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CAPITAL ASSET ACQUISITION

Capital Assets, often called Fixed Assets, refer to items that will be of benefit to a company for a long period of time. Examples would include Land, Land Improvements (paved driveways, etc.), Buildings, Equipment and Vehicles.

According to the Cost Principle, assets must be recorded at their cost and includes all costs involved in getting them to a condition for use by the company.

In most cases the value of the Capital Asset is easily determined because the cost is the total invoice amount less any recoverable sales taxes (GST).

There are however, situations that are not as simple as follows:

Example 1:

Purchased a used machine	\$80,000
Cost of moving the machine to the plant	1,000
Cost of repairs to put it in working condition	3,000
Cost of making the foundation for the machine	2,000
Cost of installation (assembly, wiring, etc.)	1,500
Cost of Raw Materials to test the machine	500
Total Cost of the Machine	<u>\$88,000</u>

Example 2:

Purchased Land, Building and Equipment for \$200,000. Since each item must be set up in a separate account, we need to allocate the \$200,000 between Land, Building and Equipment. To do this we need an appraisal of the value of each item and then we can allocate the cost.

Asset	Appraised Value	Percentage of Total	Cost Allocation
Land	72,000	1. 30%	4. 60,000
Building	120,000	2. 50%	5. 100,000
Equipment	48,000	3. 20%	6. 40,000
Total	240,000	100%	200,000

1. 72,000 divided by 240,000 equals 30%
2. 120,000 divided by 240,000 equals 50%
3. 48,000 divided by 240,000 equals 20%
4. 200,000 times 30% equals 60,000
5. 200,000 times 50% equals 100,000
6. 200,000 times 20% equals 40,000

Once a Capital Asset has been purchased a Subsidiary Ledger Card should be created to keep track of the Cost and the Accumulated Amortization.

Example of a Subsidiary Ledger Card for a Fixed Asset

Item Name:	Drill Press	Amortization Method:	Straight Line
Purchase From:	ABC Equipment	Location:	Factory Floor
Estimated Life:	10 years	Est. Salvage Value:	\$2,000

Date	Asset Cost			Accumulated Amortization			Book Value
	Debit	Credit	Balance	Debit	Credit	Balance	
Jan 01/91	88,000		88,000				88,000
Dec 31/91					8,600	8,600	79,400
Dec 31/92					8,600	17,200	70,800
Dec 31/93					8,600	25,800	62,200
Dec 31/94					8,600	34,400	53,600

As you can probably see, we are amortizing (reducing the value of) the asset at the end of each year. In reality you should be recording the credit to Accumulated Amortization and the debit to Amortization Expense on a monthly basis if you are creating monthly financial statements.

The amortization method we used above is referred to as the Straight Line Method. The calculation is as follows:

Cost	88,000
Less Estimated Salvage Value	2,000
Equals Maximum Accumulated Amortization	86,000
Divided by Estimated Life in Years	10
Equals Amortization per Year	8,600

Other methods of amortization exist and are covered in another chapter.

ACCUMULATED AMORTIZATION

Capital (Fixed) Assets benefit a company for several years but decrease in value over that time. To record the accumulated reduction in a Capital Asset's value we use an account called Accumulated Amortization (also known as Accumulated Depreciation). This asset is a Contra account, which means that even though it is an asset, its balance is a Credit. In this way its balance reduces the Debit balance of the Capital Asset account.

Example 1 – Appearance on a Trial Balance:

	DEBIT	CREDIT
Office Equipment	8,000	
Accumulated Amortization – Office Equipment		2,000
Store Equipment	3,000	
Accumulated Amortization – Store Equipment		1,000

Example 2 – Appearance on a Statement of Financial Position (Balance Sheet)

CAPITAL ASSETS:

Office Equipment	8,000	
Less Accumulated Amortization	<u>2,000</u>	6,000
Store Equipment	3,000	
Less Accumulated Amortization	<u>1,000</u>	<u>2,000</u>
Total Capital Assets		<u>8,000</u>

When recording amortization (depreciation) the journal entry would Debit an Expense account called Amortization Expense and Credit an Asset account called Accumulated Amortization. The problem is to arrive at the amount to be used in the Journal Entry.

There are three methods used to calculate the amount of amortization expense. The method you choose should be applied throughout the life of the Capital Asset. In this way you are adhering to the Consistency Principle.

Straight Line Method

CALCULATION	EXPLANATION
Cost	Cost of the Capital Asset
<u>minus Salvage Value</u>	Estimated Proceeds from Disposal (sale)
equals Maximum Accumulated Amortization	The maximum amount to be amortized
<u>divided by the Life in Years</u>	Estimated # of years you keep the asset
equals the Amortization per Year	
<u>divided by 12</u>	Number of months in a year
equals the Amortization per Month	

Example:

CALCULATION	EXPLANATION
14,000	Cost of a Vehicle
- 2,000	Expected cash received when sold
= 12,000	The maximum amount to be amortized
/ 10	Expected to be kept for 10 years
= 1,200	Amortization Expense per year
/ 12	Number of months in a year
= 100	Amortization Expense per month

Units of Production Method

CALCULATION	EXPLANATION
Cost	Cost of the Capital Asset
<u>minus Salvage Value</u>	Estimated Proceeds from Disposal (sale)
equals Maximum Accumulated Amortization	The maximum amount to be amortized
<u>divided by Maximum Units</u>	Estimated Total Units before disposal
equals the Amortization per Unit	
<u>times the number of units per period</u>	Actual Units per period
equals the Amortization per period	

Example:

CALCULATION	EXPLANATION
14,000	Cost of a Vehicle
<u>- 2,000</u>	Expected cash received when sold
= 12,000	The maximum amount to be amortized
<u>/ 100,000</u>	Estimated kilometres before disposal
= 0.12	Amortization per kilometre
<u>x 1,000</u>	Kilometres driven in the month
= 120	Amortization for the month

Double Declining Method

CALCULATION 1	EXPLANATION
Cost	Cost of the Capital Asset
<u>minus Salvage Value</u>	Estimated Proceeds from Disposal
equals Maximum Accumulated Amortization	The maximum amount to be amortized

Example of Calculation 1:

CALCULATION 1	EXPLANATION
14,000	Cost of a Vehicle
<u>- 2,000</u>	Expected cash received when sold
= 12,000	The maximum amount to be amortized

CALCULATION 2	EXPLANATION
100%	Always use 100%
<u>divided by Life in Years</u>	Estimated # of years you keep the asset
equals Single Rate	Rate for Straight Line Method
time 2	Double the Straight Line Rate
equals Double Declining Rate	Rate to be applied to Net Book Value

Example of Calculation 2:

CALCULATION 2	EXPLANATION
100%	Always use 100%
<u>/ 10</u>	Keep the Vehicle for 10 years
= 10%	Rate for Straight Line Method
<u>x 2</u>	Double the Straight Line Rate
= 20%	Rate to be applied to Net Book Value

The above shows how to calculate the Rate and the Maximum Accumulated Amortization but does not address the “Declining” part. The following will illustrate how “Declining” works.

As you can see from the following, we begin the first year with the cost of the asset and apply the Double Declining rate to arrive at the amortization for the year (divided by 12 would give the amortization per month). The amount of amortization reduces the Net Book Value (Cost minus Accumulated Amortization). This reduced Net Book Value is then used as the basis for calculating the next year’s amortization. It should be noted that the Accumulated Amortization must still not exceed the Maximum Accumulated Amortization. Another way to say the same thing is “The Net Book Value (Cost minus the Accumulated Amortization) must not go below the Salvage Value”.

Year	Net Book Value at the Beginning	Rate	Amortization for the Year	Net Book Value at the End
1	14,000	20%	2,800	11,200
2	11,200	20%	2,240	8,960
3	8,960	20%	1,792	7,168
4	7,168	20%	1,434	5,734
5	5,734	20%	1,147	4,587
6	4,587	20%	917	3,670
7	3,670	20%	734	2,936
8	2,936	20%	587	2,349
9	2,349	20%	470	1,879
10	1,879	20%	376	1,503

As you can see from the above, the amortization expense starts out large (\$2,800) and decreases each year. The only problem with the above solution is that the Net Book Value has gone below the Salvage Value of \$2,000, which means our Accumulated Amortization has exceeded the Maximum Accumulated Amortization of \$12,000. Therefore, the amortization expense for the 9th year should have been \$349 instead of \$470. The \$349 will reduce the Net Book Value to \$2,000 (Salvage Value). There should be no amortization for the 10th year.

The Double Declining Method is the most popular for two reasons:

1. The amortization expense is highest at the beginning of an asset's life when Repair Expense is low and lowest at the end of an asset's life when Repair Expense is high. This evens out the amount of expense over the life of the asset.
2. The Taxation department of the government allows the Double Declining Method. They have posted rates (Capital Cost Allowance) that (for tax purposes) vary depending on the asset being amortized.

BETTERMENT & DISPOSAL

Betterments

In the normal use of a Capital Asset small dollar items for repairs and maintenance are necessary to keep the asset operating. However, a situation may arise where a substantial expenditure is required to improve the performance of the asset. This is called a Betterment and would reflect an increase in the cost of the asset. Because the cost of the asset has changed, the amortization must be recalculated. The two other things that create the necessity to recalculate amortization are a change in the estimated life of the asset and a change in the expected salvage value. The following example uses a table that is useful in these situations. Study the table below with the Explanations on the next page to understand the concept.

Example of Changes in Cost, Life or Salvage Value of a Capital Asset assuming the Straight Line Method of Amortization:

Date		Cost	Accum. Amort.	Net Book Value	Salvage Value	Remaining Life in Months
Jan 02/91	Cost	14,000		14,000	2,000	120
Dec 31/91	Change		+1,200	-1,200		-12
	Balance	14,000	1,200	12,800	2,000	108
Apr 30/92	Change		+400	-400		-4
	Balance	14,000	1,600	12,400	2,000	104
Apr 30/92	Change	+1,040		+1,040		
	Balance	15,040	1,600	13,440	2,000	104
Dec 31/92	Change		+880	-880		-8
	Balance	15,040	2,480	12,560	2,000	96
May 31/93	Change		+550	-550		-5
	Balance	15,040	3,030	12,010	2,000	91
May 31/93	Change				-455	
	Balance	15,040	3,030	12,010	1,545	91
Dec 31/93	Change		+805	-805		-7
	Balance	15,040	3,835	11,205	1,545	84
Oct 31/94	Change		+1,150	-1,150		-10
	Balance	15,040	4,985	10,055	1,545	74
Oct 31/94	Change				-490	-14
	Balance	15,040	4,985	10,055	1,055	60
Dec 31/94	Change		+300	-300		-2
	Balance	15,040	5,285	9,755	1,055	58
Dec 31/95	Change		+1,800	-1,800		-12
	Balance	15,040	7,085	7,955	1,055	46

Explanations:

- Jan 02/91 Purchased a vehicle for \$14,000 that we expect to sell at the end of 120 months (10 years) for \$2,000.
- Dec 31/91 Recorded amortization for 12 months $(14,000 - 2,000) / 10 \text{ years} = \$1,200$ or \$100 per month.
- Apr 30/92 Recorded amortization for 4 months just before the betterment $(\$100 \times 4 = \$400)$.
- Apr 30/92 Recorded the betterment of \$1,040

You must calculate the new monthly amortization as $(13,440 - 2,000) / 104 = \110 .

- Dec 31/92 Recorded amortization for the remaining 8 months of 1992 $(\$110 \times 8 = \$880)$.
- May 31/93 Recorded amortization for 5 months just before the estimated \$455 decrease in the salvage value $(\$110 \times 5 = \$550)$
- May 31/93 Reduction of \$455 in the estimate of the salvage value

You must calculate the new monthly amortization as $(12,010 - 1,545) / 91 = \115 .

- Dec 31/93 Recorded amortization for the remaining 7 months of 1993 $(\$115 \times 7 = \$805)$.
- Oct 31/94 Recorded amortization for 10 months just before a change in the estimated life and estimated salvage value $(\$115 \times 10 = \$1,150)$.
- Oct 31/94 Reduction of \$490 in the estimated salvage value and a reduction of 14 months in the estimated life

You must calculate the new monthly amortization as $(10,055 - 1,055) / 60 = \150 .

- Dec 31/94 Recorded amortization for the remaining 2 months of 1994 $(\$150 \times 2 = \$300)$.
- Dec 31/95 Recorded amortization for the 12 months of 1995 $(\$150 \times 12 = \$1,800)$

Each time there is a change in the Cost, Estimated Salvage Value or Estimated Life of a Capital Asset, the Accumulated Amortization must be brought up to date and a new monthly amortization amount is calculated. The calculation is as follows:

Net Book Value minus Salvage Value divided by the Remaining Life in Months

Disposals

When we no longer need a Capital Asset we get rid of (dispose of) it. Because we no longer own the asset we must create the journal entry to remove it (and its related Accumulated Amortization) from our books. Before we can do this the Accumulated Amortization must be brought up to date.

Let's assume that, in the example above, we disposal of the vehicle March 31, 1996. To do this we must first bring the Accumulated Amortization up to date as follows:

Date		Cost	Accum. Amort.	Net Book Value	Salvage Value	Remaining Life in Months
Dec 31/95	Balance	15,040	7,085	7,955	1,055	46
Mar 31/96	Change		450	-450		-3
Mar 31/96	Balance	15,040	7,535	7,505	1,055	43

Once the amortization has been brought up to date the calculation and journal entry for the disposal of the asset can be made.

The calculation appears as follows:

$$\text{Proceeds from Disposal minus } \frac{\text{Cost minus Accumulated Amortization}}{\text{Net Book Value}} \text{ equals Gain (Loss)}$$

Using our example above and the assumption that we sold the vehicle for \$8,000, the calculation would be as follows:

$$8,000 \text{ minus } \frac{15,040 - 7,535}{7,505} = \$495 \text{ Gain}$$

The journal entry to record the disposal would be as follows:

DATE	ACCOUNT	PUZZLE	DEBIT	CREDIT
Mar 31/96	Cash in Bank	Asset	8,000	
	Old Acc. Amort.	Asset	7,535	
	Old Vehicle	Asset		15,040
	Gain on Disposal	Revenue		495

If the Proceeds from Disposal were less that the Net Book Value of \$7,505 the result would be a Loss on Disposal

Another possibility besides the straight disposal would be a Trade-In of one Capital asset for another. When this happens the dealer will give a "Trade-In Allowance" for the old

asset. The difference between the Net Book Value and the Trade-In Allowance can be material (large amount) or immaterial (small amount). The journal entry to record the trade will differ depending upon whether the amount is material or immaterial.

Example 1:

Assume the vehicle above was traded in for a new vehicle on March 31, 1996. The new vehicle has a sticker price of \$20,000 and the dealer will give us a trade-in allowance of \$9,000. The difference between the \$9,000 and the \$7,505 (Net Book Value) is \$1,495 and should be considered material. The difference between 20,000 and 9,000 is the cash pay out of \$11,000. The journal entry for this trade would be as follows:

DATE	ACCOUNT	PUZZLE	DEBIT	CREDIT
Mar 31/96	New Vehicle	Asset	20,000	
	Old Acc. Amort.	Asset	7,535	
	Old Vehicle	Asset		15,040
	Cash in Bank	Asset		11,000
	Gain on Disposal	Revenue		1,495

Example 2:

Assume the vehicle above was traded in for a new vehicle on March 31, 1996. The new vehicle has a sticker price of \$20,000 and the dealer will give us a trade-in allowance of \$7,600. The difference between the \$7,600 and the \$7,505 (Net Book Value) is \$95 and should be considered immaterial. The difference between 20,000 and 7,600 is the cash pay out of \$12,400. The journal entry for this trade would be as follows:

DATE	ACCOUNT	PUZZLE	DEBIT	CREDIT
Mar 31/96	New Vehicle	Asset	19,905	
	Old Acc. Amort.	Asset	7,535	
	Old Vehicle	Asset		15,040
	Cash in Bank	Asset		12,400

As you can see, if the difference is immaterial, the gain (or loss) is subtracted (or added) to the cost of the new asset.

DEPARTMENTAL ACCOUNTING

Large companies operate with several departments run by managers. To allow for the evaluation of each department and their managers it is necessary to allocate revenues and expenses to those departments. To fully understand departmental accounting we must first recognize that some departments are revenue-generating departments while others are service departments. For example, in a large store, the Men's Clothing, Jewelry and Shoe departments would be considered revenue generating departments as opposed to the Purchasing and Accounting departments, which would be considered service departments.

Revenue generating departments have both revenue and expenses. The revenue of these departments and some costs (ie: cost of goods sold and wages) are easily attributed to the department that generated the revenue, but some costs are for the company as a whole and must be allocated to each department. Service departments have only expenses. To create a Statement of Earnings for each department, we must allocate the costs of the service departments to the revenue generating departments. After this allocation, the sum of the Net Income (excluding Income Tax) for each department is the same as the Net Income for the company as a whole.

To illustrate, we will assume our company has four departments, two revenue-generating departments (Clothing and Shoes) and two service departments (Purchasing and Accounting). To allocate the revenue and expenses to the appropriate departments we must create a Department Allocation Worksheet as follows:

	Allocation Base	Total Expense	Purch. Dept.	Acct. Dept.	Cloth. Dept.	Shoe Dept.
Sales					250,000	150,000
Cost of Goods Sold					150,000	90,000
Gross Profit					100,000	60,000
Direct Expenses:						
Wages		27,000	9,000	8,000	5,000	5,000
Supplies		3,000	1,000	1,000	500	500
Indirect Expenses:						
Rent		30,000				
Utilities		10,000				
Advertising		40,000				
Insurance		10,000				
Total Expenses						
Purch. Dept.						
Acct. Dept.						
Expenses after Service Dept Allocation						
Net Income (before Income Taxes)						

As mentioned earlier, the allocation of the revenue, cost of goods sold and direct expenses to each department is not difficult. The problem becomes apparent when we start to deal with indirect expenses. To allocate these expenses we need a basis for the allocation. This basis is a management decision, but there are some obvious choices as we will use in our example. Let's deal with one indirect expense at a time.

The total rent expense for the company is \$30,000 and we must allocate a portion of that dollar amount to each of the four departments. It is a common assumption that floor space on the first floor is more valuable than the second floor and floor space at the front of the store is more valuable than at the back of the store. Therefore it is important when allocating rent to first put a value on the floor space.

For the purpose of this example, let's assume that our store has two stories both of which are 1,000 square metres in size. Let's further assume that the revenue generating departments occupy the first floor and the service departments occupy the second floor. From talking to real estate agents we have determined that the first floor space is worth twice as much as the second floor space and that the first floor space is worth \$22 per square metre. Our initial calculations would be as follows:

	Appraised Value	Portion of Total	\$30,000 Rent
First Floor	22	2/3	20,000
Second Floor	11	1/3	10,000
Total	33	3/3	30,000

Our next step is to allocate the appropriate expense to each department on each floor. To allocate the first floor's rent let's assume that the Clothing Department occupies 750 square metres and the Shoe Department occupies 250 square metres. We now get the following allocation:

	Floor Space	Portion of Total	\$20,000 Rent
Clothing	750	75%	15,000
Shoes	250	25%	5,000
Total	1,000	100%	20,000

To allocate the second floor rent let's assume that the Purchasing Department occupies 500 square metres of the second floor and the Accounting Department occupies 500 square metres. We now get the following allocation:

	Floor Space	Portion of Total	\$10,000 Rent
Purchasing	500	50%	5,000
Accounting	500	50%	5,000
Total	1,000	100%	10,000

We can now add the allocation of the rent to our worksheet and it appears as follows:

	Allocation Base	Total Expense	Purch. Dept.	Acct. Dept.	Cloth. Dept.	Shoe Dept.
Sales					250,000	150,000
Cost of Goods Sold					150,000	90,000
Gross Profit					100,000	60,000
Direct Expenses:						
Wages		27,000	9,000	8,000	5,000	5,000
Supplies		3,000	1,000	1,000	500	500
Indirect Expenses:						
Rent	Floor Space	30,000	5,000	5,000	15,000	5,000
Utilities		10,000				
Advertising		40,000				
Insurance		10,000				
Total Expense						
Purch. Dept.						
Acct. Dept.						
Expenses after Service Dept Allocation						
Net Income						

Our next indirect expense to allocate is Utilities. Because this includes things like heat and light, which benefits all departments equally, it is normally allocated to each department based on the floor space they occupy. The following would be the allocation calculation:

	Floor Space	Portion of Total	\$10,000 Utilities
Purchasing	500	25.0%	2,500
Accounting	500	25.0%	2,500
Clothing	750	37.5%	3,750
Shoes	250	12.5%	1,250
Total	2,000	100.0%	10,000

We can now add the allocation of the utilities to our worksheet and it appears as follows:

	Allocation Base	Total Expense	Purch. Dept.	Acct. Dept.	Cloth. Dept.	Shoe Dept.
Sales					250,000	150,000
Cost of Goods Sold					150,000	90,000
Gross Profit					100,000	60,000
Direct Expenses:						
Wages		27,000	9,000	8,000	5,000	5,000
Supplies		3,000	1,000	1,000	500	500
Indirect Expenses:						
Rent	Floor Space	30,000	5,000	5,000	15,000	5,000
Utilities	Floor Space	10,000	2,500	2,500	3,750	1,250
Advertising		40,000				
Insurance		10,000				
Total Expenses						
Purch. Dept.						
Acct. Dept.						
Expenses after Service Dept Allocation						
Net Income						

Our next indirect expense to allocate is Advertising which is normally allocated to each revenue-generating department based on sales. The following would be the allocation calculation:

	Sales	Portion of Total	\$40,000 Advertising
Clothing	250,000	62.5%	25,000
Shoes	150,000	37.5%	15,000
Total	400,000	100.0%	40,000

We can now add the allocation of the advertising to our worksheet and it appears as follows:

	Allocation Base	Total Expense	Purch. Dept.	Acct. Dept.	Cloth. Dept.	Shoe Dept.
Sales					250,000	150,000
Cost of Goods Sold					150,000	90,000
Gross Profit					100,000	60,000
Direct Expenses:						
Wages		27,000	9,000	8,000	5,000	5,000
Supplies		3,000	1,000	1,000	500	500
Indirect Expenses:						
Rent	Floor Space	30,000	5,000	5,000	15,000	5,000
Utilities	Floor Space	10,000	2,500	2,500	3,750	1,250
Advertising	Sales	40,000			25,000	15,000
Insurance		10,000				
Total Expenses						
Purch. Dept.						
Acct. Dept.						
Expenses after Service Dept Allocation						
Net Income						

Our next indirect expense to allocate is Insurance, which we will allocate to each department based on floor space. The following would be the allocation calculation:

	Floor Space	Portion of Total	\$10,000 Insurance
Purchasing	500	25%	2,500
Accounting	500	25%	2,500
Clothing	750	37.5%	3,750
Shoes	250	12.5%	1,250
Total	2,000	100.0%	10,000

We can now add the allocation of the advertising to our worksheet and it appears as follows:

	Allocation Base	Total Expense	Purch. Dept.	Acct. Dept.	Cloth. Dept.	Shoe Dept.
Sales					250,000	150,000
Cost of Goods Sold					150,000	90,000
Gross Profit					100,000	60,000
Direct Expenses:						
Wages		27,000	9,000	8,000	5,000	5,000
Supplies		3,000	1,000	1,000	500	500
Indirect Expenses:						
Rent	Floor Space	30,000	5,000	5,000	15,000	5,000
Utilities	Floor Space	10,000	2,500	2,500	3,750	1,250
Advertising	Sales	40,000			25,000	15,000
Insurance	Floor Space	10,000	2,500	2,500	3,750	1,250
Total Expenses			20,000	19,000	53,000	28,000
Purch. Dept.						
Acct. Dept.						
Expenses after Service Dept Allocation						
Net Income						

Our next step is to allocate the total expenses of the Purchasing Department to the revenue generating departments, which we will allocate to each department, based on cost of goods sold. The following would be the allocation calculation:

	Cost of Goods Sold	Portion of Total	\$20,000 Purch Dept
Clothing	150,000	62.5%	12,500
Shoes	90,000	37.5%	7,500
Total	240,000	100.0%	20,000

We can now add the allocation of the Purchasing Department expenses to our worksheet and it appears as follows:

	Allocation Base	Total Expense	Purch. Dept.	Acct. Dept.	Cloth. Dept.	Shoe Dept.
Sales					250,000	150,000
Cost of Goods Sold					150,000	90,000
Gross Profit					100,000	60,000
Direct Expenses:						
Wages		27,000	9,000	8,000	5,000	5,000
Supplies		3,000	1,000	1,000	500	500
Indirect Expenses:						
Rent	Floor Space	30,000	5,000	5,000	15,000	5,000
Utilities	Floor Space	10,000	2,500	2,500	3,750	1,250
Advertising	Sales	40,000			25,000	15,000
Insurance	Floor Space	10,000	2,500	2,500	3,750	1,250
Total Expenses			20,000	19,000	53,000	28,000
Purch. Dept.	Cost of Sales		(20,000)		12,500	7,500
Acct. Dept.						
Expenses after Service Dept Allocation			0			
Net Income						

Our final step is to allocate the total expenses of the Accounting Department to the revenue generating departments, which we will allocate to each department based on Sales. The following would be the allocation calculation:

	Sales	Portion of Total	\$19,000 Acct. Dept
Clothing	250,000	62.5%	11,875
Shoes	150,000	37.5%	7,125
Total	400,000	100.0%	19,000

We can now add the allocation of the Accounting Department expenses to our worksheet and it appears as follows:

	Allocation Base	Total Expense	Purch. Dept.	Acct. Dept.	Cloth. Dept.	Shoe Dept.
Sales					250,000	150,000
Cost of Goods Sold					150,000	90,000
Gross Profit					100,000	60,000
Direct Expenses:						
Wages		27,000	9,000	8,000	5,000	5,000
Supplies		3,000	1,000	1,000	500	500
Indirect Expenses:						
Rent	Floor Space	30,000	5,000	5,000	15,000	5,000
Utilities	Floor Space	10,000	2,500	2,500	3,750	1,250
Advertising	Sales	40,000			25,000	15,000
Insurance	Floor Space	10,000	2,500	2,500	3,750	1,250
Total Expenses			20,000	19,000	53,000	28,000
Purch. Dept.	Cost of Sales		-20,000		12,500	7,500
Acct. Dept.	Sales			-19,000	11,875	7,125
Expenses after Service Dept Allocation			0	0	77,375	42,625
Net Income (Gross Profit less Total Expenses after Allocation)					22,625	17,375

As you can see, once the indirect expenses have been allocated to the departments and the service department's total expenses have been allocated to the revenue-generating departments, the creation of a Statement of Earnings by Department is easy. The steps to create Departmental Statements is as follows:

1. Assign the revenue to the revenue generating departments
2. Assign the direct expenses to all departments
3. Allocate the indirect expenses to all applicable departments
4. Allocate the service department total expenses to the revenue generating departments.

COST ACCOUNTING

There are basically three types of companies, Service, Merchandising and Manufacturing companies. Service companies provide a service and charge an hourly rate like a lawyer or accountant. Merchandising companies purchase large quantities of items that they put on the shelf and sell to the customer. Manufacturing companies purchase raw materials, add labour and create a finished product that is sold. This, and the following chapters deal with Manufacturing companies.

Inventories

Unlike a merchandising company that has one type of inventory (merchandise), a manufacturing company has three inventories:

1. Raw Materials Inventory (purchased from a supplier)
2. Goods in Process Inventory (partly finished product)
3. Finished Goods Inventory (finished but unsold product)

Costs

There are two types of costs:

1. Product Costs (costs that go into making the product)
2. Period Costs (selling expenses and general & administrative expenses)

Product Costs

These are all the costs that go into the making of a product. These cost can be broken down into three components:

1. Direct Material
2. Direct Labour
3. Factory Overhead

Material

These are the raw materials that go into the product being manufactured. There are two types of materials, Direct Materials and Indirect Materials. To be considered Direct Material, their quantity and value (per product) must be measurable so a dollar value can be associated with that product. As an example, when manufacturing a wooden desk, the wood would be considered a Direct Material whereas the glue would be considered Indirect Material.

Labour

This is the labour cost that goes into the product being manufactured. There are two types of labour, Direct Labour and Indirect Labour. To be considered Direct Labour, the quantity and value (per product) must be measurable so a dollar value can be associated with that product. As an example, when manufacturing a wooden desk, the cost of the person putting the pieces together would be considered Direct Labour whereas the shift supervisor's cost would be considered Indirect Labour.

Factory Overhead

This is the Indirect Material, Indirect Labour and any other costs directly associated with the manufacturing process. These costs include such things as Factory Rent, Factory Utilities, Factory Insurance, Amortization on Factory Equipment, etc.

Reports

When all costs have been compiled the company can now create a Manufacturing Statement for the period. The format of the statement would change depending upon whether the Raw Materials Inventory was kept on a periodic or perpetual basis. The following statement assumes a periodic raw material inventory system:

**ABC Manufacturing Company
Manufacturing Statement
For the Month ended January 31, 2000**

Direct Materials		
Beginning Raw Material Inventory	10,000	
Raw Materials Purchased	60,000	
Raw Materials Available	70,000	
Less Ending Raw Materials Inventory	15,000	
Cost of Direct Materials		55,000
Cost of Direct Labour		60,000
Factory Overhead:		
Indirect Materials	2,000	
Indirect Labour	5,000	
Factory Rent	10,000	
Factory Utilities	1,000	
Factory Insurance	1,000	
Amortization	3,000	
Cost of Factory Overhead		22,000
Total Manufacturing Costs		137,000
Goods in Process Inventory January 1, 2000		35,000
Total Goods in Process during the month		172,000
Less Goods in Process Inventory January 31, 2000		40,000
Cost of Goods Manufactured		132,000

As you can see from the above statement, we begin with Raw Material Inventory. To this we add Factory Labour and Overhead and create Total Manufacturing Costs. After adding the beginning Goods in Process Inventory and subtracting the ending Goods in Process Inventory we get our Cost of Goods Manufactured. If we were using a periodic inventory system, this Cost of Goods Manufactured would appear in the Cost of Goods Sold section of the Statement of Earnings replacing the Cost of Purchases as follows:

Cost of Goods Sold:		
Beginning Finished Goods Inventory	500,000	
Plus Cost of Goods Manufactured	132,000	
Goods Available for Sale	632,000	
Less Ending Finished Goods Inventory	420,000	
Cost of Goods Sold		212,000

There are two types of Cost Accounting as follows:

Process Cost Accounting

This type of accounting deals with manufacturing companies that operate as an assembly line and will be covered in a later chapter.

Job Order Cost Accounting

This type of accounting deals with manufacturing companies that build items as they are ordered by the customer and will be covered in a later chapter.

Management Concepts

Customer Orientation

This concept deals with manufacturing what the customer wants as opposed to creating a bunch of product and then trying to sell it.

Total Quality Management

This concept deals with the idea that all persons involved in the manufacturing process care about the quality of the product being made.

Just-In-Time Manufacturing

This concept deals with the idea of eliminating stockpiles of inventory. We should only purchase what is needed and make sure it arrives just in time to be used. The danger with this concept is the possibility of running out of needed material. Because of this you must ensure your suppliers are reliable and willing to make frequent shipments of smaller quantities.

Theory of Constraints

This concept deals with the analysis of the manufacturing process to identify bottle necks (places where there is a slow down in the production line).

Continuous Improvement

This concept, like Total Quality Management, involves all employees in an attempt to improve all aspects of the company.

Job Order Cost Accounting

A manufacturing company either builds products specifically ordered by a customer (Job Order Costing) or operates an assembly line to manufacture a large quantity of the same product (Process Costing).

As opposed to Process Costing, which assigns costs to specific processes with the output of one process becoming the input for the next process, Job Order costs are assigned to specific jobs.

To illustrate, let's look at an example where we have a company that manufactures large fishing boats as they are ordered by the customer. To track the Direct Material, Direct Labour and Factory Overhead costs associated with each order we need to create Job Cost sheets as follows:

Customer Name:						Job #:		
Job Description:						GIP:		
Date Started:						FG:		
Date Completed:						CGS:		
Direct Materials			Direct Labour			Factory Overhead		
Date	Mat. Req #	Cost	Date	Time Ticket	Cost	Date	Rate	Cost

This Job Cost sheet is used to record the customer and job number, a description of the job, the costs associated with this job and track the movement of the job from Goods in Process inventory (GIP) through Finished Goods inventory (FG) and finally into Cost of Goods Sold (CGS). This sheet is a subledger of specific General Ledger accounts. The total of the jobs uncompleted equals the Goods in Process inventory account, the total of the jobs completed but unsold equals the Finished Goods inventory account and the total of the jobs sold equals the Cost of Goods Sold expense account (except for minor differences due to under (or over) applied overhead).

Information for the Direct Materials comes from Material Requisition forms, information for the Direct Labour comes from Time Tickets and the Factory Overhead is a rate that has been predetermined by management and is based on either Direct Materials or Direct Labour.

To understand the whole system we must first look at the eleven accounting transactions that this type of systems would use as follows:

1		Purchase of Raw Materials
2	Raw Materials	Direct Materials Used
3		Indirect Materials Used
4		Factory Payroll
5	Factory Labour	Direct Labour
6		Indirect Labour
7	Factory Overhead	
8	Apply Overhead to Goods in Process	
9	Goods in Process to Finished Goods	
10	Finished Goods to Cost of Goods Sold	
11	Clear Factory Overhead account	

The first three transactions deal with Raw Materials, which, after being purchased, are used on the job and give rise to the following journal entries:

Entry 1: Purchase of Raw Materials:

DATE	ACCOUNT	PUZZLE	DEBIT	CREDIT
Jan 1/98	Raw Material Inventory	Asset	XXXX	
	Accounts Payable	Liability		XXXX

Entry 2: Direct Materials Used (from Material Requisition forms):

DATE	ACCOUNT	PUZZLE	DEBIT	CREDIT
Jan 31/98	Goods in Process	Asset	XXXX	
	Raw Material Inventory	Asset		XXXX

Entry 3: Indirect Materials Used (from Material Requisition forms):

DATE	ACCOUNT	PUZZLE	DEBIT	CREDIT
Jan 31/98	Factory Overhead	Temporary	XXXX	
	Raw Material Inventory	Asset		XXXX

The next three transactions deal with Factory Labour, which give rise to the following journal entries:

Entry 4: Payment of Factory Wages (all wage expenses):

DATE	ACCOUNT	PUZZLE	DEBIT	CREDIT
Jan 31/98	Factory Payroll	Temporary	XXXX	
	Wages Payable	Liability		XXXX

Entry 5: Direct Labour (from Time Tickets):

DATE	ACCOUNT	PUZZLE	DEBIT	CREDIT
Jan 31/98	Goods in Process	Asset	XXXX	
	Factory Payroll	Temporary		XXXX

Entry 6: Indirect Labour (from Time Tickets):

DATE	ACCOUNT	PUZZLE	DEBIT	CREDIT
Jan 31/98	Factory Overhead	Temporary	XXXX	
	Factory Payroll	Temporary		XXXX

It should be noted that all labour costs should be accounted for with the total of entry 5 and 6 being equal to the amount in entry 4.

Entry 7: Factory Overhead (any other factory costs):

DATE	ACCOUNT	PUZZLE	DEBIT	CREDIT
Jan 31/98	Factory Overhead	Temporary	XXXX	
	Prepaid Insurance	Asset		XXXX
	Acc. Amort.- Equip.	Asset		XXXX
	Accounts Payable	Liability		XXXX

As you can see, the Indirect Materials, Indirect Labour and any other Factory costs are accumulated in an account called Factory Overhead. When a period end comes or a job has been completed a portion of the Factory Overhead must be applied to the job. This application amount is usually a percentage of the Direct Materials or Direct Labour and results in the following journal entry:

Entry 8: Apply Factory Overhead (from a predetermined overhead rate):

DATE	ACCOUNT	PUZZLE	DEBIT	CREDIT
Jan 31/98	Goods in Process	Asset	XXXX	
	Factory Overhead	Temporary		XXXX

A completed job must be moved from the Goods in Process inventory to the Finished Goods inventory. The procedure involves summing the three costs on the job sheet to arrive at the dollar value of the finished job as follows:

Entry 9: Completed Jobs (total cost amount from job sheet):

DATE	ACCOUNT	PUZZLE	DEBIT	CREDIT
Jan 31/98	Finished Goods	Asset	XXXX	
	Goods in Process	Asset		XXXX

When the customer picks up the finished product there must be a transaction to record the revenue from the sale, the receivable, the cost of goods sold and the reduction of finished goods inventory as follows:

Entry 10: Completed Jobs (total cost amount from job sheet):

DATE	ACCOUNT	PUZZLE	DEBIT	CREDIT
Jan 31/98	Accounts Receivable	Asset	XXXX	
	Sales	Revenue		XXXX
	Cost of Goods Sold	Expense	XXXX	
	Finished Goods Inventory	Asset		XXXX

Finally, at month end, the factory overhead account must be zero and no matter what rate you use, it will never credit the factory overhead account for exactly the same as was debited to that account. The amount left in this account can be either “Material” (large) or “Immaterial” (small). If it is a large amount it must be allocated to the jobs left in the Goods in Process inventory and Finished Goods inventory and jobs in the Cost of Goods Sold. If the amount is small a single journal entry would put it to Cost of Goods Sold. The entry would either debit or credit the Factory Overhead account depending upon what was needed to clear that account to zero.

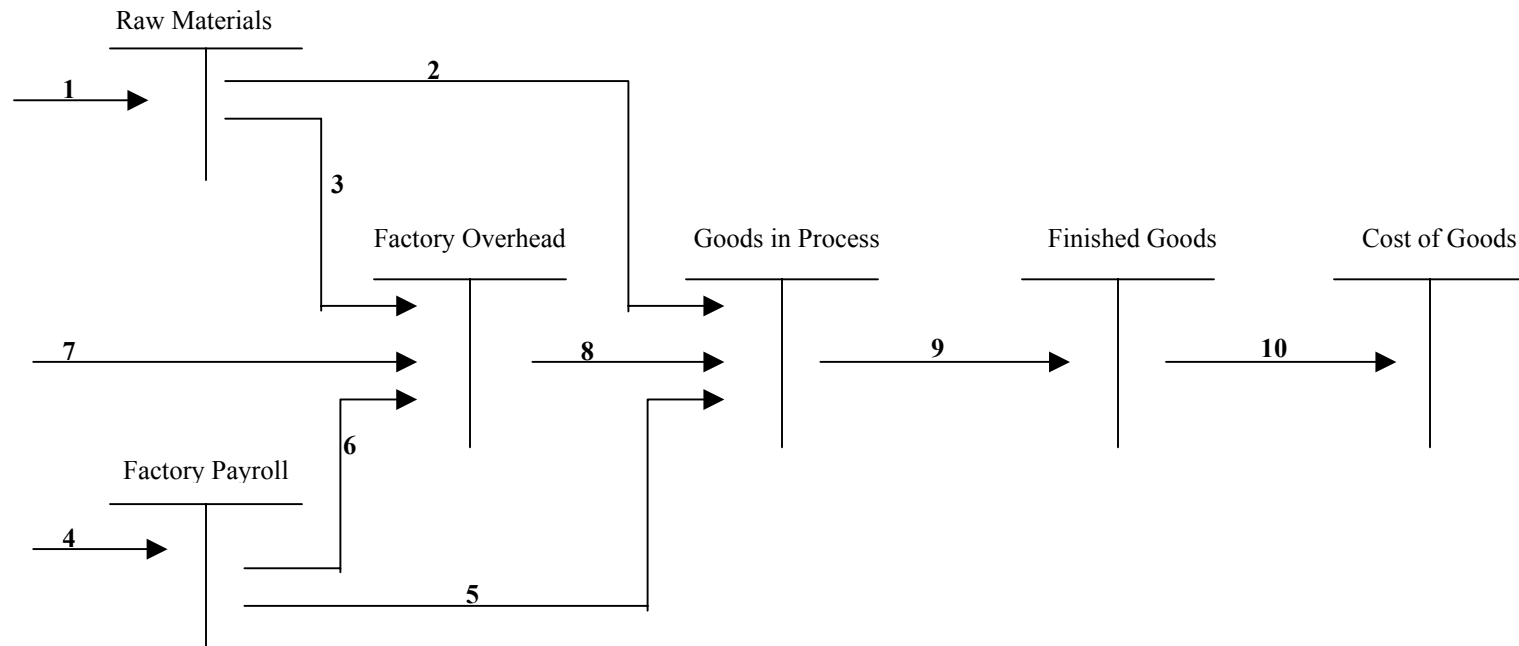
Predetermined Overhead Application Rate

Tracking Direct Materials and Direct Labour and adding those numbers to the Job Cost sheet are the first two steps in completing a job. The allocation of Factory Overhead is the final step. This step is done either at the end of the month (for uncompleted jobs) or when the job is complete. The amount of the allocation (a management decision) is usually based on the dollar value of the Direct Materials or the dollar value of the Direct Labour. Following is an example of how the overhead rate is determined and used:

Total Factory Overhead last year	divided by	Total Direct Labour last year
800,000	divided by	400,000 = 200%

Customer Name: ABC Company						Job #: 7880		
Job Description: Building an Item						GIP:	X	
Date Started: January 2, 2002						FG:	X	
Date Complete: February 27, 2002						CGS:		
Direct Materials			Direct Labour			Factory Overhead		
Date	Mat. Req #	Cost	Date	Time Ticket	Cost	Date	Rate	Cost
Jan 20	667	500	Jan 21	44	120			
Feb 21	781	900	Feb 22	83	120			
Total Material		1,400	Total Labour		240		200%	480
Total Cost								2,120

The following page is a graphical representation of the 10 journal entries.

MANUFACTURING FLOW CHART

1. Purchase Raw Materials	4. Factory Payroll Expenses	7. Other Factory Expenses
2. Used Direct Materials	5. Assign Direct Labour	8. Allocate Factory Overhead
3. Used Indirect Materials	6. Assign Indirect Labour	9. Transfer to Finished Goods
		10. Cost of Jobs Sold

MANUFACTURING FLOW CHART JOURNAL ENTRIES

	DEBIT	CREDIT	EXPLANATION
1	Raw Material Inventory	Accounts Payable	Purchase Raw Materials
2	Goods in Process Inventory	Raw Materials Inventory	Use of Direct Materials
3	Factory Overhead	Raw Materials Inventory	Use of Indirect Materials
4	Factory Payroll	El, CPP, Tax and Wages Payable	Payroll for Factory
5	Goods in Process Inventory	Factory Payroll	Direct Labour for the period
6	Factory Overhead	Factory Payroll	Indirect Labour for the period
7	Factory Overhead	Cash or A/P or Prepaid or Acc. Amortization or other Liability	All other Factory Expenses including period end adjustments.
8	Goods in Process Inventory	Factory Overhead	Application of Overhead when Job Completed or at Period End
9	Finished Goods Inventory	Goods In Process Inventory	Transfer of Completed Jobs
10	Cost of Goods Sold	Finished Goods Inventory	Transfer cost when jobs are sold

When all of the above transactions are recorded for the period, check that the balance in the Factory Payroll account is zero. Next, take note of the balance in the Factory Overhead account. If the amount is immaterial (judgment call) prepare a journal entry to clear the Factory Overhead account to zero and offset the entry to Cost of Goods Sold.

If the amount left in the Factory Overhead account is material, the amount must be allocated to Goods in Process, Finished Goods and Cost of Goods Sold. In either case, the Factory Overhead account must be zero at the end of the period.

Process Cost Accounting

A manufacturing company either builds products specifically ordered by a customer (Job Order Costing) or operates an assembly line to manufacture a large quantity of the same product (Process Costing).

As opposed to Job Order Costing where costs are assigned to specific jobs, Process Costing assigns costs to specific processes with the output of one process becoming the input for the next process.

To illustrate, let's look at an example where we have a company that manufactures desks by purchasing the wood for the desktop, the steel piping for the frame and the plastic for the seats. The following might represent the different processes:

Cutting of the desk tops
Forming of the steel frames
Molding of the plastic seats
Assembling of the Desks

As we know from previous chapters, we must deal with three costs, namely, Direct Materials, Direct Labour and Factory Overhead. Let's deal with each cost separately as follows:

Raw Materials

The purchase of raw materials would result in a general journal entry as follows:

DATE	ACCOUNT	PUZZLE	DEBIT	CREDIT
Jan 1/95	Raw Material Inventory	Asset	20,000	
	Accounts Payable	Liability		20,000

As a department (Cutting, Forming, Molding or Assembly) makes a request for materials, a Material Requisition Form is completed. This form is the basis for the accounting entry to reduce the Raw Material Inventory account and either increase the Goods in Process Inventory account (for Direct Materials) or increase the Factory Overhead account (for Indirect Materials) as follows:

Direct Materials:

DATE	ACCOUNT	PUZZLE	DEBIT	CREDIT
Jan 2/95	Good in Process-Cutting	Asset	5,000	
	Raw Material Inventory	Asset		5,000

Indirect Materials:

DATE	ACCOUNT	PUZZLE	DEBIT	CREDIT
Jan 2/95	Factory Overhead	Temporary	2,000	
	Raw Material Inventory	Asset		2,000

Labour

The purchase of labour would result in a general journal entry as follows:

DATE	ACCOUNT	PUZZLE	DEBIT	CREDIT
Jan 1/95	Factory Payroll	Temporary	10,000	
	Wages Payable	Liability		10,000

As a department (Cutting, Forming, Molding or Assembly) does work, a Time Ticket is completed. These forms are the basis for the accounting entry to reduce Factory Payroll account and either increase the Goods in Process Inventory account (for Direct Labour) or increase the Factory Overhead account (for Indirect Labour) as follows:

Direct Labour:

DATE	ACCOUNT	PUZZLE	DEBIT	CREDIT
Jan 2/95	Good in Process-Cutting	Asset	8,000	
	Factory Payroll	Temporary		8,000

Indirect Labour:

DATE	ACCOUNT	PUZZLE	DEBIT	CREDIT
Jan 2/95	Factory Overhead	Temporary	2,000	
	Factory Payroll	Temporary		2,000

Notice that the Factory Payroll account is a temporary account and that its balance (\$10,000) is completely allocated to either Goods in Process (Direct Labour) or Factory Overhead (Indirect Labour).

Factory Overhead

The final cost is Factory Overhead. This temporary account is used to accumulate all other factory costs besides direct material and direct labour. A couple of examples are as follows:

Factory Rent:

DATE	ACCOUNT	PUZZLE	DEBIT	CREDIT
Jan 2/95	Factory Overhead	Temporary	10,000	
	Cash in Bank	Asset		10,000

Factory Insurance (one month):

DATE	ACCOUNT	PUZZLE	DEBIT	CREDIT
Jan 31/95	Factory Overhead	Temporary	1,000	
	Prepaid Insurance	Asset		1,000

These other factory costs must eventually be allocated to specific departments and therefore to the Goods in Process Inventory account. This allocation must be determined by management and is called a Predetermined Overhead Application Rate. This rate is based on some other variable such as Direct Labour Hours or Direct Labour Cost.

For example, after analysis of past history, we may decide that Factory Overhead is to be applied to each of the Cutting, Forming and Molding departments as 200% of Direct Labour Cost. This would result in the following:

Department	Direct Labour	Application Rate	Allocation Amounts
Cutting	\$ 3,000	200%	\$ 6,000
Forming	\$ 3,000	200%	\$ 6,000
Molding	\$ 2,000	200%	\$ 4,000
Total Factory Overhead Allocated to Goods In Process			\$ 16,000

The total dollar amount allocated should reduce the Factory Overhead account to zero. In reality you will never be exact, but the goal is to make the amount coming out of the Factory Overhead account approximate the amount that went into Factory Overhead. Any amount left in the Factory Overhead account (if immaterial) must be cleared to Cost of Goods Sold at month end. In our example, the journal entry to reduce the account would be as follows:

Clear Factory Overhead:

DATE	ACCOUNT	PUZZLE	DEBIT	CREDIT
Jan 31/95	GIP-Cutting Dept.	Asset	6,000	
	GIP-Forming Dept.	Asset	6,000	
	GIP-Molding Dept.	Asset	4,000	
	Factory Overhead	Temporary		16,000

As each department completes its process, the end result is transferred to the next department. In our example costs are accumulated in three departments and when the Cutting, Forming and Molding departments have completed their process, the end result is transferred to the Assembly department's Goods In Process Inventory as follows:

Transfer to Assembly Department:

DATE	ACCOUNT	PUZZLE	DEBIT	CREDIT
Jan 31/95	GIP-Assembly Dept.	Asset	49,000	
	GIP-Cutting Dept.	Asset		19,000
	GIP-Forming Dept.	Asset		18,000
	GIP-Molding Dept.	Asset		12,000

Once the Assembly department has completed its process (putting all the parts together) the Goods in Process Inventory is transferred to Finished Goods Inventory as follows:

Transfer to Assembly Department:

DATE	ACCOUNT	PUZZLE	DEBIT	CREDIT
Jan 31/95	Finished Goods Inventory	Asset	55,000	
	GIP-Assembly Dept.	Asset		55,000

Again, this is an oversimplification of a very complex subject but you should, after taking a look at this chapter, have an appreciation for the procedures needed to track cost in a Process Costing situation. There is however one more thing that needs to be mentioned and that is Goods In Process Inventory value at a period end.

Valuation of Goods In Process Inventory

Financial and management reports must be created periodically (ie: monthly) and any process is not completely finished every month at month end. This leaves partially completed processes that contain some materials, some labour and some factory overhead. The value of the Goods in Process must be determined for the Manufacturing Statement and Statement of Financial Position.

Our first step is to determine how many uncompleted units exist in each department. Next we must determine the percentage complete. Since we know the value of the finished product we can determine the value of the Goods in Process as follows:

CUTTING DEPARTMENT

	% of Complete d Product	Value of a Completed Product	Value (per unit) of Goods in Process Inventory
Direct Materials	20%	\$ 100	\$ 20
Direct Labour	30%	\$ 100	\$ 30
Factory Overhead	30%	\$ 200	\$ 60
			\$ 110

If there are 100 uncompleted units, the value of the Goods In Process inventory for the Cutting Department would be $100 \times \$110$ or \$11,000.