u>21,000</u>
Units accounted for		
Transferred out	7,000	16,000
Ending work in process	<u>2,000</u>	<u>5,000</u>
Total units	<u>9,000</u>	<u>21,000</u>

(b)	(1) <u>Materials</u>	(2) <u>Conversion Costs</u>
January	9,000 (7,000 + 2,000)	8,200 (7,000 + 1,200)
March	15,000 (12,000 + 3,000)	12,900 (12,000 + 900)
May	21,000 (16,000 + 5,000)	20,000 (16,000 + 4,000)
July	11,500 (10,000 + 1,500)	10,600 (10,000 + 600)

EXERCISE 21-6

(a)	<u>Materials</u>	<u>Conversion Costs</u>
Units transferred out	9,000	9,000
Work in process, July 31		
3,000 X 100%	3,000	
3,000 X 60%		<u>1,800</u>
Total equivalent units	<u>12,000</u>	<u>10,800</u>

- (b) Materials: $\$45,000 \div 12,000 = \3.75
 Conversion costs: $(\$16,200 + \$18,900) \div 10,800 = \$3.25$

Costs accounted for		
Transferred out (9,000 X \$7.00)		\$63,000
Work in process, July 31		
Materials (3,000 X \$3.75)	\$11,250	
Conversion costs (1,800 X \$3.25)	<u>5,850</u>	<u>17,100</u>
Total costs		<u>\$80,100</u>

EXERCISE 21-7

ORTIZ FURNITURE COMPANY
Sanding Department
Production Cost Report
For the Month Ended March 31, 2008

Quantities	Physical Units	Equivalent Units		
		Materials	Conversion Costs	
Units to be accounted for				
Work in process, March 1	0			
Started into production	<u>15,000</u>			
Total units	<u>15,000</u>			
Units accounted for				
Transferred out	12,000	12,000	12,000	
Work in process, March 31	<u>3,000</u>	<u>3,000</u>	<u>600</u>	(3,000 X 20%)
Total units	<u>15,000</u>	<u>15,000</u>	<u>12,600</u>	
Costs		Materials	Conversion Costs	Total
Unit costs				
Costs in March		<u>\$33,000</u>	<u>\$63,000</u>	<u>\$96,000</u>
Equivalent units		<u>15,000</u>	<u>12,600</u>	
Unit costs (a) ÷ (b)		<u>\$2.20</u>	<u>\$5.00</u>	<u>\$7.20</u>
Costs to be accounted for				
Work in process, March 1				\$ 0
Started into production				<u>96,000</u>
Total costs				<u>\$96,000</u>
Cost Reconciliation Schedule				
Costs accounted for				
Transferred out (12,000 X \$7.20)				\$86,400
Work in process, March 31				
Materials (3,000 X \$2.20)			\$6,600	
Conversion costs (600 X \$5.00)			<u>3,000</u>	<u>9,600</u>
Total costs				<u>\$96,000</u>

EXERCISE 21-8

(a)		<u>Materials</u>	<u>Conversion Costs</u>	
	Units transferred out	14,000	14,000	
	Work in process, April 30			
	1,000 X 100%	1,000		
	1,000 X 40%		400	
		<u>15,000</u>	<u>14,400</u>	
(b)		<u>Materials</u>	<u>Conversion Costs</u>	<u>Total</u>
	Costs in April	<u>\$900,000⁽¹⁾</u>	<u>\$432,000⁽²⁾</u>	\$1,332,000
	Equivalent units	<u>15,000</u>	<u>14,400</u>	
	Unit costs	<u>\$60.00</u>	<u>\$30.00</u>	<u>\$90.00</u>
	⁽¹⁾ \$100,000 + \$800,000			
	⁽²⁾ \$ 70,000 + \$362,000			
(c)	Transferred out (14,000 X \$90.00)			\$1,260,000
	Work in process			
	Materials (1,000 X \$60)		\$60,000	
	Conversion costs (400 X \$30)		<u>12,000</u>	<u>72,000</u>
	Total costs			<u>\$1,332,000</u>

EXERCISE 21-9

- (a) Materials: $30,000 + 6,000 = \underline{36,000}$
 Conversion costs: $30,000 + (6,000 \times 40\%) = \underline{32,400}$
- (b) Materials: $\$72,000 / 36,000 = \underline{\$2.00}$
 Conversion costs: $(\$81,000 + \$97,200) / 32,400 = \underline{\$5.50}$
- (c) Units transferred out: $30,000 \times \$7.50 = \underline{\$225,000}$
 Units in ending work in process:
- | | | |
|----------------|---|-----------------|
| 6,000 X \$2.00 | = | \$12,000 |
| 2,400 X \$5.50 | = | <u>13,200</u> |
| | | <u>\$25,200</u> |

EXERCISE 21-10

(a) Materials: $68,000^{(1)} + 24,000 = \underline{92,000}$

Conversion costs: $68,000 + (24,000 \times 60\%) = \underline{82,400}$

⁽¹⁾ $20,000 + 72,000 - 24,000$

(b) Materials: $\$101,200/92,000 = \underline{\$1.10}$

Conversion costs: $(\$164,800 + \$123,600)/82,400 = \underline{\$3.50}$

(c) Units transferred out: $68,000 \times \$4.60 = \underline{\$312,800}$

Units in ending work in process:

$24,000 \times \$1.10 = \$26,400$

$14,400 \times \$3.50 = \underline{50,400}$

\$76,800

EXERCISE 21-11

(a)	<u>Physical Units</u>
Work in process, September 1	1,600
Units started into production	<u>18,400</u>
	<u>20,000</u>

Units transferred out	15,000
Work in process, September 30	<u>5,000</u>
	<u>20,000</u>

	<u>Equivalent Units</u>	
	<u>Materials</u>	<u>Conversion Costs</u>
Units transferred out	15,000	15,000
Work in process		
5,000 X 100%	5,000	
5,000 X 10%		<u>500</u>
	<u>20,000</u>	<u>15,500</u>

EXERCISE 21-11 (Continued)

(b)		<u>Materials</u>
	Work in process, September 1	
	Direct materials	\$ 20,000
	Costs added to production	
	during September	<u>177,200</u>
	Total materials cost	<u>\$197,200</u>

$\$197,200 \div 20,000 = \9.86 (Materials cost per unit)

		<u>Conversion Costs</u>
	Work in process, September 1	
	Conversion costs	\$ 43,180
	Costs added to production	
	during September	
	Conversion costs	<u>359,820</u>
	Total conversion costs	<u>\$403,000</u>

$\$403,000 \div 15,500 = \26.00

(c) Costs accounted for

Transferred out (15,000 X \$35.86)		\$537,900
Work in process, September 30		
Materials (5,000 X \$9.86)	\$49,300	
Conversion costs (500 X \$26.00)	<u>13,000</u>	<u>62,300</u>
Total costs		<u>\$600,200</u>

EXERCISE 21-12

To: Stan Maley

From: Student

Re: Ending inventory

The reason for any confusion related to your department's ending inventory quantity stems from the fact that the quantity can be measured in two different ways, depending on what the information is used for.

The ending inventory quantity can be measured in physical units or equivalent units. Physical units are actual units present without regard to the stage of completion. Your department's ending inventory in physical units is at least double the amount reported as equivalent units.

Equivalent units measure the work done on the physical units, expressed in terms of fully completed units. Therefore, if your ending inventory contains 4,000 units which are 50% complete, that is equivalent to having 2,000 completed units at month end. Therefore, the ending inventory could be expressed as containing 4,000 physical units or 2,000 equivalent units.

I hope this clears up any misunderstandings. Please contact me if you have any further questions.

EXERCISE 21-13

BATISTA MANUFACTURING COMPANY Welding Department Production Cost Report For the Month Ended February 28, 2008

Quantities	Physical Units	Equivalent Units		
	(Step 1)	Materials	Conversion Costs	
		(Step 2)		
Units to be accounted for				
Work in process, February 1	15,000			
Started into production	<u>60,000</u>			
Total units	<u>75,000</u>			
Units accounted for				
Transferred out	49,000	49,000	49,000	
Work in process, February 28	<u>26,000</u>	<u>26,000</u>	<u>5,200</u>	
Total units	<u>75,000</u>	<u>75,000</u>	<u>54,200</u>	
Costs				
		Materials	Conversion Costs	Total
Unit costs (Step 3)				
Costs in February		(a) <u>\$198,000⁽¹⁾</u>	<u>\$108,400⁽²⁾</u>	<u>\$306,400</u>
Equivalent units		(b) <u>75,000</u>	<u>54,200</u>	
Unit costs (a) ÷ (b)		<u>\$2.64</u>	<u>\$2.00</u>	<u>\$4.64</u>
Costs to be accounted for				
Work in process, February 1				\$ 32,175
Started into production				<u>274,225</u>
Total costs				<u>\$306,400</u>
Cost Reconciliation Schedule (Step 4)				
Costs accounted for				
Transferred out (49,000 X \$4.64)				\$227,360
Work in process, February 28				
Materials (26,000 X \$2.64)			\$68,640	
Conversion costs (5,200 X \$2.00)			<u>10,400</u>	<u>79,040</u>
Total costs				<u>\$306,400</u>

⁽¹⁾\$18,000 + \$180,000

⁽²⁾\$14,175 + \$32,780 + \$61,445

***EXERCISE 21-14**

(a) The overhead rates are:

<u>Activity</u>	<u>Total Cost</u>	<u>Total Driver Volume</u>	<u>Overhead Rate</u>
Materials handling	\$30,000	1,000	\$30
Machine setups	27,000	450	60
Quality inspections	24,000	600	40

(b) The assignment of the overhead costs to products is as follows:

<u>Cost</u>	<u>Instruments</u>		<u>Gauges</u>		<u>Total Cost</u>
	<u>Number</u>	<u>Cost</u>	<u>Number</u>	<u>Cost</u>	
Requisitions (\$30)	400	\$12,000	600	\$18,000	\$30,000
Setups (\$60)	150	9,000	300	18,000	27,000
Inspections (\$40)	200	8,000	400	16,000	24,000
Total costs (a)		<u>\$29,000</u>		<u>\$52,000</u>	<u>\$81,000</u>
Total units (b)		<u>50</u>		<u>300</u>	
Cost per unit (a) ÷ (b)		<u>\$580</u>		<u>\$173.33</u>	

(c) **MEMO**

To: President, Carmeli Instrument

From: Student

Re: Benefits of activity-based costing (ABC)

ABC focuses on the activities performed in producing a product. Overhead costs are assigned to products based on cost drivers that measure the activities performed on the product.

The primary benefit of ABC is more accurate and meaningful product costing. This improved cost data can lead to reduced costs as managers become more aware of the underlying causes of cost incurrence. Thus, control over costs is enhanced.

The improved cost data should also lead to better management decisions. More accurate product costing should contribute to setting selling prices which will achieve desired profitability levels. In addition, it should be helpful in deciding whether to discontinue or expand a product line or in deciding whether to make or buy a product component.

***EXERCISE 21-15**

(a)	Direct materials (1,000 X \$35).....	\$35,000
	Direct labor (1,000 X \$15).....	15,000
	Overhead (\$15,000 X 225%*).....	<u>33,750</u>
	Total	<u>\$83,750</u>

*($\$450,000/\$200,000$)

(b)	Direct materials (1,000 X \$35).....	\$35,000
	Direct labor (1,000 X \$15).....	15,000
	Overhead	
	Materials handling (2,500 X \$2*)	\$ 5,000
	Machining (500 X \$10**).....	5,000
	Factory supervision (1,000 X \$12.50***)	<u>12,500</u>
	Total.....	<u>22,500</u>
		<u>\$72,500</u>

* $\$100,000 \div 50,000$

** $\$200,000 \div 20,000$

*** $\$150,000 \div 12,000$

SOLUTIONS TO PROBLEMS

PROBLEM 21-1A

(a) Physical units

Units to be accounted for

Work in process, June 1	0
Started into production	<u>20,000</u>
Total units	<u>20,000</u>

Units accounted for

Transferred out	18,000
Work in process, June 30	<u>2,000</u>
Total units	<u>20,000</u>

(b) Equivalent units

	<u>Materials</u>	<u>Conversion Costs</u>
Units transferred out	18,000	18,000
Work in process, June 30		
2,000 X 100%	2,000	
2,000 X 60%		<u>1,200</u>
Total equivalent units	<u>20,000</u>	<u>19,200</u>

(c)

	<u>Unit Costs</u>
Materials	\$9.90 (\$198,000 ÷ 20,000)
Conversion costs	\$8.50 (\$163,200 ÷ 19,200)
Total unit cost	\$18.40 (\$9.90 + \$8.50)

(d) Costs accounted for

Transferred out (18,000 X \$18.40)		\$331,200
Work in process, June 30		
Materials (2,000 X \$9.90)	\$19,800	
Conversion costs (1,200 X \$8.50)	<u>10,200</u>	<u>30,000</u>
Total costs		<u>\$361,200</u>

PROBLEM 21-1A (Continued)

(e)

KASTEN COMPANY
Molding Department
Production Cost Report
For the Month Ended June 30, 2008

Quantities	Physical Units	Equivalent Units		
		Materials	Conversion Costs	
	(Step 1)	(Step 2)		
Units to be accounted for				
Work in process, June 1	0			
Started into production	<u>20,000</u>			
Total units	<u>20,000</u>			
Units accounted for				
Transferred out	18,000	18,000	18,000	
Work in process, June 30	<u>2,000</u>	<u>2,000</u>	<u>1,200</u>	(2,000 X 60%)
Total units	<u>20,000</u>	<u>20,000</u>	<u>19,200</u>	
Costs				
		Materials	Conversion Costs	Total
Unit costs (Step 3)				
Costs in June	(a)	<u>\$198,000</u>	<u>\$163,200</u>	<u>\$361,200</u>
Equivalent units	(b)	<u>20,000</u>	<u>19,200</u>	
Unit costs (a) ÷ (b)		<u>\$9.90</u>	<u>\$8.50</u>	<u>\$18.40</u>
Costs to be accounted for				
Work in process, June 1				\$ 0
Started into production				<u>361,200</u>
Total costs				<u>\$361,200</u>
Cost Reconciliation Schedule (Step 4)				
Costs accounted for				
Transferred out (18,000 X \$18.40)				\$331,200
Work in process, June 30				
Materials (2,000 X \$9.90)			\$19,800	
Conversion costs (1,200 X \$8.50)			<u>10,200</u>	<u>30,000</u>
Total costs				<u>\$361,200</u>

PROBLEM 21-2A

(a) (1) Physical units

	T12 Tables	C10 Chairs
Units to be accounted for		
Work in process, July 1	0	0
Started into production	<u>20,000</u>	<u>16,000</u>
Total units	<u>20,000</u>	<u>16,000</u>
 Units accounted for		
Transferred out	17,000	15,500
Work in process, July 31	<u>3,000</u>	<u>500</u>
Total units	<u>20,000</u>	<u>16,000</u>

(2) Equivalent units

	T12 Tables	
	Materials	Conversion Costs
Units transferred out	17,000	17,000
Work in process, July 31		
(3,000 X 100%)	3,000	
(3,000 X 60%)		<u>1,800</u>
Total equivalent units	<u>20,000</u>	<u>18,800</u>

	C10 Chairs	
	Materials	Conversion Costs
Units transferred out	15,500	15,500
Work in process, July 31		
(500 X 100%)	500	
(500 X 80%)		<u>400</u>
Total equivalent units	<u>16,000</u>	<u>15,900</u>

PROBLEM 21-2A (Continued)

(3) Unit costs

	<u>T12 Tables</u>	<u>C10 Chairs</u>
Materials ($\$380,000 \div 20,000$) ($\$288,000 \div 16,000$)	\$19	
Conversion costs ($\$338,400 \div 18,800$) ($\$222,600 \div 15,900$)	18	\$18
Total	<u>\$37</u>	<u>14</u> <u>\$32</u>

(4)

T12 Tables

Costs accounted for		
Transferred out ($17,000 \times \$37$)		\$629,000
Work in process		
Materials ($3,000 \times \$19$)	\$57,000	
Conversion costs ($1,800 \times \$18$)	<u>32,400</u>	<u>89,400</u>
Total costs		<u>\$718,400</u>

C10 Chairs

Costs accounted for		
Transferred out ($15,500 \times \$32$)		\$496,000
Work in process		
Materials ($500 \times \$18$)	\$9,000	
Conversion costs ($400 \times \$14$)	<u>5,600</u>	<u>14,600</u>
Total costs		<u>\$510,600</u>

PROBLEM 21-2A (Continued)

**(b) ORTEGA INDUSTRIES INC.
Cutting Department—Plant 1
Production Cost Report
For the Month Ended July 31, 2008**

Quantities	Physical Units (Step 1)	Equivalent Units (Step 2)	
		Materials	Conversion Costs
Units to be accounted for			
Work in process, July 1	0		
Started into production	<u>20,000</u>		
Total units	<u>20,000</u>		
Units accounted for			
Transferred out	17,000	17,000	17,000
Work in process, July 31	<u>3,000</u>	<u>3,000</u>	<u>1,800</u> (3,000 X 60%)
Total units	<u>20,000</u>	<u>20,000</u>	<u>18,800</u>

Costs		Materials	Conversion Costs	Total
Unit costs (Step 3)				
Costs in July	(a)	<u>\$380,000</u>	<u>\$338,400</u>	<u>\$718,400</u>
Equivalent units	(b)	<u>20,000</u>	<u>18,800</u>	
Unit costs (a) ÷ (b)		<u>\$19</u>	<u>\$18</u>	<u>\$37</u>

Costs to be accounted for			
Work in process, July 1			\$ 0
Started into production			<u>718,400</u>
Total costs			<u>\$718,400</u>

Cost Reconciliation Schedule (Step 4)

Costs accounted for			
Transferred out (17,000 X \$37)			\$629,000
Work in process, July 31			
Materials (3,000 X \$19)		\$57,000	
Conversion costs (1,800 X \$18)		<u>32,400</u>	<u>89,400</u>
Total costs			<u>\$718,400</u>

PROBLEM 21-3A

1.	Raw Materials Inventory	300,000	
	Accounts Payable		300,000
2.	Work in Process—Mixing	210,000	
	Work in Process—Packaging	45,000	
	Raw Materials Inventory		255,000
3.	Factory Labor	248,900	
	Wages Payable		248,900
4.	Work in Process—Mixing	182,500	
	Work in Process—Packaging	66,400	
	Factory Labor		248,900
5.	Manufacturing Overhead	790,000	
	Accounts Payable		790,000
6.	Work in Process—Mixing (28,000 X \$22)	616,000	
	Work in Process—Packaging	132,000	
	(6,000 X \$22)		
	Manufacturing Overhead		748,000
7.	Work in Process—Packaging	979,000	
	Work in Process—Mixing		979,000
8.	Finished Goods Inventory	1,315,000	
	Work in Process—Packaging		1,315,000
9.	Accounts Receivable	2,500,000	
	Sales		2,500,000
	Cost of Goods Sold	1,640,000	
	Finished Goods Inventory		1,640,000

PROBLEM 21-4A

(a)

	Physical Units	Equivalent Units	
		Materials	Conversion Costs
Units to be accounted for			
Work in process, November 1	35,000		
Started into production	<u>700,000</u>		
Total units	<u>735,000</u>		
Units accounted for			
Transferred out	710,000	710,000	710,000
Work in process, November 30	<u>25,000</u>	<u>25,000</u>	<u>10,000</u>
Total units	<u>735,000</u>	<u>735,000</u>	<u>720,000</u>
Materials cost		Conversion costs	
Beginning work in process	\$ 69,000	Beginning work in process	\$ 48,150
Added during month	<u>1,548,000</u>	Added during month	<u>563,850</u> (\$225,920 + \$337,930)
Total	<u>\$1,617,000</u>	Total	<u>\$612,000</u>
Equivalent units	<u>735,000</u>	Equivalent units	<u>720,000</u>
Cost per unit	<u>\$2.20</u>	Cost per unit	<u>\$.85</u>

(b) Costs accounted for

Transferred out (710,000 X \$3.05)	\$2,165,500
Work in process, November 30	
Materials (25,000 X \$2.20)	\$55,000
Conversion costs (10,000 X \$.85)	<u>8,500</u>
Total costs	<u>\$2,229,000</u>

PROBLEM 21-4A (Continued)

(c)

CAVALIER COMPANY
Assembly Department
Production Cost Report
For the Month Ended November 30, 2008

<u>Quantities</u>	<u>Physical Units</u> (Step 1)	<u>Equivalent Units</u>		
		<u>Materials</u>	<u>Conversion Costs</u> (Step 2)	
Units to be accounted for				
Work in process, November 1	35,000			
Started into production	<u>700,000</u>			
Total units	<u>735,000</u>			
Units accounted for				
Transferred out	710,000	710,000	710,000	
Work in process, November 30	<u>25,000</u>	<u>25,000</u>	<u>10,000</u>	(25,000 X 40%)
Total units	<u>735,000</u>	<u>735,000</u>	<u>720,000</u>	
<u>Costs</u>		<u>Materials</u>	<u>Conversion Costs</u>	<u>Total</u>
Unit costs (Step 3)				
Costs in November		(a) <u>\$1,617,000</u>	<u>\$612,000</u>	<u>\$2,229,000</u>
Equivalent units		(b) <u>735,000</u>	<u>720,000</u>	
Unit costs (a) ÷ (b)		<u>\$2.20</u>	<u>\$.85</u>	<u>\$3.05</u>
Costs to be accounted for				
Work in process, November 1				\$ 117,150
Started into production				<u>2,111,850</u>
Total costs				<u>\$2,229,000</u>
<u>Cost Reconciliation Schedule (Step 4)</u>				
Costs accounted for				
Transferred out (710,000 X \$3.05)				\$2,165,500
Work in process, November 30				
Materials (25,000 X \$2.20)			\$55,000	
Conversion costs (10,000 X \$.85)			<u>8,500</u>	<u>63,500</u>
Total costs				<u>\$2,229,000</u>

PROBLEM 21-5A

(a) (1)

	Physical Units	Equivalent Units	
		Materials	Conversion Costs
Units to be accounted for			
Work in process, July 1	500		
Started into production	<u>1,000</u>		
Total units	<u>1,500</u>		
Units accounted for			
Transferred out	900	900	900
Work in process, July 31	<u>600</u>	<u>600</u>	<u>180</u>
Total units	<u>1,500</u>	<u>1,500</u>	<u>1,080</u>

(2)	Materials cost	Conversion costs	
	Beginning work in process	Beginning work in process	
	\$ 750	\$ 600	
	Added during month	Added during month	
	<u>2,400</u>	<u>2,640</u>	(\$1,580 + \$1,060)
	Total	Total	
	<u>\$3,150</u>	<u>\$3,240</u>	
	Equivalent units	Equivalent units	
	<u>1,500</u>	<u>1,080</u>	
	Cost per unit	Cost per unit	
	<u>\$2.10</u>	<u>\$3.00</u>	

(3)	Costs accounted for	
	Transferred out (900 X \$5.10)	\$4,590
	Work in process, July 31	
	Materials (600 X \$2.10)	\$1,260
	Conversion costs (180 X \$3.00)	<u>540</u>
	Total costs	<u>1,800</u>
		<u>\$6,390</u>

PROBLEM 21-5A (Continued)

(b)

CHEN COMPANY
Basketball Department
Production Cost Report
For the Month Ended July 31, 2008

Quantities	Physical Units	Equivalent Units		
	(Step 1)	Materials	Conversion Costs	
		(Step 2)		
Units to be accounted for				
Work in process, July 1	500			
Started into production	<u>1,000</u>			
Total units	<u>1,500</u>			
Units accounted for				
Transferred out	900	900	900	
Work in process, July 31	<u>600</u>	<u>600</u>	<u>180</u>	
Total units	<u>1,500</u>	<u>1,500</u>	<u>1,080</u>	
Costs				
		Materials	Conversion Costs	Total
Unit costs (Step 3)				
Costs in July	(a)	<u>\$3,150</u>	<u>\$3,240</u>	<u>\$6,390</u>
Equivalent units	(b)	<u>1,500</u>	<u>1,080</u>	
Unit costs (a) ÷ (b)		<u>\$2.10</u>	<u>\$3.00</u>	
Costs to be accounted for				
Work in process, July 1				\$1,350
Started into production				<u>5,040</u>
Total costs				<u>\$6,390</u>
Cost Reconciliation Schedule (Step 4)				
Costs accounted for				
Transferred out (900 X \$5.10)				\$4,590
Work in process, July 31				
Materials (600 X \$2.10)			\$1,260	
Conversion costs (180 X \$3.00)			<u>540</u>	<u>1,800</u>
Total costs				<u>\$6,390</u>

PROBLEM 21-6A

(a) Computation of equivalent units:

	Physical Units	Equivalent Units	
		Materials	Conversion Costs
Units accounted for			
Transferred out	130,000	130,000	130,000
Work in process, October 31 (60% materials, 40% conversion costs)	50,000	30,000	20,000
Total units	180,000	160,000	150,000

Computation of October unit costs

Materials: $\$240,000 \div 160,000$ equivalent units =	\$1.50
Conversion cost: $\$105,000 \div 150,000$ equivalent units =	<u>.70</u>
Total unit cost, October	<u>\$2.20</u>

(b) Cost Reconciliation Schedule

Costs accounted for		
Transferred out (130,000 X \$2.20)		\$286,000
Work in process, October 31		
Materials (30,000 X \$1.50)	\$45,000	
Conversion costs (20,000 X \$0.70)	14,000	59,000
Total costs		\$345,000

***PROBLEM 21-7A**

- (a) The allocation of total manufacturing overhead using activity-based costing is as follows:

Cost	Royale		Majestic		Total Cost
	Number	Cost	Number	Cost	
Purchase orders (\$40)	16,000	\$ 640,000	14,000	\$ 560,000	\$1,200,000
Machine setups (\$60)	5,000	300,000	10,000	600,000	900,000
Machine hours (\$30)	100,000	3,000,000	60,000	1,800,000	4,800,000
Inspections (\$20)	10,000	200,000	25,000	500,000	700,000
Total assigned costs (a)		<u>\$4,140,000</u>		<u>\$3,460,000</u>	<u>\$7,600,000</u>
Units produced (b)		<u>30,000</u>		<u>10,000</u>	
Costs per unit (a) ÷ (b)		<u>\$138</u>		<u>\$346</u>	

- (b) The cost per unit and gross profit of each model under ABC costing were:

	Royale	Majestic
Direct materials	\$ 700	\$ 420
Direct labor	100	80
Manufacturing overhead	138	346
Total cost per unit	<u>\$ 938</u>	<u>\$ 846</u>
Sales price per unit	\$1,500	\$1,200
Cost per unit	938	846
Gross profit	<u>\$ 562</u>	<u>\$ 354</u>

- (c) Management's future plans for the two television models are not sound. Under ABC costing, the Royale model is \$208 per unit more profitable than the Majestic model.

PROBLEM 21-1B

(a) Physical units

Units to be accounted for	
Work in process, January 1	0
Started into production	<u>35,000</u>
Total units	<u>35,000</u>

Units accounted for	
Transferred out	30,000
Work in process, January 31	<u>5,000</u>
Total units	<u>35,000</u>

(b) Equivalent units

	<u>Materials</u>	<u>Conversion Costs</u>
Units transferred out	30,000	30,000
Work in process, January 31		
5,000 X 100%	5,000	
5,000 X 40%		<u>2,000</u>
Total equivalent units	<u>35,000</u>	<u>32,000</u>

(c) Unit Costs

Materials	<u>\$17.00</u> (\$595,000 ÷ 35,000)
Conversion costs	<u>\$10.00</u> (\$320,000 ÷ 32,000)
Total manufacturing	<u>\$27.00</u> (\$17.00 + \$10.00)

(d) Costs accounted for

Transferred out (30,000 X \$27.00)	\$810,000
Work in process, January 31	
Materials (5,000 X \$17.00)	\$85,000
Conversion costs (2,000 X \$10.00)	<u>20,000</u>
Total costs	<u>\$915,000</u>

PROBLEM 21-1B (Continued)

(e)

BICNELL CORPORATION
Molding Department
Production Cost Report
For the Month Ended January 31, 2008

<u>Quantities</u>	<u>Physical Units</u> (Step 1)	<u>Equivalent Units</u>		
		<u>Materials</u>	<u>Conversion Costs</u> (Step 2)	
Units to be accounted for				
Work in process, January 1	0			
Started into production	<u>35,000</u>			
Total units	<u>35,000</u>			
Units accounted for				
Transferred out	30,000	30,000	30,000	
Work in process, January 31	<u>5,000</u>	<u>5,000</u>	<u>2,000</u>	(5,000 X 40%)
Total units	<u>35,000</u>	<u>35,000</u>	<u>32,000</u>	
Costs				
		<u>Materials</u>	<u>Conversion Costs</u>	<u>Total</u>
Unit costs (Step 3)				
Costs in January	(a)	<u>\$595,000</u>	<u>\$320,000</u>	<u>\$915,000</u>
Equivalent units	(b)	<u>35,000</u>	<u>32,000</u>	
Unit costs (a) ÷ (b)		<u>\$17</u>	<u>\$10</u>	<u>\$27</u>
Costs to be accounted for				
Work in process, January 1				\$ 0
Started into production				<u>915,000</u>
Total costs				<u>\$915,000</u>
Cost Reconciliation Schedule (Step 4)				
Costs accounted for				
Transferred out (30,000 X \$27)				\$810,000
Work in process, January 31				
Materials (5,000 X \$17)			\$85,000	
Conversion costs (2,000 X \$10)			<u>20,000</u>	<u>105,000</u>
Total costs				<u>\$915,000</u>

PROBLEM 21-2B

(a) (1) Physical units

	R12 Refrigerators	F24 Freezers
Units to be accounted for		
Work in process, June 1	0	0
Started into production	<u>20,000</u>	<u>18,000</u>
Total units	<u>20,000</u>	<u>18,000</u>
 Units accounted for		
Transferred out	16,000	15,500
Work in process, June 30	<u>4,000</u>	<u>2,500</u>
Total units	<u>20,000</u>	<u>18,000</u>

(2) Equivalent units

	R12 Refrigerators	
	Materials	Conversion Costs
Units transferred out	16,000	16,000
Work in process, June 30		
(4,000 X 100%)	4,000	
(4,000 X 75%)		<u>3,000</u>
Total equivalent units	<u>20,000</u>	<u>19,000</u>

	F24 Freezers	
	Materials	Conversion Costs
Units transferred out	15,500	15,500
Work in process, June 30		
(2,500 X 100%)	2,500	
(2,500 X 60%)		<u>1,500</u>
Total equivalent units	<u>18,000</u>	<u>17,000</u>

PROBLEM 21-2B (Continued)

(3) Unit costs

	<u>R12 Refrigerators</u>	<u>F24 Freezers</u>
Materials (\$840,000 ÷ 20,000)	\$42	
(\$684,000 ÷ 18,000)		\$38
Conversion costs (\$665,000 ÷ 19,000)	35	
(\$442,000 ÷ 17,000)		26
Total	<u>\$77</u>	<u>\$64</u>

(4)

R12 Refrigerators

Costs accounted for		
Transferred out (16,000 X \$77)		\$1,232,000
Work in process		
Materials (4,000 X \$42)	\$168,000	
Conversion costs		
(3,000 X \$35)	<u>105,000</u>	<u>273,000</u>
Total costs		<u>\$1,505,000</u>

F24 Freezers

Costs accounted for		
Transferred out (15,500 X \$64)		\$ 992,000
Work in process		
Materials (2,500 X \$38)	\$95,000	
Conversion costs		
(1,500 X \$26)	<u>39,000</u>	<u>134,000</u>
Total costs		<u>\$1,126,000</u>

PROBLEM 21-2B (Continued)

**(b) ATKINS CORPORATION
Stamping Department—Plant A
Production Cost Report
For the Month Ended June 30, 2008**

Quantities	Physical Units (Step 1)	Equivalent Units (Step 2)		
		Materials	Conversion Costs	
Units to be accounted for				
Work in process, June 1	0			
Started into production	<u>20,000</u>			
Total units	<u>20,000</u>			
Units accounted for				
Transferred out	16,000	16,000	16,000	
Work in process, June 30	<u>4,000</u>	<u>4,000</u>	<u>3,000</u>	(4,000 X 75%)
Total units	<u>20,000</u>	<u>20,000</u>	<u>19,000</u>	
Costs		Materials	Conversion Costs	Total
Unit costs (Step 3)				
Costs in June	(a)	<u>\$840,000</u>	<u>\$665,000</u>	<u>\$1,505,000</u>
Equivalent units	(b)	<u>20,000</u>	<u>19,000</u>	
Unit costs (a) ÷ (b)		<u>\$42</u>	<u>\$35</u>	<u>\$77</u>
Costs to be accounted for				
Work in process, June 1				\$ 0
Started into production				<u>1,505,000</u>
Total costs				<u>\$1,505,000</u>
Cost Reconciliation Schedule (Step 4)				
Costs accounted for				
Transferred out (16,000 X \$77)				\$1,232,000
Work in process, June 30				
Materials (4,000 X \$42)			\$168,000	
Conversion costs (3,000 X \$35)			<u>105,000</u>	<u>273,000</u>
Total costs				<u>\$1,505,000</u>

PROBLEM 21-3B

1.	Raw Materials Inventory	25,000	
	Accounts Payable		25,000
2.	Work in Process—Blending	18,930	
	Work in Process—Packaging	7,140	
	Raw Materials Inventory		26,070
3.	Factory Labor	20,770	
	Wages Payable		20,770
4.	Work in Process—Blending	13,320	
	Work in Process—Packaging	7,450	
	Factory Labor		20,770
5.	Manufacturing Overhead.....	41,500	
	Accounts Payable		41,500
6.	Work in Process—Blending (900 X \$20)	18,000	
	Work in Process—Packaging (300 X \$20)	6,000	
	Manufacturing Overhead.....		24,000
7.	Work in Process—Packaging	44,940	
	Work in Process—Blending		44,940
8.	Finished Goods Inventory	67,490	
	Work in Process—Packaging		67,490
9.	Accounts Receivable.....	90,000	
	Sales.....		90,000
	Cost of Goods Sold.....	62,000	
	Finished Goods Inventory		62,000

PROBLEM 21-4B

	Physical Units	Equivalent Units	
		Materials	Conversion Costs
Units to be accounted for			
Work in process, October 1	25,000		
Started into production	<u>415,000</u>		
Total units	<u>440,000</u>		
Units accounted for			
Transferred out	400,000	400,000	400,000
Work in process, October 31	<u>40,000</u>	<u>40,000</u>	<u>24,000</u>
Total units	<u>440,000</u>	<u>440,000</u>	<u>424,000</u>
Materials cost		Conversion costs	
Beginning work in process	\$ 29,000	Beginning work in process	\$ 26,200
Added during month	<u>1,071,000</u>	Added during month	<u>228,200</u> (\$90,000 + \$138,200)
Total	<u>\$1,100,000</u>	Total	<u>\$254,400</u>
Equivalent units	<u>440,000</u>	Equivalent units	<u>424,000</u>
Cost per unit	<u>\$2.50</u>	Cost per unit	<u>\$.60</u>

(b)	Costs accounted for	
	Transferred out (400,000 X \$3.10)	\$1,240,000
	Work in process, October 31	
	Materials (40,000 X \$2.50)	\$100,000
	Conversion costs (24,000 X \$.60)	<u>14,400</u>
	Total costs	<u>\$1,354,400</u>

PROBLEM 21-4B (Continued)

(c)

**CROSBY COMPANY
Assembly Department
Production Cost Report
For the Month Ended October 31, 2008**

<u>Quantities</u>	<u>Physical Units</u> (Step 1)	<u>Equivalent Units</u>		
		<u>Materials</u>	<u>Conversion Costs</u> (Step 2)	
Units to be accounted for				
Work in process, October 1	25,000			
Started into production	<u>415,000</u>			
Total units	<u>440,000</u>			
Units accounted for				
Transferred out	400,000	400,000	400,000	
Work in process, October 31	<u>40,000</u>	<u>40,000</u>	<u>24,000</u>	(40,000 X 60%)
Total units	<u>440,000</u>	<u>440,000</u>	<u>424,000</u>	
<u>Costs</u>		<u>Materials</u>	<u>Conversion Costs</u>	<u>Total</u>
Unit costs (Step 3)				
Costs in October		(a) <u>\$1,100,000</u>	<u>\$254,400</u>	<u>\$1,354,400</u>
Equivalent units		(b) <u>440,000</u>	<u>424,000</u>	
Unit costs (a) ÷ (b)		<u>\$2.50</u>	<u>\$.60</u>	<u>\$3.10</u>
Costs to be accounted for				
Work in process, October 1				\$ 55,200
Started into production				<u>1,299,200</u>
Total costs				<u>\$1,354,400</u>
<u>Cost Reconciliation Schedule (Step 4)</u>				
Costs accounted for				
Transferred out (400,000 X \$3.10)				\$1,240,000
Work in process, October 31				
Materials (40,000 X \$2.50)			\$100,000	
Conversion costs (24,000 X \$.60)			<u>14,400</u>	<u>114,400</u>
Total costs				<u>\$1,354,400</u>

PROBLEM 21-5B

(a) (1)

	Physical Units	Equivalent Units	
		Materials	Conversion Costs
Units to be accounted for			
Work in process, May 1	500		
Started into production	<u>1,000</u>		
Total units	<u>1,500</u>		
 Units accounted for			
Transferred out	900	900	900
Work in process, May 31	<u>600</u>	<u>600</u>	<u>60</u>
Total units	<u>1,500</u>	<u>1,500</u>	<u>960</u>

(2)	Materials cost	Conversion costs	
	Beginning work in process	Beginning work in process	
	\$10,000	\$ 9,280	
	Added during month	Added during month	
	<u>50,000</u>	<u>48,320</u>	(\$18,320 + \$30,000)
	Total	Total	
	<u>\$60,000</u>	<u>\$57,600</u>	
	Equivalent units	Equivalent units	
	<u>1,500</u>	<u>960</u>	
	Cost per unit	Cost per unit	
	<u>\$40</u>	<u>\$60</u>	

(3)	Costs accounted for	
	Transferred out (900 X \$100)	\$ 90,000
	Work in process, May 31	
	Materials (600 X \$40)	\$24,000
	Conversion costs (60 X \$60)	<u>3,600</u>
	Total costs	<u>\$117,600</u>

PROBLEM 21-5B (Continued)

(b)

**KILEY COMPANY
Bicycle Department
Production Cost Report
For the Month Ended May 31, 2008**

<u>Quantities</u>	<u>Physical Units</u> (Step 1)	<u>Equivalent Units</u>		
		<u>Materials</u>	<u>Conversion Costs</u> (Step 2)	
Units to be accounted for				
Work in process, May 1	500			
Started into production	<u>1,000</u>			
Total units	<u>1,500</u>			
Units accounted for				
Transferred out	900	900	900	
Work in process, May 31	<u>600</u>	<u>600</u>	<u>60</u>	
Total units	<u>1,500</u>	<u>1,500</u>	<u>960</u>	
<u>Costs</u>		<u>Materials</u>	<u>Conversion Costs</u>	<u>Total</u>
Unit costs (Step 3)				
Costs in May	(a)	<u>\$60,000</u>	<u>\$57,600</u>	<u>\$117,600</u>
Equivalent units	(b)	<u>1,500</u>	<u>960</u>	
Unit costs (a) ÷ (b)		<u>\$40</u>	<u>\$60</u>	<u>\$100</u>
Costs to be accounted for				
Work in process, May 1				\$ 19,280
Started into production				<u>98,320</u>
Total costs				<u>\$117,600</u>
<u>Cost Reconciliation Schedule (Step 4)</u>				
Costs accounted for				
Transferred out (900 X \$100)				\$ 90,000
Work in process, May 31				
Materials (600 X \$40)			\$24,000	
Conversion costs (60 X \$60)			<u>3,600</u>	<u>27,600</u>
Total costs				<u>\$117,600</u>

PROBLEM 21-6B

(a) Computation of equivalent units:

	Physical Units	Equivalent Units	
		Materials	Conversion Costs
Units accounted for			
Transferred out	95,000	95,000	95,000
Work in process, March 31 (2/3 materials, 1/3 conversion costs)	15,000	10,000	5,000
Total units	110,000	105,000	100,000

Computation of March unit costs

Materials: \$210,000 ÷ 105,000 equivalent units =	\$2.00
Conversion cost: \$90,000 ÷ 100,000 equivalent units =	.90
Total unit cost, March	\$2.90

(b) Cost Reconciliation Schedule

Costs accounted for		
Transferred out (95,000 X \$2.90)		\$275,500
Work in process, March 31		
Materials (10,000 X \$2.00)	\$20,000	
Conversion costs (5,000 X \$.90)	4,500	24,500
Total costs		\$300,000

- (a) The unit cost suggests that Sid took the highest total costs and divided these costs by the units started into production. The highest total costs would be the total costs charged to the Mixing Department (\$88,000 + \$573,000 + \$769,000) divided by the units started during July (91,000 gallons), which results in a per unit cost of \$15.71 ($\$1,430,000 \div 91,000$).
- (b) The principal errors made by Sid were: (1) he did not compute equivalent units of production; (2) he did not use the weighted-average costing method; and (3) he did not assign costs to ending work-in-process.

BYP 21-1 (Continued)

**(c) SUNSHINE BEACH COMPANY
Mixing Department
Production Cost Report
For the Month Ended July 31, 2008**

<u>Quantities</u>	<u>Physical Units</u> (Step 1)	<u>Equivalent Units</u>		
		<u>Materials</u> (Step 2)	<u>Conversion Costs</u>	
Units to be accounted for				
Work in process, July 1	8,000			
Started into production	<u>91,000</u>			
Total units	<u>99,000</u>			
Units accounted for				
Transferred out	94,000	94,000	94,000	
Work in process, July 31	<u>5,000</u>	<u>5,000</u>	<u>1,000</u>	
Total units	<u>99,000</u>	<u>99,000</u>	<u>95,000</u>	
<u>Costs</u>		<u>Materials</u>	<u>Conversion Costs</u>	<u>Total</u>
Unit costs (Step 3)				
Costs in July	(a)	<u>\$594,000</u>	<u>\$836,000</u>	<u>\$1,430,000</u>
Equivalent units	(b)	<u>99,000</u>	<u>95,000</u>	
Unit costs (a) ÷ (b)		<u>\$6.00</u>	<u>\$8.80</u>	<u>\$14.80</u>
Costs to be accounted for				
Work in process, July 1				\$ 88,000
Started into production				<u>1,342,000</u>
Total costs				<u>\$1,430,000</u>
<u>Cost Reconciliation Schedule (Step 4)</u>				
Costs accounted for				
Transferred out (94,000 X \$14.80)				\$1,391,200
Work in process, July 31				
Materials (5,000 X \$6.00)			\$30,000	
Conversion costs (1,000 X \$8.80)			<u>8,800</u>	<u>38,800</u>
Total costs				<u>\$1,430,000</u>

- (a) The unit cost of materials is \$140 ($\$420,000 \div 3,000$).
- (b) The materials cost of the goods transferred out is \$350,000 ($2,500 \times \140). Conversion costs, therefore, are \$250,000 ($\$600,000 - \$350,000$), and per unit conversion cost is \$100 ($\$250,000 \div 2,500$).
- (c) There are 500 units in ending work-in-process inventory (3,000 started – 2,500 transferred out). The materials cost is \$70,000 ($500 \times \140). Thus, the conversion costs in the inventory are \$30,000. \$30,000 divided by \$100 per unit conversion cost equals 300 equivalent units or 60% ($300 \div 500$) complete.

Answers will vary depending on companies chosen by students.

To: Carol Gorden, Regional Sales Manager

From: Student, Accounting Manager

Re: Production Cost Reports

Carol, congratulations again on your promotion! It's going to be great working with you. It kind of reminds me of our days at Dairy-Freeze after school (although this work is more fun, and it certainly pays better!).

I'll try to clear up some of the questions you raised in your fax. Here in the Snack Foods Division we use process costing rather than the job order system that Special Projects uses. The reason for this is that we produce all our products in a more or less continuous process, even when we run occasional special orders. You see, all our workers are assigned a particular part of the process to control. One might be in charge of making sure the mixing machines work properly, while another verifies the weight of the finished products. Whichever job a worker is assigned, he or she stays with it to completion, or at least the completion of that particular process. That's different from what you had in Special Projects, where workers moved from job to job. That's why we don't usually track the orders separately. Our special orders are for various quantities of the foods we produce, so only the Packing Department needs to be concerned with the particular set of products shipped to the particular customer—which is its ordinary concern anyway.

Your next question was about what an equivalent unit is. Well, you know already that Special Projects bids on various jobs, and then costs are recorded when the jobs are complete. The costs accumulated on jobs that aren't complete are reflected in Work in Process inventory. We in Snack Foods can't use that method for a simple reason—we produce our products in huge batches that we keep going fairly continuously. Or, in other words, we don't have a "job" that we can record as "complete." A batch may contain enough of our product to fill thirty or more orders, so we may have thirty or more "jobs" in each batch. One job may happen to be filled from two batches. Since the cost of each batch is about the same, it isn't worth keeping track of separately.

BYP 21-4 (Continued)

At the end of the month, we need to record what we finished and what still remains undone. Equivalent units are the way we measure the amount of work we have done on our work in process. It's kind of like comparing the contents of 4-ounce cups with the contents of 12-ounce cups. It doesn't make sense to compare by counting the number of cups you have. You need to find out how many ounces you have in one set; then you can get a meaningful comparison with the ounces you have in the other set. We compare by the number of "units" of materials or labor that are required to finish a product completely. If it requires 12 ounces of flour and 15 minutes of labor for a finished bag of pretzels, for example, then the 12 ounces and 15 minutes are "finished equivalents." If we have enough pretzels to fill 30 bags, but we've only spent 5 minutes (or 1/3 of the total required) of labor on them at the end of the month, we could have used the same amount of time and completely finished 10 bags. Thus, we have the "equivalent" of 10 bags worth of labor.

Your last question is the easiest to answer. You get four reports because we use four processes here in Snack Foods Division. Each process has to report its status at the end of every month. It's kind of like we have four miniature factories, each reporting "completion" of a certain number of products. The products from one department are used as raw materials for other departments, so we have a chain of reports. Notice that the units and costs transferred out of Process 1 are the same as the units and costs transferred in to Process 2, and so on.

I hope this helps. Call, write, or email me any time!

- (a) **The stakeholders in this situation are:**
- ▶ **Sue Wooten, molding department head.**
 - ▶ **Fred Barando, quality control inspector.**
 - ▶ **Customers of R. B. Patrick Company.**
 - ▶ **The department manager of the assembly department.**
- (b) **Fred is placed in an ethical dilemma. He can offend his department head by disregarding Sue's instructions and lose the support of his supervisor, and maybe lose his job. He can follow Sue's instructions and be in violation of company policy. He can also report Sue's instructions to supervisors (plant superintendent or vice-president of production). The company should make the position of quality control inspector responsible to someone other than the department head. Fred should not report to Sue.**

The following activities and cost drivers might be submitted:

(a) <u>Activities</u>	(b) <u>Cost drivers</u>
Laundering	Pounds of linen
Housekeeping	Square footage: number of beds
Dietary	Number of meals
Computing information technology	Minutes of computer usage; or number of work stations
Nursing care	Number of patients
Surgery	Number of procedures or operations
Clinical lab	Number of tests
Imaging (X-ray, etc.)	Number of images
Pharmacy	Number of prescriptions
Emergency room	Number of cases or patients
Maintenance	Square footage
Billing and collecting	Number of invoices