

COMMERCE MENTORSHIP PROGRAM

MIDTERM REVIEW SESSION

COMM 294



PREPARED BY
HARRISON YE



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Topic 1:

Managerial Accounting & the Business Environment



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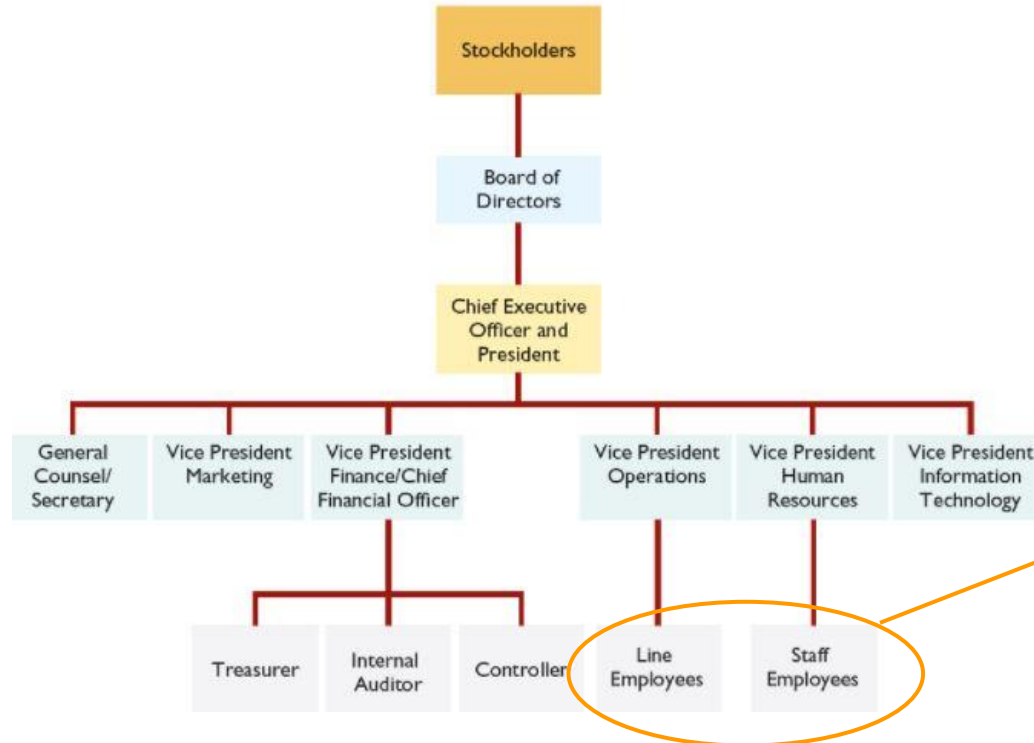
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Financial VS Managerial Accounting

	Financial	Managerial
Users	External stakeholders that have an interest in your firm's financial info (shareholders, creditors, regulators, etc.)	Internal members (officers, managers, decision makers)
Time Focus	Historical (past data)	Future
Objectives	Be precise, verifiable, accurately reported	Be relevant and timely to decision making
Focus	Whole organization	Segments of organization (product lines, divisions, departments, etc.)
Legal Requirements	Follow reporting standards (IFRS/ASPE)	Nope! Not being used outside the organization

Organizational Structure



Line positions: directly involved with the revenue-generating operating activities (e.g. sales associates, factory managers)

Staff positions: support efforts of line employees (e.g. finance, legal, HR)



Role of Management

All managers are responsible for...

Planning	<ul style="list-style-type: none">- Establish objectives- Decide how, where and when to use limited resources
Directing and Motivating	<ul style="list-style-type: none">- Operationalizing the plan (execution)- Hiring, training, firing, coordinating
Control	<ul style="list-style-type: none">- Ensure plan is followed- Feedback, evaluation, rewards/incentivizing performance

Topic 2:

Cost Terms, Concepts, and Classifications



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Manufacturing Costs

Manufacturing (AKA Product) Costs

- **Direct Materials (DM), Direct Labour (DL), Manufacturing Overhead (MOH)**
- **DM/DL** directly associated with finished product; e.g. workers paid by production level
- **MOH** = indirectly associated costs; e.g. depreciation, insurance, maintenance on factory, factory manager salary
- **Recorded as inventory** and expensed as sold (to COGS)

**Prime Costs =
DM + DL**

Special Classifications

- **Idle time (e.g. machine failures, shortages):** charged to MOH if general; or DL if product-specific
- **Overtime premiums:** usually charged to MOH by may be job specific and charged to that job (DL)
- **Employee benefits:** charged to MOH if pertaining to indirect labour; charge to DL if benefits are for direct labour workers

**Conversion Costs =
DL + MOH**



Indirect Materials and Labour? (MOH)

Indirect Materials

- Costs that are too hard to trace to the finished product; costs that would be insignificant in terms of \$ value when tracing back to products
- Not physically part of finished product
- E.g. cleaning supplies used to wipe machinery, disposable gloves used to handle production

Indirect Labour

- Work of manufacturing-related employees that has no physical association with the making of the finished product
- E.g. factory maintenance people, factory security, QC inspectors, supervisors



Non-Manufacturing Costs

Non-Manufacturing (AKA Period) Costs

- **NOT** included in inventory; expensed when incurred
- Marketing/selling/admin expenses (e.g. advertising, shipping, sales travel, commissions, sales salaries, warehouse for manufactured goods)

Selling Costs

All costs necessary to:

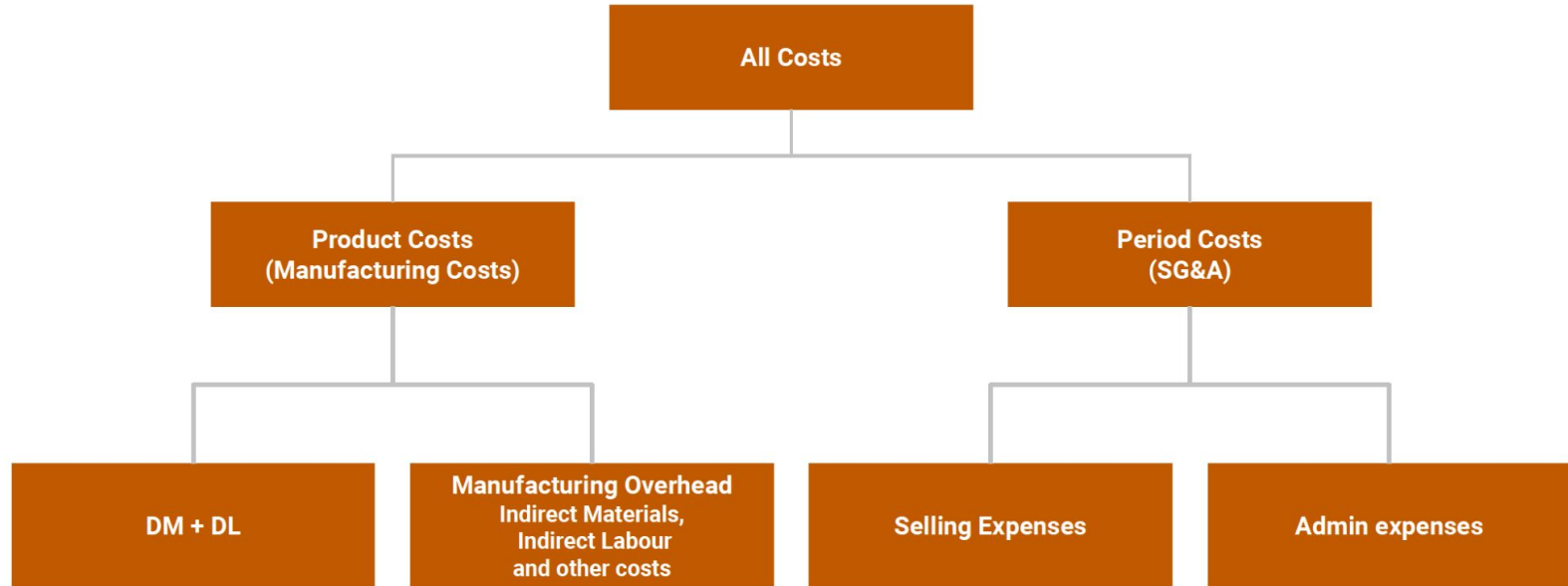
1. Secure customer orders (Sales commissions, advertising)
2. Get the service or product to the customer, (depreciation of delivery equipment, finished goods warehouses, shipping costs)

Administrative Costs

- All costs associated with general management of company as a whole
- Costs not included under manufacturing or selling costs
- E.g. CEOs salary, legal retainer/audit services costs



Cost Classification

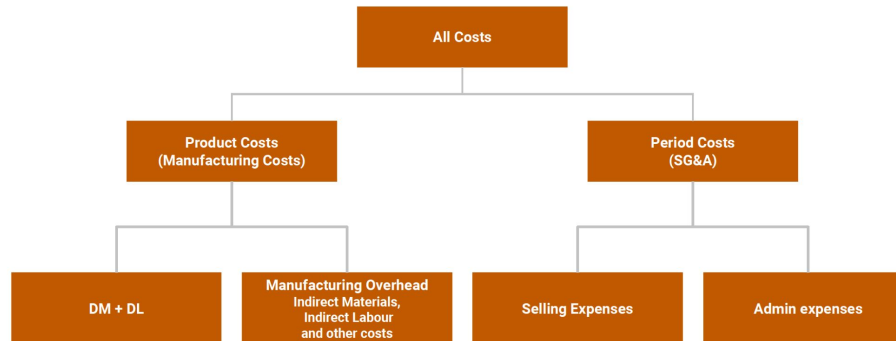


Practice Problem #1

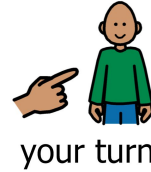


Classify the following costs for Christian Dior:

- A. Salary of Delphine Arnault, the CEO
- B. Cost of Instagram advertisements for their new collection
- C. Wage of a factory manager
- D. Idle time caused by supply chain shortage of silk
- E. Monthly electricity bill for the factory
- F. Cost of dental insurance for the marketing manager



Practice Problem #1



Classify the following costs for Christian Dior:

- A. Administrative Cost
- B. Selling Expense
- C. MOH. Indirect labour cost.
- D. DL. Directly traceable to Dior clothes and necessary.
- E. MOH. Not directly associated with production.
- F. Administrative Cost. Not associated with manufacturing employees.



Manufacturing Costs in Financial Statements

Inventory Accounts: raw materials -> work in process (WIP) -> finished goods (FG)

General Equation:

Beginning Balance + Additions - Ending Balance = Items sold/finished/completed

Raw Materials:

Beginning Raw Materials + Purchases - Ending Raw Materials Inventory = **Raw materials used**

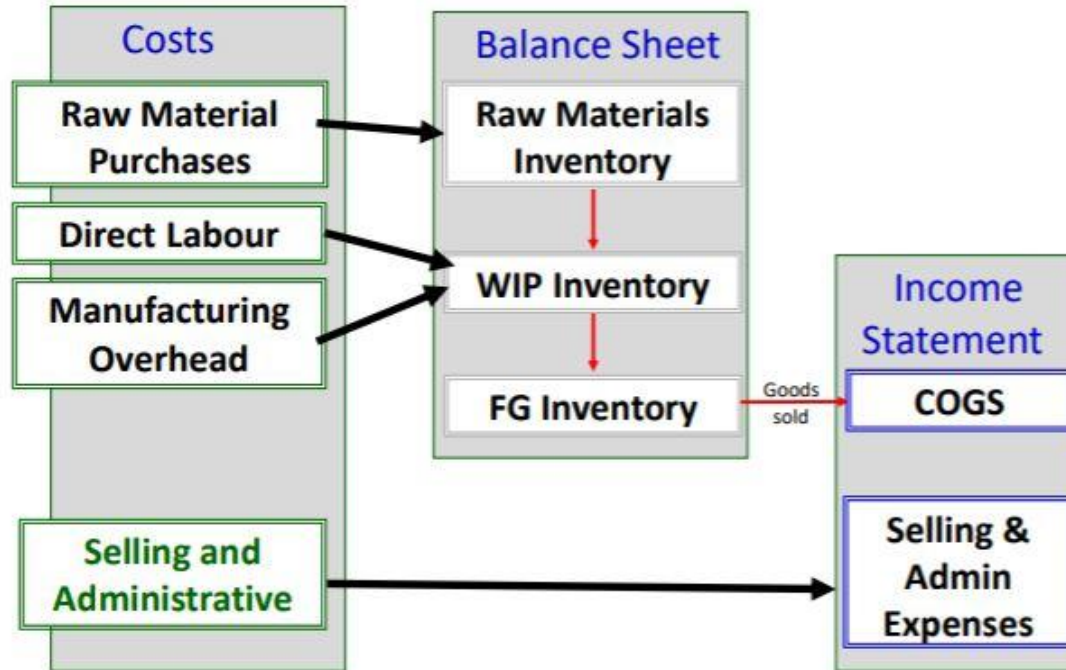
Work-In-Process (WIP):

Beginning WIP Inventory + Manufacturing costs (**DM** + DL + MOH for the period) - Ending WIP = **Cost of Goods Manufactured (COGM)**

Finished Goods:

Beginning FG inventory + **COGM** - Ending FG inventory = COGS

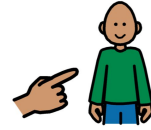
Manufacturing Costs in Financial Statements





Manufacturing Cost Example

Raw Materials			
Beg. Bal	+ Addition	- Ending Bal	= Withdraw
10k	+ 30k	- 20k	= 20k
Work in Progress (WIP)			
Beg. Bal	+ Addition	- Ending Bal	= Withdraw
50k	+ DM: 20k	- 65k	= COGM: 155k
	+ DL: 60k		
	+ MOH: 90k		
Finished Goods			
Beg. Bal	+ Addition	- Ending Bal	= Withdraw
30k	+ 155k	- 40k	= COGS: 145k



your turn

Practice Problem #2

The Krusty Krab has expanded operations to begin selling cooking supplies. Use the information to **calculate COGS** for their new product line for the month of **March**.

- Direct materials used in production totalled \$20,000.
- The wage of a pots & pans manufacturer was \$90,000.
- Manufacturing overhead was \$29,000,
- Ending WIP was \$7,000 more than beginning WIP.
- Mr. Krab's salary was \$40,000.
- Beginning finished goods inventory was \$30,000 and ending finished goods inventory was \$25,000.

What was the cost of goods sold for March?

Raw Materials:

Beginning Raw Materials + Purchases - Ending Raw Materials Inventory = **Raw materials used**

Work-In-Process (WIP):

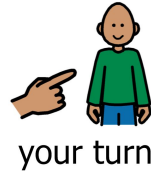
Beginning WIP Inventory + Manufacturing costs (**DM** + DL + MOH for the period) - Ending WIP = **Cost of Goods Manufactured (COGM)**

Finished Goods:

Beginning FG inventory + **COGM** - Ending FG inventory = COGS



Practice Problem #2



What was the cost of goods sold for March?

Total manufacturing costs = 20k (DM) + 90k (DL) + 29k (MOH) = 139k
Admin expense = 40k (ignore)

COGM = Beg. WIP + Manufacturing Costs - End. WIP
End. WIP > Beg. WIP by 7k; therefore subtract 7k -> 139k - 7k = 132k

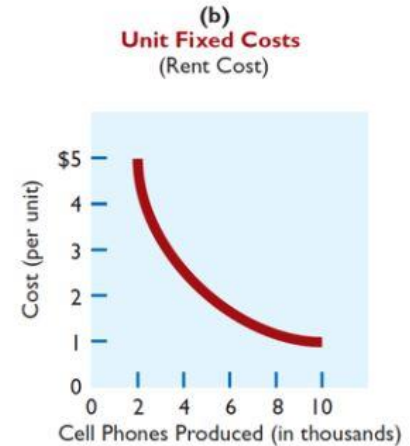
COGS = Beg. FG + COGM - End. FG
= 30k + 132k - 25k = 137k

COGS = 137k

Cost Behaviour Analysis: Fixed Costs

Fixed Costs

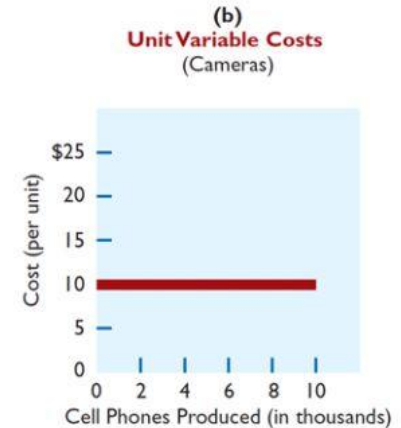
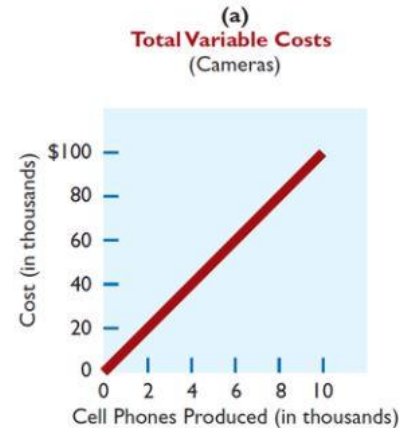
- FCs remain the same total regardless of activity changes
- i.e. If the level of production increases by 10%, total FCs stay the same
- Unit costs decreases as volume increases (e.g. facility rent costs \$10,000)
- Property taxes, insurance, rent, manager salaries, etc.



Cost Behaviour Analysis: Variable Costs

Variable Costs

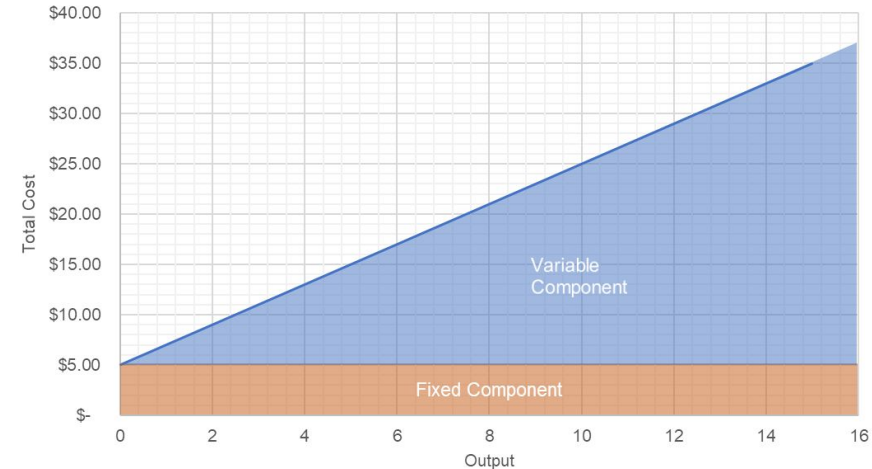
- VCs proportionately change as activity changes
- i.e. If the level of production increases by 10%, total VCs increase by 10%
- Cost remains the same per unit (e.g. every camera for iPhone costs \$10 to produce)
- Direct materials, direct labour, sales commissions, etc.



Cost Behaviour Analysis: Mixed Costs

Mixed Costs

- Includes both VC and FC components
- Change in total but not proportionately with changes in activity level (e.g. 1 → 2 units: \$3000 to \$5000)
- E.g. a cell phone plan with a \$20 monthly fee and a \$5 charge for every GB of data used
- Can be separated into VC and FC using high-low method (**more on this later**)





Other Costs

Step Fixed Costs	Costs staying the same within a certain range, increases outside the range E.g. buying a new machine after 1000 units are produced
Marginal Costs	Cost of producing one additional unit
Average Costs	$(VC + FC) / \text{total number of units produced}$
Opportunity Costs	Lost potential benefit from best possible alternative use of resources
Sunk Costs	Costs that have already be incurred and will not be changed or avoided by any present or future decisions

Topic 3:

Job Order Costing



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Cost Accounting Systems

Cost systems provide cost per unit of products produced, which can allow companies to determine how much they should charge, how much their inventory is worth, etc.

Process Cost System

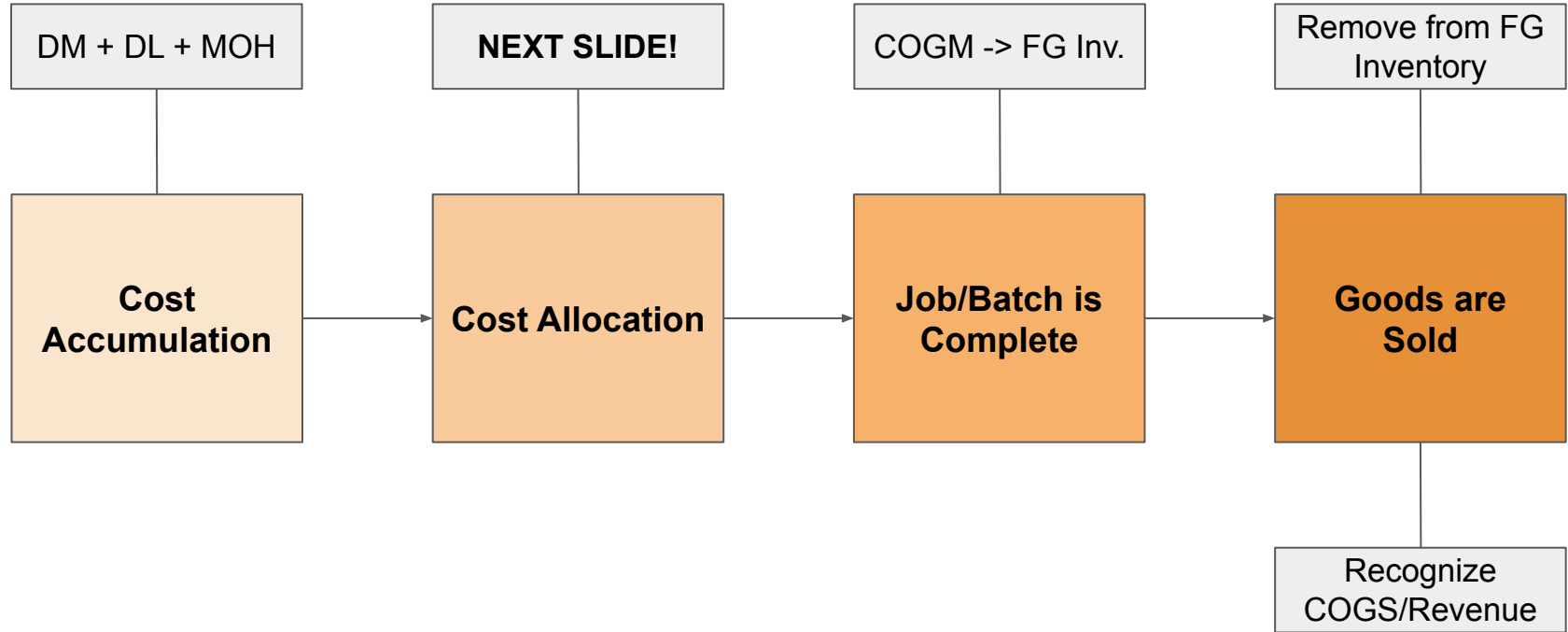
- **Used when:** large volume of similar products produced - *e.g. production of Shin Ramen, boxes of tissue, potato chip*
- Accumulates for a **time period** (week, month...)
- Costs assigned to **department or processes**
- **Same average cost per unit**

Job Order Costing System

- **Used when:** distinguishable products individually manufactured, or manufactured in small batches - *e.g. basketball jerseys, new condos in downtown Vancouver*
- Costs assigned to **each job/batch**
- **Compute cost per job**
- **Overall Cost of a Job = DM + DL + MOH**



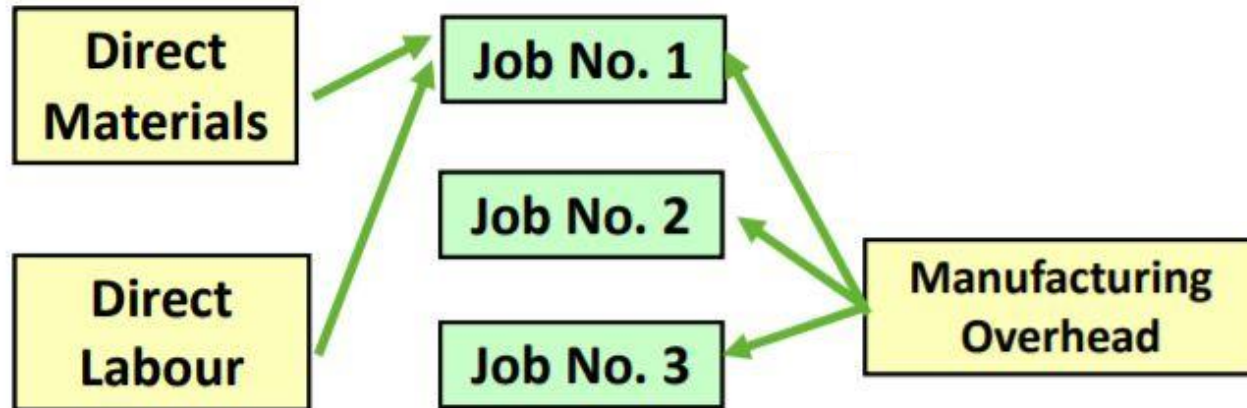
Job-Order Cost Flow



Job-Order Cost Allocation

Direct materials (DM) and direct labour (DL) are **traced directly to each job** as the work is performed.

Manufacturing Overhead (MOH) are applied/allocated to **all jobs rather than directly traced to each job.**





Allocation of Manufacturing Overhead

It's hard to trace MOH to a particular job, so before the period starts, we will...

Steps to Allocating Overhead:

1. Start by determining the **allocation base**, i.e. the **primary driver of costs** that actually causes the overhead (*e.g. # of DL hours for labour-intensive businesses, # of machine hours for automation heavy businesses*)
2. Calculate the predetermined overhead rate (PDOHR)

E.g. For every dollar we incur in labour, we will spend x amount in MOH...

$$\text{POHR} = \frac{\text{Estimated Total MOH for the period}}{\text{Estimated Total Units of Allocation Base}}$$

NOTE: ESTIMATED AMOUNTS, NOT THE ACTUAL AMOUNTS



Allocation of Manufacturing Overhead

Then, during the period, we will...

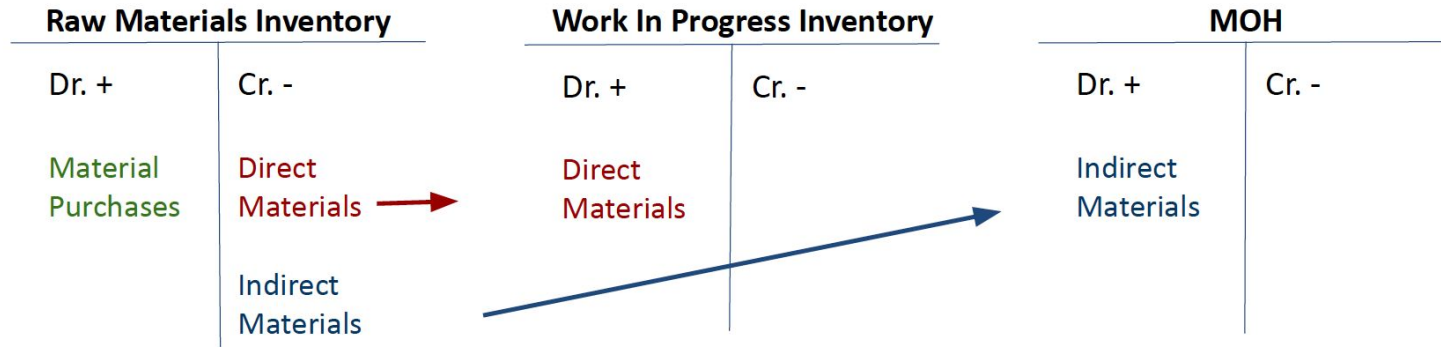
3. Use the POHR to assign MOH based on **actual activity**. We are using our **estimated rate**, calculated with our **actual activity**.

$$\text{MOH Applied} = \text{POHR} * \text{Actual Activity}$$

After the period, we will...

4. Compare MOH Applied (estimate) to the **actual MOH incurred**, deal with our variances as required
 - **Actual MOH > Applied MOH** = underapplied MOH (need to increase COGS to make up difference)
 - **Actual MOH < Applied MOH** = overapplied MOH (need to decrease COGS to make up difference)

How is Actual MOH Derived? - Raw Materials



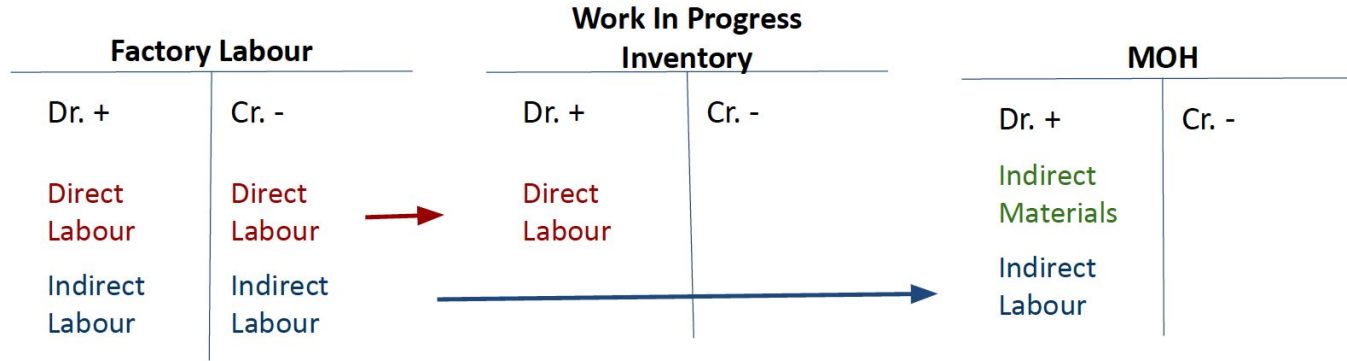
Raw Materials Purchase

Dr. Raw Materials Inventory
Cr. A/P

Raw Materials Usage

Dr. WIP Inventory (DM)
Dr. MOH (IM)
Cr. Raw Materials Inventory

How is Actual MOH Derived? - Labour



Factory Labour Accumulated	
Dr. Factory Labour	(DL + IL)
Cr. Wages Payable	
Assigning DL	
Dr. WIP Inventory	(DL)
Cr. Factory Labour	
Assigning IL	
Dr. MOH (actual)	(IL)
Cr. Factory Labour	



How is Actual MOH Derived? - Other Costs

MOH	
Dr. +	Cr. -
Indirect Materials	
Indirect Labour	
Other Overhead	

In addition to **Indirect Materials** and **Indirect Labour**, other MOH costs are charged to the MOH account as incurred.

Dr. MOH (actual)
Cr. A/P (utilities, repairs, etc.)
Cr. Prepaid Insurance
Cr. Property Taxes Payable
Cr. Accumulated Dep.



Actual VS Applied MOH: Adjusting Variances

Actual MOH is recorded as a debit, while Applied MOH is recorded as a credit

Manufacturing Overhead	
Incurring	Applied
13,800	22,400
6,000	
4,000	
1,400	

Over-Applied

Actual MOH < Applied MOH (MOH currently has a credit balance)

Adjustment:

Dr. MOH - Applied

CR. Cost of Goods Sold

Under-Applied

Actual MOH > Applied MOH (MOH currently has a debit balance)

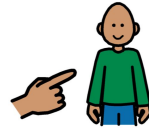
Adjustment:

Dr. Cost of Goods Sold

CR. MOH - Applied



Practice Problem #3



your turn

Bob, owner of Bob's Burgers has been tasked with a catering order for a competitive eating competition. To prepare, Bob spends \$100 on 20 kg of ground beef. He ends up using 8 kg on the catering order, and \$15 worth of indirect materials.

For this order, Bob uses \$180 worth of ingredients and 4 hours of labour at \$15 an hour. MOH is allocated based on direct labour hours. The MOH budget for the year is \$900,000 and he expects to incur 195,000 labour hours.

During his end of year review, Bob calculates that Bob's Burgers incurred 215,000 direct labour hours and actual manufacturing overhead costs were \$935,000.

- a) *Help Bob determine the total manufacturing cost of the catering order.*
- b) *What are the journal entries to record the purchase and usage of the ground beef and \$15 in indirect materials? (Ignore all the other materials)*
- c) *Did Bob's Burgers under or overapply their MOH? What is the adjusting journal entry?*





Practice Problem #3



a) *Help Bob determine the total manufacturing cost of the catering order.*

- DM: \$180
- DL: $\$15 * 4 \text{ hours} = \60
- POHR = $900\text{k}/195\text{k} = \$4.62/\text{hour}$
 - $\$4.62 * 4 \text{ hours} = \18.46

$$\text{POHR} = \frac{\text{Estimated Total MOH for the period}}{\text{Estimated Total Units of Allocation Base}}$$

Total = $180 + 60 + 18.46 = \text{\$258.46}$

b) *What are the journal entries to record the purchase and usage of the ground beef and \$15 in indirect materials? (Ignore all the other materials)*

Purchase:

DR. Raw Materials Inventory \$100
CR. A/P (or Cash) \$100

Usage:

DR. Work in Process Inventory \$40
DR. Manufacturing Overhead \$15
CR. Raw Materials Inventory \$55

Practice Problem #3



c) *Did Bob's Burgers under or overapply their MOH? What is the adjusting journal entry?*

- Actual MOH = 935k
- Applied MOH = 4.62 (PDOR) * 215k hours (actual) = \$992,307.69
- Applied > Actual MOH by $992,307.69 - 935,000 = \$57,307.69$ **Overapplied**

Adjusting Journal Entry:

DR. Manufacturing Overhead - Applied \$57,307.69

CR. Cost of Goods Sold \$57,307.69

REMINDER: Do not round your intermediary answers until the end of the question.

Topic 4:

Activity-Based Costing



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An Alternative to Traditional Costing

Traditional Costing (Process/Job Order) allocates overhead based on POHR....

The Problem

No single allocation base may be able to adequately reflect all the demands that products place on overhead

Tremendous changes in manufacturing and service industries; decrease in DL and increase in MOH due to advances in automation

The Solution - Activity-Based Costing

Multiple allocation bases using different measures (# Machine Hrs, DL Hrs, etc.)

Non-manufacturing costs can be **treated as product costs** (under traditional costing would go to SG&A)

Some **manufacturing costs may be excluded** from a product's cost **(if it doesn't drive activity)**



The Four Steps to ABC

Step 1

Identify and classify activities, then allocate overhead to cost pools

Activities can be:

- Unit-level
- Batch-level
- Product-level
- Facility-level

Step 2

Identify drivers for each cost pool

Common Drivers:

- # of machine setups
- # of DL hours
- Km driven
- # of production orders

Step 3

Calculate activity based overhead rates for each cost pool

$$\frac{\text{Estimated Total Cost of Activity}}{\text{Estimated Total Activity Allocation Base}}$$

Similar to PDOR, but there is **one rate per pool**

Step 4

Assign MOH costs based on activity level to each activity

$$\text{Allocated OH} = \text{Activity Rate} * \text{Actual Activity}$$

Same as job-order costing, just doing it multiple times (**one for each pool**)



The Four Steps to ABC: Example

Step 1: Distribute OH to Cost Pools

Atlas Company	
Activity Cost Pools	Estimated Overhead
Manufacturing	\$700,000
Machine setups	100,000
Purchase ordering	50,000
Factory maintenance	50,000
Total	\$900,000

Step 2: Assign Cost Drivers

<u>Activity Cost Pools</u>	<u>Cost Drivers</u>	<u>Estimated Use of Cost Drivers per Activity</u>
Manufacturing	Machine hours	50,000 machine hours
Machine setups	Number of setups	2,000 setups
Purchase ordering	Number of purchase orders	2,500 purchase orders
Factory maintenance	Square footage	25,000 square feet

The Four Steps to ABC: Example

Step 3: Compute Activity-Based OH Rates

Atlas Company				
Activity Cost Pools	Estimated Overhead	Estimated Use of Cost Drivers per Activity	Activity-Based Overhead Rates	
Manufacturing	\$700,000	50,000 machine hours	\$14 per machine hour	
Machine setups	100,000	2,000 setups	\$50 per setup	
Purchase ordering	50,000	2,500 purchase orders	\$20 per order	
Factory maintenance	50,000	25,000 square feet	\$2 per square foot	
Total	\$900,000			

Step 4: Assign OH Costs to Products

Activity Cost Pools	Cost Drivers	Estimated Use of Cost Drivers per Activity	Use of Cost Drivers per Product	
			Ab Bench	Ab Coaster
Manufacturing	Machine hours	50,000 machine hours	30,000	20,000
Machine setups	Number of setups	2,000 setups	500	1,500
Purchase ordering	Number of purchase orders	2,500 purchase orders	750	1,750
Factory maintenance	Square feet	25,000 square feet	10,000	15,000

The Four Steps to ABC: Example

Step 4: Assign OH Costs to Products

Atlas Company												
Home Insert Page Layout Formulas Data Review View												
P18 fx												
	A	B	C	D	E	F	G	H	I	J	K	L
1	Atlas Company											
2		Ab Bench					Ab Coaster					
3	Activity Cost Pools	Use of Cost Drivers per Product	×	Activity-Based Overhead Rates	=	Cost Assigned	Use of Cost Drivers per Product	×	Activity-Based Overhead Rates	=	Cost Assigned	
4	Manufacturing	30,000		\$14		\$420,000	20,000		\$14		\$280,000	
5	Machine setups	500		\$50		25,000	1,500		\$50		75,000	
6	Purchase ordering	750		\$20		15,000	1,750		\$20		35,000	
7	Factory maintenance	10,000		\$2.00		20,000	15,000		\$2.00		30,000	
8	Total costs assigned (a)					\$480,000					\$420,000	
9	Units produced (b)					25,000					5,000	
10	Overhead cost per unit [(a)÷(b)], rounded					\$19.20					\$84.00	
11												

Practice Problem #4



Lebron James Jersey Co. produces two types of jerseys: Replicas and Authentics. The company uses activity-based costing to accurately predict product costs. Annual production and sales of Replicas and Authentics are 14,000 units and 6,000 units, respectively. Lebron James has already distributed overhead to cost pools and assigned cost drivers as seen below. **Calculate the overhead cost per unit of both the Replicas and the Authentics.**

Activity Cost Pool	Cost Driver	Estimated OH Cost	Expected Activity Level	
			Replicas	Authentics
Stitching	# of fabric yards used	\$85,000	18,000	14,000
Printing	# of machine hours	\$42,000	1,250	800
Packaging	# of packages	\$100,000	10,000	5,500



Practice Problem #4



Step 1 and Step 2 of ABC costing have already been completed for you.

Step 3: Calculate Activity Rates:

- Stitching: $85k / (18k + 14k) = \mathbf{\$2.66}$ (though I have rounded to two decimals for the slide, ensure that **you** are not rounding intermediate calculations)
- Printing: $42k / (1250 + 800) = \mathbf{\$20.49}$
- Packaging: $100k / (10k + 5.5k) = \mathbf{\$6.45}$

Step 4: Assign MOH costs based on activity levels:

Overhead Cost per Unit:

Replicas: $137,938.39 / 14,000 = \mathbf{\$9.85}$

Authentics: $89,061.61 / 6,000 = \mathbf{\$14.84}$

	Replicas	Authentics
Stitching	$18k * 2.66 =$ \$47,812.50	$14k * 2.66 =$ \$37,187.50
Printing	$1250 * 20.49 =$ \$25,609.76	$800 * 20.49 =$ \$16,390.24
Packaging	$10k * 6.45 =$ \$64,516.13	$5.5k * 6.45 =$ \$35,483.87
Total	\$137,938.39	\$89,061.61

Topic 5:

Cost-Volume-Profit Analysis



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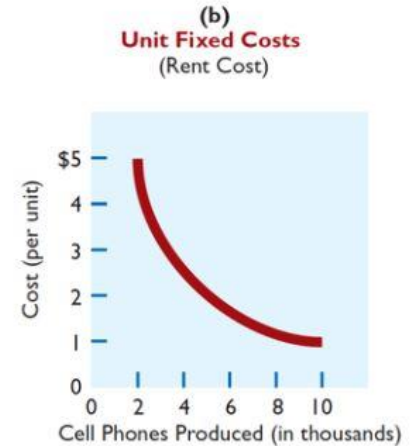
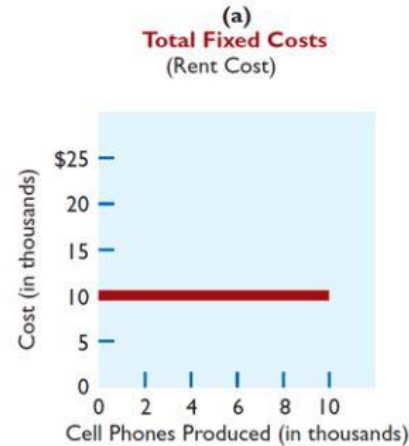
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Recall: Fixed Costs

Fixed Costs

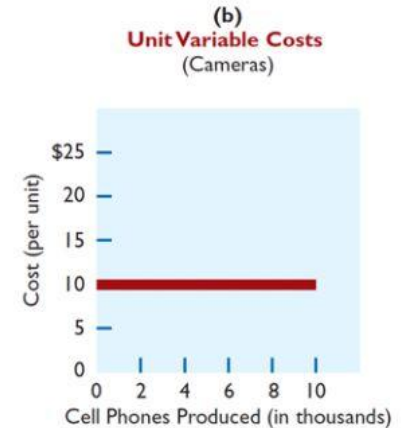
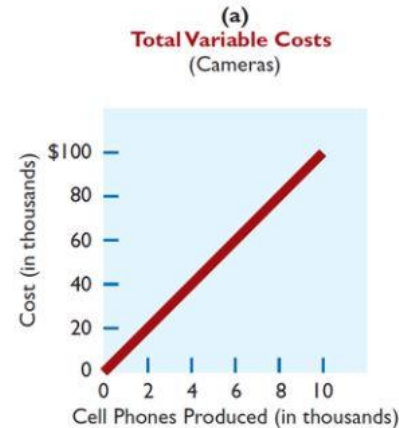
- FCs remain the same total regardless of activity changes
- i.e. If the level of production increases by 10%, total FCs stay the same
- Unit costs decreases as volume increases (e.g. facility rent costs \$10,000)
- Property taxes, insurance, rent, manager salaries, etc.



Recall: Variable Costs

Variable Costs

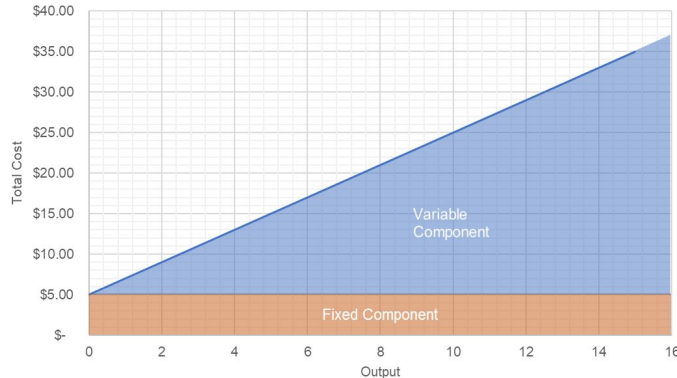
- VCs proportionately change as activity changes
- i.e. If the level of production increases by 10%, total VCs increase by 10%
- Cost remains the same per unit (e.g. every camera for iPhone costs \$10 to produce)
- Direct materials, direct labour, sales commissions, etc.



Mixed Costs & High-Low Method

Mixed Costs

- Includes both VC and FC components
- E.g. a cell phone plan with a \$20 monthly fee and a \$5 charge for every GB of data used
- Can be separated using the high-low method



High-Low Method

Start with a list of activity levels and their associated costs

Step 1: identify highest (HAL) and lowest (LAL) activity levels

Step 2: calculate VC/unit (slope of $y = mx + b$)

$$\frac{\text{Total Cost @ HAL} - \text{Total Cost @ LAL}}{\text{Activity @ HAL} - \text{Activity @ LAL}}$$

Step 3: @ either HAL or LAL....

$$\text{Total Cost} - \text{Variable Cost} = \text{Fixed Cost}$$

Step 4: Compile into $y = mx + b$ format

Practice Problem #5

Body Energy Club provides you with the following information about their operations. They ask you to forecast the total cost in December, with their estimated smoothie sales level being 5,400 units.

Month	Smoothies Sold	Total Cost
June	3,800	\$10,100
July	5,000	\$18,500
August	4,200	\$14,300
September	7,800	\$25,900
October	7,200	\$27,800
November	6,400	\$20,100





Practice Problem #5

Step 1:

Month	Smoothies Sold	Total Cost
June	3,800	\$18,100
July	5,000	\$26,500
August	4,200	\$22,300
September	7,800	\$33,900
October	7,200	\$35,800
November	6,400	\$28,100

Step 2:

$$(33.9k - 18.1k) / (7.8k - 3.8k) = \text{\$3.95 (VC)}$$

Step 3:

Take June (LAL) or September (HAL)

$$33,900 - 3.95 * 7,800 = \text{\$3,090 (FC)}$$

Step 4:

$$Y = 3.95x + 3090$$

Forecast for 5400 units:

$$3.95 * 5400 + 3090 = \text{\$24,420}$$



Contribution Margin Formulas

Contribution Margin = Sales - Variable Costs

- **Recall:** Sales - Variable Costs - Fixed Costs = Net Income
- Therefore, CM - FC = Net Income

CM per Unit = Selling price per unit - VC per unit

- For every \$1 you sell, how much do you make after your variable costs?

CM Ratio (%) = CM / Sales Revenues

- % of each sales dollar available to apply towards fixed costs and profits



Cost-Volume-Profit Analysis

What Is It?

The study of effects of changes in costs and volume on a company's profits

Helps management makes decisions, such as setting the selling price or determining the product mix

Key Assumptions

Behaviour of costs and revenue is linear through the relevant range

Costs are classified as either variable or fixed

Changes in activity is the only factor that affects costs (no macro factors)

All units produced are sold

When more than one type of product is sold, sales mix remains constant



Cost-Volume-Profit (CVP) Income Statement

Income statement for internal use that reports net income

Classified **costs and expenses as fixed or variable**, rather than as COGS, SG&A Expenses (Product / Period Costs)

Traditional Statement VS CVP Statement

Vargo Electronics Company GAAP Income Statement For the Month Ended June 30, 2022			
Sales (1,600 × \$500)			\$800,000
Cost of goods sold			
Direct materials (1,600 × \$185)	\$296,000		
Direct labor (1,600 × \$100)	160,000		
Manufacturing overhead	40,000	496,000	
Gross profit		304,000	
Operating expenses			
Sales commissions (1,600 × \$15)	24,000		
Sales personnel salaries	10,000		
CEO salary	150,000	184,000	
Net income		\$120,000	

Vargo Electronics Company CVP Income Statement For the Month Ended June 30, 2022			
Sales (1,600 × \$500)			\$800,000
Variable costs			
Direct materials (1,600 × \$185)	\$296,000		
Direct labor (1,600 × \$100)	160,000		
Sales commissions (1,600 × \$15)	24,000	480,000	
Contribution margin		320,000	
Fixed costs			
Manufacturing overhead	40,000		
Sales personnel salaries	10,000		
CEO salary	150,000	200,000	
Net income		\$120,000	



Break-Even Analysis

The Break-Even Point

- The least amount of sales needed to recover fixed costs; $CM = FC$
- i.e. the level of activity where total revenue = total costs; $Sales = VC + FC$
- Every \$1 produced **above** breakeven = **PROFIT**
- Every \$1 produced **below** breakeven = **LOSS**

Equation Method

Set Net Income/Profit to \$0 and solve

1. Profit (\$0) = Sales - Variable Costs - Fixed Costs
2. Sales = Variable Costs + Fixed Costs + Net Income (\$0)

Contribution Margin Method

1. # of Units

$$\frac{\text{Total Fixed Costs}}{\text{CM Per Unit}} = \text{\# of Units to B/E}$$

2. Amount of Sales \$

$$\frac{\text{Total Fixed Costs}}{\text{CM Ratio}} = \text{Sales \$ to B/E}$$

3. Amount of Time (Months, Years, Days, etc.)

$$\frac{\text{Total Fixed Costs}}{\text{CM Per Time Period}} = \text{Amount of Time to B/E}$$



Target Net Income

Level of sales necessary to achieve target income

1. # of Units

$$\frac{\text{Total Fixed Costs} + \text{Target Net Income}}{\text{CM Per Unit}} = \text{\# of Units to Achieve Target}$$

Same method as calculating Break-Even, just replace \$0 with your target income

2. Amount of Sales \$

$$\frac{\text{Total Fixed Costs} + \text{Target Net Income}}{\text{CM Ratio}} = \text{Sales \$ to Achieve Target}$$

$$\text{Sales} - \text{VC} - \text{FC} = \text{Target Net Income}$$

$$\text{CM} = \text{FC} + \text{Target Net Income}$$

3. Amount of Time (Months, Years, Days, etc.)

$$\frac{\text{Total Fixed Costs} + \text{Target Net Income}}{\text{CM Per Time Period}} = \text{Amount of Time to Achieve Target}$$

Practice Problem #6



UBC has built a new flower store on campus, Pushing Petals, offering affordable prices to romantic students. They incur the following costs:

- Roses: \$7 per bouquet
- Direct Labour: \$3 per bouquet
- Variable Overhead: \$2 per bouquet
- Monthly Rent: \$2,000

Each month, UBC sells 500 units for \$20 each.

- What is Pushing Petals' breakeven point in sales dollars?
- How long in months will it take Pushing Petals' to break even?
- Pushing Petals' would like to earn \$7,500 in net income through their sales. Compute the number of units required to meet this goal.



Practice Problem #6



a) *What is Pushing Petals' breakeven point in sales dollars?*

- $\text{CM per unit} = 20 - 7 - 3 - 2 = \$8/\text{unit}$
- $\text{CM ratio} = \text{CM} / \text{Sales} = 8 / 20 = 40\%$
- $\text{Total Fixed Costs} / \text{CM Ratio} = \text{B/E in Sales } \$$
 - $2000 / 40\% = \mathbf{\$5,000}$

b) *How long in months will it take Pushing Petals' to break even?*

- $\text{Fixed Cost} = \$2,000$
- $\text{CM per Month} = \$8/\text{unit} * 500 \text{ units} = \$4,000$
- $\text{B/E in months} = 2\text{k} / 4\text{k} = 0.5 \text{ months (half a month)}$

c) *Pushing Petals' would like to earn \$7,500 in net income through their sales. Compute the number of units required to meet this goal.*

- $\text{FC} = 2\text{k}$
- $\text{Target Net Income} = 7.5\text{k}$
- $\text{CM per unit} = \$8$
- $(2\text{k} + 7.5\text{k}) / 8 = 1.187.5$
- **1,188 units to breakeven**

$$\frac{\text{Total Fixed Costs} + \text{Target Net Income}}{\text{CM Per Unit}} = \# \text{ of Units to Achieve Target}$$



Margin of Safety

How much can sales change before a loss occurs?

$\text{Sales \$ Expected} - \text{Sales \$ to B/E} = \text{Margin of Safety (in Sales \$)}$

$$\frac{\text{Sales \$ Expected} - \text{Sales \$ to B/E}}{\text{Sales \$ Expected}} = \text{Margin of Safety Ratio (\%)}$$

Margin of Safety: Difference between actual/expected sales and sales @ break-even point

- Measures the 'cushion' that our level of sales provides above the break-even point
- Tells us how far sales can fall before company begins to operate as a loss

Higher Margin of Safety = Lower Risk



CVP and Changes in the Business Environment

Unit selling price	\$500
Unit variable costs	\$300
Total fixed costs	\$200,000
Break-even sales	\$500,000 or 1,000 units

Case 1

What effect will a 10% discount on selling price have on the break even point?

- 10% discount = unit selling price reduces to \$450; unit variable cost unchanged at \$300
- Unit CM = $450 - 300 = 150$
- $200\,000 / 150 = 1,333$ units to break even
- **Change requires monthly sales to increase by 333 units to break even**



CVP and Changes in the Business Environment

Unit selling price	\$500
Unit variable costs	\$300
Total fixed costs	\$200,000
Break-even sales	\$500,000 or 1,000 units

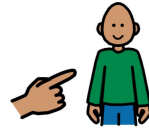
Case 2

Total fixed costs will increase by 30% and unit variable costs will decrease by 30%. What effect will the new equipment have on the sales volume required to break even?

- Total fixed costs = $200\,000 \times 1.3 = 260\,000$
- Unit variable costs = $300 \times 0.7 = 210$
- Unit CM = $500 - 210 = 290$
 - $260\,000 / 290 = 897$ units to break even
 - **Break even level reduced by 103 units**



Practice Problem #7



your turn

Unit selling price	\$500
Unit variable costs	\$300
Total fixed costs	\$200,000
Break-even sales	\$500,000 or 1,000 units

The equipment has suddenly broken down, and now the company is forced to use their old machine.

This switch has increased unit variable costs by \$20 and lowered fixed costs by \$10,200. The company is currently making net income of \$60 000 on sales of 1,100 units.

What increase in units sold will be needed to maintain the same level of net income?

Practice Problem #7



Unit selling price	\$500
Unit variable costs	\$300
Total fixed costs	\$200,000
Break-even sales	\$500,000 or 1,000 units

- Unit variable cost = $300 + 20 = \$320$
- Total fixed costs = $200\,000 - 10\,200 = \$189,800$
- Unit CM = $500 - 320 = \$180$
- $(189,800 + 60,000) / 180 = 1,388$
units to make same income
- $1,388 - 1,100 = \mathbf{288 \text{ additional units}}$

Topic 6:

Budgeting



@ubccmp



@ubccmp



[http://](http://cmp.cus.ca) cmp.cus.ca

Intro to Budgeting

Why Prepare a Budget?

Forces management to plan ahead

Improve communication between departments

Provides performance evaluation standards

Main Budgeting Methods

Incremental

Take prior year's budget and add/subtract a % to get this year's budget

Zero-Based

Identify and justify costs needed independently YoY, not comparing to historical data, conducting consistent reviews

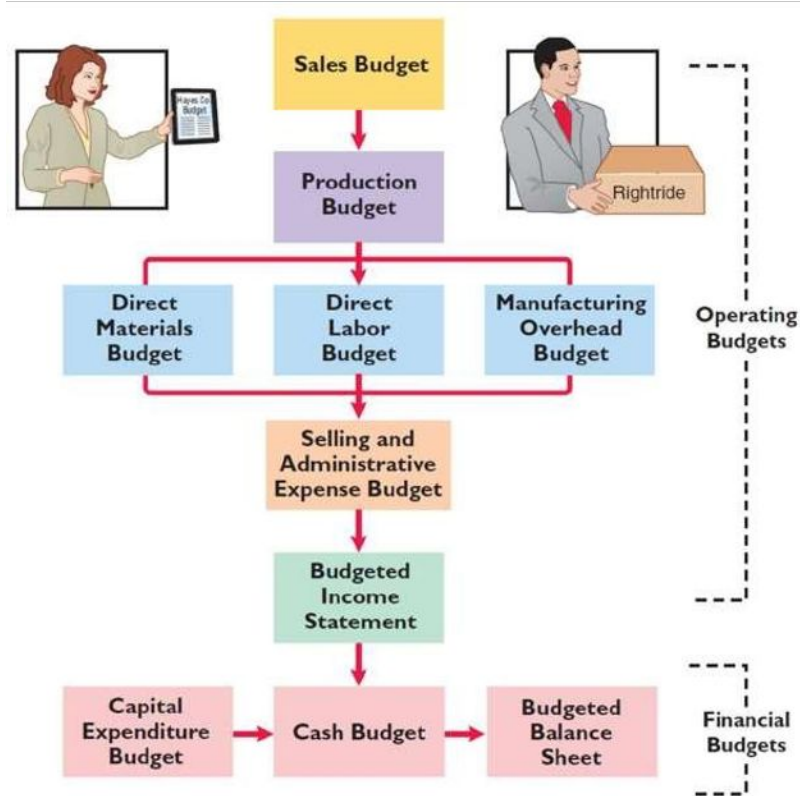
Priority-Based

Look at key priorities and allocate resources accordingly, yearly budget will differ based on changing priorities

Activity-Based

Look at activities consuming resources and use cost drivers to determine revenues and expenses based on projected activity level

The Master Budget



Set of inter-related budgets that constitute a plan of action for a specified time period

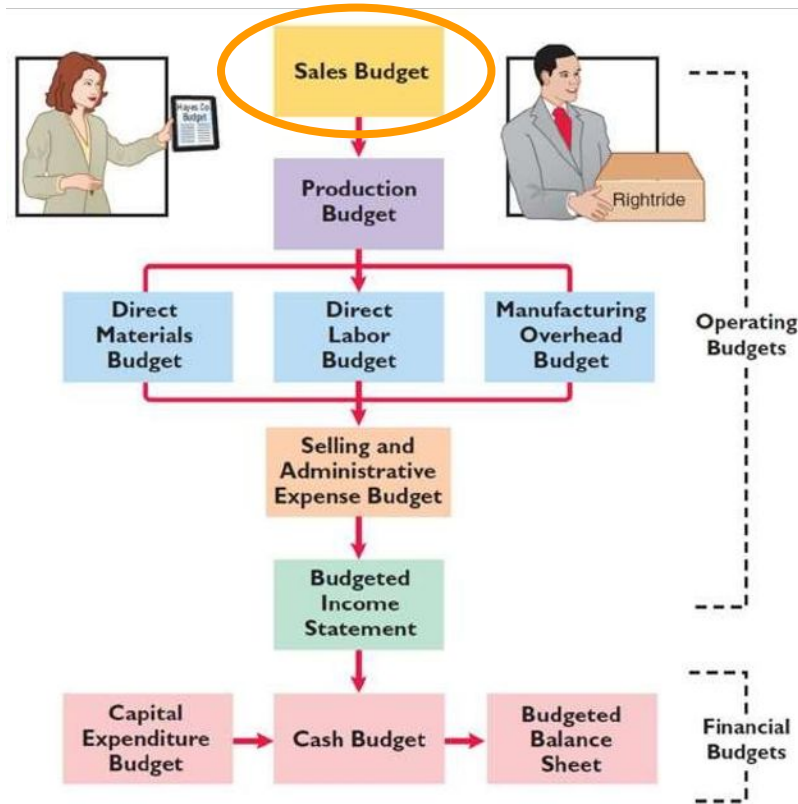
Operating Budgets

- Establish goals for sales/production staff
- Results in preparation of budgeted income statement

Financial Budgets

- Focus on cash resources to fund operations and expenditures
- Results in preparation of budgeted balance sheets

The Sales Budget



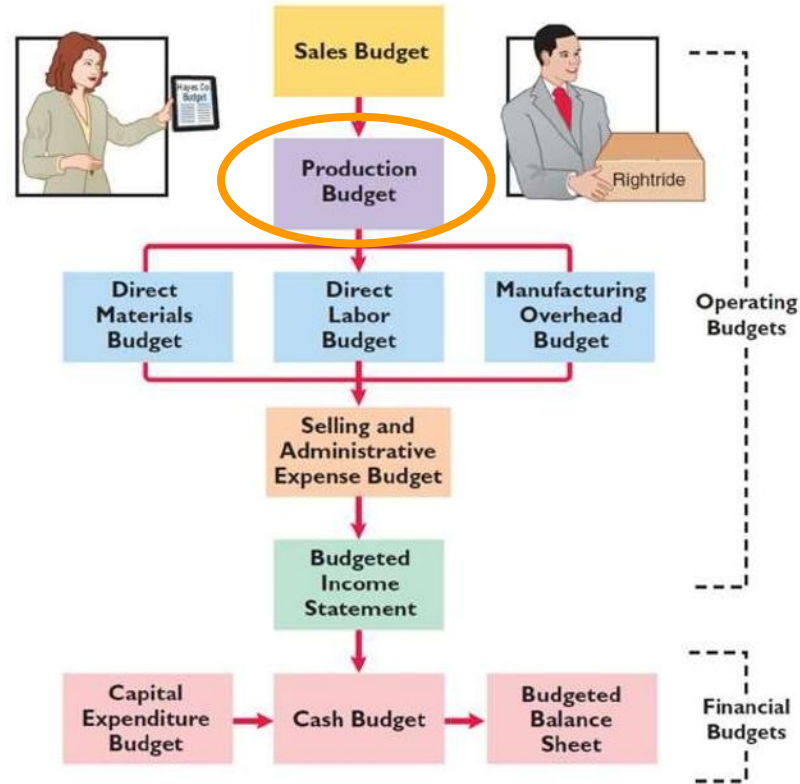
First budget prepared: every other budget flows from the Sales Budget

Derived from sales forecast (management's best estimate of revenue)

Expected unit sales for each product × anticipated unit selling price

Sales Budget For the Year Ending December 31, 2020					
	Quarter				
	1	2	3	4	Year
Expected sales in units	3,000	3,500	4,000	4,500	15,000
Unit selling price	× \$60	× \$60	× \$60	× \$60	× \$60
Total sales	\$180,000	\$210,000	\$240,000	\$270,000	\$900,000

The Production Budget



Calculate number of units that must be manufactured in a period

Budgeted Sales + Required End. Inventory - Beg. Inventory = Required Production for the Period

Production Budget by Quarter
For the Year Ending December 31, 2020

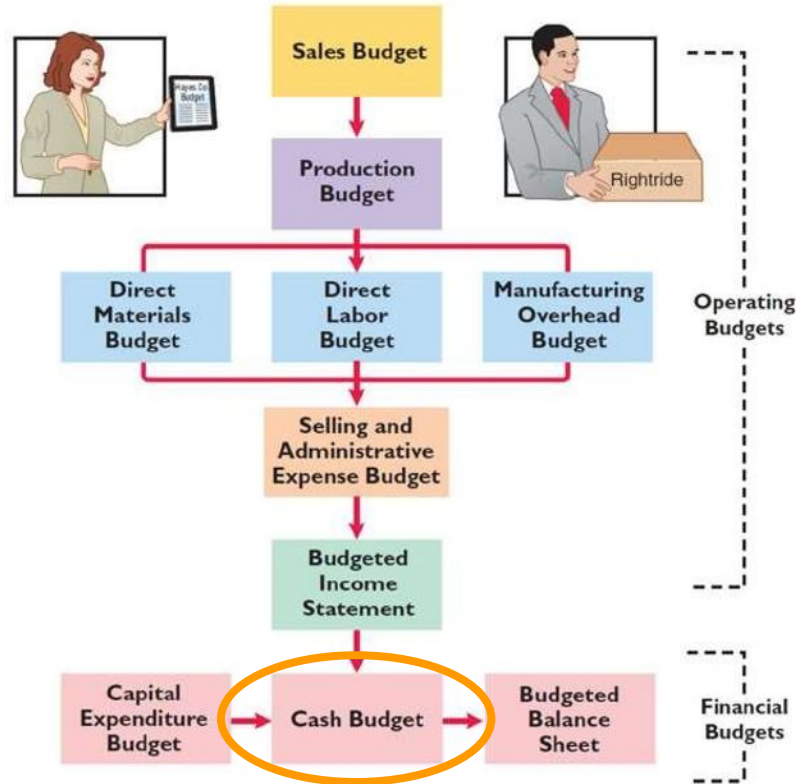
	1	2	3	4	Year
Expected sales in units	3,000	3,500	4,000	4,500	
Add: Desired finished Goods units	700	800	900	1,000	
Total required units	3,700	4,300	4,900	5,500	
Less: Beginning Finished goods units	600	700	800	900	
Required production units	3,100	3,600	4,100	4,600	15,400

Derived from sales budget

Provided: Started Q1 with 600 units on hand

Provided: 20% of next year's expected sales

The Cash Budget



Three Sections

Cash Available

Cash Needed

Excess Cash?

Beginning Cash
+ Receipts
= **Total Available Cash**

Cash Inflows: Sales, A/R, Collections

Disbursements
= **Total Cash Needs**

Cash Outflows: Purchase, Utilities

Excess (Deficiency) of Available Cash Over Cash Needs
+ Financing: Borrowings
- Financing: Repayments Including Interest
= **Ending Cash Balance**

Total Avail. Cash – Total Cash Needs

Practice Problem #8

The Scranton branch at Dunder Mifflin is currently planning their paper production budget for the upcoming fiscal year.

- Michael Scott, the branch manager, tells you that Dunder Mifflin must maintain a month-end finished goods inventory of 8,000 units + 10% of the following month's sales.
- The production manager tells you that Dunder Mifflin must maintain a month-end raw materials inventory of 9,500 units.
- The warehouse manager tells you that Dunder Mifflin has 11,000 units of inventory remaining at the end of February.
- The sales manager tells you that Dunder Mifflin's budgeted sales are 35,000 units for March and 45,000 units for April.

Please prepare the paper production budget for the month of March.





Practice Problem #8

Budgeted sales (March) = 35k

Required ending inventory = $8k + 10\%$
* 45k (April's sales) = 12.5k

Beginning inventory = 11k

March Production Budget

Budgeted Sales	35,000
+ Required Ending Inventory	12,500
- Beginning Inventory	11,000
= Required Product. For Period	36,500



Questions?

