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1 PHYSICAL FLOW SCHEDULE

Lawson, Inc. just finished its second month of operations. Lawson mass produces integrated circuits. The following production information is provided for the month of November:

Units in process, November 1, 80 percent complete	75,000	Units completed and transferred out	450,000
percent complete	50,000	Units in process, November 30, 60 percent complete	

Required:

Prepare a physical flow schedule.

2 PRODUCTION REPORT, WEIGHTED AVERAGE

Kinnamon Inc. manufactures bicycle frames in two departments: Cutting and Welding. Kinnamon uses the weighted average method. Manufacturing costs are added uniformly throughout the process. The following are cost and production data for the cutting department for October:

Production:	
Units in process, October 1, 40 percent complete	5,000
Units completed and transferred out	34,000
Units in process, October 31, 60 percent complete	10,000
Costs:	
WIP, October 1	\$40,000
Costs added during October	760,000

Required:

Prepare a production report for the cutting department

3 TRANSFERRED-IN COST

Energetics Inc. produces an energy drink. The product is sold by the gallon. The company has two departments: Mixing and Bottling. For July, the bottling department had 40,000 gallons in beginning inventory (with transferred-in costs of \$142,000) and completed 175,000 gallons during the month. Further, the mixing department completed and transferred out 160,000 units at a cost of \$458,000 in July.

Required:

1. Prepare a physical flow schedule for the bottling department.
2. Calculate equivalent units for the transferred-in category.
3. Calculate the unit cost for the transferred-in category.

4 FIFO; PRODUCTION REPORT

Required:

Prepare a cost of production report.

5 JOURNAL ENTRIES, BASIC COST FLOWS

In October, Gardner Company had the following cost flows:

	Molding Department (\$)	Grinding Department (\$)	Finishing Department
Direct materials	35,800	5,000	3,600
Direct labor	3,000	5,800	4,800
Applied overhead	3,200	29,200	4,600
Transferred-in cost:			
From Molding		42,000	
From Grinding	—	—	82,000
Total cost	<u>42,000</u>	<u>82,000</u>	<u>95,000</u>

Required:

Prepare the journal entries to transfer costs from (a) Molding to Grinding, (b) Grinding to Finishing, and (c) Finishing to Finished Goods.

6 EQUIVALENT UNITS, UNIT COST, VALUATION OF GOODS TRANSFERRED OUT AND ENDING WORK IN PROCESS

The mixing department had the following data for the month of December:

Units in BWIP	—
Units completed	5,850
Units in EWIP (30 percent complete)	500
Total manufacturing costs	\$3,900

Required:

1. What is the output in equivalent units for December?
2. What is the unit manufacturing cost for December?
3. Calculate the cost of goods transferred out for December.
4. Calculate the value of December's EWIP.

7 WEIGHTED AVERAGE METHOD, EQUIVALENT UNITS

Lawson Company produces a product where all manufacturing inputs are applied uniformly. The company produced the following physical flow schedule for March:

Units to account for:	
Units in BWIP (40 percent)	15,000
Units started	<u>35,000</u>
Total units to account for	<u>50,000</u>
Units accounted for:	
Units completed:	
From BWIP	10,000
Started and completed	<u>32,000</u>
	<u>42,000</u>

Units, EWIP (75 percent complete)	<u>8,000</u>
Total units accounted for	<u>50,000</u>

Required:

Prepare a schedule of equivalent units using the weighted average method.

8 WEIGHTED AVERAGE METHOD, UNIT COST, VALUING INVENTORIES

Milton Inc. manufactures products that pass through two or more processes. During April, equivalent units were computed using the weighted average method:

Units completed	18,000
Units in EWIP x Fraction complete (12,000 x 60 percent)	7,200
Equivalent units of output	25,200
April's costs to account for are as follows:	
BWIP (40 percent complete)	\$3,360
Materials	30,000
Conversion cost	12,000
Total	\$45,360

Required:

1. Calculate the unit cost for April using the weighted average method. Using the weighted average method, determine the cost of EWIP and the cost of the goods transferred out.

9 WEIGHTED AVERAGE METHOD, UNIT COSTS, VALUING INVENTORIES

Walser Inc. produces a product that passes through two processes. During February, equivalent units were calculated using the weighted average method:

Units completed	150,000
Add: Units in EWIP X Fraction complete (50,000 X 40 percent)	<u>20,000</u>
Equivalent units of output (weighted average)	170,000
Less: Units in BWIP X Fraction complete (25,000 X 70 percent)	<u>17,500</u>
Equivalent units of output (FIFO)	<u>152,500</u>

The costs that Walser had to account for during the month of February were as follows:

BWIP	\$
	105,000
Costs added	
	<u>993,000</u>
	Total
	<u>\$1.09</u>
	<u>8,000</u>

Required:

1. Using the weighted average method, calculate unit cost.

Under the weighted average method, what is the total cost of units transferred out? What is the cost assigned to units in ending inventory?

10 PHYSICAL FLOW SCHEDULE

The following information was obtained for the first department of LPZ Company for April:

- a. BWIP had 30,500 units, 30 percent complete with respect to manufacturing costs.
- b. EWIP had 8,400 units, 25 percent complete with respect to manufacturing costs.
- c. LPZ started 33,000 units in April.

Required:

Prepare a physical flow schedule.

11 PHYSICAL FLOW, WEIGHTED AVERAGE METHOD

Nelrok Company manufactures fertilizer. Department 1 mixes the chemicals required for the fertilizer. The following data are for the year:

BWIP (40 percent complete)	25,000
Units started	142,500
Units in EWIP (60 percent complete)	35,000

Required:

Prepare a physical flow schedule.

12 PRODUCTION REPORT, WEIGHTED AVERAGE

Mino Inc. manufactures chocolate syrup in three departments: Cooking, Mixing, and Bottling. Mino uses the weighted average method. The following are cost and production data for the cooking department for April (assume that units are measured in gallons):

Production:	
Units in process, April 1, 60 percent complete	20,000
Units completed and transferred out	50,000
Units in process, April 30, 20 percent	10,000
Costs:	
WIP, April 1	\$ 93,600
Costs added during April	314,600

Required:

Prepare a production report for the cooking department.

13 NONUNIFORM INPUTS, EQUIVALENT UNITS

Terry Linens Inc. manufactures bed and bath linens. The bath linens department sews terry cloth into towels of various sizes. Terry uses the weighted average method. All materials are added at the beginning of the process. The following data are for the bath linens department for August:

Production:

Units in process, August 1, 25 percent complete* 10,000

Units completed and transferred out Units in, 60,000

Process, August 31, 60 percent complete 20,000

* With respect to conversion costs.

Required:

Calculate equivalent units of production for the bath linens department for August.

14 UNIT COST AND COST ASSIGNMENT, NONUNIFORM INPUTS

Loran Inc. had the following equivalent units schedule and cost for its fabrication department during the month of September:

		Materials	Conversion
Units completed			
	180,000	180,000	
Add: Units in ending WIP			
x Fraction complete (60,000 x 60%)		60,000	36,000
Equivalent units of output		240,000	216,000

Costs:

Work in process, September 1:

Materials \$147,000

Conversion costs 7,875

Total \$154,875

Current costs:

Materials \$1,053,000

Conversion costs 236,205

Total \$1,289,205

Required:

1. Calculate the unit cost for materials, for conversion, and in total for the fabrication department for September.
2. Calculate the cost of units transferred out and the cost of EWIP.

15 NONUNIFORM INPUTS, TRANSFERRED-IN COST

Drysdale Dairy produces a variety of dairy products. In Department 12, cream (transferred in from Department 6) and other materials (sugar and flavorings) are mixed and churned to make ice cream. The following data are for Department 12 for August:

Production:

Units in process, August 1, 25 percent complete* 40,000

Units completed and transferred out 120,000

Units in process, August 31, 60 percent complete* 30,000

* With respect to conversion costs.

Required:

1. Prepare a physical flow schedule for the month.
 2. Calculate equivalent units for the following categories: transferred-in, materials, and conversion.

16 TRANSFERRED-IN COST

Golding's finishing department had the following data for the month of July:

Units transferred out	60,000	60,000	60,000
Units in EWIP	15,000	15,000	9,000
Equivalent units	75,000	75,000	69,000
Costs:			
Work in process, July 1:			
Transferred-in from fabricating	\$ 2,100		
Materials	1,500		
Conversion costs	3,000		
Total	<u>\$ 6,600</u>		
Current costs:			
Transferred-in from fabricating	\$30,900		
Materials	22,500		
Conversion costs	45,300		
Total	<u>\$98,700</u>		

Required:

1. Calculate unit costs for the conversion.
2. Calculate total unit cost.

17 FIRST-IN, FIRST-OUT METHOD; EQUIVALENT UNITS

Lawson Company produces a product where all manufacturing inputs are applied uniformly. The company produced the following physical flow schedule for March:

Units to account for:		
Units in BWIP (40 percent complete)		15,000
Units started		35,000
Total units to account for		<u>50,000</u>
Units accounted for:		
Units completed:		
From BWIP		10,000
Started and completed		32,000
		<u>42,000</u>
Units, EWIP (75 percent complete)		8,000
Total units accounted for		<u>50,000</u>

Required:

Prepare a schedule of equivalent units using the FIFO method.

18 FIRST-IN, FIRST-OUT METHOD; UNIT COST; VALUING INVENTORIES

Loren Inc. manufactures products that pass through two or more processes. During April, equivalent units were computed using the FIFO method:

Units started and completed 4,600
Units in BWIP x Fraction to complete (60 percent) Units 840
in EWIP x Fraction complete (4,000 x 60 percent) 2,400
Equivalent units of output (FIFO) 7,840
April's costs to account for are as follows:
BWIP (40 percent complete) \$ 1,120
Materials 10,000
Conversion cost 4,000
Total \$15,120

Required:

1. Calculate the unit cost for April using the FIFO method. Round to two decimal places
2. Using the FIFO method, determine the cost of EWIP and the cost of the goods transferred out.

19 BASIC FLOWS, EQUIVALENT UNITS

Karsen Company produces a pain medication that passes through two departments: Mixing and Tableting. Karsen uses the weighted average method. Data for November for Mixing is as follows: BWIP was zero; EWIP had 2,400 units, 50 percent complete; and 28,000 units were started.

Tableting's data for November is as follows: BWIP was 1,600 units, 20 percent complete; and 800 units were in EWIP, 40 percent complete.

Required:

1. For Mixing, calculate the following:
 - a. Number of units transferred to Tableting.
 - b. Equivalent units of production.
2. For Tableting, calculate the number of units transferred out to Finished Goods.
3. Suppose that the units in the mixing department are measured in ounces, while the units in Tableting are measured in bottles of 100 tablets, with a total weight of eight ounces (excluding the bottle). Decide how you would treat units that are measured differently, and then repeat Requirement 2 using this approach.

20 STEPS FOR A COST OF PRODUCTION REPORT

The owner of Stillwater Designs was pleased with the prospect of becoming an original equipment supplier to DaimlerChrysler. Stillwater designs will provide an audio package for the Dodge Neon SRT4 line. Assembling the plastic cabinets, speakers, and amplifiers for this audio package will be done in-house.

Assume that Stillwater Designs uses the weighted average method to cost out the audio package. The following are cost and production data for the assembly process for April:

Production:

Units in process, April 1, 60 percent complete	40,000
Units completed and transferred out	100,000
Units in process, April 30, 20 percent complete	20,000

Costs:

WIP, April 1:

Plastic cabinets	\$ 800,000
Kicker components	8,400,000
Conversion costs	3,600,000

Costs added during April:

Plastic cabinets	\$ 1,600,000
Kicker components	16,800,000
Conversion costs	5,760,000

Required:

1. Prepare a cost of production report for the assembly department for the month of April.
2. Write a one-page report that compares the purpose and content of the cost of production report with the job-order cost sheet.

21 EQUIVALENT UNITS, UNIT COST, WEIGHTED AVERAGE

Fino Linens Inc. manufactures bed and bath linens. The bath linens department sews terry cloth into towels of various sizes. Fino uses the weighted average method. All materials are added at the beginning of the process. The following data are for the bath linens department for August:

Production:

Units in process, August 1, 60 percent complete	20,000
Units completed and transferred out	60,000
Units in process, August 31, 60 percent complete	20,000

Costs:

WIP, August 1	\$11,520
Current costs	<u>72,000</u>

Total \$83,520

Required:

1. Prepare a physical flow analysis for the bath linens department for August.
 2. Calculate equivalent units of production for the bath linens department for August.
 3. Calculate the unit cost for the bath linens department for August.
- Show that the cost per unit calculated in Requirement 3 is a weighted average of the cost per equivalent unit in BWIP and the current (FIFO) cost per equivalent unit. (*Hint:* The weights are in proportion to the number of units from each source).

22 COST OF PRODUCTION REPORT

The owner of Fino Linens Inc., a manufacturer of bed and bath linens, insisted on a formal report that provided all the details of the weighted average method. In the manufacturing process, all materials are added at the beginning. The following data are for the bath linens department for August:

Production:	
Units in process, August 1, 60 percent complete	20,000
Units completed and transferred out	60,000
Units in process, August 31, 60 percent complete	20,000
Costs:	
WIP, August 1	\$11,520
Current costs	<u>72,000</u>
Total	<u>\$83,520</u>

Required:

Prepare a cost of production report for the bath linens department for August using the weighted average method.

23 WEIGHTED AVERAGE METHOD, PHYSICAL FLOW, EQUIVALENT UNITS, UNIT COSTS, COST ASSIGNMENT

Yomasca Inc. manufactures various Halloween masks. Each mask is shaped from a piece of rubber in the molding department. The masks are then transferred to the finishing department, where they are painted and have elastic bands attached. Yomasca uses the weighted average method. In April, the molding department reported the following data:

- BWIP consisted of 6,000 units, 20 percent complete. Cost in beginning inventory totaled \$552.
- Costs added to production during the month were \$8,698.
- At the end of the month, 18,000 units were transferred out to Finishing. Then, 2,000 units remained in EWIP, 25 percent complete.

Required:

- Prepare a physical flow schedule.
- Calculate equivalent units of production.
- Compute unit cost.
- Calculate the cost of goods transferred to Finishing at the end of the month. Calculate the cost of ending inventory.

Assume that the masks are inspected at the end of the molding process. Of the 18,000 units inspected, 1,000 are rejected as faulty and are discarded. Thus, only 17,000 units are transferred to the finishing department. The manager of Yomasca considers all such spoilage as abnormal and does not want to assign any of this cost to the 17,000 good units produced and transferred to finishing. Your task is to determine the cost of this spoilage of 1,000 units and then to discuss how you would account for this spoilage cost. Now suppose that the manager feels that this spoilage cost is just part of the cost of producing the good units transferred out. Therefore, he wants to assign this cost to the good production. Explain how this would be handled. (*Hint*: Spoiled units are a type of output, and equivalent units of spoilage can be calculated.)

24 WEIGHTED AVERAGE METHOD, SINGLE-DEPARTMENT ANALYSIS

Jbooth Company produces a product that passes through an assembly process and a finishing process. All manufacturing costs are added uniformly for both processes. The following information was obtained for the assembly department for March:

- a. WIP, March 1, had 48,000 units (60 percent completed) and the following costs:

Direct materials \$186,256
Direct labor 64,864
Overhead applied 34,400

- b. During March, 138,400 units were completed and transferred to the finishing department, and the following costs were added to production:

Direct materials \$267,880
Direct labor 281,280
Overhead applied 117,144

- c. On March 31, there were 21,600 partially completed units in process. These units were 70 percent complete.

Required:

Prepare a production report for the assembly department for March using the weighted average method of costing. The report should disclose the physical flow of units, equivalent units, and unit costs and should track the disposition of manufacturing costs.

25 FIRST-IN, FIRST-OUT METHOD; SINGLE-DEPARTMENT ANALYSIS; ONE COST CATEGORY

Jbooth Company produces a product that passes through an assembly process and a finishing process. All manufacturing costs are added uniformly for both processes. The following information was obtained for the assembly department for March:

- a. WIP, March 1, had 48,000 units (60 percent completed) and the following costs:

Direct materials \$186,256
Direct labor 64,864
Overhead applied 34,400

- b. During March, 138,400 units were completed and transferred to the finishing department, and the following costs were added to production:

Direct materials	\$267,880
Direct labor	281,280
Overhead applied	117,144

- c. On March 31, there were 21,600 partially completed units in process. These units were 70 percent complete.

Required:

Prepare a production report for the assembly department for March using the FIFO method of costing. (Carry the unit cost computation to four decimal places.)

26 WEIGHTED AVERAGE METHOD, SEPARATE MATERIALS COST

Tyrone Company produces a variety of stationery products. One product, sealing wax sticks, passes through two processes: blending and molding. The weighted average method is used to account for the costs of production. After blending, the resulting product is sent to the molding department, where it is poured into molds and cooled. The following information relates to the blending process for August:

- a. WIP, August 1, had 20,000 pounds, 20 percent complete. Costs associated with partially completed units were:

Materials	\$220,000
Direct labor	30,000
Overhead applied	10,000

- b. WIP, August 31, had 30,000 pounds, 70 percent complete.
c. Units completed and transferred out totaled 500,000 pounds. Costs added during the month were (all inputs are added uniformly):

Materials	\$5,610,000
Direct labor	3,877,500
Overhead applied	1,292,500

Required:

1. Prepare (a) a physical flow schedule and (b) an equivalent unit schedule.
2. Calculate the unit cost. Round to four decimal places.
3. Compute the cost of EWIP and the cost of goods transferred out.
4. Prepare a cost reconciliation.
5. Suppose that the materials added uniformly in blending are paraffin and pigment and that the manager of the company wants to know how much each of these materials costs per equivalent unit produced. The costs of the materials in BWIP are as follows:

Paraffin	\$120,000
Pigment	100,000

The costs of the materials added during the month are also given:

Paraffin	\$3,060,000
Pigment	2,550,000

Prepare an equivalent unit schedule with cost categories for each material. Calculate the cost per unit for each type of material.

27 WEIGHTED AVERAGE METHOD, JOURNAL ENTRIES

Seacrest Company uses a process-costing system. The company manufactures a product that is processed in two departments, A and B. As work is completed, it is transferred out. The following summarizes the production activity and costs for November:

	Department A	Department B
Beginning inventories:		
Physical units	5,000	8,000
Costs:		

Transferred in	—	\$45,320
Direct materials	\$10,000	—
Conversion costs	\$6,900	\$16,800
Current production:		
Units started	25,000	?
Units transferred out	28,000	33,000
Costs:		
Transferred in	—	?
Direct materials	\$57,800	\$37,950
Conversion costs	\$95,220	\$128,100
Percentage completion:		
Beginning inventory	40%	50%
Ending inventory	80%	50%

Required:

1. Using the weighted average method, prepare the following for Department

- A physical flow schedule.
- An equivalent unit calculation.
- Calculation of unit costs. Round to two decimal
- Cost of EWIP and cost of goods transferred out.
- A cost reconciliation.

2. Prepare journal entries that show the flow of manufacturing costs for Department A. Use a conversion cost control account for conversion costs. Many firms are now combining direct labor and overhead costs into one category. They are not tracking direct labor separately. Offer some reasons for this practice.

28 WEIGHTED AVERAGE METHOD, NONUNIFORM INPUTS, MULTIPLE DEPARTMENTS

Benson Pharmaceuticals uses a process-costing system to compute the unit costs of the over-the-counter cold remedies that it produces. It has three departments: Picking, Encapsulating, and Bottling. In Picking, the ingredients for the cold capsules are measured, sifted, and blended. The mix is transferred out in gallon containers. The encapsulating department takes the powdered mix and places it in capsules. One gallon of powdered mix converts into 1,500 capsules. After the capsules are filled and polished, they are transferred to Bottling, where they are placed in bottles that are then affixed with a safety seal, lid, and label. Each bottle receives 50 capsules.

During March, the following results are available for the first two departments:

	Picking	Encapsulating
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Beginning inventories:		
Physical units	10 gallons	4,000
Costs:		
Materials	\$252	\$32
Labor	\$282	\$20
Overhead	?	?
Transferred in	—	\$140
	Picking	Encapsulating
	<hr/>	

Current production:		
Transferred out	140 gallons	208,000
Ending inventory	20 gallons	6,000
Costs:		
Materials	\$3,636	\$1,573
Transferred in	—	?
Labor	\$4,618	\$1,944
Overhead	?	?
Percentage of completion:		
Beginning inventory	40%	50%
Ending inventory	50%	40%

Overhead in both departments is applied as a percentage of direct labor costs. In the picking department, overhead is 200 percent of direct labor. In the encapsulating department, the overhead rate is 150 percent of direct labor.

Required:

1. Prepare a production report for the picking department using the weighted average method. Follow the five steps outlined in the chapter. Round to two decimal places for the unit cost.
2. Prepare a production report for the encapsulating department using the weighted average method. Follow the five steps outlined in the chapter. Round to four decimal places for the unit cost.
3. Explain why the weighted average method is easier to use than FIFO. Explain when weighted average will give about the same results as FIFO.

29 PRODUCTION REPORT, ETHICAL BEHAVIOR

Consider the following conversation between Gary Means, manager of a division that produces industrial machinery, and his controller, Donna Simpson, a certified management accountant and certified public accountant:

Gary: Donna, we have a real problem. Our operating cash is too low, and we are in desperate need of a loan. As you know, our financial position is marginal, and we need to show as much income as possible—and our assets need bolstering as well.

Donna: I understand the problem, but I don't see what can be done at this point. This is the last week of the fiscal year, and it looks like we'll report income just slightly above break even.

Gary: I know all this. What we need is some creative accounting. I have an idea that might help us, and I wanted to see if you would go along with it. We have 200 partially finished machines in process, about 20 percent complete. That compares with the 1,000 units that we completed and sold during the year. When you computed the per-unit cost, you used 1,040 equivalent units, giving us a manufacturing cost of \$1,500 per unit. That per-unit cost gives us cost of goods sold equal to \$1.5 million and ending work in process worth \$60,000. The presence of the work in process gives us a chance to improve our financial position. If we report the units in work in process as 80 percent complete, this will increase our equivalent units to 1,160. This, in turn, will decrease our unit cost to about \$1,345 and cost of goods sold to \$1.345 million. The value of our work in process will increase to \$215,200. With those financial stats, the loan would be a cinch.

Donna: Gary, I don't know. What you're suggesting is risky. It wouldn't take much auditing skill to catch this one.

Gary: You don't have to worry about that. The auditors won't be here for at least six to eight more weeks. By that time, we can have those partially completed units completed and sold. I can bury the labor cost by having some of our more loyal workers work overtime for some bonuses. The overtime will never be reported. And, as you know, bonuses come out of the corporate budget and are assigned to overhead—next year's overhead. Donna, this will work. If we look good and get the loan to boot, corporate headquarters will treat us well. If we don't do this, we could lose our jobs.

Required:

1. Should Donna agree to Gary's proposal? Why or why not? To assist in deciding, review the corporate code of ethics standards described in Chapter 13 and read the Institute of Management Accountants "Statement of Ethical Professional Practice" found at https://www.imanet.org/about_ethics_statement.asp. Do any of these apply?
2. Assume that Donna refuses to cooperate and that Gary accepts this decision and drops the matter. Does Donna have any obligation to report the divisional manager's behavior to a superior? Explain.
3. Assume that Donna refuses to cooperate; however, Gary insists that the changes be made. Now what should she do? What would you do?
4. Suppose that Donna is age 63 and that the prospects for employment elsewhere are bleak. Assume again that Gary insists that the changes be made. Donna also knows that his supervisor, the owner of the company, is his father-in-law. Under these circumstances, would your recommendations for Donna differ?

30 FIRST-IN, FIRST-OUT METHOD; JOURNAL, ENTRIES

Seacrest Company uses a process-costing system. The company manufactures a product that is processed in two departments, A and B. As work is completed, it is transferred out. The following summarizes the production activity and costs for November:

	Department A	Department B
Beginning inventories:		
Physical units	5,000	8,000
Costs:		
Transferred in	—	\$45,320
Direct materials	\$10,000	—
Conversion costs	\$6,900	\$16,800
Current production:		
Units started	25,000	?
Units transferred out 28,000 33,000		
Costs:		
Transferred in	—	?
Direct materials	\$57,800	
\$37,950		
Conversion costs	\$95,220	
\$128,100		
Percentage completion:		
Beginning inventory	40%	50%
Ending inventory	80%	50%

Required:

1. Using the FIFO method, prepare the following for Department A:
 - a. A physical flow schedule.
 - b. An equivalent unit calculation.
 - c. Calculation of unit costs. Round to two decimal places.

- d. Cost of EWIP and cost of goods transferred out.
 - e. A cost reconciliation.
2. Prepare journal entries that show the flow of manufacturing costs for Department A. Use a conversion cost control account for conversion costs. Many firms are now combining direct labor and overhead costs into one category. They are not tracking direct labor separately. Offer some reasons for this practice

31 FIRST-IN, FIRST-OUT METHOD

Benson Pharmaceuticals uses a process-costing system to compute the unit costs of the over-the-counter cold remedies that it produces. It has three departments: Picking, Encapsulating, and Bottling. In Picking, the ingredients for the cold capsules are measured, sifted, and blended. The mix is transferred out in gallon containers. The encapsulating department takes the powdered mix and places it in capsules. One gallon of powdered mix converts into 1,500 capsules. After the capsules are filled and polished, they are transferred to Bottling, where they are placed in bottles that are then affixed with a safety seal, lid, and label. Each bottle receives 50 capsules.

During March, the following results are available for the first two departments:

	Picking	Encapsulating
<hr/>		
Beginning inventories:		
Physical units	10 gallons	4,000
Costs:		
Materials	\$252	\$32
Labor	\$282	\$20
Overhead	?	?
Transferred in	—	\$140
Current production:		
Transferred out	140 gallons	208,000
Ending inventory	20 gallons	6,000
Costs:		
Materials	\$3,636	\$1,573
Transferred in	—	?
Labor	\$4,618	\$1,944
Overhead	?	?
Percentage of completion:		
Beginning inventory	40%	50%
Ending inventory	50%	40%

Overhead in both departments is applied as a percentage of direct labor costs. In the picking department, overhead is 200 percent of direct labor. In the encapsulating department, the overhead rate is 150 percent of direct labor.

Required:

Prepare a production report for each department using the FIFO method. (*Hint:* For the second department, you must convert gallons to capsules.)

32 PROCESS COSTING VERSUS ALTERNATIVE COSTING METHODS, IMPACT ON RESOURCE ALLOCATION DECISION

Golding Manufacturing, a division of Farnsworth Sporting Inc., produces two different models of bows and eight models of knives. The bow-manufacturing process involves the production of two major subassemblies: the limbs and the handles. The limbs pass through four sequential processes before reaching final assembly: layup, molding, fabricating, and finishing. In the layup department, limbs are created by laminating layers of wood. In the molding department, the limbs are heat-treated, under pressure, to form strong resilient limbs. In the fabricating department, any protruding glue or other processing residue is removed. Finally, in the finishing department, the limbs are cleaned with acetone, dried, and sprayed with the final finishes.

The handles pass through two processes before reaching final assembly: pattern and finishing. In the pattern department, blocks of wood are fed into a machine that is set to shape the handles. Different patterns are possible, depending on the machine's setting. After coming out of the machine, the handles are cleaned and smoothed. They then pass to the finishing department, where they are sprayed with the final finishes. In final assembly, the limbs and handles are assembled into different models using purchased parts such as pulley assemblies, weight-adjustment bolts, side plates, and string.

Golding, since its inception, has been using process costing to assign product costs. A predetermined overhead rate is used based on direct labor dollars (80 percent of direct labor dollars). Recently, Golding has hired a new controller, Karen Jenkins. After reviewing the product-costing procedures, Karen requested a meeting with the divisional manager, Aaron Suhr. The following is a transcript of their conversation.

Karen: Aaron, I have some concerns about our cost accounting system. We make two different models of bows and are treating them as if they were the same product. Now I know that the only real difference between the models is the handle. The processing of the handles is the same, but the handles differ significantly in the amount and quality of wood used. Our current costing does not reflect this difference in material input.

Aaron: Your predecessor is responsible. He believed that tracking the difference in material cost wasn't worth the effort. He simply didn't believe that it would make much difference in the unit cost of either model.

Karen: Well, he may have been right, but I have my doubts. If there is a significant difference, it could affect our views of which model is more important to the company. The additional bookkeeping isn't very stringent. All we have to worry about is the pattern department. The other departments fit what I view as a process-costing pattern.

Aaron: Why don't you look into it? If there is a significant difference, go ahead and adjust the costing system.

After the meeting, Karen decided to collect cost data on the two models: the Deluxe model and the Econo model. She decided to track the costs for one week. At the end of the week, she had collected the following data from the pattern department:

- a. There were a total of 2,500 bows completed: 1,000 Deluxe models and 1,500 Econo models.
- b. There was no BWIP; however, there were 300 units in EWIP: 200 Deluxe and 100 Econo models. Both models were 80 percent complete with respect to conversion costs and 100 percent complete with respect to materials.
- c. The pattern department experienced the following costs:

Direct materials	\$114,000
Direct labor	45,667

- d. On an experimental basis, the requisition forms for materials were modified to identify the dollar value of the materials used by the Econo and Deluxe models:

Econo model	\$30,000
Deluxe model	84,000

Required:

1. Compute the unit cost for the handles produced by the pattern department assuming that

- process costing is totally appropriate. Round unit cost to two decimal places.
2. Compute the unit cost of each handle using the separate cost information provided on materials. Round unit cost to two decimal places.
 3. Compare the unit costs computed in Requirements 1 and 2. Is Karen justified in her belief that a pure process-costing relationship is not appropriate? Describe the costing system that you would recommend.
 4. In the past, the marketing manager has requested more money for advertising the Econo line. Aaron has repeatedly refused to grant any increase in this product's advertising budget because its per-unit profit (selling price less manufacturing cost) is so low. Given the results in Requirements 1 through 3, was Aaron justified in his position?

33 EQUIVALENT UNITS; VALUATION OF WORK-IN-PROCESS INVENTORIES; FIRST-IN, FIRST-OUT VERSUS WEIGHTED AVERAGE

AKL Foundry manufactures metal components for different kinds of equipment used by the aerospace, commercial aircraft, medical equipment, and electronic industries. The company uses investment casting to produce the required components. Investment casting consists of creating, in wax, a replica of the final product and pouring a hard shell around it. After removing the wax, molten metal is poured into the resulting cavity. What remains after the shell is broken is the desired metal object ready to be put to its designated use.

Metal components pass through eight processes: gating, shell creating, foundry work, cutoff, grinding, finishing, welding, and strengthening. Gating creates the wax mold and clusters the wax pattern around a sprue (a hole through which the molten metal will be poured through the gates into the mold in the foundry process), which is joined and supported by gates (flow channels) to form a tree of patterns. In the shell-creating process, the wax molds are alternately dipped in a ceramic slurry and a fluidized bed of progressively coarser refractory grain until a sufficiently thick shell (or mold) completely encases the wax pattern. After drying, the mold is sent to the foundry process. Here, the wax is melted out of the mold, and the shell is fired, strengthened, and brought to the proper temperature. Molten metal is then poured into the dewaxed shell. Finally, the ceramic shell is removed, and the finished product is sent to the cutoff process, where the parts are separated from the tree by the use of a band saw. The parts are then sent to the grinding process, where the gates that allowed the molten metal to flow into the ceramic cavities are ground off using large abrasive grinders. In the finishing process, rough edges caused by the grinders are removed by small handheld pneumatic tools. Parts that are flawed at this point are sent to welding for corrective treatment. The last process uses heat to treat the parts to bring them to the desired strength.

In 2007, the two partners who owned AKL Foundry decided to split up and divide the business. In dissolving their business relationship, they were faced with the problem of dividing the business assets equitably. Since the company had two plants—one in Arizona and one in New Mexico—a suggestion was made to split the business on the basis of geographic location. One partner would assume ownership of the plant in New Mexico, and the other would assume ownership of the plant in Arizona. However, this arrangement had one major complication: the amount of WIP inventory located in the Arizona plant.

The Arizona facilities had been in operation for more than a decade and were full of WIP. The New Mexico facility had been operational for only two years and had much smaller WIP inventories. The partner located in New Mexico argued that to disregard the unequal value of the WIP inventories would be grossly unfair.

Unfortunately, during the entire business history of AKL Foundry, WIP inventories had never been assigned any value. In computing the cost of goods sold each year, the company had followed the policy of adding depreciation to the out-of-pocket costs of direct labor, direct materials, and overhead. Accruals for the company are nearly nonexistent, and there are hardly ever any ending inventories of materials.

During 2007, the Arizona plant had sales of \$2,028,670. The cost of goods sold is itemized as follows:

Direct materials	\$378,000
Direct labor	530,300
Overhead	643,518

Upon request, the owners of AKL provided the following supplementary information (percentages are cumulative):

Costs Used by Each Process as a Percentage of Total Cost

	Direct Materials (%)	Direct Total Labor (%)
Gating	23	35
Shell creating	70	50
Foundry work	100	70
Cutoff	100	72
Grinding	100	80
Finishing	100	90
Welding	100	93
Strengthening	100	100

Gating had 10,000 units in BWIP, 60 percent complete. Assume that all materials are added at the beginning of each process. During the year, 50,000 units were completed and transferred out. The ending inventory had 11,000 unfinished units, 60 percent complete.

Required:

1. The partners of AKL want a reasonable estimate of the cost of WIP inventories. Using the gating department's inventory as an example, prepare an estimate of the cost of the EWIP. What assumptions did you make? Did you use the FIFO or weighted average method? Why? Round unit cost to two decimal places.
2. Assume that the shell-creating process has 8,000 units in BWIP, 20 percent complete. During the year, 50,000 units were completed and transferred out. (All 50,000 units were sold; no other units were sold.) The EWIP inventory had 8,000 units, 30 percent complete. Compute the value of the shell-creating department's EWIP. What additional assumptions had to be made

SOLUZIONI

Esercizio 1

Physical flow schedule:

Units in BWIP		75,000
Units started		<u>425,000</u>
Total units to account for		<u>500,000</u>

Units completed and transferred out:

Units started and completed	375,000	
Units completed from BWIP	<u>75,000</u>	450,000
Units in		<u>50,000</u>
Total units accounted for		<u>500,000</u>

Cornerstone Exercise 17–26

Cutting Department
Production Report
For the Month of October
Weighted Average Method

UNIT INFORMATION

Physical flow:

Units to account for:		Units accounted for:	
Units in beginning WIP	5,000	Units completed	34,000
Units started	<u>39,000</u>	Units in ending WIP	<u>10,000</u>
Total units to acct. for	<u>44,000</u>	Total units acctd. for	<u>44,000</u>

Equivalent units:

Units completed	34,000
Units in ending work in process	<u>6,000</u>
Total equivalent units	<u>40,000</u>

COST INFORMATION

Costs to account for:

Beginning work in process	\$ 40,000
Incurred during April	<u>760,000</u>
Total costs to account for	<u>\$800,000</u>

Cost per equivalent unit

\$20.00

Costs accounted for:

	<u>Transferred Out</u>	<u>Ending Work in Process</u>	<u>Total</u>
Goods transferred out (\$20.00 × 34,000)	\$680,000	—	\$680,000
Goods in ending WIP (\$20.00 × 6,000)	<u>—</u>	<u>\$120,000</u>	<u>120,000</u>
Total costs accounted for	<u>\$680,000</u>	<u>\$120,000</u>	<u>\$800,000</u>

Esercizio 2

1. Physical flow schedule:

Units in beginning work in process.....		40,000	
Units started during the period		<u>160,000</u>	
Total units to account for			<u>200,000</u>
Units completed and transferred out:			
Units started and completed	135,000		
Units completed from beginning work in process	<u>40,000</u>	175,000	
Units in ending work in process.....			<u>25,000</u>
Total units accounted for.....			<u>200,000</u>

2. Units completed	175,000	
Units, EWIP		<u>25,000</u>
Equivalent units (transferred-in materials)		<u>200,000</u>

3. Unit-transferred-in cost = $\frac{\$142,000 + \$458,000}{200,000} = \$3.00$

Esercizio 3

Bebida Company
Mixing Department
Production Report
For the Month of August
(FIFO Method)

UNIT INFORMATION

Units to account for:		Units accounted for:	
Units in beginning WIP	20,000	Started and completed	118,000
Units started	134,000	From beginning WIP	20,000
		From ending WIP	<u>16,000</u>
Total units	<u>154,000</u>	Total units	<u>154,000</u>

Equivalent units:	
Started and completed	118,000
To complete beginning WIP (20,000 × 20%)	4,000
Units in ending WIP (16,000 × 75%)	<u>12,000</u>
Total equivalent units	<u>134,000</u>

COST INFORMATION

Costs to account for:	
Costs in beginning WIP	\$ 19,200
Costs added by department	<u>180,900</u>
Total costs to account for	<u>\$200,100</u>

Cost per equivalent unit	$\frac{\$180,900}{134,000}$	\$1.35
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Costs accounted for:		
Transferred out:		
Units started and completed (118,000 × \$1.35)	\$159,300	
Units in beginning work in process:		
From prior period	19,200	
From current period (4,000 × \$1.35)	<u>5,400</u>	
Total cost transferred out	\$183,900	
Goods in ending work in process (12,000 × \$1.35)	<u>16,200</u>	
Total costs accounted for		<u>\$200,100</u>

Esercizio 4

a. Work in Process—Grinding.....	42,000	
Work in Process—Molding.....		42,000
b. Work in Process—Finishing.....	82,000	
Work in Process—Grinding.....		82,000
c. Finished Goods.....	95,000	
Work in Process—Finishing.....		95,000

Esercizio 5

1. 5,850 units completed	=	5,850 equivalent units
500 units × 0.30	=	<u>150</u> equivalent units
December output	=	<u>6,000</u> equivalent units

2. Unit cost = $\frac{\$3,900}{6,000} = \0.65 per unit

3. Cost of goods transferred out = $\$0.65 \times 5,850 = \$3,802.50$

4. EWIP = $\$0.65 \times 150 = \97.50

Esercizio 6

Units completed.....	42,000
Units in ending work in process × Fraction complete:	
8,000 × 0.75.....	<u>6,000</u>
Equivalent units of output.....	<u>48,000</u>

Esercizio 7

1. Unit cost = $\frac{\$30,000 + \$12,000 + \$3,360}{25,200} = \1.80 per unit

2. Cost of ending work in process:

$$\$1.80 \times 7,200 = \$12,960$$

Cost of goods transferred out:

$$\$1.80 \times 18,000 = \$32,400$$

Esercizio 8

1. Unit cost: $\frac{\$1,098,000}{170,000} = \6.46

2. Cost of units transferred out:

$$150,000 \times \$6.46$$

$$\$ \quad 969,000$$

Cost of ending WIP:

$$20,000 \times \$6.46$$

$$\underline{129,200}$$

Total costs accounted for

$$\underline{\underline{\$1,098,200^*}}$$

*Difference is due to rounding.

Esercizio 9

Physical flow schedule:

Units in beginning work in process.....		30,500
Units started during the period.....		<u>33,000</u>
Total units to account for		<u>63,500</u>
Units completed and transferred out:		
Units started and completed	24,600*	
Units completed from beginning work in process	<u>30,500</u>	55,100
Units in ending work in process.....		<u>8,400</u>
Total units accounted for.....		<u>63,500</u>

$$*33,000 - 8,400 = 24,600.$$

Esercizio 10

Units to account for:

Units in beginning WIP.....		25,000
Units started		<u>142,500</u>
Total units		<u>167,500</u>

Units accounted for:

Completed from BWIP		25,000
Started and completed.....		107,500
Units in ending WIP.....		<u>35,000</u>
Total units		<u>167,500</u>

Esercizio 11

Cooking Department
Production Report
For the Month of April
(Weighted Average Method)

UNIT INFORMATION

Physical flow:

Units to account for:		Units accounted for:	
Units in beginning WIP	20,000	Units completed	50,000
Units started	<u>40,000</u>	Units in ending WIP	<u>10,000</u>
Total units to acct. for	<u>60,000</u>	Total units acctd. for	<u>60,000</u>

Equivalent units:

Units completed	50,000
Units in ending work in process	<u>2,000</u>
Total equivalent units	<u>52,000</u>

COST INFORMATION

Costs to account for:

Beginning work in process	\$ 93,600
Incurred during April	<u>314,600</u>
Total costs to account for	<u>\$408,200</u>

Cost per equivalent unit \$7.85

Costs accounted for:

	Transferred Out	Ending Work in Process	Total
Goods transferred out ($\$7.85 \times 50,000$)	\$392,500	—	\$392,500
Goods in ending WIP ($\$7.85 \times 2,000$)	<u>—</u>	<u>\$15,700</u>	<u>15,700</u>
Total costs accounted for	<u>\$392,500</u>	<u>\$15,700</u>	<u>\$408,200</u>

Esercizio 12

	<u>Materials</u>	<u>Conversion</u>
Units completed.....	60,000	60,000
Add: Units in ending WIP × Fraction complete ($20,000 \times 60\%$).....	<u>20,000</u>	<u>12,000</u>
Equivalent units of output.....	<u>80,000</u>	<u>72,000</u>

Esercizio 13

1. Unit materials cost:	$\frac{\$147,000 + \$1,053,000}{240,000}$	=	\$5.00
Unit conversion cost:	$\frac{\$7,875 + \$236,205}{216,000}$	=	<u>1.13</u>
Total unit cost			<u>\$6.13</u>

2. Cost transferred out: $180,000 \times \$6.13 = \$1,103,400$

Cost of ending WIP:

Materials:	$60,000 \times \$5.00 =$	\$300,000
Conversion:	$36,000 \times \$1.13 =$	<u>40,680</u>
Total ending WIP cost		<u>\$340,680</u>

Esercizio 14

1. Units to account for:		Units accounted for:	
Units in beginning WIP	40,000	Units transferred out	120,000
Units started	<u>110,000*</u>	Units in ending WIP	<u>30,000</u>
Total units	<u>150,000</u>	Total units	<u>150,000</u>

*Calculation:

Units transferred out	120,000
Units in ending WIP	30,000
Less: Units in beginning WIP	<u>(40,000)</u>
Units transferred in	<u>110,000</u>

2.	<u>Transferred-In</u>	<u>Materials</u>	<u>Conversion</u>
Units transferred out	120,000	120,000	120,000
Units in ending WIP	<u>30,000</u>	<u>30,000</u>	<u>18,000</u>
Equivalent units	<u>150,000</u>	<u>150,000</u>	<u>138,000</u>

Esercizio 15

1. Unit transferred-in cost:
$$\frac{\$2,100 + \$30,900}{75,000} = \$0.44$$

Unit materials cost:
$$\frac{\$1,500 + \$22,500}{75,000} = \$0.32$$

Unit conversion cost:
$$\frac{\$3,000 + \$45,300}{69,000} = \$0.70$$

2. Total unit cost: $\$0.44 + \$0.32 + \$0.70 = \1.46

Esercizio 16

Units started and completed.....	32,000
Units in BWIP × Fraction to be completed:	
10,000 × 0.60	6,000
Units in EWIP × Fraction complete:	
8,000 × 0.75	<u>6,000</u>
Equivalent units of output.....	<u>44,000</u>

Esercizio 17

1. Unit cost = $\frac{\$14,000}{7,840} = \1.79 (rounded)

2. Cost of ending work in process:

$$\$1.79 \times 2,400 = \$4,296$$

Cost of goods transferred out:

From BWIP:

Prior period costs	\$	1,120
Completion costs ($\$1.79 \times 840$)		1,504
Started and completed ($\$1.79 \times 4,600$)		<u>8,234</u>
Total		<u>\$10,858</u>

PROBLEMS

Esercizio 18

1. Mixing department:

a. Units transferred to Tableting = Total units* – Ending WIP
 = 28,000 – 2,400 = 25,600

*Total units = Beginning WIP + Units started = 0 + 28,000

b. Units completed	25,600
Add: Units in ending work in process	
2,400 × 50%	1,200
Equivalent units of output	<u>26,800</u>

2. Tableting department:

Units transferred out = Total units* – Ending WIP = 27,200 – 800 = 26,400

*Total units = Beginning WIP + Units transferred in = 1,600 + 25,600 = 27,200

3. The solution is to convert the transferred-in units to the same unit of measure as the output for the tableting department. Each bottle has eight ounces of transferred-in material. Thus, 25,600 ounces become 3,200 bottles. Using this converted measure, the revised solution would be as follows:

Units transferred out = Total units* – Ending WIP = 3,400 – 100 = 2,400

*Total units = Beginning WIP + Units transferred in = 200 + 3,200 = 3,400

Esercizio 19

1.

Assembly Department
 Production Report
 For the Month of April
 (Weighted Average Method)

Unit Information

Physical flow:

Units to account for:		Units accounted for:	
Units in beginning WIP	40,000	Units completed	100,000
Units started	80,000	Units in ending WIP	20,000
Total units to acct. for	<u>120,000</u>	Total units acctd. for	
<u>120,000</u>			

Equivalent units:

	<u>Cabinets</u>	<u>Components</u>	<u>Conversion</u>
Units completed	100,000	100,000	100,000
Units in EWIP	20,000	20,000	4,000*

Equivalent units	<u>120,000</u>	<u>120,000</u>	<u>104,000</u>	
Costs to account for:	<u>Cabinets</u>	<u>Components</u>	<u>Conversion</u>	<u>Total</u>
Beginning WIP	\$ 800,000		\$ 8,400,000	\$3,600,000
\$12,800,000				
Incurred during April	<u>1,600,000</u>		<u>16,800,000</u>	<u>5,760,000</u>
<u>24,160,000</u>				
Total costs to acct. for	\$2,400,000	\$25,200,000	\$9,360,000	
<u>\$36,960,000</u>				
÷ Equivalent units	120,000	120,000	104,000	
Cost per equivalent unit	\$20	\$210	\$90	\$320

Costs accounted for:

	<u>Transferred</u>	<u>Ending</u>	
	<u>Out</u>	<u>Work in Process</u>	<u>Total</u>
Goods transferred out (\$320 × 100,000)		\$32,000,000	\$32,000,000
Goods in ending WIP:			
Cabinets (\$20 × 20,000)		\$ 400,000	400,000
Components (\$210 × 20,000)		4,200,000	4,200,000
Conversion (\$90 × 4,000)	<u>—</u>	<u>360,000</u>	<u>360,000</u>
Total costs accounted for		<u>\$32,000,000</u>	<u>\$4,960,000</u> <u>\$36,960,000</u>

*0.20 × 20,000

2. Although the answers may vary, some essential elements should be mentioned in the report. The job cost sheet summarizes the manufacturing activity for a job, whereas the production report summarizes the manufacturing activity in a process department for a period of time. Both reports provide unit cost information, although the production report only provides the unit cost for a given process. Only the last process provides the total cost per unit. A similar observation can be made about the detail concerning materials and conversion costs. The job cost sheet acts as a subsidiary work-in-process account. The production report also provides the cost of ending work in process for each process. The sum of these amounts will give the total work in process—so the production report serves a similar information function. Thus, the purpose and content of the reports are very similar.

Esercizio 20

1. Units to account for:

Units in beginning work in process (60% complete)	20,000
Units started during the period	<u>60,000</u>
Total units to account for	<u>80,000</u>

Units accounted for:

Units completed and transferred out:		
Started and completed	40,000	
From beginning work in process	<u>20,000</u>	60,000
Units in ending work in process (60% complete)		<u>20,000</u>
Total units accounted for		<u>80,000</u>

2. Units completed 60,000

Add: Units in ending WIP ×
 Fraction complete
 (20,000 × 60%) 12,000

Equivalent units of output 72,000

(While it is possible to calculate equivalent units of materials (80,000), it is not possible to calculate the materials cost per unit because only total production costs are given; thus, materials must be treated as if they were uniformly added even though they are added at the beginning.)

3. Unit conversion cost: $\frac{\$11,520 + \$72,000}{72,000} = \$1.16$

4. First, calculate the cost per unit for the equivalent units in beginning inventory ($60\% \times 20,000 = 12,000$ equivalent units in BWIP):

$$\text{Prior period unit cost} = \frac{\$11,520}{12,000} = \$0.96 \text{ per unit}$$

Next, calculate the current-period (FIFO) cost per unit:

$$\begin{aligned} \text{FIFO equivalent units for materials} &= \text{Weighted average equivalent units less prior period} \\ &\quad \text{equivalent units} \\ &= 72,000 - 12,000 = 60,000 \end{aligned}$$

$$\text{FIFO unit cost} = \frac{\$72,000}{60,000} = \$1.20$$

$$\begin{aligned} \text{The weighted average unit cost} &= \left(\frac{12,000}{72,000}\right)\$0.96 + \left(\frac{60,000}{72,000}\right)\$1.20 \\ &= \$1.16 \end{aligned}$$

Esercizio 21

Bath Linens Department
Production Report
For the Month of August
(Weighted Average Method)

UNIT INFORMATION

Physical flow:

Units to account for:		Units accounted for:	
Units in beginning WIP	20,000	Units completed	60,000
Units started	<u>60,000</u>	Units in ending WIP	<u>20,000</u>
Total units to acct. for	<u>80,000</u>	Total units acctd. for	<u>80,000</u>

Equivalent units:

Units completed	60,000
Units in ending work in process	<u>12,000</u>
Total equivalent units	<u>72,000</u>

COST INFORMATION

Costs to account for:	
Beginning WIP	\$11,520
Incurred during August	<u>72,000</u>
Total costs to account for	<u>\$83,520</u>
Cost per equivalent unit	\$1.16

Costs accounted for:

	<u>Transferred Out</u>	<u>Ending Work in Process</u>	<u>Total</u>
Goods transferred out (\$1.16 × 60,000)	\$69,600	—	\$69,600
Goods in ending WIP Conversion (\$1.16 × 12,000)	_____	\$13,920	<u>13,920</u>
Total costs accounted for	<u>\$69,600</u>	<u>\$13,920</u>	<u>\$83,520</u>

(Because the materials cost is not given separately, materials are treated as if they are added uniformly throughout the process, even though they are added at the beginning.)

Esercizio 22

1. Units to account for:	Units accounted for:		
Units in beginning WIP	6,000	Transferred out	18,000
Units started	<u>14,000*</u>	Units in ending WIP	<u>2,000</u>
Total	<u>20,000</u>	Total	<u>20,000</u>

$$*20,000 - 6,000 = 14,000.$$

2.	<u>Equivalent Units</u>
Transferred out	18,000
Ending WIP	<u>500 (2,000 × 25%)</u>
Total	<u>18,500</u>

3. Unit cost: $\frac{\$552 + \$8,698}{18,500} = \$0.50$

4. Cost transferred out:

$$18,000 \times \$0.50 = \$9,000$$

Cost of ending WIP:

$$500 \times \$0.50 = \$250$$

5. To assign costs to spoiled units, they should appear as an item in the equivalent units schedule:

	<u>Equivalent Units</u>
Transferred out	17,000
Spoiled units	1,000
Ending WIP	<u>500 (2,000 × 25%)</u>
Total	<u>18,500</u>

The cost per equivalent unit is the same calculated without spoilage.

$$\text{Spoilage cost} = 1,000 \times \$0.50 = \$500$$

If the spoilage cost is abnormal, then it will not be assigned to production. A common approach is to treat the \$500 as a loss for the period. If the spoilage is normal, then it would be added to the cost of goods transferred out.

Esercizio 23

Jbooth Company
 Assembly Department
 Production Report
 For the Month of March
 (Weighted Average Method)

UNIT INFORMATION

Units to account for:		Units accounted for:	
Units in beginning WIP	48,000	Units completed	138,400
Units started	<u>112,000</u>	Units in ending WIP	<u>21,600</u>
Total units	<u>160,000</u>	Total units	<u>160,000</u>
Equivalent units:			
Units completed	138,400		
Units in ending WIP (21,600 × 70%)	<u>15,120</u>		
Total equivalent units	<u>153,520</u>		

COST INFORMATION

Costs to account for:	
Costs in beginning WIP	\$285,520
Costs added by department	<u>666,304</u>
Total costs to account for	<u>\$951,824</u>
Cost per equivalent unit (\$951,824/153,520)	\$6.20
Costs accounted for:	
Goods transferred out (138,400 × \$6.20)	\$858,080
Ending work in process (15,120 × \$6.20)	<u>93,744</u>
Total costs accounted for	<u>\$951,824</u>

Esercizio 24

Jbooth Company
 Assembly Department
 Production Report
 For the Month of March
 (FIFO Method)

UNIT INFORMATION

Units to account for:		Units accounted for:	
Units in beginning WIP	48,000	Started and completed	90,400
Units started	112,000	From beginning WIP	48,000
		From ending WIP	<u>21,600</u>
Total units	<u>160,000</u>	Total units	<u>160,000</u>
Equivalent units:			
Started and completed		90,400	
To complete beginning WIP (48,000 × 40%)		19,200	

Units in ending WIP (21,600 × 70%)	<u>15,120</u>
Total equivalent units	<u>124,720</u>

COST INFORMATION

Costs to account for:	
Costs in beginning WIP	\$285,520
Costs added by department	<u>666,304</u>
Total costs to account for	<u>\$951,824</u>
Cost per equivalent unit (\$666,304/124,720)	\$5.3424
Costs accounted for:	
Transferred out:	
Units started and completed (90,400 × \$5.3424)	\$482,953
Units in beginning work in process:	
From prior period	285,520
From current period (19,200 × \$5.3424)	<u>102,574</u>
Total cost transferred out	\$871,047
Goods in ending work in process (15,120 × \$5.3424)	<u>80,777</u>
Total costs accounted for	<u>\$951,824</u>

Esercizio 25

1. a. Physical flow schedule:

Units to account for:		Units accounted for:	
Units in BWIP	20,000	Units completed	500,000
Units started	<u>510,000</u>	From EWIP	<u>30,000</u>
Total units	<u>530,000</u>	Total units	<u>530,000</u>

- b. Equivalent unit schedule:

Units completed	500,000
Units in ending WIP (30,000 × 0.70)	<u>21,000</u>
Total equivalent units	<u>521,000</u>

2. Unit cost computation:

Costs in BWIP	\$ 260,000
Costs added	<u>10,780,000</u>
Total costs	<u>\$ 11,040,000</u>

$$\begin{aligned} \text{Unit cost} &= \frac{\mathbf{\$11,040,000}}{\mathbf{521,000}} \\ &= \$21.19 \end{aligned}$$

3. Ending work in process = 21,000 × \$21.19
= \$444,990

Goods transferred out: 500,000 × \$21.19 = \$10,595,000

4. Cost reconciliation:

Costs to account for:	Costs accounted for:
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Beginning WIP	\$	260,000	Transferred out	\$	10,595,000
August costs		<u>10,780,000</u>	Ending WIP		<u>444,990</u>
Total to acct. for	\$	<u><u>11,040,000</u></u>	Total acctd. for	\$	<u><u>11,039,990*</u></u>

*Difference due to rounding.

5. Equivalent unit schedule:

		<u>Paraffin</u>	<u>Pigment</u>
Units completed		500,000	500,000
Units in ending WIP	<u>21,000</u>	<u>21,000</u>	
Total equivalent units	<u><u>521,000</u></u>	<u><u>521,000</u></u>	

Unit cost computation:

	<u>Paraffin</u>	<u>Pigment</u>
Costs in BWIP	\$ 120,000	\$ 100,000
Costs added	<u>3,060,000</u>	<u>2,550,000</u>
Total costs	<u><u>\$3,180,000</u></u>	<u><u>\$2,650,000</u></u>

$$\text{Unit paraffin cost} = \frac{\mathbf{\$3,180,000}}{\mathbf{521,000}} = \$6.10$$

$$\text{Unit pigment cost} = \frac{\mathbf{\$2,650,000}}{\mathbf{521,000}} = \$5.09$$

Esercizio 26

1. Department A

a. Physical flow schedule:

Units in beginning WIP	5,000
Units started in November	<u>25,000</u>
Total units to account for	<u><u>30,000</u></u>
Units completed and transferred out:	
Units completed	28,000
Units in ending WIP	<u>2,000</u>
Total units accounted for	<u><u>30,000</u></u>

b. Equivalent unit calculation:

Units completed	28,000
Add: Equivalent units in ending WIP (2,000 × 0.80)	<u>1,600</u>
Total equivalent units	<u><u>29,600</u></u>

c. Costs charged to the department:

	<u>Materials</u>	<u>Conversion</u>	<u>Total</u>
Beginning WIP	\$10,000	\$ 6,900	\$ 16,900
Incurred during November	<u>57,800</u>	<u>95,220</u>	<u>153,020</u>
Total costs	<u><u>\$67,800</u></u>	<u><u>\$102,120</u></u>	<u><u>\$169,920</u></u>

Unit cost calculation:

$$\text{Unit cost} = \frac{\mathbf{\$169,920}}{\mathbf{29,600}}$$

= \$5.74

d. and e. Cost reconciliation:

Costs to account for:	
Beginning work in process	\$ 16,900
Costs incurred during November	<u>153,020</u>
Total costs to account for	<u>\$169,920</u>
Total costs accounted for:	
Goods transferred out (28,000 × \$5.74)	\$160,720
Costs in ending WIP (1,600 × \$5.74)	<u>9,184</u>
Total costs accounted for	<u>\$169,904*</u>

*Difference due to rounding.

2. Work in Process—Department A.....	57,800	
Raw Materials.....		57,800
Work in Process—Department A.....	95,220	
Conversion Costs—Department A		95,220
Work in Process—Department B.....	160,720	
Work in Process—Department A		160,720

Using a conversion cost control account is more commonly used because direct labor is becoming a small percentage of total manufacturing costs. Automation is one cause; changing the nature of direct labor as in JIT is another cause. In manufacturing cells, direct labor also performs many so-called traditional overhead activities such as maintenance and inspection—thus, taking on the nature of “conversion labor.”

Esercizio 27

1. Benson Pharmaceuticals
Picking Department Production Report
For the Month of March (Weighted Average Method)

UNIT INFORMATION

Units to account for:		
Units in beginning WIP	10	
Units started	<u>150</u>	
Total units to account for	<u>160</u>	
Units accounted for:		
	<u>Physical Flow</u>	<u>Equivalent Units</u>
Units completed	140	140
Units in ending WIP	<u>20</u>	<u>10</u>
Total units accounted for	<u>160</u>	<u>150</u>

COST INFORMATION

Costs to account for:	<u>Materials</u>	<u>Conversion*</u>	<u>Total</u>
Beginning WIP	\$ 252	\$ 846	\$ 1,098

Incurring during March	<u>3,636</u>	<u>13,854</u>	<u>17,490</u>
Total costs to account for	<u>\$3,888</u>	<u>\$14,700</u>	\$18,588
÷ Equivalent units			150
Cost per equivalent unit			\$123.92

*Conversion is labor plus overhead (200% of labor):

BWIP: $282 + (282 \times 2) = \$846$

March: $4,618 + (4,618 \times 2) = \$13,854$

	<u>Transferred</u> <u>Out</u>	<u>Ending</u> <u>Work in Process</u>	<u>Total</u>
Costs accounted for:			
Goods transferred out (140 × \$123.92)	\$17,349	—	\$17,349
Ending work in process: (10 × \$123.92)		<u>\$1,239</u>	<u>1,239</u>
Total costs accounted for	<u>\$17,349</u>	<u>\$1,239</u>	<u>\$18,588</u>

2. Benson Pharmaceuticals
Encapsulating Department Production Report
For the Month of March (Weighted Average Method)

UNIT INFORMATION

Units to account for:	
Units in beginning WIP	4,000
Units started	<u>210,000</u>
Total units to account for	<u>214,000</u>

Units accounted for:	<u>Physical</u> <u>Flow</u>	<u>Equivalent Units</u>		
		<u>Trans. In</u>	<u>Materials</u>	<u>Conversion</u>
Units completed	208,000	208,000	208,000	208,000
Units in ending WIP	<u>6,000</u>	<u>6,000</u>	<u>6,000</u>	<u>2,400*</u>
Total units acctd. for	<u>214,000</u>	<u>214,000</u>	<u>214,000</u>	<u>210,400</u>

*6,000 × 0.40

COST INFORMATION

Costs to account for:	<u>Trans. In</u>	<u>Materials</u>	<u>Conversion*</u>	<u>Total</u>
Beginning WIP	\$ 140	\$ 32	\$ 50	\$ 222
Incurring during March	<u>17,349</u>	<u>1,573</u>	<u>4,860</u>	<u>23,782</u>
Total costs to acct. for	\$17,489	\$1,605	\$4,910	<u>\$24,004</u>
÷ Equivalent units	214,000	214,000	210,400	
Cost per equivalent unit	\$0.0817	\$0.0075	\$0.0233	\$0.1125

*BWIP: $\$20 + (\$20 \times 1.5)$; March: $1,944 + (1,944 \times 1.50)$

	<u>Transferred</u> <u>Out</u>	<u>Ending</u> <u>Work in Process</u>	<u>Total</u>
Costs accounted for:			
Goods transferred out (208,000 × \$0.1125)	\$23,400	—	\$23,400

Ending work in process:			
Trans. In (6,000 × \$0.0817)	—	\$490	490
Materials (6,000 × \$0.0075)	—	45	45
Conversion (2,400 × \$0.0233)	—	56	56
Total costs accounted for	<u>\$23,400</u>	<u>\$591</u>	<u>\$23,991*</u>

*Rounded

3. Weighted average is easier to use than FIFO because it does not require separate tracking for units in BWIP. FIFO requires that prior period work and costs be accounted for separately. The weighted average method commingles prior period work and costs with current period work and costs, thus, making the computations much easier. The weighted average method will produce essentially the same results as the FIFO method if the cost of inputs remains relatively unchanged from one period to the next. If there are significant changes in costs, then the unit cost of the two periods can be significantly different. Of course, if BWIP is very small, then the effect of using weighted average will not be noticeable either.

Esercizio 28

1. Gary's proposal requires Donna to falsify the equivalent unit calculation so that income and assets can be inflated and reported incorrectly. Falsification of the production report would be a violation of at least two major ethical standards: integrity and credibility. If Donna agrees to the proposal, she would be taking action that would discredit her profession. In addition, Donna has an ethical obligation to communicate information fairly and objectively, disclosing all information that would be needed for the loan officer to fairly assess the merits of the company's request for a loan. Clearly, Donna should not agree to falsify the production report.
2. Donna has an obligation to report Gary to a superior only if an actual ethical problem exists. If Gary decides that the course of action he is suggesting is not really in his or the company's best interests, then no ethical problem exists and no action by Donna is needed.
3. If Gary insists on his idea of falsification of the division's reports, Donna should attempt to resolve the conflict by appealing to Gary's immediate supervisor (and on up, if necessary and with the immediate supervisor's knowledge, assuming he or she is not involved) until a satisfactory resolution is achieved. If no satisfactory resolution is possible, then Donna should consult her own attorney as to legal obligations and rights concerning the ethical conflict. She may also clarify the ethical issues by initiating a confidential discussion with an IMA Ethics Counselor.
4. In this situation, the ethical dilemma is complicated by two factors: Donna's age and a low likelihood of resolution by appealing to higher-level authorities. Donna's age may make it more difficult to find alternative employment (at least at the same level and pay), and it may mean possible forfeiture of retirement benefits. Seeking help from an expert in ethics and consulting a lawyer are certainly good recommendations. Donna has the option of fighting back, and at her age (with retirement benefits at stake), a good offense may be her best defense.

Esercizio 29

1. Department A

a. Physical flow schedule:

Units in beginning WIP	5,000
Units started in November	<u>25,000</u>
Total units to account for	<u>30,000</u>
Units completed and transferred out:	
Started and completed	23,000
From beginning WIP	5,000
Units in ending WIP	<u>2,000</u>
Total units accounted for	<u>30,000</u>

b. Equivalent unit calculation:

Units started and completed	23,000
Equivalent units in beginning WIP $(1 - 0.40) \times 5,000$	3,000
Equivalent units in ending WIP $(2,000 \times 0.80)$	<u>1,600</u>
Total equivalent units	<u>27,600</u>

c. Costs charged to the department:

	<u>Materials</u>	<u>Conversion</u>	<u>Total</u>
Beginning WIP	\$10,000	\$ 6,900	\$ 16,900
Incurred during November	<u>57,800</u>	<u>95,220</u>	<u>153,020</u>
Total costs	<u>\$67,800</u>	<u>\$102,120</u>	<u>\$169,920</u>

Unit cost calculation:

$$\begin{aligned} \text{Unit cost} &= \frac{\$153,020}{27,600} \\ &= \$5.54 \end{aligned}$$

d. and e. Cost reconciliation:

Cost of units started and completed $(23,000 \times \$5.54)$	\$127,420
Cost of units in beginning WIP:	
Prior period costs	16,900
Current cost to finish units $(3,000 \times \$5.54)$	<u>16,620</u>
Total cost of units transferred out	\$160,940
Costs in ending WIP:	
$(1,600 \times \$5.54)$	<u>8,864</u>
Total costs accounted for	<u>\$169,804*</u>
Costs to account for:	
Beginning WIP	\$ 16,900
Costs incurred	<u>153,020</u>
Total costs to account for	<u>\$169,920</u>

*Difference due to rounding.

2. Journal entries:

Work in Process—Department A	57,800	
Raw Materials		57,800
Work in Process—Department A	95,220	
Conversion Costs—Department A		95,220*
Work in Process—Department B	160,940	
Work in Process—Department A		160,940

*Because conversion costs are not broken into labor and overhead components, a control account for conversion costs is used. Some firms are now combining overhead and direct labor costs into one category. This practice is developing because direct labor is becoming a small percentage of total manufacturing costs.

Esercizio 30

Benson Pharmaceuticals
Picking Department Production Report
For the Month of March (FIFO Method)

UNIT INFORMATION

Units to account for:		
Units in beginning WIP	10	
Units started	<u>150</u>	
Total units to account for	<u>160</u>	
	<u>Physical Flow</u>	<u>Equivalent Units</u>
Units accounted for:		
Units started and completed	130	130
Units in BWIP (to complete)	10	6*
Units in EWIP	<u>20</u>	<u>10**</u>
Total units accounted for	<u>160</u>	<u>146</u>

* $10 \times (0.60)$; ** 20×0.50

COST INFORMATION

Costs to account for:	<u>Materials</u>	<u>Conversion***</u>	<u>Total</u>
Beginning WIP	\$ 252	\$ 846	\$ 1,098
Incurred during March	<u>3,636</u>	<u>13,854</u>	<u>17,490</u>
Total costs to account for	<u>\$3,888</u>	<u>\$ 14,700</u>	<u>\$ 18,588</u>

÷ Equivalent units 146

Cost per equivalent unit ($\$17,490/146$) \$119.79

***BWIP: $282 + (282 \times 2)$; March: $4,618 + (4,618 \times 2)$

	<u>Transferred Out</u>	<u>EWIP</u>	<u>Total</u>
Costs accounted for:			
Units started and comp. ($130 \times \$119.79$)	\$15,573	—	\$15,573
Units in beginning WIP:			
From prior period	1,098	—	1,098
From current period ($6 \times \$119.79$)	719	—	719
Ending work in process:			
($10 \times \$119.79$)	<u> </u>	<u>\$1,198</u>	<u>1,198</u>
Total costs accounted for	<u>\$17,390</u>	<u>\$1,198</u>	<u>\$18,588</u>

Benson Pharmaceuticals
Encapsulating Department Production Report
For the Month of March (FIFO Method)

UNIT INFORMATION

Units to account for:	
Units in beginning WIP	4,000
Units started	<u>210,000</u>
Total units to account for	<u>214,000</u>

Physical	Equivalent Units			
	Flow	Trans. In	Materials	Conversion
Units accounted for:				
Units started and completed	204,000	204,000	204,000	204,000
Units in BWIP (to complete)	4,000	—	—	2,000
Units in EWIP	<u>6,000</u>		<u>6,000</u>	<u>6,000</u>
<u>2,400</u>				
Total units accounted for	<u>214,000</u>	<u>210,000</u>	<u>210,000</u>	<u>208,400</u>

COST INFORMATION

Costs to account for:	Trans. In	Materials	Conversion	Total
Beginning WIP	\$ 140	\$ 32	\$ 50	\$ 222
Incurred during March	<u>17,390</u>	<u>1,573</u>	<u>4,860</u>	<u>23,823</u>
Total costs to acct. for	<u>\$17,530</u>	<u>\$1,605</u>	<u>\$4,910</u>	<u>\$24,045</u>
÷ Equivalent units	210,000	210,000	208,400	
Cost per equivalent unit	\$0.0828*	\$0.0075*	\$0.0233*	\$0.1136

*The numbers are rounded and the unit costs are calculated using only costs for March because FIFO is being used.

	Transferred Out	Ending Work in Process	Total
Costs accounted for:			
Units started and completed (204,000 × \$0.1136)	\$23,174	—	\$23,174
Units in BWIP from prior period	222	—	222
Current period (2,000 × \$0.0233)	47	—	47
Ending work in process:			
Transferred in (6,000 × \$0.0828)	—	\$497	497
Materials (6,000 × \$0.0075)	—	45	45
Conversion (2,400 × \$0.0233)	—	<u>56</u>	<u>56</u>
Total costs accounted for	<u>\$23,443</u>	<u>\$598</u>	<u>\$24,041*</u>

*Difference due to rounding.

CASES

Esercizio 31

1. Unit cost computation:

Physical flow schedule:

Units, beginning work in process	0
Units started	<u>2,800</u>
Total units to account for	<u>2,800</u>
Units completed and transferred out:	
Started and completed	2,500
From beginning work in process	0
Units, ending work in process	<u>300</u>
Total units accounted for	<u>2,800</u>

Costs charged to the department:

	Direct <u>Materials</u>	Conversion <u>Costs</u>	<u>Total</u>
Costs in beginning work in process	\$ 0	\$ 0	\$ 0
Costs added by department	<u>114,000</u>	<u>82,200*</u>	<u>196,200</u>
Total costs	<u>\$114,000</u>	<u>\$82,200</u>	<u>\$196,200</u>

* $45,667 + (.80 \times 45,667)$

Equivalent units calculation:

	Direct <u>Materials</u>	Conversion <u>Costs</u>
Units completed	2,500	2,500
Equivalent units in ending work in process	<u>300</u>	<u>240</u>
Total equivalent units	<u>2,800</u>	<u>2,740</u>

Unit cost calculation:

$$\begin{aligned}
 \text{Unit cost} &= \text{Unit direct materials cost} + \text{Unit conversion costs} \\
 &= \frac{\$114,000}{2,800} + \frac{\$82,200}{2,740} \\
 &= \$40.71^* + \$30 \\
 &= \$70.71
 \end{aligned}$$

*Rounded

2. Since conversion activity is the same for both bows, only the materials cost will differ. Thus, the unit materials cost is computed and then added to the unit conversion cost obtained in Requirement 1.

Econo Model

Physical flow schedule:

Units, beginning work in process	0
Units started	<u>1,600</u>

Total units to account for 1,600

Units completed and transferred out:

Started and completed	1,500
From beginning work in process	0
Units, ending work in process	<u>100</u>
Total units accounted for	<u>1,600</u>

Direct materials cost charged to the department:

	<u>Direct Materials</u>
Costs in beginning work in process	\$ 0
Costs added by department	<u>30,000</u>
Total costs	<u>\$30,000</u>

Equivalent units calculation:

	<u>Direct Materials</u>
Units completed	1,500
Add: Equivalent units in ending work in process	<u>100</u>
Total equivalent units	<u>1,600</u>

Unit cost calculation:

Unit cost = Unit direct materials cost + Unit conversion costs
= $\frac{\$30,000}{1,600} + \30.00
= \$18.75 + \$30.00
= \$48.75

Deluxe Model

Physical flow schedule:

Units, beginning work in process	0
Units started	<u>1,200</u>
Total units to account for	<u>1,200</u>

Units completed and transferred out:

Started and completed	1,000
From beginning work in process	0
Units, ending work in process	<u>200</u>
Total units accounted for	<u>1,200</u>

Direct materials cost charged to the department:

	<u>Direct Materials</u>
Costs in beginning work in process	\$ 0
Costs added by department	<u>84,000</u>
Total costs	<u>\$84,000</u>

Equivalent units calculation:

	<u>Direct Materials</u>
Units completed	1,000
Add: Equivalent units in ending work in process	<u>200</u>

Total equivalent units 1,200

Unit cost calculation:

$$\begin{aligned}
 \text{Unit cost} &= \text{Unit direct materials cost} + \text{Unit conversion costs} \\
 &= \frac{\mathbf{\$84,000}}{\mathbf{1,200}} + \$30 \\
 &= \$70 + \$30 \\
 &= \$100
 \end{aligned}$$

3. Unit cost for Econo model	\$48.75
Unit cost for Deluxe model	\$100.00
Unit cost for both together	\$70.71

Using pure process costing understates the cost of the Deluxe model and overstates the cost of the Econo model. The error is large, so Karen seems to be justified in her belief that a pure process-costing relationship is not appropriate.

Process costing could be used for all departments other than the pattern department. In the pattern department, process-costing procedures can be used for conversion costs, but the cost of direct materials should be tracked by batch.

4. The profitability of the Econo line was being understated by nearly \$22, while that of the Deluxe line was overstated by over \$29, producing an erroneous \$51 difference in profitability under the current process-costing system. This easily could be enough difference to make the marketing manager's request for additional advertising dollars a sound one. It is quite possible that Aaron was wrong in not granting the request—wrong because he was using the wrong cost information. This example illustrates the importance of an accurate costing system.

Esercizio 33

1. Physical flow schedule:

Units, beginning work in process	10,000
Units started (transferred in)	<u>51,000</u>
Total units to account for	<u>61,000</u>
Units completed and transferred out:	
Started and completed	40,000
From beginning work in process	10,000
Units, ending work in process	<u>11,000</u>
Total units accounted for	<u>61,000</u>

Costs:

Costs incurred by the gating department:		
Direct materials	(23% × \$378,000)	\$ 86,940
Direct labor	(35% × \$530,300)	185,605
Overhead	(35% × \$643,518)	<u>225,231*</u>
Total costs added		<u>\$497,776</u>

*Assumes that overhead is used in the same proportion as direct labor.

Equivalent units calculation:

	<u>Direct Materials</u>	<u>Conversion Costs</u>
Units started and completed	40,000	40,000
Units completed from beginning work in process	—	4,000
Add: Equivalent units in ending work in process	<u>11,000</u>	<u>6,600</u>
Total equivalent units	<u>51,000</u>	<u>50,600</u>

Unit cost calculation:

$$\begin{aligned}
 \text{Unit cost} &= \text{Unit direct materials cost} + \text{Unit conversion costs} \\
 &= \frac{\$86,940}{51,000} + \frac{\$410,836}{50,600} \\
 &= \$1.70^* + \$8.12^* \\
 &= \$9.82
 \end{aligned}$$

*Rounded

Value of ending work in process:

Direct materials	(11,000 × \$1.70)	\$18,700
Conversion costs	(6,600 × \$8.12)	<u>53,592</u>
Total cost of units in ending work in process		<u>\$72,292</u>

Assumptions: Overhead is used at the same rate as direct labor.

The FIFO method is used because the costs associated with the beginning work in process are not known. Only the manufacturing costs added this period (2007) are known. Since the FIFO method requires only current output and current costs to calculate the unit cost, it is the method that should be used. Once a cost per equivalent unit is known, the ending work in process can be valued.

2. Units, beginning work in process	8,000
Units started (transferred in)	<u>50,000</u>
Total units to account for	<u>58,000</u>

Units completed and transferred out:

Started and completed	42,000
From beginning work in process	8,000
Units, ending work in process	<u>8,000</u>
Total units accounted for	<u>58,000</u>

Equivalent units calculation:

	<u>Direct Materials</u>	<u>Conversion Costs</u>	<u>Transferred In</u>
Units started and completed	42,000	42,000	42,000
Units to complete, beginning work in process	—	6,400	—
Add: Equivalent units in ending work in process	<u>8,000</u>	<u>2,400</u>	<u>8,000</u>
Total equivalent units	<u>50,000</u>	<u>50,800</u>	<u>50,000</u>

Costs:

Transferred-in cost (50,000 × \$9.82)		\$491,000*
Costs incurred by shell creating:		
Direct materials (\$378,000 × 0.47)	\$177,660	
Direct labor (\$530,300 × 0.15)	79,545	
Overhead (\$643,518 × 0.15)	<u>96,528**</u>	
Total conversion cost		<u>353,733</u>
Total costs		<u>\$844,733</u>

*Assumes that all units transferred out, including those finished from beginning work in process, have a cost of \$9.82 per unit. In essence, this assumes that the unit cost of this period equals the unit cost of the prior period.

**Rounded

$$\begin{aligned}
 \text{Unit cost} &= \text{Unit direct materials cost} + \text{Unit conversion costs} + \\
 &\quad \text{Unit transferred-in cost} \\
 &= \frac{\$177,660}{50,000} + \frac{\$176,073}{50,800} + \frac{\$491,000}{50,000} \\
 &= \$3.55^* + \$3.47^* + \$9.82 \\
 &= \$16.84
 \end{aligned}$$

*Rounded

Units, ending work in process:		
Direct materials (8,000 × \$3.55)	\$	28,400
Conversion costs (2,400 × \$3.47)		8,328
Transferred in (8,000 × \$9.82)		<u>78,560</u>
Total cost of ending work in process		<u>\$115,288</u>

In addition to the same assumptions made for the first department, we had to assume that the unit cost of all units transferred out was equal to the FIFO method unit cost. This assumption holds if the cost of producing last period did not change for this period. Even if the cost did change, the error is not likely to be large. For purposes of estimating the value of ending work in process, the assumption is quite workable.