

Chapter 3

Type of costs: Materials, Labor & Machinery

Materials

CONTENTS

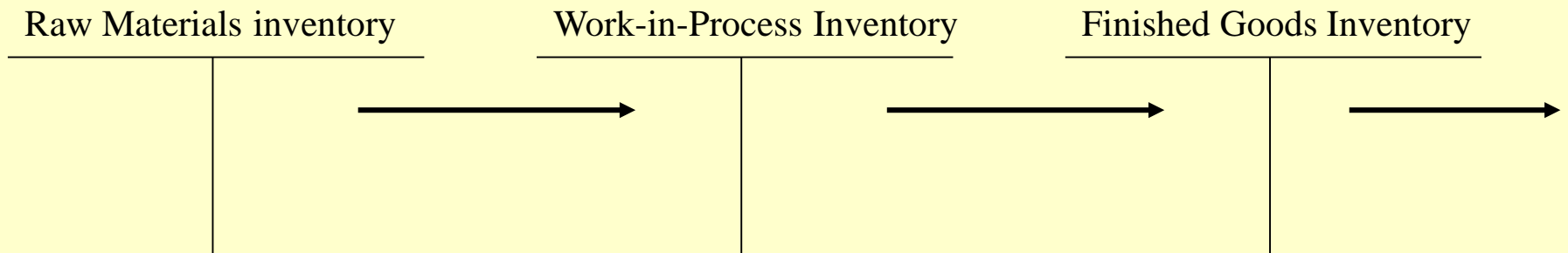
Material costing

1. Types of materials
2. Methods of pricing materials:
FIFO, LIFO, Weighted Average Cost
Periodical vs. Perpetual inventory
3. Treatment of materials: warehousing / handling costs

Learning Objectives

- *Identify categories of costs associated with goods for sale*
- *Calculate the warehousing allocation rate*
- *Distinguish between the perpetual and the periodic inventory system*
- *Distinguish between inventory costing methods (cost flow assumptions)*
- *Calculate the pricing of inventory using the perpetual inventory system according to FIFO, LIFO and weighted average cost methods*

Manufacturing-sector companies typically have one or more of the following three types of inventories:



Costs Associated with Goods for Sale

1. *Purchasing costs*

include freight-in or transportation costs.

2. *Ordering costs*

comprise costs incurred in receiving and inspecting the items in the orders.

3. *Stockout costs*

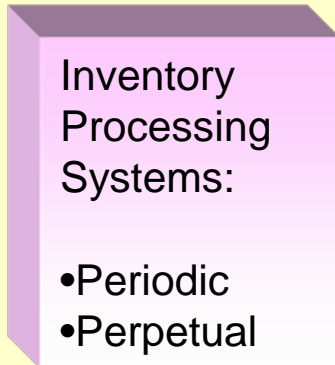
occur when an organization runs out of an item for which there is customer demand.

4. *Quality costs*

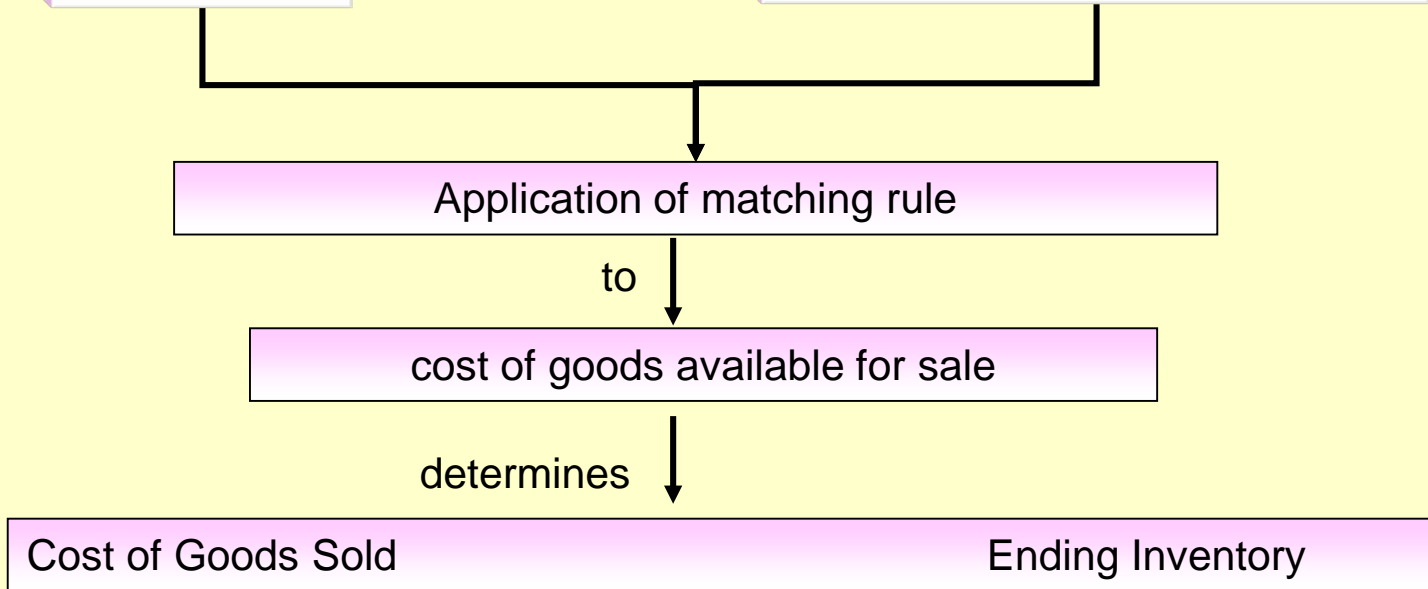
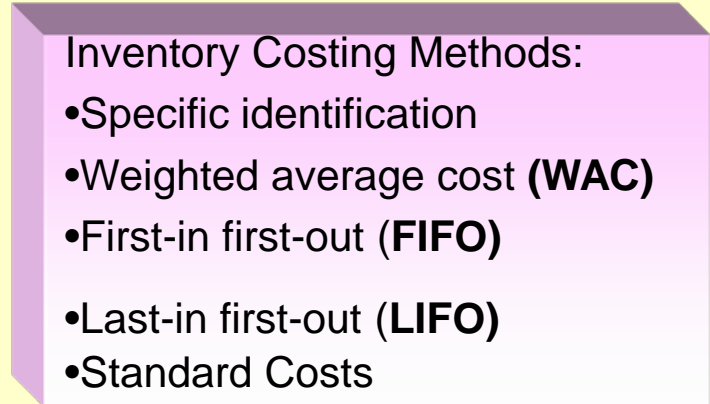
of a product or service are its lack of conformance with a pre-specified standard.

Management Choices in Accounting for Inventories

Which inventory systems to use?



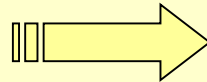
What price to put on inventories?



Which inventory systems to use?

Inventory systems

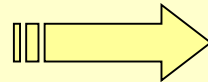
Periodic Inventory



The available inventory is counted periodically, usually at the end of the accounting period.

No detailed records of the actual available inventory are kept during the period.

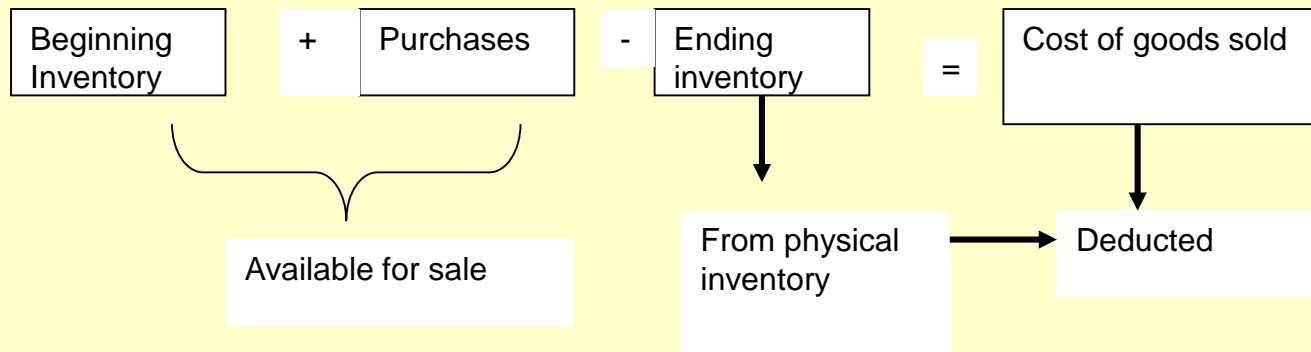
Perpetual Inventory



The cost of each item is recorded in the inventory account when the item is purchased.

The balance on the inventory account always equals the cost of goods available.

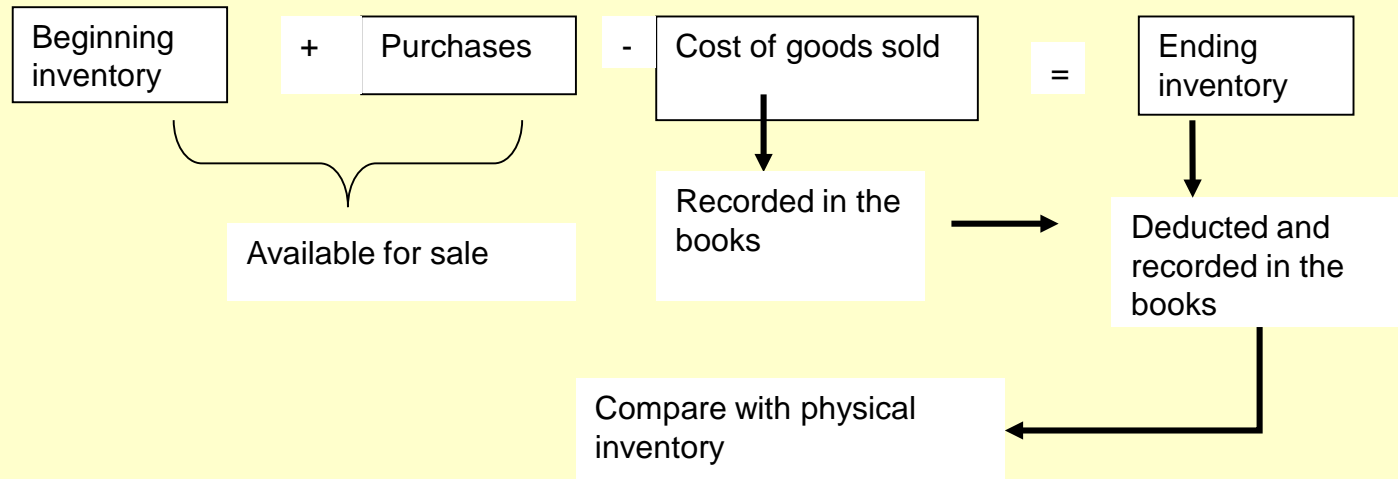
Periodic Inventory



•NO DETAILED RECORDS OF THE ACTUAL AVAILABLE INVENTORY ARE KEPT DURING THE PERIOD.

•AT THE END OF THE ACCOUNTING PERIOD, THE PHYSICAL INVENTORY IS TAKEN AND THE COST OF THE GOODS SOLD IS DEDUCTED.

Perpetual Inventory

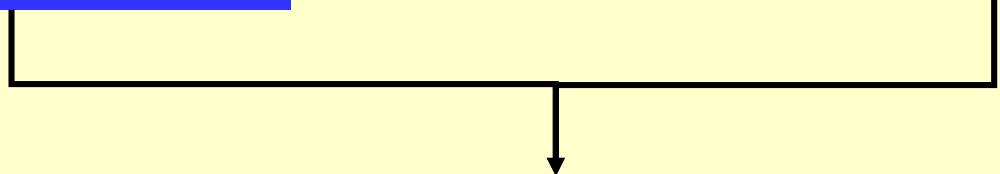


- The quantity and cost of each item is recorded in the inventory when it is purchased.
- The quantity and cost of each item is recorded in the inventory when it is sold.
- The detailed data are available under the perpetual inventory.

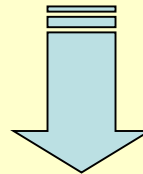
Inventory systems

**Periodic
Inventory**

**Perpetual
Inventory**



must conduct a



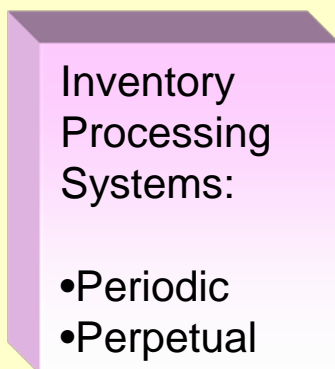
Physical Inventory

Count all goods available at the end of an accounting period

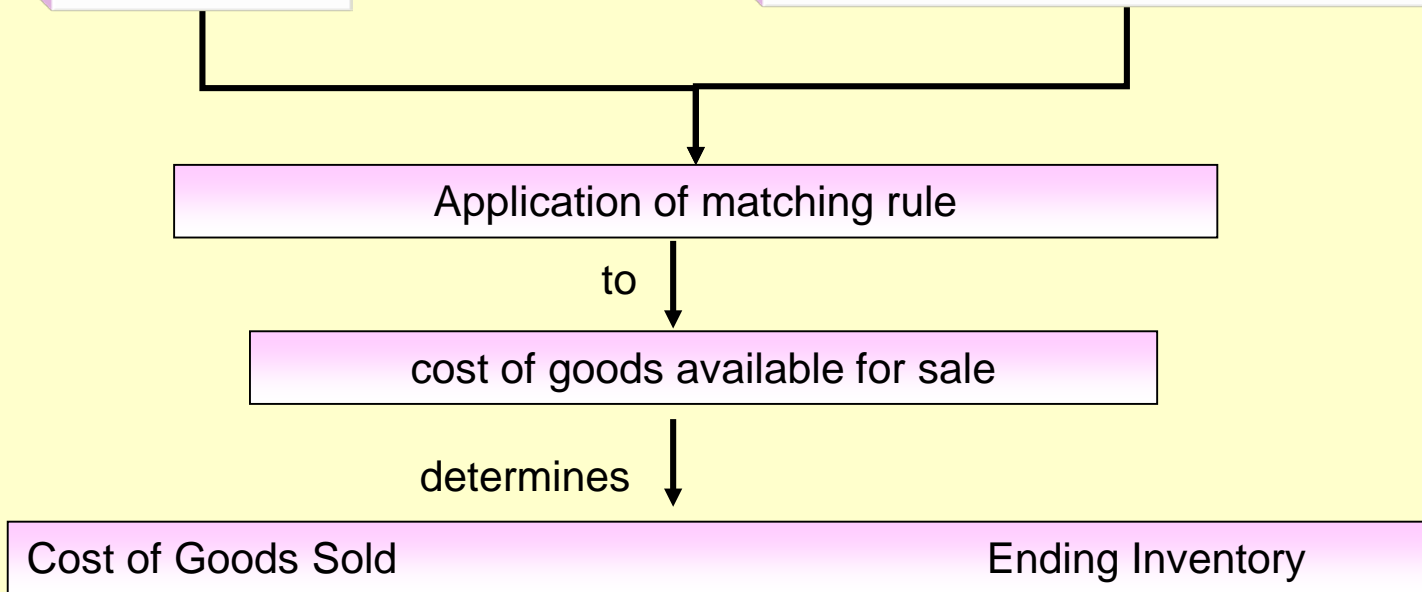
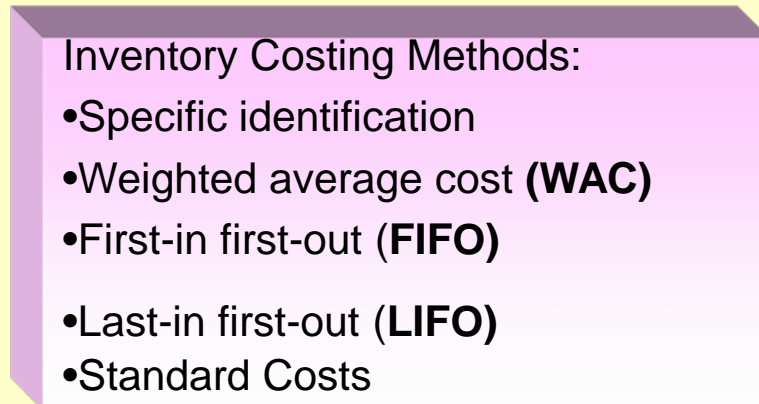
Today we are closed for annual stocktaking

Management Choices in Accounting for Inventories

Which inventory systems to use?



What price to put on inventories?



What price to put on inventories?

→ **Pricing Inventory**

Methods:

Specific identification

Weighted average cost

FIFO: First-in first-out

LIFO: Last-in first-out

Standard costs

The choice depends on....

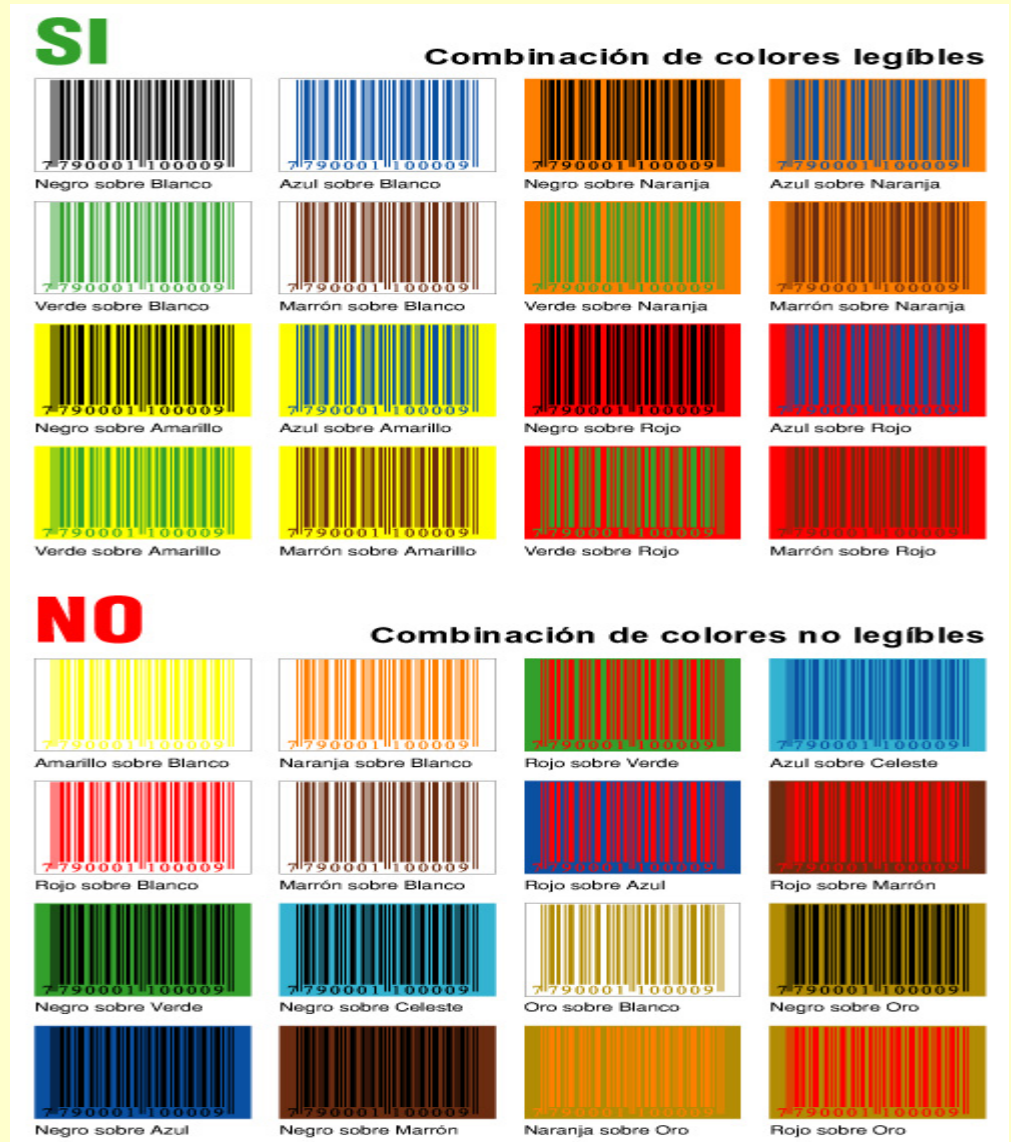
... the nature of the business

... the financial effects

... the cost of implementing the method

System of identification:

✓ *Bar codes*





Wine cellar

Stainless steel deposits



Barrels



Fresh dairy products

Cheese



Milk



Yogurt



Steel pipe pile



Wooden trunk pile



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Format: FIFO, LIFO, WAC, perpetual inventory

Stock card

Product: _____ **Code No** _____ **Recording method:** _____

<i>DATE</i>	<i>CONCEPT</i>	<i>IN</i>			<i>OUT</i>			<i>STOCK</i>		
		<i>UNITS</i>	<i>COST</i>	<i>TOTAL</i>	<i>UNITS</i>	<i>COST</i>	<i>TOTAL</i>	<i>UNITS</i>	<i>COST</i>	<i>TOTAL</i>

Product: **Wastebasket**Code: **HJL578**

Date		Physical Units	Unit Cost
year 2014	Concepts		
January 1	Beginning inventory	600	10
January 15	Purchase	120	9
January 20	Purchase	125	10.56
January 25	Sales	800	

Stock card

Product: **Wastebasket**Code: **HJL578**Recording Method: **FIFO**

Date	Concepts	IN			OUT			STOCK			
		Units	Unit Cost	Total Cost	Units	Unit Cost	Total Cost	Units	Unit Cost	Total Costs	
2014											
1 Jan	Beginning inventory	600	10	6000				600	10	6000	
15 Jan	Purchase	120	9	1080				600 120	10 9	6000 1080	
20 Jan	Purchase	125	10.56	1320				600 120 125	10 9 10.56	6000 1080 1320	
25 Jan	Sales				600 120 80	10 9 10.56	6000 1080 844.8		45	10.56	475.2

<i>Stock card</i>

Product: ***Wastebasket***Code: ***HJL578***Recording Method: ***LIFO***

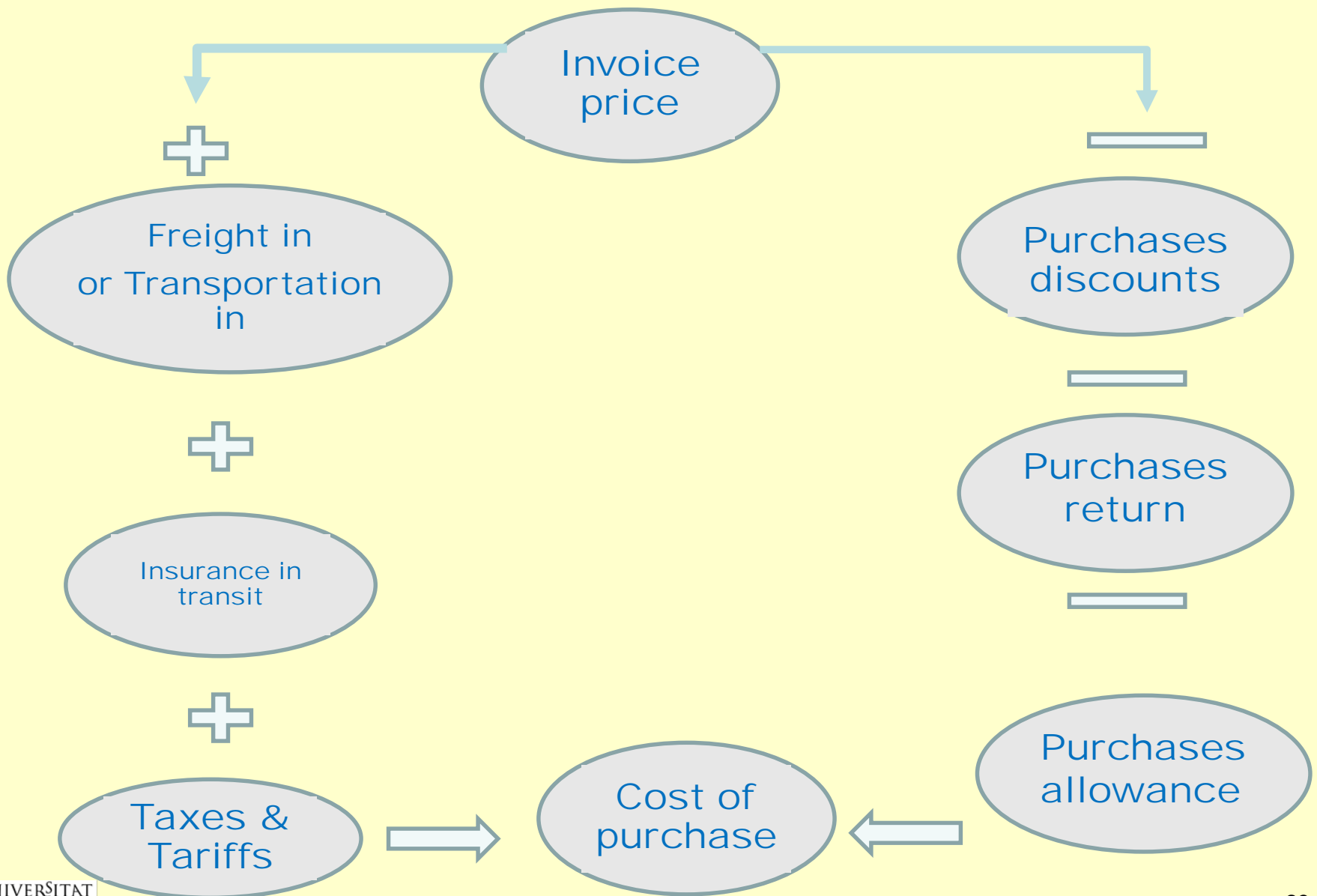
Date	Concepts	IN			OUT			STOCK		
		Units	Unit Cost	Total Cost	Units	Unit Cost	Total Cost	Units	Unit Cost	Total Cost
2014										
1 Jan	Beginning inventory	600	10	6000				600	10	6000
15 Jan	Purchase	120	9	1080				600	10	6000
								120	9	1080
20 Jan	Purchase	125	10.56	1320				600	10	6000
								120	9	1080
								125	10.56	1320
25 Jan	Sales				125	10.56	1320			
					120	9	1080			
					555	10	5550	45	10	450

Stock card

Product: **Wastebasket**Code: **HJL578**Recording Method: **WAC**

Date	Concepts	IN			OUT			STOCK		
		Units	Unit Cost	Total Cost	Units	Unit Cost	Total Cost	Units	Unit Cost	Total Costs
2014										
1 Jan	Beginning inventory	600	10	6000				600	10	6000
15 Jan	Purchase	120	9	1080				600	10	6000
								120	9	1080
								720	9.83	7080
20 Jan	Purchase	125	10.56	1320				720	9.83	7080
								125	10.56	1320
								845	9.94	8400
25 Jan	Sales				800	9.94	7952.66	45	9.94	447.34

3. Treatment of materials: warehousing / handling costs



Warehousing costs: Indirect / overhead costs

Receiving
Storing
Issuing
Handling

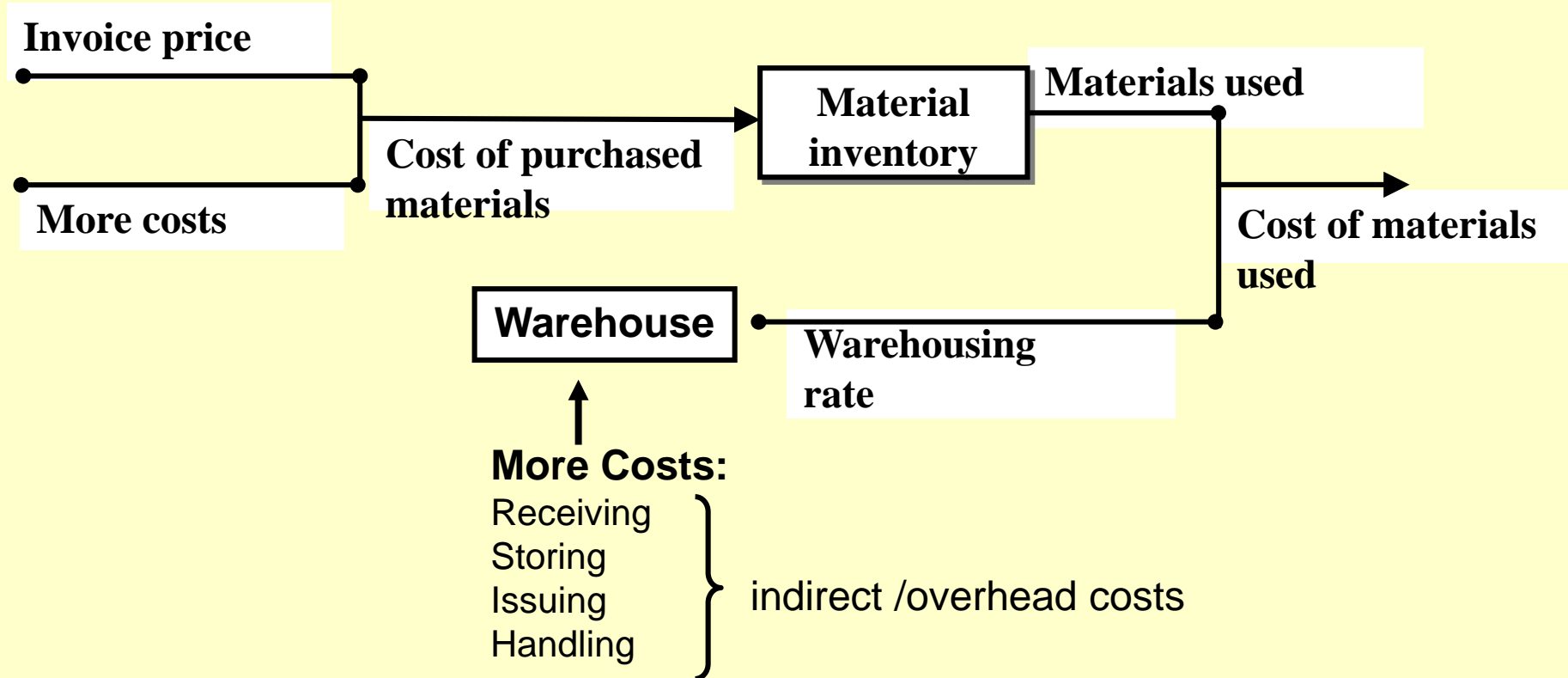


Receiving Your Delivery



“Warehousing costs” →

Receiving, storing, issuing and handling materials.



Work-in-process inventory

Beginning work in process

Manufacturing costs incurred during the period:

- Raw materials used
- **Warehousing costs**
- Direct manufacturing labor costs
- Manufacturing overheads costs

Costs of goods manufactured

Ending work in process

The sum of Debit

=

The sum of Credit

Total manufacturing costs to account for

**Warehousing
Allocation Rate**

=

Warehousing overheads costs

Allocation base

*Most advisable and extensive
allocation bases used*

• **Based on the weight of the materials used: physical units (kg, L, m², m³, etc.)**

€/ physical units: (e.g. €/kg, €/L

or

• **Based on the cost of the materials used (total amount)**

€/ total amount: (e.g. €/ €)

3. Treatment of materials: warehousing / handling costs

Case 1:

**Raw Material
"X"**

**MANUFACTURING
PROCESS 1**

**MANUFACTURING
PROCESS 2**

**FINISHED GOOD
INVENTORY**

Is it necessary calculate the warehousing allocation rate?

Case 2:

**Raw Material
"X"**

**MANUFACTURING
PROCESS 1**

**MANUFACTURING
PROCESS 2**

**FINISHED GOOD
INVENTORY**

**Raw Material
"Y"**

Is it necessary calculate the warehousing allocation rate?

WIP 1

Beginning WIP

Manufacturing costs incurred
during the period:

- Raw material X used
- Raw material Y used
- Warehousing costs

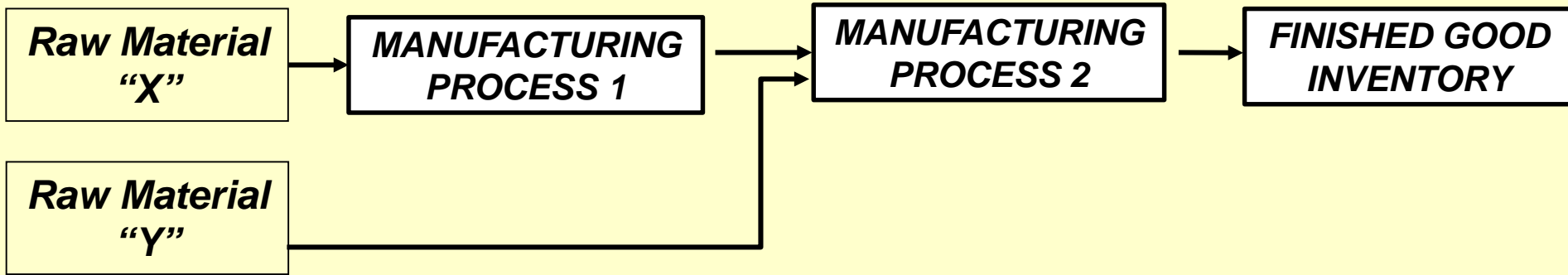
- Direct manufacturing labor costs
- Manufacturing overheads costs

Costs of goods manufactured

Ending WIP

3. Treatment of materials: warehousing / handling costs

Case 3:



Is it necessary calculate the warehousing allocation rate?

WIP 1		WIP 2	
Beginning WIP	Costs of goods manufactured	Beginning WIP	Costs of goods manufactured
<u>Manufacturing costs incurred during the period:</u> <ul style="list-style-type: none"> • Raw material X used • Warehousing material X • Direct manufacturing labor costs • Manufacturing overheads costs 	Ending WIP	<u>Manufacturing costs incurred during the period:</u> <ul style="list-style-type: none"> • Raw material Y used • Warehousing material Y • Direct manufacturing labor costs • Manufacturing overheads costs 	Ending WIP
		Costs of goods manufactured in Process 1	

Labor costs

1. Labor costs

PAYROLL

The list of people employed and paid by a company.

PAYROLL LEDGER

A list of staff and their salaries.

PAYROLL TAX

A tax on the people employed by a company.

PAY SCALE

A hierarchy of wages levels, which typically depend on job title, salary and length of service. Also called salary scale or wage scale.

WAGE

The money paid to an employee in return for work done, especially when paid weekly (blue-collar workers).

WAGE COSTS

The cost of paying employees' salaries, including costs such as pension contributions and salaries.

SALARY

A regular payment, usually at the end of each month, to a (white-collar/office) employee for work done.

SALARY DEDUCTIONS

Money the company removes from salaries to pay to the government as tax or national insurance contributions, etc.

SOCIAL SECURITY CONTRIBUTIONS

Regular payments made by employers and employees to the National Insurance Scheme.

1. Labor costs

INCOME TAX

The tax on a person's income.

BONUS

An extra payment in addition to a normal payment.

FRINGE BENEFITS

An extra item given by a company to employees in addition to a salary: e.g. a company car or private health insurance.

OVERTIME

An amount paid for work done outside ordinary working hours.

GROSS SALARY

The salary before tax and National Insurance contributions are deducted.

NET SALARY

The salary after tax and National Insurance contributions are deducted.

ANNUAL LEAVE

Full-time employees are entitled to 4 weeks' annual leave after every 12 months of continuous service (holiday pay).

HOURLY RATE

The money paid to an employee for work done by the hour.

DOCUMENTS

E.g. time sheets, idle time cards, clock cards, payslips, etc.

Payroll taxes, costs & benefits paid by employers (the Company)

In addition to salaries and wages, the Company will incur some or all of the following payroll-related expenses:

- Company portion of Social Security tax
- Company portion of medical tax
- State unemployment tax
- Company portion of insurance
- Company-paid holidays, vacations and sick days
- Company contribution to pension plans
- Etc.

Payroll withholdings: taxes & benefits paid by employees

Payroll withholdings include some or all of the following:

- Employee portion of Social Security tax
- Employee portion of medical tax
- State income tax
- Court-ordered withholdings
- Other withholdings
- Etc.

PAYROLL JOURNAL ENTRIES

- The cost of labor and related taxes is a major expense.
- The January payroll is as follows: gross employee wages: € 18,000; withholdings: 10% for income tax and 5% for social security. The employer also pays 30% of gross employee wages in social security \Rightarrow Total social security is: €5,400 plus €900

Document: January payslip

Gross salary:	18,000
- Income tax (10%)	1,800
- S. Security (5%)	900
Net Salary	15,300

PAYROLL JOURNAL ENTRIES (Cont.)

	Debit	Credit
Wage or salary expenses	18,000	
Payroll tax expenses	5,400	
Employees' income tax payable		1,800
Social security payable (company portion)		5,400
Social security payable (employee portion)		900
Wages payable		15,300

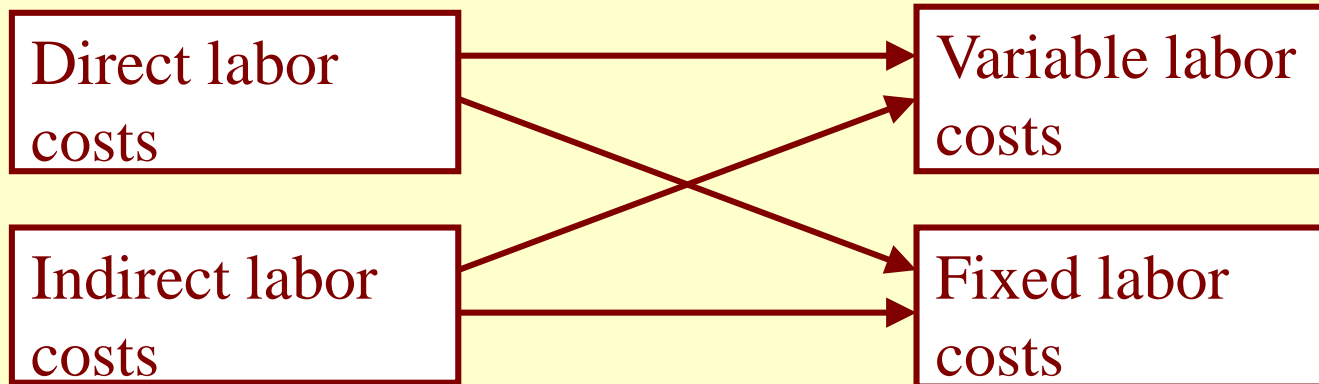
- When the payables are paid, they must be debited and cash credited!!!

	Debit	Credit
Wages payable	15,300	
Cash or bank		15,300

	Debit	Credit
Employees' income tax payable	1,800	
Social security payable (company + employee)	6,300	
Cash or bank		8,100

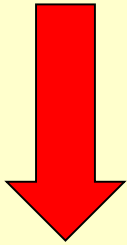
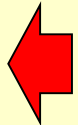
Assignment to a cost object

Behavior in relation to level of activity



	Departments	Assignment to a cost object	Behaviour in relation to level of activity
Labor Costs	Warehousing	Indirect	Fixed
	Manufacturing	Direct / Indirect	Variable / fixed
	Marketing	Indirect / Direct	Fixed
	Administration	Indirect	Fixed

Paid attention: indirect labor costs



Indirect (overheads) labor costs

Office staff wages

Rework labor

Overtime premium

This is the wage rate paid to workers in excess of their straight-time wage rate (for overtime hours)

Idle time

This is the wage rate paid for unproductive time caused by lack of orders, machine or computer breakdowns, works delays, poor scheduling, etc.

Managers' salaries

Payroll fringe costs

e.g. health care premiums, pension costs, etc.

PRODUCTIVE TIME = ATTENDANCE TIME – IDLE TIME

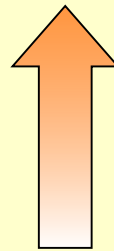
This is the time spent on a product. The time sheets shows the start and finishing times.

It is obtained from documents such as time sheets, clock cards, etc. Ordinary working hours are usually 8 hours per day, 5 days per week, 52 weeks per year (see wages or agreement award).

Idle time may occur for reasons such as temporary lack of work, bottlenecks, machine breakdowns, poor production scheduling, material shortages, etc.

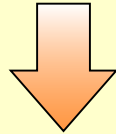
The aim of labor cost accounting is to record the time spent by all operatives on each activity on a separate job card.

$$\text{Hourly rate} = \frac{\text{Labor cost}}{\text{Productive time}} = \text{€ per hour}$$

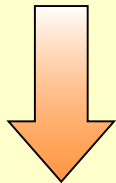


Attendance time – idle time

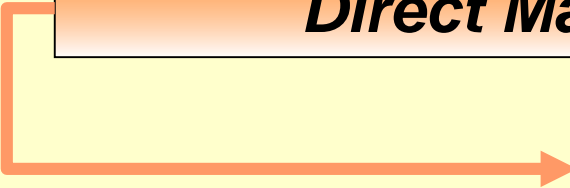
Productive time = (Attendance time – idle time)



Productive time x Hourly rate (regular rate)



Direct Manufacturing Labor Costs



Productive time x Hourly rate

(Attendance time	-	Idle time)	x	Hourly rate	=	Direct manufacturing labor costs
(44 h.	-	4 h.)	X	10€/h.	=	€ 400

Machinery: Depreciation

- Depreciation is the allocation of the depreciable amount of a tangible non-current asset over its estimated useful life.
- Non-current assets (except land) have a limited useful life.
- The cost of the asset must be distributed as an expense over the years it provides benefit.
- Depreciation does not refer to the decrease in the market value of the asset \Rightarrow although the market price increases, depreciation continues (it is the allocation of the cost)
- The main causes of depreciation are:
 - Physical deterioration due to use and exposure to natural elements (the sun and the wind) \Rightarrow repairs and maintenance!!
 - Obsolescence, i.e. the process of becoming out of date due to the emergence of new technology, changes in demand, etc.

- **VALUE:** Net purchase price plus all reasonable and necessary expenses to get the asset in place and ready for use.
- **RESIDUAL VALUE:** Estimated net scrap, salvage or trade-in value at the estimated date of disposal. This value should be reviewed every year but is normally insignificant: zero.
- **DEPRECIABLE AMOUNT:** Cost minus Residual value.
- **USEFUL LIFE:** Number of units of service expected from the asset: e.g. years, units of product, kilometres to be used (e.g. 5 years, 100,000 units, or 2,500km).
- **YEARLY DEPRECIATION AMOUNT:** This depends on the method (e.g.: linear; decreasing or increasing over time).

- STRAIGHT-LINE METHOD
 - This method assumes that depreciation depends on the passage of time
 - Yearly depreciation = $\text{Depreciable amount} / \text{Useful life in years}$
 - The annual amount is constant over time
- PRODUCTION METHOD
 - This method assumes that depreciation depends on use
 - Yearly depreciation = $\text{Depreciable amount} / \text{Useful life in units of service}$
 - The annual amount varies over time

• **DECLINING BALANCE METHOD**

- This method assumes that assets are more efficient (provide more service) and that obsolescence strongly affects the value of the asset (the asset loses value immediately) when new.
- Annual depreciation = non-current percentage over carrying amount.
- Annual depreciation decreases over time.

$a_1 = t \times CA_0$	$CA_1 = CA_0 - a_1 = CA_0 - t \times CA_0 = CA_0 (1-t)$
$a_2 = t \times CA_1$	$CA_2 = CA_1 - a_2 = CA_1 - t \times CA_1 = CA_0 (1-t)^2$
$a_3 = t \times CA_2$	$CA_3 = CA_2 - a_3 = CA_2 - t \times CA_2 = CA_0 (1-t)^3$
.....
$a_n = t \times CA_{n-1}$	$CA_n = CA_{n-1} - a_n = CA_{n-1} - t \times CA_{n-1} = CA_0 (1-t)^n$

Alternative Depreciation Methods

	<u><i>Straight line method</i></u>	<u><i>Reducing balance method</i></u>
<i>How is it calculated</i>	<p>There are two ways of determining depreciation using this method: Historical cost (original purchase price) – scrap value / Useful life OR Historical cost x depreciation rate per annum</p>	<p>If not provided with the rate: Rate for straight line method x 1.5 Depreciation is calculated each year as follows: (Historical cost – accumulated depreciation) x depreciation rate.</p>
<i>When should it be used?</i>	<p>To calculate depreciation for non-current assets that are expected to be used <i>evenly</i> (same amount depreciated each year) over their useful life, e.g. furniture, office equipment, fixtures and fittings, buildings.</p>	<p>To calculate depreciation for non-current assets that are used more in their early life and less as time goes by, e.g. computer systems, vehicles, equipment, machinery.</p>



End of Chapter 3

Any questions?

Thank you for your attention.