

SECOND EDITION

Managerial Accounting



RAY H. GARRISON
ERIC W. NOREEN
PETER C. BREWER
NAM SANG CHENG
KATHERINE C. K. YUEN

ASIA GLOBAL EDITION





Cost Concepts

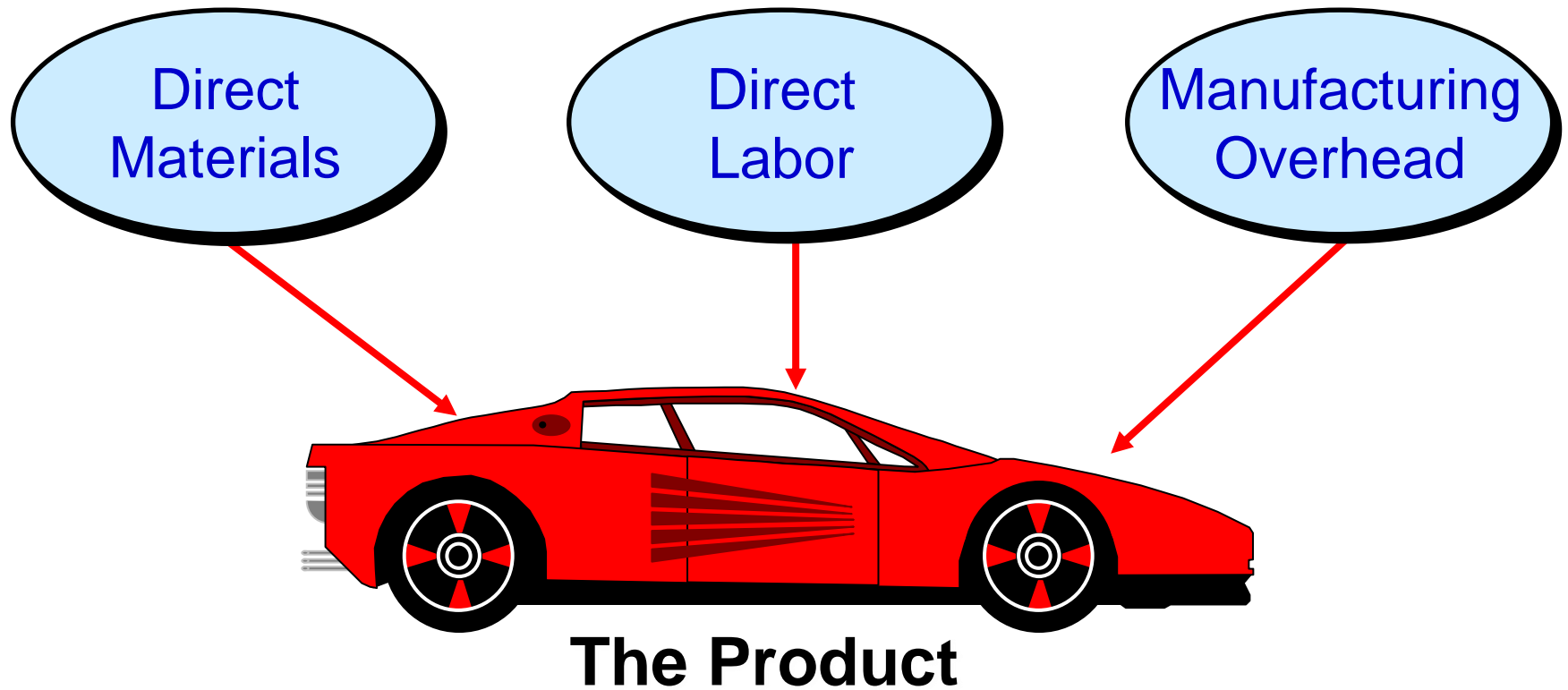
Chapter 2

Learning Objective 1

Identify and give examples of each of the three basic manufacturing cost categories.

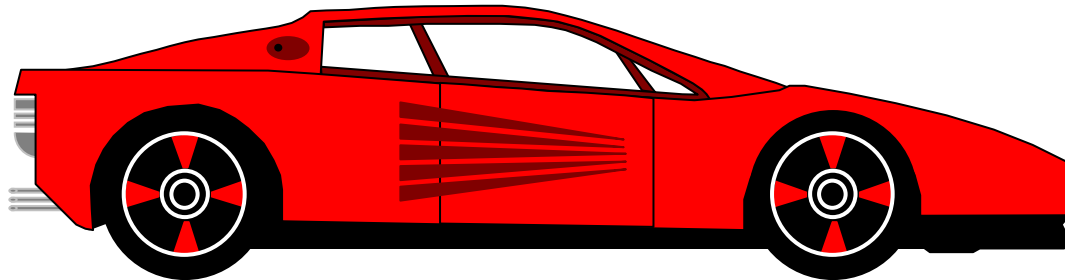


Manufacturing Costs



Direct Materials

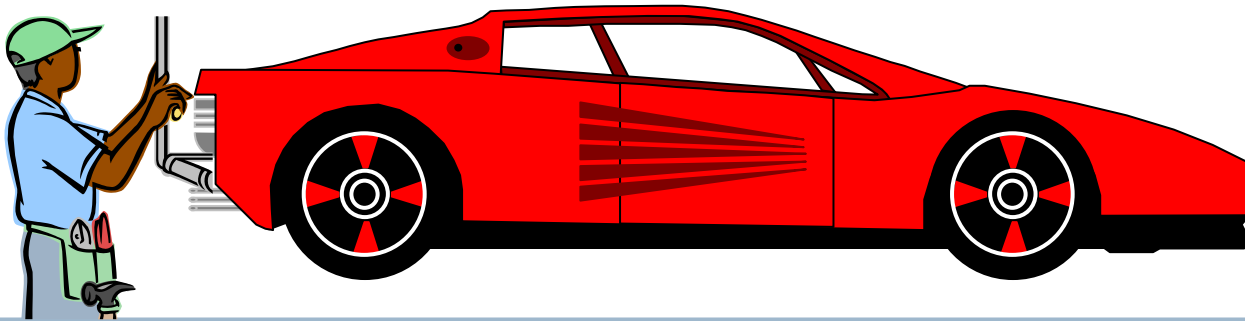
Raw materials that become an integral part of the product and that can be conveniently traced directly to it.



Example: A radio installed in an automobile

Direct Labor

Those labor costs that can be easily traced to individual units of product.



Example: Wages paid to automobile assembly workers

Manufacturing Overhead

Manufacturing costs that **cannot** be traced directly to specific units produced.

Examples: Indirect materials and indirect labor



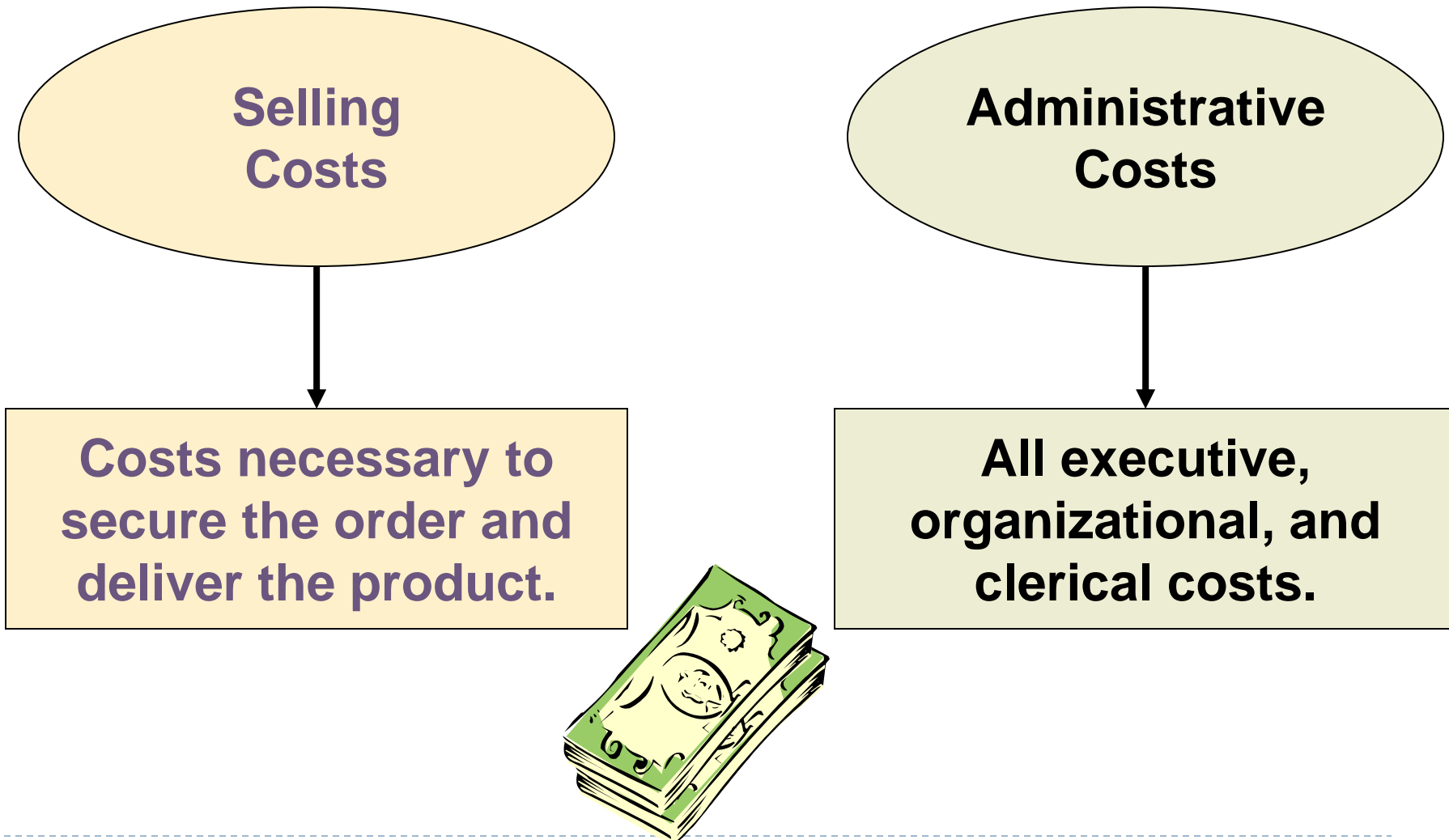
Materials used to support the production process.

Examples: lubricants and cleaning supplies used in the automobile assembly plant.

Wages paid to employees who are not directly involved in production work.

Examples: maintenance workers, janitors and security guards.

Nonmanufacturing Costs



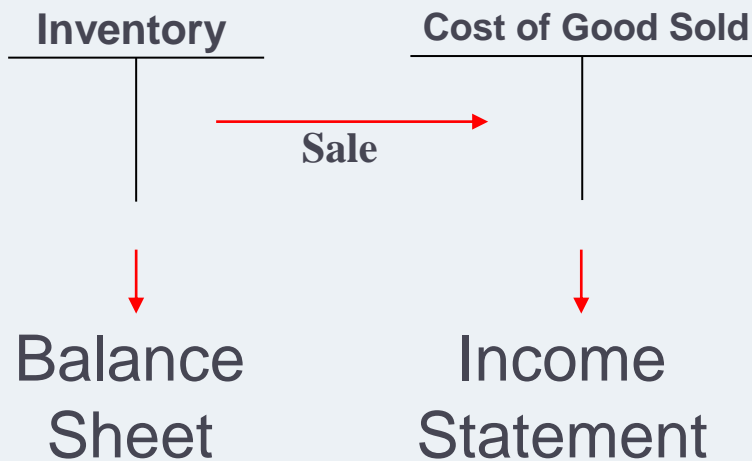
Learning Objective 2

Understand cost classifications used to prepare financial statements: product costs and period costs.

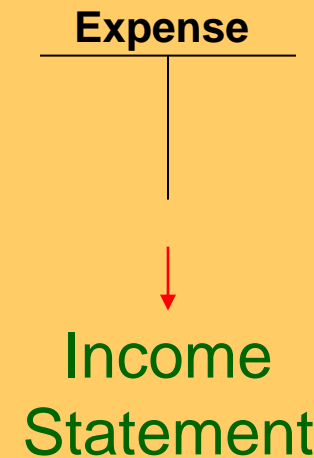


Product Costs Versus Period Costs

Product costs include direct materials, direct labor, and manufacturing overhead.



Period costs include all selling costs and administrative costs.



Quick Check ✓

Which of the following costs would be considered a period rather than a product cost in a manufacturing company?

- A. Manufacturing equipment depreciation.
- B. Property taxes on corporate headquarters.
- C. Direct materials costs.
- D. Electrical costs to light the production facility.
- E. Sales commissions.

Quick Check ✓

Which of the following costs would be considered a period rather than a product cost in a manufacturing company?

A. Manufacturing equipment depreciation.

☒ B. Property taxes on corporate headquarters.

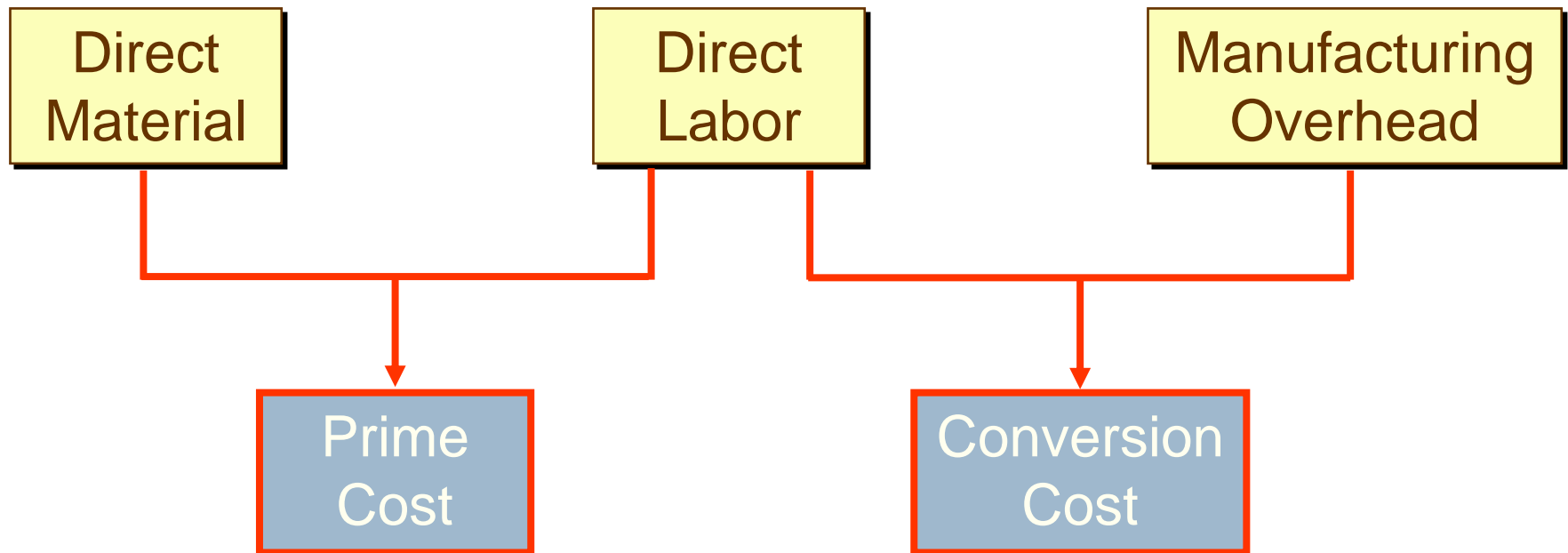
C. Direct materials costs.

D. Electrical costs to light the production facility.

☒ E. Sales commissions.

Classifications of Costs

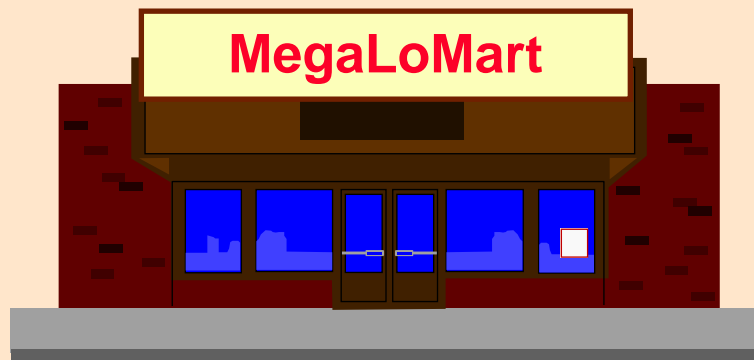
Manufacturing costs are often classified as follows:



Comparing Merchandising and Manufacturing Companies

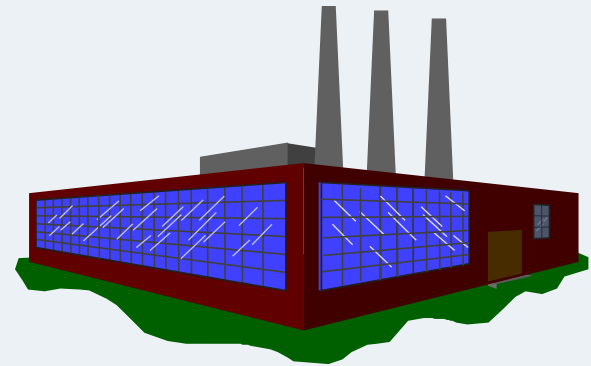
Merchandisers ...

- Buy finished goods.
- Sell finished goods.



Manufacturers ...

- Buy raw materials.
- Produce and sell finished goods.



Balance Sheet

Merchandiser

Current assets

- ◆ Cash
- ◆ Receivables
- ◆ Merchandise Inventory

Manufacturer

Current Assets

- Cash
- Receivables
- Inventories
 - Raw Materials
 - Work in Process
 - Finished Goods

Balance Sheet

Merchandiser

Current assets

◆ Cash

◆ Receivables

◆ Merchandise Inventory

Partially complete products—some material, labor, or overhead has been added.

Manufacturer

Current Assets

Materials waiting to be processed.

□ Inventories

- Raw Materials
- Work in Process
- Finished Goods

Completed products awaiting sale.



Learning Objective 3

Prepare an income statement including calculation of the cost of goods sold.



The Income Statement

Cost of goods sold for manufacturers differs only slightly from cost of goods sold for merchandisers.

Merchandising Company

| | |
|--------------------------------|--------------------------|
| Cost of goods sold: | |
| Beg. merchandise inventory | \$ 14,200 |
| + Purchases | <u>234,150</u> |
| Goods available for sale | \$ 248,350 |
| - Ending merchandise inventory | <u>(12,100)</u> |
| = Cost of goods sold | <u><u>\$ 236,250</u></u> |

Manufacturing Company

| | |
|-----------------------------------|--------------------------|
| Cost of goods sold: | |
| Beg. finished goods inv. | \$ 14,200 |
| + Cost of goods manufactured | <u>234,150</u> |
| Goods available for sale | \$ 248,350 |
| - Ending finished goods inventory | <u>(12,100)</u> |
| = Cost of goods sold | <u><u>\$ 236,250</u></u> |

Basic Equation for Inventory Accounts

**Beginning
balance**

+

**Additions
to inventory**

=

**Ending
balance**

+

**Withdrawals
from
inventory**



Quick Check ✓

If your inventory balance at the beginning of the month was \$1,000, you bought \$100 during the month, and sold \$300 during the month, what would be the balance at the end of the month?

- A. \$1,000.
- B. \$ 800.
- C. \$1,200.
- D. \$ 200.

Quick Check ✓

If your inventory balance at the beginning of the month was \$1,000, you bought \$100 during the month, and sold \$300 during the month, what would be the balance at the end of the month?

A. \$1,000.

☒ B. \$ 800.

C. \$1,200.

D. \$ 200.

$$\$1,000 + \$100 = \$1,100$$

$$\$1,100 - \$300 = \$800$$

Learning Objective 4

Prepare a schedule of cost of goods manufactured.



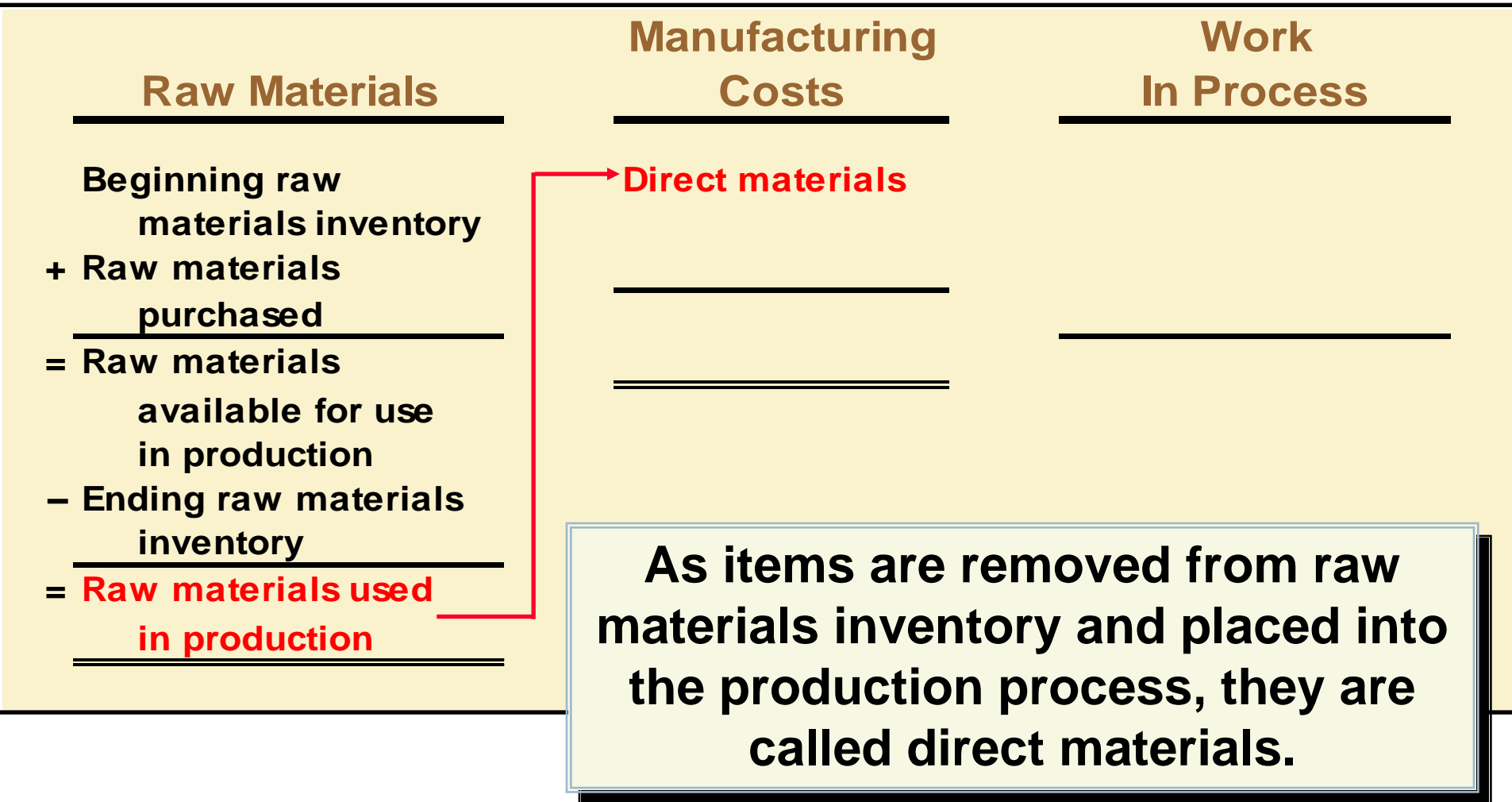
Schedule of Cost of Goods Manufactured

Calculates the cost of raw material, direct labor, and manufacturing overhead used in production.

Calculates the manufacturing costs associated with goods that were finished during the period.



Product Cost Flows



Product Cost Flows

| Raw Materials | Manufacturing Costs | Work In Process |
|---|--|---|
| Beginning raw materials inventory + Raw materials purchased = Raw materials available for use in production – Ending raw materials inventory = Raw materials used in production | Direct materials + Direct labor + Mfg. overhead = Total manufacturing costs | Conversion costs are costs incurred to convert the direct material into a finished product. |

Product Cost Flows

| Raw Materials | Manufacturing Costs | Work In Process |
|---|------------------------------------|--|
| Beginning raw materials inventory | Direct materials | Beginning work in process inventory |
| + Raw materials purchased | + Direct labor | |
| | + Mfg. overhead | + Total manufacturing costs |
| = Raw materials available for use in production | = Total manufacturing costs | = Total work in process for the period |
| - Ending raw materials inventory | | |
| = Raw materials used in production | | |

All manufacturing costs incurred during the period are added to the beginning balance of work in process.

Product Cost Flows

Raw Materials

Beginning raw materials inventory
 + Raw materials purchased
 = Raw materials available for use in production
 – Ending raw materials

Costs associated with the goods that are completed during the period are transferred to finished goods inventory.

Manufacturing Costs

Direct materials
 + Direct labor
 + Mfg. overhead
 = Total manufacturing costs

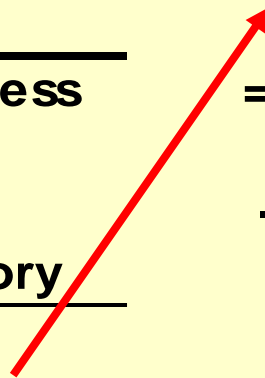
Work In Process

Beginning work in process inventory
 + Total manufacturing costs
 = Total work in process for the period
 – Ending work in process inventory
 = **Cost of goods manufactured**

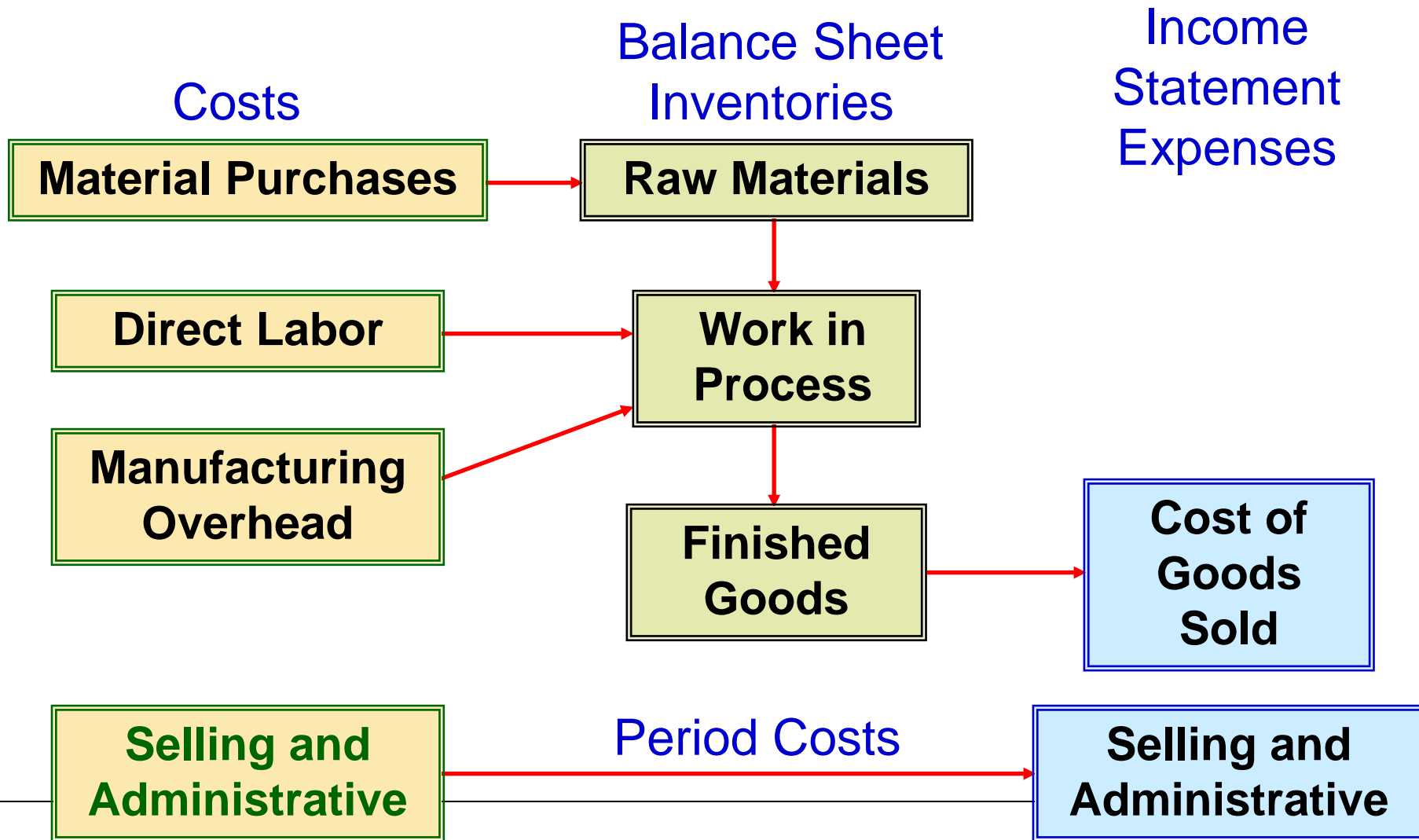


Product Cost Flows

| Work In Process | Finished Goods |
|---|---|
| Beginning work in process inventory | Beginning finished goods inventory |
| + Manufacturing costs for the period | + Cost of goods manufactured |
| = Total work in process for the period | = Cost of goods available for sale |
| - Ending work in process inventory | - Ending finished goods inventory |
| = Cost of goods manufactured | Cost of goods sold |



Manufacturing Cost Flows



Quick Check ✓

Beginning raw materials inventory was \$32,000. During the month, \$276,000 of raw material was purchased. A count at the end of the month revealed that \$28,000 of raw material was still present. What is the cost of direct material used?

- A. \$276,000
- B. \$272,000
- C. \$280,000
- D. \$ 2,000

Quick Check ✓

Beginning raw materials inventory was \$32,000. During the month, \$276,000 of raw material was purchased. A count at the end of the month revealed that \$28,000 of raw material was still present. What is the cost of direct materials used in production?

- A. \$276,000
- B. \$272,000
- C. \$280,000**
- D. \$ 2,000

| | |
|---|-------------------|
| Beg. raw materials | \$ 32,000 |
| + Raw materials purchased | 276,000 |
| <hr/> | |
| = Raw materials available for use in production | \$ 308,000 |
| – Ending raw materials inventory | 28,000 |
| <hr/> | |
| = Raw materials used in production | <u>\$ 280,000</u> |

Quick Check ✓

Direct materials used in production totaled \$280,000. Direct labor was \$375,000 and factory overhead was \$180,000. What were total manufacturing costs incurred for the month?

- A. \$555,000
- B. \$835,000
- C. \$655,000
- D. Cannot be determined.

Quick Check ✓

Direct materials used in production totaled \$280,000. Direct labor was \$375,000 and factory overhead was \$180,000. What were total manufacturing costs incurred for the month?

- A. \$555,000
- B. \$835,000**
- C. \$655,000
- D. Cannot be determined

| | |
|-----------------------|-----------|
| Direct Materials | \$280,000 |
| + Direct Labor | 375,000 |
| + Mfg. Overhead | 180,000 |
| <hr/> | |
| = Mfg. Costs Incurred | |
| for the Month | \$835,000 |
| <hr/> | |

Quick Check ✓

Beginning work in process was \$125,000. Manufacturing costs incurred for the month were \$835,000. There were \$200,000 of partially finished goods remaining in work in process inventory at the end of the month. What was the cost of goods manufactured during the month?

- A. \$1,160,000
- B. \$ 910,000
- C. \$ 760,000
- D. Cannot be determined.

Quick Check ✓

Beginning work in process was \$125,000. Manufacturing costs incurred for the month were \$835,000. There were \$200,000 of partially finished goods remaining in work in process inventory at the end of the month. What was the cost of goods manufactured during the month?

- A. \$1,160,000
- B. \$ 910,000
- C. \$ 760,000**
- D. Cannot be determined

| | |
|---|-------------------|
| Beginning work in process inventory | \$ 125,000 |
| + Mfg. costs incurred for the period | 835,000 |
| = Total work in process during the period | \$ 960,000 |
| – Ending work in process inventory | 200,000 |
| = Cost of goods manufactured | <u>\$ 760,000</u> |

Quick Check ✓

Beginning finished goods inventory was \$130,000. The cost of goods manufactured for the month was \$760,000. And the ending finished goods inventory was \$150,000. What was the cost of goods sold for the month?

- A. \$ 20,000.
- B. \$740,000.
- C. \$780,000.
- D. \$760,000.

Quick Check ✓

Beginning finished goods inventory was \$130,000. The cost of goods manufactured for the month was \$760,000. And the ending finished goods inventory was \$150,000. What was the cost of goods sold for the month?

A. \$ 20,000.

B. \$740,000.

C. \$780,000.

D. \$760,000.

$$\begin{aligned} \$130,000 + \$760,000 &= \$890,000 \\ \$890,000 - \$150,000 &= \$740,000 \end{aligned}$$

Learning Objective 5

Understand cost classifications used to predict cost behavior: variable costs and fixed costs.



Cost Classifications for Predicting Cost Behavior

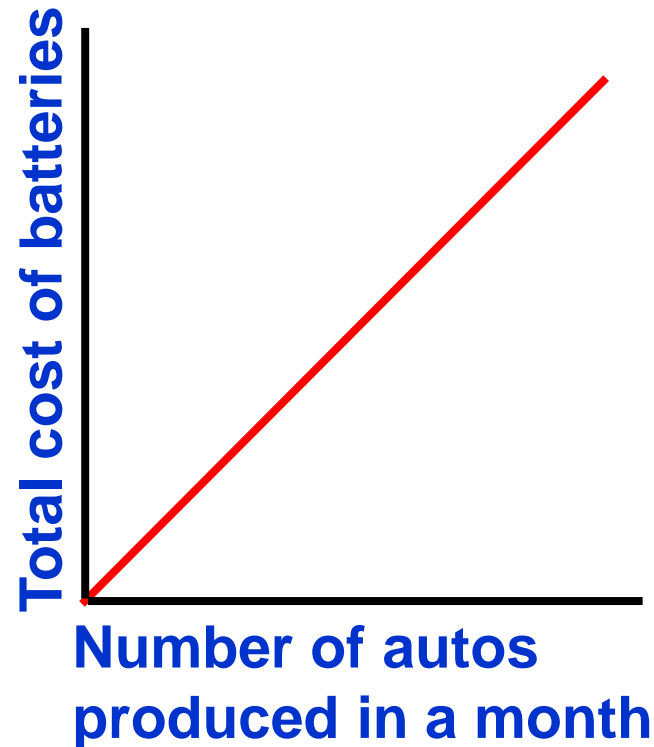


How a cost will react to changes in the level of activity within the relevant range.

- ▶ Total **variable costs** change when activity changes.
- ▶ Total **fixed costs** remain unchanged when activity changes.

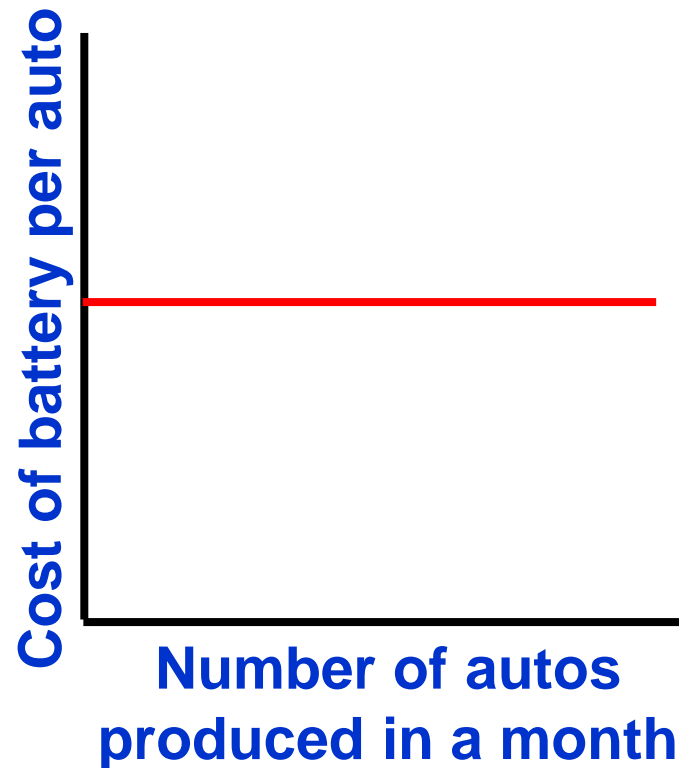
Total Variable Cost

The **total cost of batteries** is based on the number of autos produced in a month



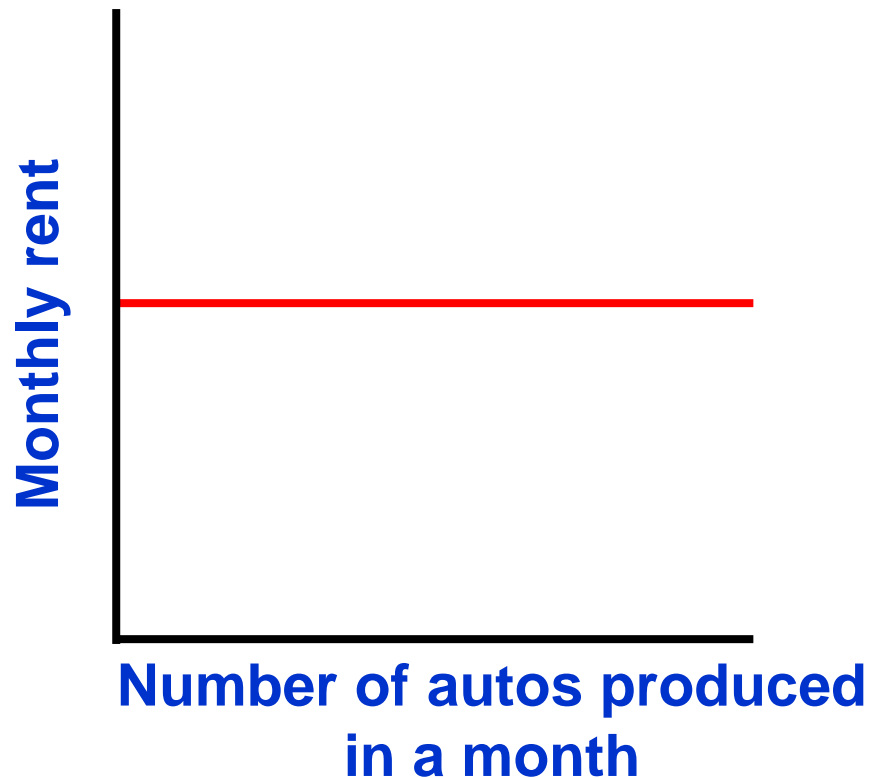
Variable Cost Per Unit

The **cost of battery** is constant per each auto produced



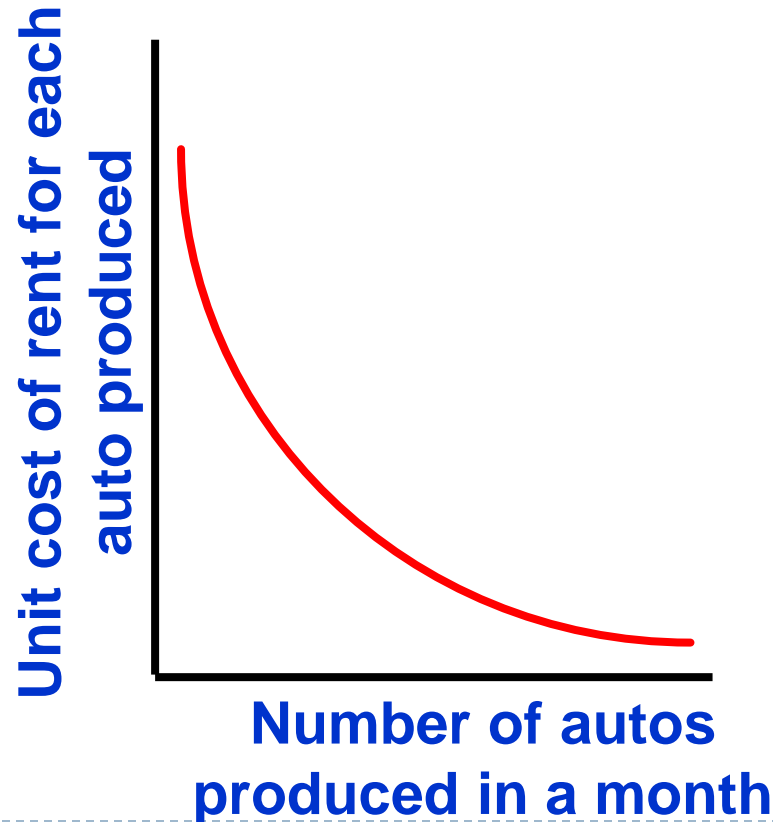
Total Fixed Cost

The **monthly rent** for an auto factory is fixed regardless of the number of autos produced



Fixed Cost Per Unit

The **average monthly rent per auto** decreases as more autos are produced



Cost Classifications for Predicting Cost Behavior

| Behavior of Cost (within the relevant range) | | |
|--|---|---|
| Cost | In Total | Per Unit |
| Variable | Total variable cost changes as activity level changes. | Variable cost per unit remains the same over wide ranges of activity. |
| Fixed | Total fixed cost remains the same even when the activity level changes. | Average fixed cost per unit goes down as activity level goes up. |

Quick Check ✓

Which of the following costs would be variable with respect to the number of cones sold at a Baskins & Robbins shop? (There may be more than one correct answer.)

- A. The cost of lighting the store.
- B. The wages of the store manager.
- C. The cost of ice cream.
- D. The cost of napkins for customers.

Quick Check ✓

Which of the following costs would be variable with respect to the number of cones sold at a Baskins & Robbins shop? (There may be more than one correct answer.)

A. The cost of lighting the store.

B. The wages of the store manager.

☒ C. The cost of ice cream.

☒ D. The cost of napkins for customers.

Learning Objective 6

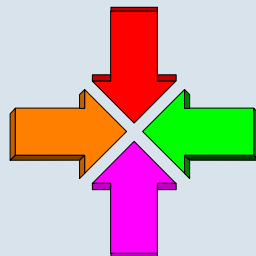
Understand cost classifications used for assigning costs to cost objects: direct and indirect costs.



Assigning Costs to Cost Objects

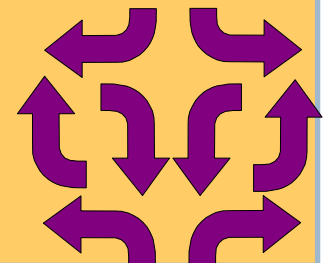
Direct costs

- ▶ **Costs that can be easily and conveniently traced to a unit of product or other cost object.**
- ▶ **Examples: direct material and direct labor**



Indirect costs

- ▶ **Costs that cannot be easily and conveniently traced to a unit of product or other cost object.**
- ▶ **Example: manufacturing overhead**



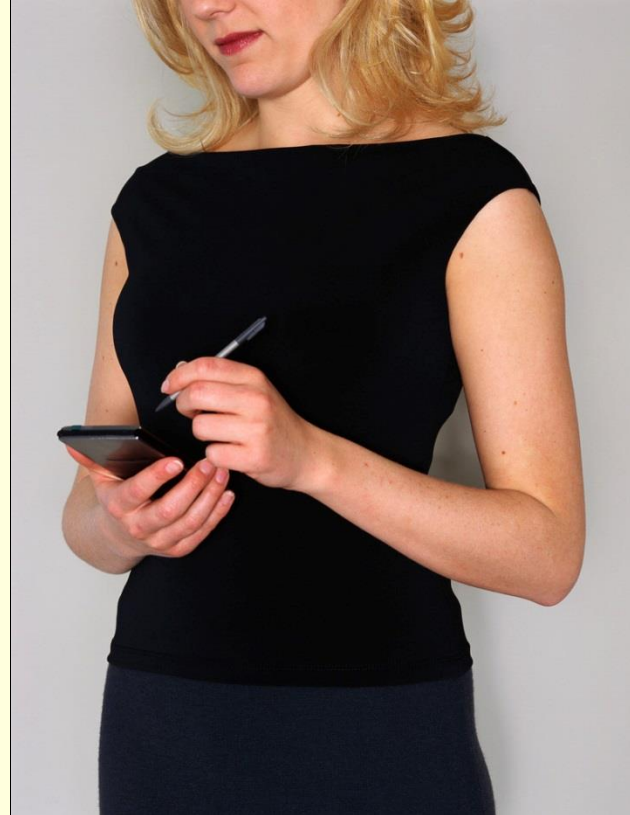
Learning Objective 7

Understand cost classifications used in making decisions: differential costs, opportunity costs, and sunk costs.



Cost Classifications for Decision Making

- ▶ Every decision involves a choice between at least two alternatives.
- ▶ Only those costs and benefits that differ between alternatives are relevant in a decision. All other costs and benefits can and should be ignored.



Differential Cost and Revenue

Costs and revenues that differ among alternatives.

Example: You have a job paying \$1,500 per month in your hometown. You have a job offer in a neighboring city that pays \$2,000 per month. The commuting cost to the city is \$300 per month.

Differential revenue is:

$$\text{\$2,000} - \text{\$1,500} = \text{\$500}$$

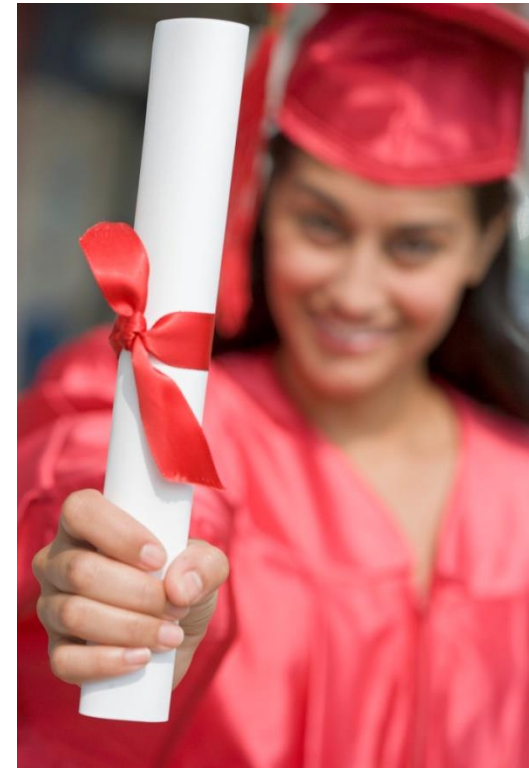
Differential cost is:

\$300

Opportunity Cost

The potential benefit that is given up when one alternative is selected over another.

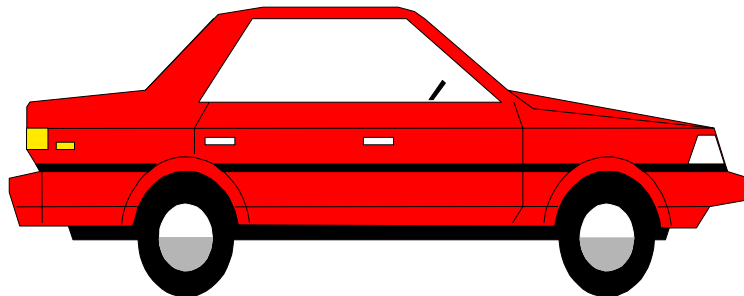
Example: If you were not attending college, you could be earning \$15,000 per year. Your opportunity cost of attending college for one year is \$15,000.



Sunk Costs

Sunk costs have already been incurred and cannot be changed now or in the future. These costs should be ignored when making decisions.

Example: You bought an automobile that cost \$10,000 two years ago. The \$10,000 cost is sunk because whether you drive it, park it, trade it, or sell it, you cannot change the \$10,000 cost.



Quick Check ✓

Suppose you are trying to decide whether to drive or take the train to Kuala Lumpur to attend a concert. You have ample cash to do either, but you don't want to waste money needlessly. Is the cost of the train ticket relevant in this decision? In other words, should the cost of the train ticket affect the decision of whether you drive or take the train to Kuala Lumpur?

A. Yes, the cost of the train ticket is relevant.

B. No, the cost of the train ticket is not relevant.

Quick Check ✓

Suppose you are trying to decide whether to drive or take the train to Kuala Lumpur to attend a concert. You have ample cash to do either, but you don't want to waste money needlessly. Is the cost of the train ticket relevant in this decision? In other words, should the cost of the train ticket affect the decision of whether you drive or take the train to Kuala Lumpur?

☒ A. Yes, the cost of the train ticket is relevant.

☐ B. No, the cost of the train ticket is not relevant.

Quick Check ✓

Suppose you are trying to decide whether to drive or take the train to Kuala Lumpur to attend a concert. You have ample cash to do either, but you don't want to waste money needlessly. Is the annual cost of licensing your car relevant in this decision?

A. Yes, the licensing cost is relevant.

B. No, the licensing cost is not relevant.

Quick Check ✓

Suppose you are trying to decide whether to drive or take the train to Kuala Lumpur to attend a concert. You have ample cash to do either, but you don't want to waste money needlessly. Is the annual cost of licensing your car relevant in this decision?

A. Yes, the licensing cost is relevant.

☒ B. No, the licensing cost is not relevant.

Quick Check ✓

Suppose that your car could be sold now for \$5,000. Is this a sunk cost?

A. Yes, it is a sunk cost.

B. No, it is not a sunk cost.

Quick Check ✓

Suppose that your car could be sold now for \$5,000. Is this a sunk cost?

A. Yes, it is a sunk cost.

☒ B. No, it is not a sunk cost.

Summary of the Types of Cost Classifications

**Financial
Reporting**

**Predicting Cost
Behavior**

**Assigning Costs
to Cost Objects**

**Making Business
Decisions**



Further Classification of Labor Costs

Appendix 2A

Learning Objective 8

(Appendix 2A)

Properly account for labor costs associated with idle time, overtime, and fringe benefits.



Idle Time

**Machine
Breakdowns**

**Material
Shortages**

**Power
Failures**

**The labor costs incurred
during idle time are ordinarily
treated as manufacturing
overhead.**



Overtime

The overtime premiums for all factory workers are usually considered to be part of manufacturing overhead.

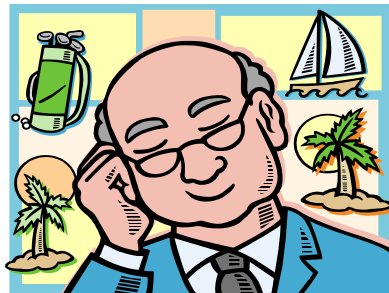


What if a company consistently has overtime? Can the overtime costs be part of labor expenses?

Labor Fringe Benefits

Fringe benefits include employer paid costs for insurance programs, retirement plans, supplemental unemployment programs, Social Security, Medicare, workers' compensation, and unemployment taxes.

Some companies include all of these costs in manufacturing overhead.



Other companies treat fringe benefit expenses of direct laborers as additional direct labor costs.



Cost of Quality

Appendix 2B

Learning Objective 9

(Appendix 2B)

Identify the four types of quality costs and explain how they interact.



Quality of Conformance

When the overwhelming majority of products produced conform to design specifications and are free from defects.

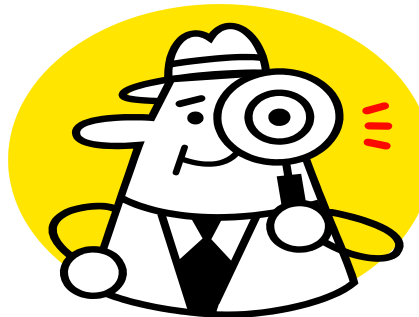


Prevention and Appraisal Costs

**Prevention
Costs**



**Support activities
whose purpose is to
reduce the number of
defects**

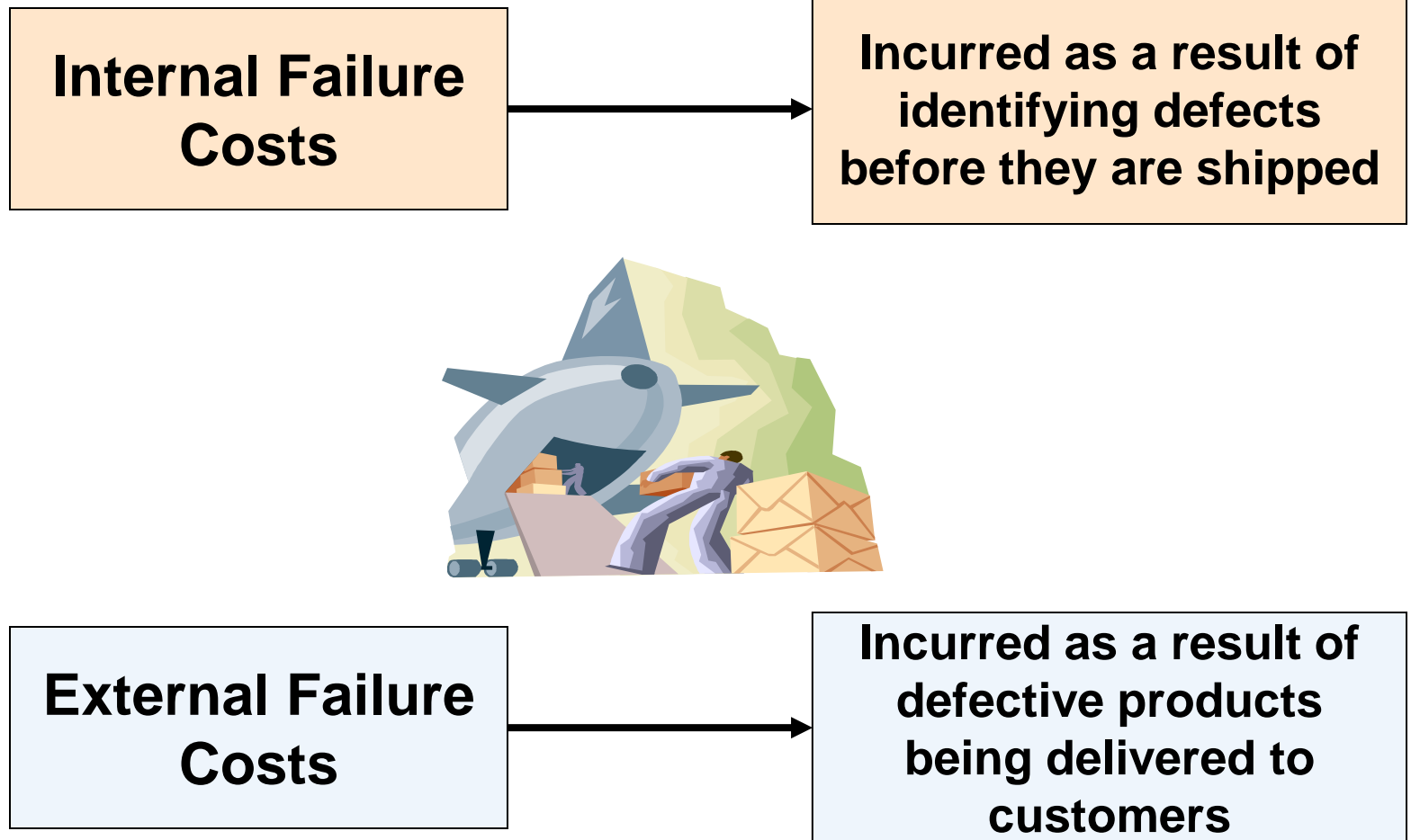


Appraisal Costs



**Incurred to identify
defective products
before the products are
shipped to customers**

Internal and External Failure Costs



Examples of Quality Costs

Prevention Costs

- Quality training
- Quality circles
- Statistical process control activities

Appraisal Costs

- Testing and inspecting incoming materials
- Final product testing
- Depreciation of testing equipment

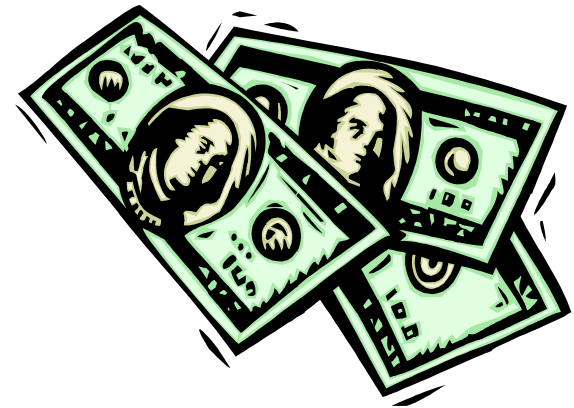
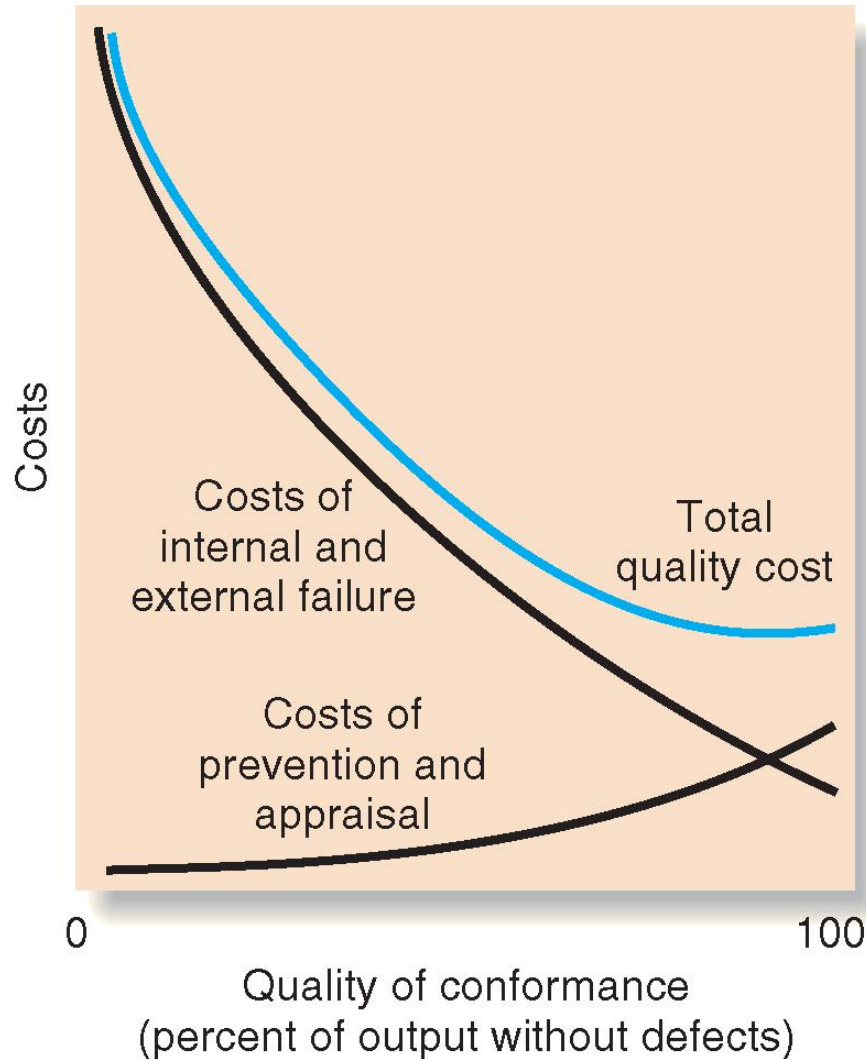
Internal Failure Costs

- Scrap
- Spoilage
- Rework

External Failure Costs

- Cost of field servicing and handling complaints
- Warranty repairs
- Lost sales

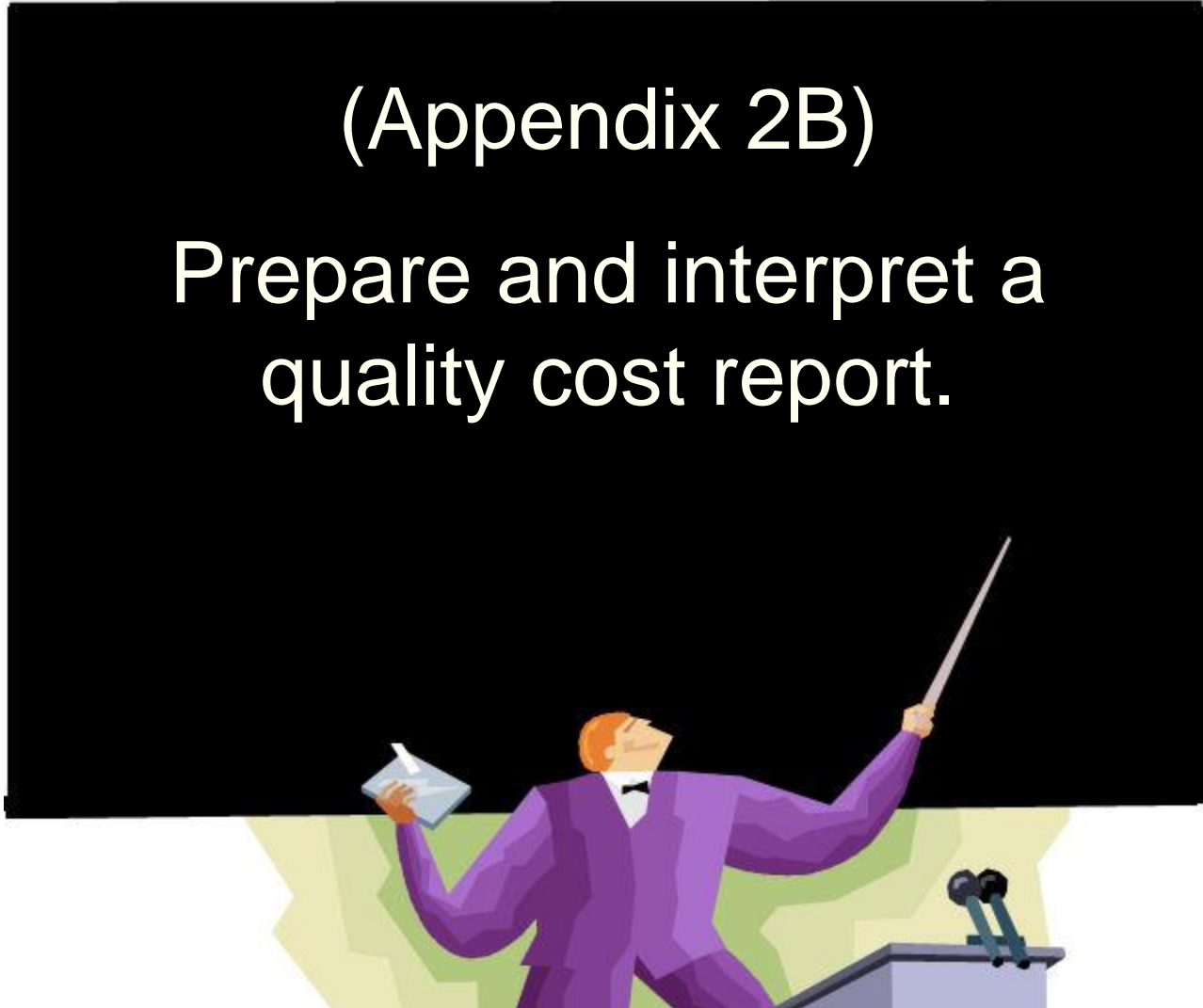
Distribution of Quality Costs



Learning Objective 10

(Appendix 2B)

Prepare and interpret a
quality cost report.



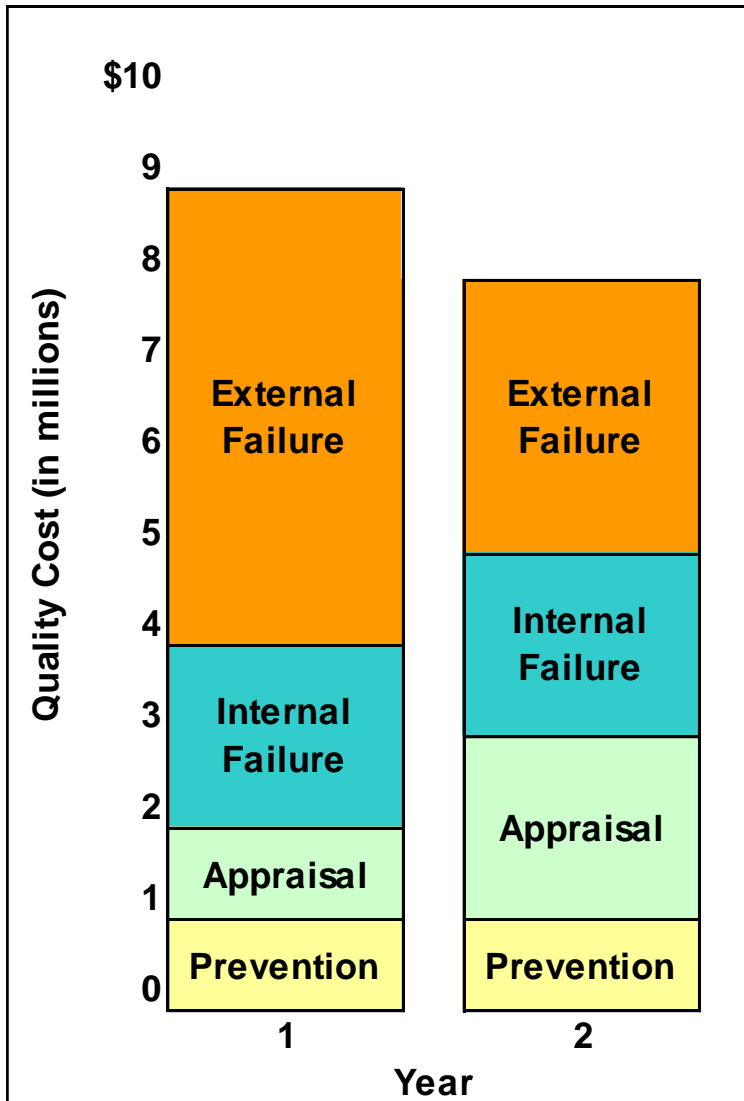
**Quality Cost Report
For Years 1 and 2**

| | Year 2 | | Year 1 | |
|---------------------------------------|--------------|----------|--------------|----------|
| | Amount | Percent* | Amount | Percent* |
| Prevention costs: | | | | |
| Systems development | \$ 400,000 | 0.80% | \$ 270,000 | 0.54% |
| Quality training | 210,000 | 0.42% | 130,000 | 0.26% |
| Supervision of prevention activities | 70,000 | 0.14% | 40,000 | 0.08% |
| Quality improvement | 320,000 | 0.64% | 210,000 | 0.42% |
| Total prevention cost | 1,000,000 | 2.00% | 650,000 | 1.30% |
| Appraisal costs: | | | | |
| Inspection | 600,000 | 1.20% | 560,000 | 1.12% |
| Reliability testing | 580,000 | 1.16% | 420,000 | 0.84% |
| Supervision of testing and inspection | 120,000 | 0.24% | 80,000 | 0.16% |
| Depreciation of test equipment | 200,000 | 0.40% | 140,000 | 0.28% |
| Total appraisal cost | 1,500,000 | 3.00% | 1,200,000 | 2.40% |
| Internal failure costs: | | | | |
| Net cost of scrap | 900,000 | 1.80% | 750,000 | 1.50% |
| Rework labor and overhead | 1,430,000 | 2.86% | 810,000 | 1.62% |
| Downtime due to defects in quality | 170,000 | 0.34% | 100,000 | 0.20% |
| Disposal of defective products | 500,000 | 1.00% | 340,000 | 0.68% |
| Total internal failure cost | 3,000,000 | 6.00% | 2,000,000 | 4.00% |
| External failure costs: | | | | |
| Warranty repairs | 400,000 | 0.80% | 900,000 | 1.80% |
| Warranty replacements | 870,000 | 1.74% | 2,300,000 | 4.60% |
| Allowances | 130,000 | 0.26% | 630,000 | 1.26% |
| Cost of field servicing | 600,000 | 1.20% | 1,320,000 | 2.64% |
| Total external failure cost | 2,000,000 | 4.00% | 5,150,000 | 10.30% |
| Total quality cost | \$ 7,500,000 | 15.00% | \$ 9,000,000 | 18.00% |

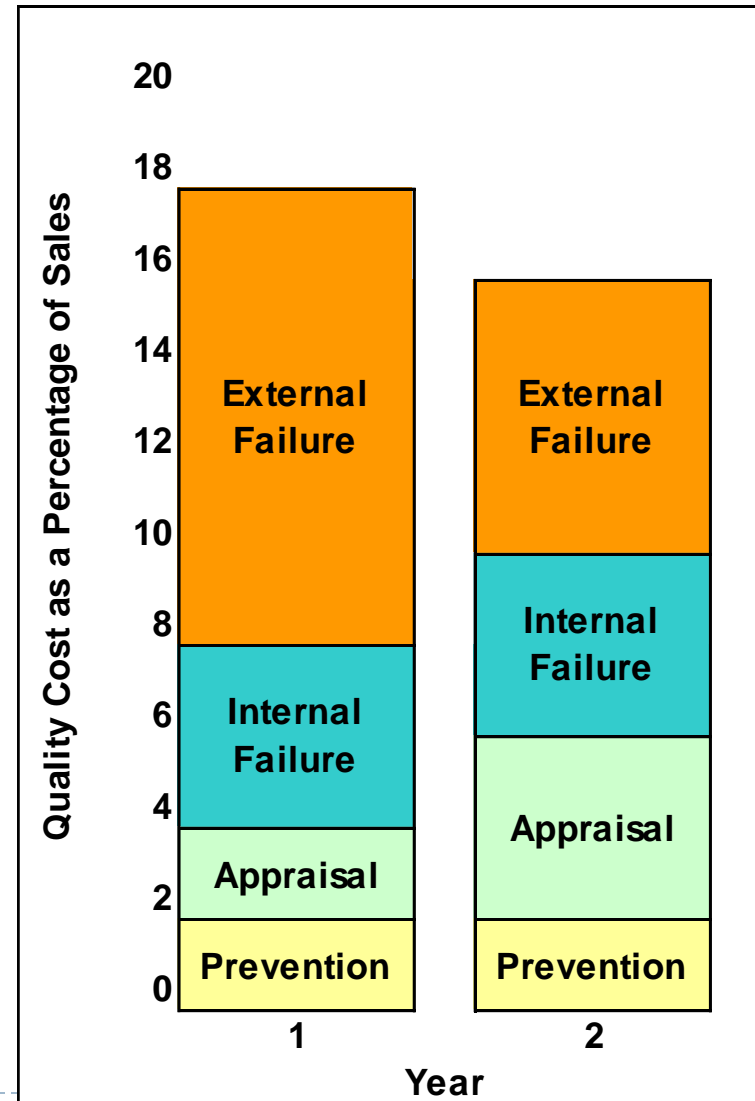
* As a percentage of total sales. In each year sales totaled \$50,000,000.

Quality cost reports provide an estimate of the financial consequences of the company's current defect rate.

Quality Cost Reports in Graphic Form



Quality reports can also be prepared in graphic form.



Uses of Quality Cost Information

Help managers see the financial significance of defects.

Help managers identify the relative importance of the quality problems.

Help managers see whether their quality costs are poorly distributed.

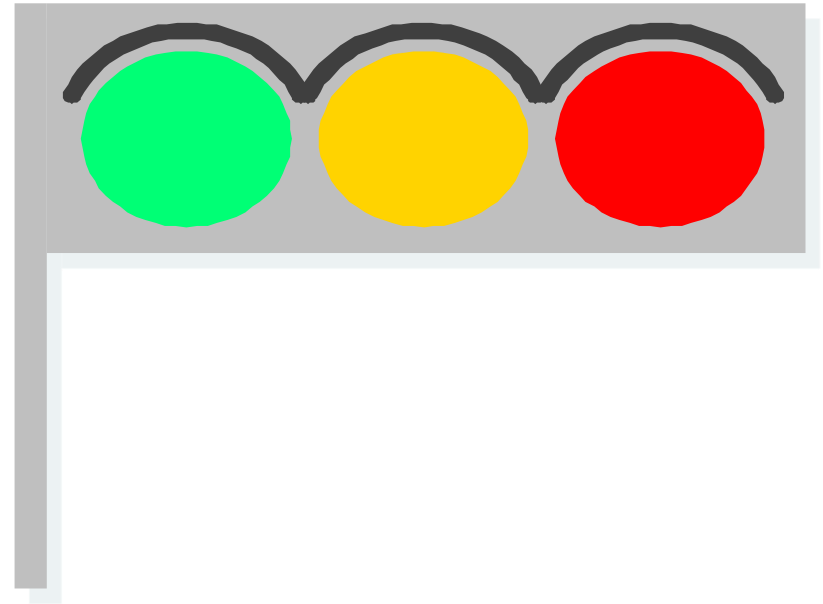


Limitations of Quality Cost Information

Simply measuring and reporting quality cost problems does not solve quality problems.

Results usually lag behind quality improvement programs.

The most important quality cost, lost sales, is often omitted from quality cost reports.



ISO 9000 Standards

ISO 9000 standards have become international measures of quality.

To become ISO 9000 certified, a company must demonstrate:

- 1. A quality control system is in use, and the system clearly defines an expected level of quality.**
- 2. The system is fully operational and is backed up with detailed documentation of quality control procedures.**
- 3. The intended level of quality is being achieved on a sustained basis.**

End of Chapter 2

