Learning Objective 5

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

Cost Classifications for Decision Making

- Decisions involve choosing between alternatives. The goal of making decisions is to identify **those costs that are either *relevant* or *irrelevant* to the decision**.
- It is important to understand the terms *differential cost* and *revenue*, *sunk cost*, and *opportunity cost*.

Differential Costs

- **Differential cost (or incremental cost)** is the difference in cost between any two alternatives.
- A difference in revenue between two alternatives is called **differential revenue**.
- Both are always relevant to decisions.
- Differential costs can be *either fixed or variable.*

Differential Costs

Ex: you have a fixed job with a salary of $1.500 per month in your city. You receive an offer for city near to yours, salary $2.000 per month. The cost of the trip is $300 per month.

Differential revenue is:
$2.000 – $1.500 = $500

Differential cost is:
$300

Sunk Costs

- **Sunk costs** *have already been incurred* and cannot be changed by any decision made now or in the future.
- These costs should be ***ignored*** when making decisions.

Sunk costs

Example: You bought a car that cost $ 10,000 two years ago. The cost of $ 10,000 is *sunk*, because whether you drive it, park it, trade it or sell it, you can't change the cost of $ 10,000.

Opportunity Cost

- **Opportunity cost** is the *potential benefit* that is given up when one alternative is selected over another.
- These costs are *not usually found in accounting records* but must be explicitly considered in every decision.
- For students: What is the opportunity cost you incur by attending class?

Concept Check 3

Suppose you are trying to decide *whether to drive or take the train* to Milan 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 Milan?

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

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

Concept Check 3a

Suppose you are trying to decide whether to drive or take the train to Milan 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 Milan?

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

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

Answer: A

Concept Check 4

Suppose you are trying to decide whether to drive or take the train to Milan 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.

Concept Check 4a

Suppose you are trying to decide whether to drive or take the train to Milan 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.

Answer: B

Concept Check 5

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.

Concept Check 5a

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.

Answer: B

Learning Objective 6

Prepare income statements for a merchandising company using the traditional and contribution formats.

The Traditional and Contribution Formats

Traditional Format		**Contribution Format**	
Sales	$ 100,000	Sales	$ 100,000
Cost of goods sold	70,000	**Variable expenses**	60,000
Gross margin	$ 30,000	Contribution margin	$ 40,000
Selling & admin. expense	20,000	**Fixed expenses**	30,000
Net operating income	$ 10,000	Net operating income	$ 10,000

Traditional format → Used primarily for external reporting (costs accounted by ***function***)

Contribution format → Used primarily by management (cost accounted by ***behavior***)

Uses of the Contribution Format

The contribution format income statement is used as an internal planning and decision-making tool. We will use this approach for:

1. Cost-volume-profit analysis (Chapter 6).
2. Segmented reporting of profit data (Chapter 7).
3. Budgeting (Chapter 8).
4. Special decisions such as pricing and make-or-buy analysis (Chapter 11).

Harris Company manufactures and sells a single product. A partially completed schedule of the Company's total costs and costs per unit over the relevant range of 30,000 to 50,000 units is given below:

	Units Produced and Sold		
	30,000	40,000	50,000
Total costs:			
Variable cost	$180,000	?	?
Fixed cost	300,000	?	?
Total cost.	$480,000	?	?
Costs per unit:			
Variable cost	?	?	?
Fixed cost	?	?	?
Total cost per unit	?	?	?

Required:

- Complete the schedule of the company's total costs and costs per unit;
- Assume that the company produces and sells 45,000 units during the year at a selling price of $16 per unit. Prepare a contribution format income statement for the year.

Solution 1

1. The company's variable cost per unit is:

$$\frac{\$180{,}000}{30{,}000 \text{ units}} = \$6 \text{ per unit.}$$

The completed schedule is as follows:

	Units produced and sold		
	30,000	40,000	50,000
Total costs:			
Variable cost	$180,000	$240,000	$300,000
Fixed cost	300,000	300,000	300,000
Total cost	$480,000	$540,000	$600,000
Costs per unit:			
Variable cost	$ 6.00	$ 6.00	$ 6.00
Fixed cost	10.00	7.50	6.00
Total cost per unit	$16.00	$13.50	$12.00

Solution 2

2. The company's contribution format income statement is:

Sales (45,000 units × $16 per unit)	$720,000
Variable expenses (45,000 units × $6 per unit)	270,000
Contribution margin	450,000
Fixed expense	300,000
Net operating income	$150,000

Additional exercises

Otsego, Inc., is a merchandiser that provided the following information:

Number of units sold	12,000
Selling price per unit	$25
Variable selling expense per unit	$2.50
Variable administrative expense per unit	$2
Total fixed selling expense	$16,000
Total fixed administrative expense	$17,000
Merchandise inventory, beginning balance	$25,000
Merchandise inventory, ending balance	$18,000
Merchandise purchases	$101,000

Required:

1. Prepare a traditional income statement.
2. Prepare a contribution format income statement.

The Alpine House Inc. is a large retailer of snow skis. The company assembled the information shown below for the quarter ended March 31:

	Amount
Sales	$150,000
Selling price per pair of skis	$750
Variable selling expense per pair of skis	$50
Variable administrative expense per pair of skis	$10
Total fixed selling expense	$20,000
Total fixed administrative expense	$20,000
Beginning merchandise inventory	$30,000
Ending merchandise inventory	$40,000
Merchandise purchases	$100,000

Required:

- Prepare a traditional income statement for the quarter ended March 31;
- Prepare a contribution format income statement for the quarter ended March 31;
- What was the contribution margin per unit?

Job-Order Costing: Calculating Unit Product Costs

Chapter 2

PowerPoint Authors:
Susan Coomer Galbreath, Ph.D., CPA
Jon A. Booker, Ph.D., CPA, CIA
Cynthia J. Rooney, Ph.D., CPA
April L. Mohr, MAcc, CPA

Job-Order Costing: An Overview (1 of 2)

Job-order costing systems are used when:

1. **Many different products** are produced each period.
2. Products are **manufactured to order.** Many service industries use job-order costing.
3. The unique nature of each order requires **tracing and allocating costs to each job**, and maintaining cost records for each job.

Job-Order Costing: An Overview (2 of 2)

Examples of companies that would use job-order costing include:

1. Boeing (aircraft manufacturing)
2. Bechtel International (large scale construction)
3. Walt Disney Studios (movie production)
4. Hospitals
5. Law firms

Check

Which one of the following companies is likely to use the job-order costing?

a. Scott Paper Company for kleenex.
b. Architects.
c. Heinz for ketchup.
d. Caterer for a wedding reception
e. Builder of fishing vessels.

Check

Which one of the following companies is likely to use the job-order costing?

a. Scott Paper Company for kleenex.

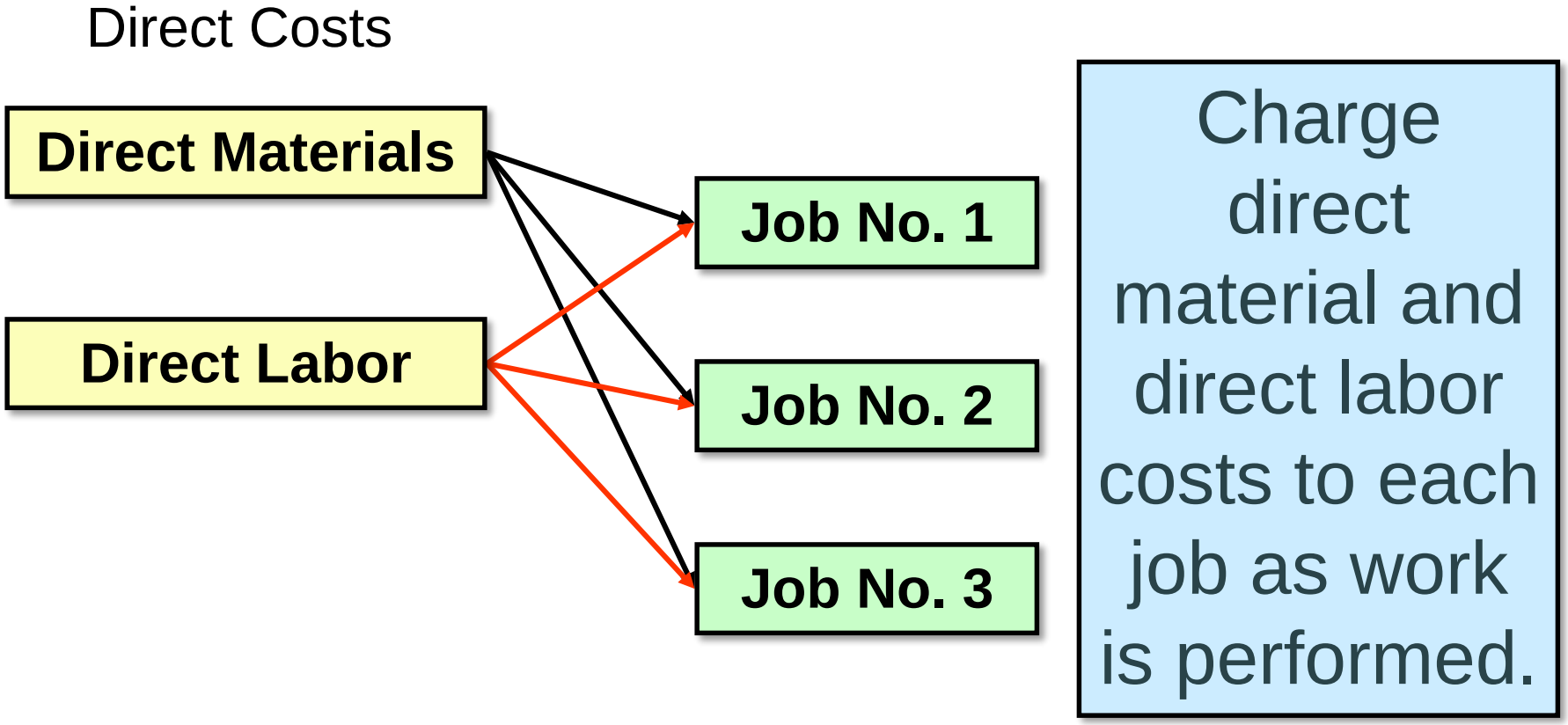
b. Architects.

c. Heinz for ketchup.

d. Caterer for a wedding reception.

e. Builder of fishing vessels.

Job-Order Costing – Cost Flow 1



Job-Order Costing – Cost Flow 2

Direct Costs

Direct Materials

Direct Labor

Indirect Costs

Manufacturing Overhead

HOW?

Job No. 1

Job No. 2

Job No. 3

Manufacturing Overhead, including *indirect materials* and *indirect labor*, are *allocated* to all jobs rather than directly traced to each job.

The Job Cost Sheet

PearCo Job Cost Sheet

Job Number A - 143 Date Initiated 3-4-17

Date Completed

Department B3 Units Completed

Item Wooden cargo crate

Direct Materials		Direct Labor			Manufacturing Overhead		
Req. No.	Amount	Ticket	Hours	Amount	Hours	Rate	Amount

Cost Summary	Units Shipped		
Direct Materials	Date	Number	Balance
Direct Labor			
Manufacturing Overhead			
Total Cost			
Unit Product Cost			

Measuring Direct Materials Cost (1 of 2)

Measuring Direct Materials Cost (2 of 2)

PearCo Job Cost Sheet

Job Number A - 143 Date Initiated 3-4-17

Date Completed

Department B3 Units Completed

Item Wooden cargo crate

Direct Materials		Direct Labor			Manufacturing Overhead		
Req. No.	Amount	Ticket	Hours	Amount	Hours	Rate	Amount
X7-6890	$ 116						

Cost Summary		Units Shipped		
Direct Materials	$ 116	Date	Number	Balance
Direct Labor				
Manufacturing Overhead				
Total Cost				
Unit Product Cost				

Measuring Direct Labor Costs

PearCo Employee Time Ticket

Time Ticket No. 36 Date 3-5-17

Employee I. M. Skilled Station 42

Starting Time	Ending Time	Hours Completed	Hourly Rate	Amount	Job No.
0800	1600	8.00	$ 15.00	$ 120.00	A-143
Totals		8.00	$ 15.00	$ 120.00	A-143

Supervisor *C. M. Workman*

Job-Order Cost Accounting

PearCo Job Cost Sheet

Job Number A - 143 Date Initiated 3-4-17

Date Completed

Department B3 Units Completed

Item Wooden cargo crate

Direct Materials		Direct Labor			Manufacturing Overhead		
Req. No.	Amount	Ticket	Hours	Amount	Hours	Rate	Amount
X7-6890	$ 116	36	8	$ 120			

Cost Summary		Units Shipped		
Direct Materials	$ 116	Date	Number	Balance
Direct Labor	$ 120			
Manufacturing Overhead				
Total Cost				
Unit Product Cost				

Learning Objective 1

Compute a predetermined overhead rate.

Why Use an Allocation Base?

An allocation base, such as direct labor-hours, direct labor-dollars, or machine-hours, is used to assign manufacturing overhead to individual jobs.

We use an allocation base because:

a. It is impossible or difficult to trace overhead costs to particular jobs.

b. Manufacturing overhead consists of many different items ranging from the grease used in machines to the production manager's salary.

c. Many types of manufacturing overhead costs are fixed even though output fluctuates during the period.

Manufacturing Overhead Application

The predetermined overhead rate (*POHR*) used to apply overhead to jobs is determined before the period begins.

$$\text{POHR} = \frac{\text{Estimated total manufacturing overhead cost for the coming period}}{\text{Estimated total units in the allocation base for the coming period}}$$

Ideally, the allocation base is a cost driver that causes overhead.

The Need for a POHR

Predetermined overhead rates that rely upon estimated data are often used because:

1. Actual overhead for the period is not known until the end of the period, thus inhibiting the ability to estimate job costs during the period.
2. Actual overhead costs can fluctuate seasonally, thus misleading decision makers.

Computing Predetermined Overhead Rates (1 of 2)

The predetermined overhead rate is computed before the period begins using a four-step process.

1. Estimate the **total amount of the allocation base** (the denominator) that will be required for next period's estimated level of production.

2. Estimate the **total fixed manufacturing overhead cost** for the coming period and the variable manufacturing overhead cost per unit of the allocation base.

Computing Predetermined Overhead Rates (2 of 2)

3. Use the following **equation** to estimate the total amount of manufacturing overhead:

$$Y = a + bX$$

Where,

Y = The estimated total manufacturing overhead cost
a = The estimated total **fixed** manufacturing overhead cost
b = The estimated ***variable*** manufacturing overhead cost per unit of the allocation base
X = The estimated total amount of the allocation base.

4. Compute the predetermined overhead rate.

Learning Objective 2

Apply overhead cost to jobs using a predetermined overhead rate.

Overhead Application Rate

PearCo estimates that it will require 160,000 direct labor-hours to meet the coming period's estimated production level. In addition, the company estimates total fixed manufacturing overhead at $200,000, and variable manufacturing overhead costs of $2.75 per direct labor-hour.

Y = a + bX
Y = $200,000 + ($2.75 per direct labor-hour × 160,000 direct labor-hours)
Y = $200,000 + $440,000
Y = $640,000

$$\text{POHR} = \frac{\$640{,}000 \text{ estimated total manufacturing overhead}}{160{,}000 \text{ estimated direct labor hours (DLH)}}$$

POHR = $4.00 per direct labor-hour

Recording Manufacturing Overhead

PearCo Job Cost Sheet

Job Number A - 143 Date Initiated 3-4-17

Date Completed 3-5-17

Department B3 Units Completed 2

Item Wooden cargo crate

Direct Materials		Direct Labor			Manufacturing Overhead		
Req. No.	Amount	Ticket	Hours	Amount	Hours	Rate	Amount
X7-6890	$ 116	36	8	$ 88	8	$ 4	$ 32

Cost Summary		Units Shipped		
Direct Materials	$ 116	Date	Number	Balance
Direct Labor	$ 120			
Manufacturing Overhead	$ 32			
Total Cost				
Unit Product Cost				

Learning Objective 3

Compute the total cost and the unit product cost of a job using a plantwide predetermined overhead rate.

Calculating Total Cost of Job

PearCo Job Cost Sheet

Job Number A - 143 Date Initiated 3-4-17

Date Completed 3-5-17

Department B3 Units Completed 2

Item Wooden cargo crate

Direct Materials		Direct Labor			Manufacturing Overhead		
Req. No.	Amount	Ticket	Hours	Amount	Hours	Rate	Amount
X7-6890	$ 116	36	8	$ 120	8	$ 4	$ 32

Cost Summary		Units Shipped		
Direct Materials	$ 116	Date	Number	Balance
Direct Labor	$ 120			
Manufacturing Overhead	$ 32			
Total Cost	$ 268			
Unit Product Cost				

Calculating Unit Product Cost

PearCo Job Cost Sheet

Job Number A - 143
Date Initiated 3-4-17
Date Completed 3-5-17
Department B3
Units Completed 2
Item Wooden cargo crate

Direct Materials		Direct Labor			Manufacturing Overhead		
Req. No.	Amount	Ticket	Hours	Amount	Hours	Rate	Amount
X7-6890	$ 116	36	8	$ 120	8	$ 4	$ 32

Cost Summary		Units Shipped		
		Date	Number	Balance
Direct Materials	$ 116			
Direct Labor	$ 120			
Manufacturing Overhead	$ 32			
Total Cost	$ 268			
Unit Product Cost	$ 134			

Concept Check 1

Job WR53 at NW Fab, Inc. required $200 of direct materials and 10 direct labor-hours at $15 per hour. Estimated total overhead for the year was $760,000 and estimated direct-labor hours were 20,000. What would be recorded as the cost of job WR53?

a. $200.

b. $350.

c. $380.

d. $730.

Concept Check 1a

Job WR53 at NW Fab, Inc. required $200 of direct materials and 10 direct labor-hours at $15 per hour. Estimated total overhead for the year was $760,000 and estimated direct labor hours were 20,000. What would be recorded as the cost of job WR53?

a. $200.

b. $350.

c. $380.

d. $730.

POHR = $760,000/20,000 hours			$38
Direct materials			$200
Direct labor	$15	x 10 hours	$150
Manufacturing overhead	$38	x 10 hours	$380
Total cost			$730

End of part 1 – Chapter 2