



COURSE MANUAL

C9: Accounting and Finance Course

Module 3

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Module overview

Welcome to Module 3

This module is designed to further enhance your knowledge about management accounting techniques. In particular, you will be introduced to the role of budgeting, the construction of a budget and its use in managerial decision-making. We will then discuss the concept of standard costing and variance analysis.

Opportunities will be given throughout the course for you to select, calculate and make appropriate decisions using these concepts. The ultimate object is for you to identify the correct data to make business decisions.

Outcomes



Outcomes

Upon completion of this module you will be able to:

- *Demonstrate* knowledge and understanding of the role of budgets in providing information for decision-making purposes.
- *Demonstrate* knowledge and understanding of the need to produce flexible budgets.
- *Demonstrate* knowledge and understanding of the content of the concept of standard costing.
- *Demonstrate* knowledge and understanding of variance analysis and the ability to interpret the results of this analysis.

Unit 6

Budgeting

Introduction

This unit is intended to provide you with an introduction to the budgeting process. The process comprises the master budget, which consists of the operating budget and the capital budget. The operating budget is a plan for the use of scarce resources for running the day-to-day operations of an organisation. The formulation of budgets is examined in detail, including the methodology of budget construction and the differences between budget preparation in manufacturing and non-manufacturing firms.

The unit comprises:

- The purpose of budgeting
- The master budget
- The sales budget
- The operations budget
- The cash budget
- Flexible budgeting

Upon completion of this unit you will be able to:

- *Explain* the purpose of a budget.
- *Understand* the components of a master budget.
- *Prepare* a sales budget.
- *Prepare* an operations budget.
- *Prepare* a cash budget.
- *Explain* the purpose of a flexible budget.
- *Prepare* a flexible budget and analyse the output.



Outcomes



Terminology



Terminology

Budget:	A detailed plan of action for an ensuing period.
Flexible budget:	A budget that adjusts or flexes for changes in the volume of activity.
Master budget:	A quantitative expression of a plan of action usually for the forthcoming year.
Sales budget:	A budget that reflects forecasted sales volume for the period under consideration.

Purposes of budgets

A budget is a detailed plan of action for an ensuing period, either for the business as a whole or for any sub-unit. The budgetary process is a means of translating the objectives of the business into detailed plans of action. The culmination of the budgeting process is the preparation of a cash budget and a set of pro forma financial statements for a future period in the organisation's operations.

Budgets perform five main functions in an organisation. They:

1. encourage the organisation to translate the strategic plan into short term goals and objectives by forcing objectives to be quantified,
2. indicate the timing and amount of the organisation's future financing needs,
3. facilitate resource allocation among different departments within the organisation,
4. provide the basis for taking corrective action, and
5. provide the basis for performance evaluation of both sub-units (divisions) and managers.

Department managers in a business make decisions every day that affect the profitability of the business. In order to make effective decisions and co-ordinate the decisions and actions of the various departments, a business needs to have a plan for its operations. Planning the financial operations of a business is called budgeting. A budget is a written financial plan of a business for a specific period, expressed in dollars. Each area of a business's operations typically has a separate budget. For example, a business might have an advertising budget, a purchasing budget, a sales budget, a manufacturing budget, a research and development budget, and a cash budget. New and ongoing projects would each have a detailed budget. Each budget would then be compiled into a master budget for the operations of the entire company.

A business that does not have a budget or a plan will make decisions that may not contribute to the profitability of the business because managers lack a clear idea of goals of the business. A budget serves the following purposes.

Communication

In the budgeting process, managers in every department justify the resources they need to achieve their goals. They explain to their superiors the scope and volume of their activities as well as how their tasks will be performed. The communication between superiors and subordinates helps affirm their mutual commitment to company goals. In addition, different departments and units must communicate with each other during the budget process to co-ordinate their plans and efforts. For example, the information technology department and the marketing department have to agree on how to co-ordinate their efforts about the need for services and the resources required.

Co-ordination

Different units in the company must also co-ordinate the many different tasks they perform. For example, the number and types of products to be marketed must be co-ordinated with the purchasing and manufacturing departments to ensure goods are available. Equipment may have to be purchased and installed. Advertising promotions may need to be planned and implemented and all tasks have to be performed at the appropriate times.

Planning

A budget is ultimately the plan for the operations of an organisation for a period of time. Many decisions are involved, and many questions must be answered. Old plans and processes are questioned as well as new plans and processes. Managers decide the most effective ways to perform each task. They ask whether a particular activity should still be performed and, if so, how. Managers ask what resources are available and what additional resources will be needed.

Control

Once a budget is finalised, it becomes the plan for the operations of the organisation. Managers have authority to spend within the budget and responsibility to achieve targets specified within the budget. Budgets and actual revenues and expenditures are monitored constantly for variations and to determine whether the organisation is on target. If performance does not meet the budget, action can be taken immediately to adjust activities. Without constant monitoring, a company may not realise it is not on target until it is too late to make adjustments.

Evaluation

One way to evaluate a manager is to compare the budget with actual performance. Did the manager reach the target revenue within the



constraints of the targeted expenditures or did the manager stay within the limits of research and development expenditure budget? Of course, other factors, such as market and general economic conditions affect a manager's performance. Whether a manager achieves targeted goals is an important part of managerial responsibility.

In summary, the budget is a necessary and defining tool for the successful operation of most organisations. This is equally true for profit-making organisations, governmental and not-for-profit entities. As a result, the budget should be taken seriously and great care should be given to its development.

Master budget

The master budget is a quantitative expression of a plan of action usually for the forthcoming year. It is a comprehensive set of all operating budgets and includes budgeted financial statements as well as a capital expenditure budget. Note that some management accounting commentators refer to master budgets as annual plans (or just plans) and to capital budgets as financial budgets. We will use the terms master budget and capital budget respectively in this course.

An operating budget is the first part of the master budget. It represents the expected results of operations. In manufacturing organisations it normally contains the sales, production, direct materials, direct labour, factory overhead, and selling and administrative expense budgets. Sometimes other budgets such as research and development, distribution costs and customer service budgets also make up the operating budget.

In merchandising organisations, a budget for merchandise purchases and payments replaces the budgets for manufacturing costs.

The detailed operating budgets are combined to produce a pro forma set of financial statements which comprises the cash budget, the budgeted income statement and the budgeted statement of financial position.

Budgeting methods

There are several ways that organisations can approach the annual budgeting process, each with markedly different implications. These include:

- Zero-based budgeting, which involves managers having to justify activities from scratch. This is rarely used in practice as it is very time consuming.
- Kaizen budgeting is used by organisations with a continuous improvement programme. Any anticipated improvements are incorporated into the budget during the budget-setting process. Kaizen budgeting is used in firms such as General Motors in the United States, and Citizen Watch and Toyota in Japan.

- Activity-based budgeting focuses on the cost of the activities necessary to produce and sell products and services. Organisations which use activity-based costing are more likely to use activity-based budgeting.
- Top-down budgeting, in which senior management determines the budget with little input from lower levels of the organisation. Although this method allows for speedy preparation it can produce negative behavioural consequences for users of the budget who do not take ownership of it.
- Bottom-up budgeting, in which the users of the budget prepare their own budgets, which should lead to increased accountability for line managers. However, it can also lead to an excessive budget which may need to be trimmed.
- Top-down and bottom-up combined budgeting, in which overall strategic direction is prepared by senior management and line managers determine resource requirements in line with corporate guidelines. This is ultimately the best practice, leading to improved communication, although it is time-consuming.

Preparation of the master budget

A series of other budgets is normally prepared in compiling the master budget:

- Sales budget
- Operations budget, including production and selling and administrative budgets
- Cash budget

When each of the above has been prepared, the organisation can compile the master budget together with the budgeted financial statements.

Sales budget

The budgeting process usually begins with a sales budget. The sales budget reflects forecasted sales volume and is influenced by factors such as:

- previous sales patterns,
- current and expected economic conditions, and
- activities of competitors.

The sales budget is complemented by an analysis of the resulting expected cash collections. Sales often occur on account, so there can be a delay between the time of a sale and the actual conversion of the transaction to cash. For the budget to be useful, careful consideration must also be given to the timing and pattern of cash collections.



Normally, a range of forecasts is prepared that aligns with different scenarios such as a worst case, a best case and an expected scenario for forecast sales. Irrespective of how the forecast is prepared, it must align with the strategic mission of the organisation.

Operations budget

In this section we will look at several budgets that comprise the operations budget. These include:

1. Production budget. This is made up of several sub-budgets, including:
 - a. direct materials
 - b. direct labour
 - c. production overheads
2. Selling and administrative budget.

Production budget

The production budget shows the quantity of each product to be manufactured and the timing of production. The production budget is a physical unit budget.

The levels of expected sales and inventory are the primary influences on production budgets. Some organisations use inventories of finished goods to provide a buffer against fluctuations above the budgeted level of sales, recognising that sales budgets are expectations and inventories help stabilise production and sales. Other organisations use just-in-time manufacturing. The production budget must be prepared considering both sales and inventory requirements.



Case study/example

AAA manufactures men's shirts (units). The shirts sell for \$5 each. Using a bottom-up budgeting approach the production supervisor asked the management accountant to prepare a production budget for the men's shirts product only for May to August 200X, based on the following sales and inventory expectations:

- Ending inventory 30 April 30,000 units
- Desired ending inventory 23,000 units for May; 16,000 units for June; 9,000 units for July and 2,000 units for August
- Expected sales: 15,000 units for April 10,000 units for May; 25,000 units for June; 40,000 units for July and 30,000 units for August.

The production budget would be as follows:

AAA
Production budget
May–August 200X

	May	June	July	August
Sales units	10,000	25,000	40,000	30,000
Ending units	23,000	16,000	9,000	2,000
Starting units	(30,000)	(23,000)	(16,000)	(9,000)
Production (units)	3,000	18,000	33,000	23,000

Once the production budget is completed, production factor budgets are prepared for:

- **Direct materials:** The quantity and cost of direct materials of the product/service. These amounts also affect the cash budget.
- **Direct labour:** The quantity and cost of direct labour input into the manufacturing of the product/service. These amounts also affect the cash budget.
- **Manufacturing overhead:** The quantity of all costs indirectly related to the product within the manufacturing areas, classified as either fixed or variable. Examples of variable manufacturing overhead include indirect manufacturing labour such as factory supervision, power (variable component), and maintenance. Examples of fixed manufacturing overhead include factory rent, depreciation on machinery, and power (fixed component). All the examples noted in this section affect the cash budget with the exception of depreciation which is a non-cash item.

Direct materials budget



Case study/example

Using the same AAA clothing manufacturers as the example:

It takes 0.25 metres of material at an estimated cost of \$5.00 per metre; and 0.5 metres of synthetic thread at \$1.00 per metre to manufacture one shirt. AAA pays materials in advance of the month of usage (in the preceding month).

The direct materials budget for the months of May, June, July and August is as follows:



AAA
Direct materials budget
May–August 200X

	April	May	June	July	August
Production (units) ¹		3,000	18,000	33,000	23,000
Material (unit cost) ²		\$1.25	\$1.25	\$1.25	\$1.25
Nylon thread (unit cost) ³		\$0.50	\$0.50	\$0.50	\$0.50
Total unit cost		\$1.75	\$1.75	\$1.75	\$1.75
Total cost		\$5,250	\$31,500	\$57,750	\$40,250
Materials cash payments (end of month)	\$5,250	\$31,500	\$57,750	\$40,250	

Direct labour budget



Case Study/Example

Using the same AAA clothing manufacturers as the example:

It takes five minutes to make and inspect one unit of men's shirts at an estimated cost of \$20.00 per hour. AAA pays employees twice monthly in cash. The direct labour usage budget for the months of May, June, July and August is:

The direct labour budget would be as follows:

AAA
Direct labour budget
May–August 200X

	May	June	July	August
Production (units)	3,000	18,000	33,000	23,000
Labour per unit (hours) ⁴	0.083	0.083	0.083	0.083
Cost per labour hour	\$20	\$20	\$20	\$20
Cost per unit	\$1.67	\$1.67	\$1.67	\$1.67
Total cost	\$5,010	\$30,060	\$55,110	\$38,410
Labour cash payments	\$5,010	\$30,060	\$55,110	\$38,410

¹ From the production budget prepared above

² $0.25 \times \$5$

³ $0.50 \times \$1$

⁴ $5/60 \text{ minutes} = 0.083$

Manufacturing overhead budget



Case Study/Example

Using the same AAA clothing manufacturers as the example:

AAA charges maintenance to sewing machines at a cost of \$90 per 1,000 units. Power is charged at a fixed rate of \$2,500 for the building. Indirect supplies are charged at \$0.10 per unit. Factory rent is \$8,000 per month. Depreciation is \$1,000 per month calculated on a straight-line basis.

The manufacturing overhead budget for the months of May, June, July and August is:

AAA Manufacturing overhead budget May–August 200X

	May	June	July	August
Production (units)	3,000	18,000	33,000	23,000
Variable costs				
Indirect supplies (\$0.10 per unit)	\$300	\$1,800	\$3,300	\$2,300
Maintenance (\$0.09 per unit)	\$270	\$1,620	\$2,970	\$2,070
Sub total	\$570	\$3,420	\$6,270	\$4,370
Fixed costs				
Factory rent	\$8,000	\$8,000	\$8,000	\$8,000
Depreciation	\$1,000	\$1,000	\$1,000	\$1,000
Power	\$2,500	\$2,500	\$2,500	\$2,500
Sub total	\$11,500	\$11,500	\$11,500	\$11,500
Total cost	\$12,070	\$14,920	\$17,770	\$15,870
Cash payments*	\$11,070	\$13,920	\$16,770	\$14,870

*Cash flows assumed to occur in same month (excludes depreciation because it is a non cash item).

Selling and administrative expense budget

The selling and administrative expense budget is then prepared, which includes expenditures for non-manufacturing activities.



Case Study/Example

Using the same AAA clothing manufacturers as the example:

AAA pays administrative salaries of \$42,000 per annum. Office supplies total \$16,000 per annum. Depreciation on office equipment is \$10,000 per annum. The straight-line method is used for depreciation. Travel costs amount to \$18,000 annually. Advertising and promotion total \$20,000 and marketing payments to sales people total \$20,000 per annum. All of these expenses relate to the whole company, not just the men's shirts product.



The selling and administration budget for the months of May, June, July and August is:

AAA
Selling and administrative expense budget
May–August 200X

	May	June	July	August
Administrative costs				
Accountants salaries	\$3,500	\$3,500	\$3,500	\$3,500
Depreciation	\$833	\$833	\$833	\$833
Office supplies	\$1,333	\$1,333	\$1,333	\$1,333
Travel	\$1,500	\$1,500	\$1,500	\$1,500
Total administrative expenses	\$7,166	\$7,166	\$7,166	\$7,166
Selling expenses				
Advertising & promotion	\$1,667	\$1,667	\$1,667	\$1,667
Other marketing	\$1,667	\$1,667	\$1,667	\$1,667
Total selling expenses	\$3,334	\$3,334	\$3,334	\$3,334
Total administrative and selling expenses	\$10,500	\$10,500	\$10,500	\$10,500
Cash payments*	\$9,667	\$9,667	\$9,667	\$9,667

*Cash payments = selling and administrative costs excluding depreciation.

Cash budget

A cash budget depicts the effects of budget activities on cash flow by incorporating the timing of cash receipts and payments. It is a critical input providing management with the opportunity to make arrangements for supplementary financing or investing. The cash budget comprises the opening cash balance: cash receipts of the current period, cash payments of the current period, and financing requirements to meet any cash shortages indicated.



Case Study/Example

Using the same AAA clothing manufacturers as the example:

AAA has a bank balance at 30 April of \$137,500. AAA receives payments from their customers in the month following the sale. We can now prepare the cash budget for the men's shirts product.

The cash budget would be as follows:

**AAA
Cash budget
May–July 200X**

	May	June	July
Receipts			
Sales @ \$5 per unit	\$75,000	\$50,000	\$125,000
Payments			
Direct materials	\$31,500	\$57,750	\$40,250
Direct labour	\$5,010	\$30,060	\$55,110
Manufacturing overhead	\$11,070	\$13,920	\$16,770
Selling and administration	\$9,667	\$9,667	\$9,667
Total payments	\$57,247	\$111,397	\$121,797
Cash surplus / (deficit)	\$37,753	(\$61,397)	\$3,203
Bank balance at beg of month	\$137,500	\$175,253	\$113,856
Bank balance at end of month	\$175,253	\$113,856	\$117,059

Income statement budget

Having developed the sales, production and overhead budgets we can now prepare the budgeted income statement.



Case Study/Example

Using the same AAA clothing manufacturers as the example:

**AAA
Budgeted income statement
May–July 200X**

	May	June	July
Sales units	10,000	25,000	40,000
Sales @ \$5 per unit	\$50,000	\$125,000	\$200,000
Cost of goods sold			
Variable costs ⁵	\$36,100	\$90,250	\$144,400
Contribution margin	\$13,900	\$34,750	\$55,600
Fixed manufacturing costs	\$11,500	\$11,500	\$11,500
Selling and administration	\$10,500	\$10,500	\$10,500
Profit/(loss) for the month	\$(8,100)	\$12,750	\$33,600

Flexible budgets

The discussion in this unit has largely presumed a “static budget”. A static budget is not designed to change with changes in activity level.

⁵ VC = material + labour + variable overhead = \$1.75+\$1.67+0.19 = \$3.61 per unit sold



Once sales and expenses are estimated, they become the relevant benchmarks.

An alternative to the static budget, which has some compelling advantages, is the flexible budget. Flexible budgets relate anticipated expenses to observed revenue. In other words, it is a budget that adjusts or flexes for changes in the volume of activity. For example, if a business greatly exceeded the sales goal, it is reasonable to expect costs to also exceed planned levels. This is because some items like cost of sales, sales commissions and shipping costs are directly related to volume. Therefore it would be incorrect to blame the manager of the business for having cost overruns.

Conversely, failing to meet sales goals should be accompanied by a reduction in variable costs. It would be incorrect to congratulate a manager for holding costs down in this case. A flexible budget is one that reflects expected costs as a function of business volume; when sales rise so do certain budgeted costs and vice versa.

A flexible budget recognises that costs are either fixed, semi-fixed (semi-variable) or variable and it is designed to change in relation to actual volume of output or the level of activity in a period.

Flexible budgets can be used during the planning process to assist management with decisions regarding capacity and resource allocation. They are also valuable in the controlling process when they are commonly used to provide a more appropriate basis for performance evaluation.



Case Study/Example

The following is an example of a flexible production budget:

Production costs	Var. cost per unit	Range of production (units)		
		2,000	2,200	2,400
Variable:				
Direct materials	\$ 8.00	\$16,000	\$17,600	\$19,200
Direct labour	\$ 2.20	\$ 4,400	\$ 4,840	\$ 5,280
Variable overhead:				
supplies	\$ 0.80	\$ 1,600	\$ 1,760	\$ 1,920
power	\$ 0.40	\$ 800	\$ 880	\$ 960
Total variable costs	\$11.40	\$22,800	\$25,080	\$27,360
Fixed overhead:				
factory rent		\$10,500	\$10,500	\$10,500
depreciation		\$12,000	\$12,000	\$12,000
Total fixed costs		\$22,500	\$22,500	\$22,500
Total production costs		\$45,300	\$47,580	\$49,860

If actual production is 2,400 units these are the budgeted amounts we should use for comparative or variance analysis, assuming that the fixed



cost amount is valid for the unit range from 0–2,400 units (that is, the relevant range).

Actual versus flexible performance report

	Actual	Budget	Variance
	2400 units	2400 units	
Variable:			
Direct materials	\$20,500	\$19,200	\$1,300 Unfavourable
Direct labour	5,400	5,280	\$ 120 Unfavourable
Variable overhead:			
supplies	1,800	1,920	\$ 120 Favourable
power	860	960	\$ 100 Favourable
Total variable costs	\$28,560	\$27,360	\$1,200 Unfavourable
Fixed overhead:			
factory rent	\$10,500	\$10,500	0
depreciation	\$12,000	\$12,000	0
Total fixed costs	\$22,500	\$22,500	0
Total production costs	\$51,060	\$49,860	\$1,200 Unfavourable

The above comparison provides a more detailed performance appraisal. It is important to note that a flexible budget does not mean that the budget has changed. The input costs are still the costs used when the budget committee approved the budget. The flexible budget presents the actual activity level at budgeted input costs.

Performance evaluation

As noted in the above example, because the flexible budget responds to changes in activity, it provides a better tool for performance evaluation. The flexible budget is driven by the expected cost behaviour. Fixed factory overhead is the same no matter the activity level, and variable costs are a direct function of observed activity.

When performance evaluation is based on a static budget, there is little incentive to increase sales and production above anticipated levels because increases in volume tend to produce more costs and unfavourable variances. The flexible budget-based performance evaluation provides a remedy for this phenomenon.

Planning

Flexible budgets can be useful planning tools if prepared in advance. In the example above the company might anticipate alternative volumes



based on seasonal fluctuations in customer demand for their product. These fluctuations will be very important to production management as they plan daily staffing and purchases of materials and labour that will be needed to support the manufacturing operation. As a result, the company might prepare in advance flexible budgets based on many different scenarios.

Activity 3.1



Activity

For the organisation that you are involved with, answer the following questions:

1. What types of budgets are prepared?
2. Describe the budget preparation process.
3. For what period (daily, weekly, monthly, annually) are the budgets prepared?
4. How often is actual performance assessed against the budget?
5. Describe what part performance against budget plays in the process for the evaluation of managerial performance.

Activity 3.2



Activity

1. A sales budget is given below for one of the products manufactured by Key Limited:

	Sales Budget in Units
January	20,000
February	35,000
March	60,000
April	40,000
May	30,000
June	25,000

The inventory of finished goods at the end of each month must equal 20 per cent of the next month's sales. On December 31, the finished goods inventory totalled 4,000 units.

Each unit of product requires three specialised electrical switches. Since the production of these specialised switches by Key's suppliers is sometimes irregular, the company has a policy of maintaining an ending inventory at the end of each month equal to 30 per cent of the next month's production needs. This requirement had been met on January 1 of the current year.

Required:

Prepare a budget showing the quantity of switches to be purchased each month for January, February and March and in total for the quarter.

2. Glendale Limited is working on its direct labour budget for the next two months. Each unit of output requires 0.29 direct labour-hours. The direct labour rate is \$7.00 per direct labour-hour. The production budget calls for producing 5,600 units in June and 6,100 units in July.

Required:

Prepare the direct labour budget for the next two months, assuming that the direct labour work force is fully adjusted to the total direct labour-hours needed each month.

3. Govan Limited bases its manufacturing overhead budget on budgeted direct labour-hours. The variable overhead rate is \$5.10 per direct labour-hour. The company's budgeted fixed manufacturing overhead is \$78,840 per month, which includes depreciation of \$20,520. All other fixed manufacturing overhead costs represent current cash flows. The November direct labour budget indicates that 5,400 direct labour-hours will be required in that month.

Required:

- a. Determine the cash disbursement for manufacturing overhead for November.
 - b. Determine the predetermined overhead rate for November.
4. Bowling Limited bases its selling and administrative expense budget on the number of units sold. The variable selling and administrative expense is \$8.30 per unit. The budgeted fixed selling and administrative expense is \$93,870 per month, which includes depreciation of \$16,380. The remainder of the fixed selling and administrative expense represents current cash flows. The sales budget shows 6,300 units are planned to be sold in July.

Required:

Prepare the selling and administrative expense budget and the related cash budget for July.

5. Domin Corporation bases its budgets on the activity measure of customers served. During April, the company planned to serve 31,000 customers, but actually served 35,000 customers. Revenue is \$4.80 per customer served. Wages and salaries are \$33,000 per month plus \$1.60 per customer served. Supplies are \$1.00 per customer served. Insurance is \$12,200 per month. Miscellaneous expenses are \$7,400 per month plus \$0.20 per customer served.

Required:

Prepare a report showing the company's activity variances for April. Indicate in each case whether the variance is favourable (F) or unfavourable (U).



6. Ahrns Tech is a for-private teaching establishment. The school bases its budgets on two measures of activity (in other words, cost drivers), namely student and course. The school uses the following data in its budgeting:

	Fixed element per month	Variable element per student	Variable element per course
Revenue.....	\$0	\$362	\$0
Faculty wages.....	\$0	\$0	\$2,500
Course supplies	\$0	\$51	\$24
Administrative expenses	\$45,200	\$15	\$20

In July, the school budgeted for 1,770 students and 148 courses. The school's income statement showing the actual results for the month appears below:

Ahrns Tech Income Statement For the Month Ended July 31	
Actual students.....	1,470
Actual courses.....	149
Revenue.....	<u>\$544,100</u>
Expenses:	
Faculty wages.....	371,110
Course supplies	78,856
Administrative expenses .	<u>71,070</u>
Total expense	<u>521,036</u>
Net operating income	<u>\$ 23,064</u>

Required:

Prepare a report showing the school's revenue and spending variances for July. Label each variance as favourable (F) or unfavourable (U).

Unit summary



Summary

In this unit you learned:

- the purpose of budgeting,
- the purpose of the master budget and its component elements,
- the purpose of a sales budget and how to prepare one,
- the purpose of an operations budget and how to prepare one,
- the purpose of a cash budget and how to prepare one, and
- in what circumstances a flexible budget is prepared and how to interpret the results.

Unit 7

Standard costs

Introduction

As discussed in previous units, one of the roles of management accounting is managing a business through accounting information. In this process, management accounting enables managerial control. One of the key aspects of managerial control is cost control. Hence, it is very important to plan and control costs. Standard costing is a technique which helps organisations to control costs and business operations. It aims at eliminating waste and increasing efficiency in performance through setting up standards or formulating cost plans.

In the previous unit we discussed budgets that deal with total expected costs. Standards are the predetermined expectation of the inputs necessary to achieve a unit of output. Standard costs provide an assessment of what those inputs should cost. This unit will look at how standards are used for performance evaluation through measures of efficiency and cost incurrence.

The unit comprises three main sections:

1. An explanation of standard costing
2. The application of standard costs
3. Variance analysis

Upon completion of this unit you will be able to:

- *Explain* the purpose and role of standard costs.
- *Describe* the advantages and limitations of standard costs.
- *Identify* the steps involved in setting standards.
- *Explain* the purpose of variance analysis.
- *Calculate* variances from expected results.



Outcomes



Terminology



Terminology

Standard cost:	A predetermined cost which determines in advance what each product or service should cost under given circumstances.
Standard costing:	A system of cost accounting designed to find out how much the cost of a product should be under the existing conditions.
Variance :	The difference between an actual result and an expected result.

Standard costs explained

Definition and explanation

The word standard means a benchmark or yardstick. The standard cost is a predetermined cost: it determines in advance what each product or service should cost under given circumstances.

The Chartered Institute of Management Accountants (CIMA) has defined standard cost as “a predetermined cost which is calculated from management’s standards of efficient operations and the relevant necessary expenditure.” (Retrieved from <http://www.cimaglobal.com>). In other words, standard costs are the predetermined costs on a technical estimate of material, labour and overhead for a selected period of time and for a prescribed set of working conditions. Therefore a standard cost is a planned cost for a unit of product or service rendered.

The technique of using standard costs for the purposes of cost control is known as *standard costing*. It is a system of cost accounting which is designed to find out how much should the cost of a product be under the existing conditions. The actual cost can be ascertained only when production has taken place. The predetermined cost is compared with the actual cost, and a variance between the two enables management to take necessary corrective measures.

Advantages of standard costing

Standard costing is a management control technique for every activity. It is not only useful for cost control purposes but is also helpful in production planning and policy formulation. It allows “management by exception”. In other words managers will investigate significant discrepancies where actual results are different from pre-set standards. So managers should not be concerned where there are minimal differences, only where differences are significant or exceptional.

In relation to the various objectives of this system, some of the advantages of this tool are given below:

- **Efficiency measurement.** The comparison of actual costs with standard costs enables management to evaluate the performance of various cost centres. Actual costs of different periods are often compared to measure efficiency. However, in the absence of a standard costing system, it would be incorrect to compare costs for different periods because the circumstances of both the periods may be different.
- **Variance analysis.** Management is able to determine significant performance variances and possible inefficiencies by comparing actual costs with standard costs. Management can then investigate the responsibility for deviations in performance and take corrective measures. Finally, an analysis of variances enables a regular check on various expenditures.
- **Management by exception.** By setting agreed standards, management can concentrate on areas that significantly either over- or under-achieve the standards. This is known as management by exception, which means that management needs to only concentrate on investigating variances that are unusual or unexpected.
- **Cost control.** Every costing system aims at cost control and cost reduction. Therefore standards should be constantly analysed with an objective to improve efficiency. Whenever a variance occurs, the reasons should be studied and immediate corrective measures undertaken, if applicable. These corrective actions ensure a continuously improving cost control system.
- **Improved decision-making.** The monitoring of standards and analysis of variances enables management to improve their decision-making.
- **Eliminating inefficiencies.** The process of setting standards and analysing variances should help to eliminate inefficiencies across the organisation.

Limitations of standard costing

- **Non-standard products.** Standard costing is difficult to apply in those organisations where non-standard products are produced. If the production is undertaken according to the customer specifications, each job will involve different amounts of expenditures.
- **Resource requirements.** The process of setting standards is a difficult task, as it requires technical skills. It normally requires detailed time and motion studies which require a lot of time and money.
- **Changing circumstances.** The conditions under which standards are set do not remain static. When circumstances change, the original standards may become obsolete. Therefore, if the standards are not revised, the subsequent variance analysis will become increasingly meaningless. For example, if an industry is subject to technological change then the standards may become



outdated quite quickly. In these circumstances the standards will have to be revised. A frequent revision of standards will require resources and be costly.

- **Assigning responsibility.** Assigning responsibility for variances is not an easy task. For example, if the sales department is successful in exceeding their budgeted sales, which results in the production department having to pay for unplanned overtime, should the production manager, be blamed for having exceeded the labour costs? Therefore management needs to be very clear on assigning responsibility for performance.

Application of standard costs

In this section we will discuss the different types of standards that can be set and then look at the setting of standards for material, labour and overhead.

Standard-setting philosophy

Standards can be set very tightly, allowing almost no room for waste or rest. Alternatively, management may adopt a more realistic set of standards that are within reach. After all, standards are like goals. For example, in playing a round of golf, most players will see par as a benchmark against which to compare a score. However, realistically, few players expect to achieve par on a consistent basis. Nevertheless, it constitutes a standard.

At other times, golfers will calculate their handicap to determine a target score they plan to shoot on a given round of golf. This is also a standard, but one that is expected to be achieved.

The point here is that, in setting standards within a business environment, management needs to consciously consider the level of standards to adopt. Generally there are two accepted types of standards:

1. **Achievable standards** are realistically within reach. Such standards take into account normal spoilage and inefficiency. Such standards are intended to allow workers to reach the established benchmarks. This level of standard provides a clear set of metrics against which job performance can be assessed. The interpretation is generally unambiguous; when goals are not met, improvement is needed. It is also thought to reduce the level of frustration and discouragement that can be associated with less-attainable goals.
2. **Ideal standards** may never be reached. They represent what will result in a state of perfection – no spoiled goods, no worker fatigue, no errors, and so on. The idea behind such standards is that employees will never be satisfied. Instead, they will achieve their full potential by striving to achieve the ideal standard every time. Many businesses avoid ideal standards because they fear that employees will see ideal standards as meaningless, since

they cannot hope to achieve them. In other words, the employees cease to strive for a goal they cannot hope to reach. Further, such goals may not help in performance evaluations; what is the feedback value of telling employees they failed to meet such standards?

Setting standards

Normally, setting up standards is based on past experience. The total standard cost includes direct materials, direct labour and overheads. The standards should be set up in a systematic way so that they are used as a tool for cost control.

Standards for direct materials

The setting of standards for direct materials involves two variables:

1. Quantity of materials
2. Price of materials

When an organisation purchases materials the quantity, quality and size should be determined. The quantity is determined by the production department. This department makes use of historical records and an allowance for changing conditions will also be given for setting standards. A number of test runs may be undertaken on different days and under different situations and an average of these results should be used for setting material quantity standards.

The second step in determining direct material cost will be a decision about the standard price. The cost of material will be decided in consultation with the purchase department. The cost of purchasing and storekeeping of materials should also be taken into consideration. The procedure for purchase of materials, minimum and maximum levels for various materials, discount policy and means of transport are the other factors which have bearing on the materials' cost price. It includes the following:

- Cost of materials.
- Ordering cost.
- Carrying cost.

The purpose should be to increase efficiency in procuring and storing materials. The type of standard used – ideal standard or achievable standard – also affects the choice of standard price.

Standards for direct labour

The setting of a standard for direct labour again involves two variables:

1. Standard labour time for producing.
2. Labour rate per hour.



Standard labour time indicates the time taken by different categories of labour force. These categories include:

- Skilled labour.
- Semi-skilled labour.
- Unskilled labour.

For setting a standard time for labour force, an organisation will take in to account previous experience, past performance records, test run result, work-studies, and so on.

The labour rate standard refers to the expected wage rates to be paid for different categories of workers. Past wage rates and demand and supply principles may be taken into account for determining standard labour rates. However, the anticipation of expected changes in labour rates will be an essential factor. Where there is an agreement, say with a labour union, for payment of wages in the coming period, these rates should be used. If a premium or bonus scheme is in operation, then anticipated extra payments should also be included.

The objective of a standard labour time and labour rate is to achieve maximum efficiency in the use of labour.

Standards for overheads

Generally, overheads should be assigned to products or services based on some common attribute, which will depend on the production process. For example, labour-intensive production organisations will normally use direct labour hours or direct labour cost to assign overheads. However, machine- or capital-intensive production organisations will tend to use machine hours or machine cost as a basis for apportionment. A further alternative is to use direct material quantities or costs.

Standard overhead rates are computed by dividing overhead expenses by one of the apportionment bases noted above. The standard overhead cost is obtained by multiplying the standard overhead rate by, for example, the labour hours spent or number of units produced. The determination of overhead rate involves three things:

1. determination of overheads,
2. determination of the apportionment base, and
3. calculating overheads rate by dividing 1 by 2.

Overheads are generally classified into fixed overheads and variable overheads. The fixed overheads remain the same irrespective of level of production. Variable overheads change in the proportion of production, in other words, the total variable expenses increase or decrease with the increase or decrease in output. The division of overheads into fixed and variable categories will help in determining the standard for overheads.

Variance analysis

A variance is the difference between an actual result and an expected result. The process by which the total difference between standard and actual results is analysed is known as variance analysis. When actual results are better than the expected, we have a favourable variance (F). If, on the other hand, actual results are worse than expected, we have an adverse (A).



Case study/example

The following information will be used to demonstrate all of the variances:

Standard cost of product A	\$
Materials (5kgs x \$10 per kg)	50
Labour (4hrs x \$5 per hr)	20
Variable o/hds (4 hrs x \$2 per hr)	8
Fixed o/hds (4 hrs x \$6 per hr)	<u>24</u>
Total standard cost	<u>102</u>

Budgeted results

Production:	1,200 units
Sales:	1,000 units
Selling price:	\$150 per unit

Actual results

Production:	1,000 units
Sales:	900 units
Materials:	4,850 kg, \$46,075
Labour:	4,200 hrs, \$21,210
Variable o/hds:	\$9,450
Fixed o/hds:	\$25,000
Selling price:	\$140 per unit



We will now look at all of the variances that arise in the above example and demonstrate how they are calculated.

Direct material variances

The total variance for direct materials is found by comparing actual direct material cost to the standard direct material cost. The overall materials variance could result from any combination of having procured goods at prices equal to, above, or below standard cost, and using more, or less, direct materials than anticipated. The total direct materials variance can therefore be separated into:

1. **Materials price variance:** A variance that reveals the difference between the standard price for materials purchased and the amount actually paid for those materials [(standard price – actual price) X actual quantity].
2. **Materials quantity variance:** A variance that compares the standard quantity of materials that should have been used to the actual quantity of materials used. The quantity variance is measured at the standard price per unit [(standard quantity – actual quantity) X standard price].

Total material variance

From the example above the material total variance is given by:

1,000 units should have cost (x \$50)	50,000
But did cost	46,075
Direct material total variance	<u>3, 925 (F)</u>

It can be divided into two sub-variances:

The direct material price variance

This is the difference between what the actual quantity of material used did cost and what it should have cost.

4,850 kg should have cost (x \$10)	48,500
But did cost	46,075
Direct material price variance	<u>2,425 (F)</u>

The direct material quantity variance

This is the difference between how much material should have been used for the number of units actually produced and how much material was used, valued at standard cost.

1,000 units should have used (x 5 kg)	5,000 kg
But did use	4,850 kg
Variance in kg	<u>150 kg (F)</u>

Valued at standard cost per kg	x \$10
Direct material usage variance in \$	<u>\$1,500 (F)</u>

Direct labour variances

The logic for direct labour variances is very similar to that of direct materials. The total variance for direct labour is found by comparing actual direct labour cost to the standard direct labour cost. The overall labour variance could result from any combination of having paid labourers at rates equal to, above, or below standard rates, and using more, or less, direct labour hours than anticipated.

The total direct labour variance can be separated into:

1. **Labour rate variance:** A variance that reveals the difference between the standard rate and actual rate for the actual labour hours worked [(standard rate – actual rate) X actual hours].
2. **Labour efficiency variance:** A variance that compares the standard hours of direct labour that should have been used to the actual hours worked. The efficiency variance is measured at the standard rate per hour [(standard hours – actual hours) X standard rate].

Total labour variance

From the example above the labour total variance is given by:

1,000 units should have cost (x \$20)	20,000
But did cost	<u>21,210</u>
Direct labour total variance	<u>1,210 (A)</u>

The direct labour rate variance

This is the difference between what the actual number of hours worked should have cost and what it did cost.

4200hrs should have cost (4200hrs x \$5)	\$21000
But did cost	<u>\$21210</u>
Direct labour rate variance	<u>\$210(A)</u>

The direct labour efficiency variance

This is the difference between how many hours should have been worked for the number of units actually produced and how many hours were worked, valued at the standard rate per hour.

1,000 units should have taken (x 4 hrs)	4,000 hrs
But did take	<u>4,200 hrs</u>
Variance in hrs	200 hrs



Valued at standard rate per hour	x \$5
Direct labour efficiency variance	<u>\$1,000 (A)</u>

Variable overhead variances

The cost behaviour for variable factory overhead is not unlike direct material and direct labour, and the variance analysis is quite similar. The goal will be to account for the total *actual* variable overhead by applying:

1. the *standard* amount to work in process, and
2. the *difference* to appropriate variance accounts.

This accounting objective is no different from that observed for direct material and direct labour.

As with direct material and direct labour, it is possible that the prices paid for underlying components deviated from expectations (a variable overhead spending variance). On the other hand, it is possible that the company's productive efficiency drove the variances (a variable overhead efficiency variance). Thus the total variable overhead variance can be divided into:

- variable overhead expenditure variance, and
- variable overhead efficiency variance.

Total variable overhead variance

From the example above the total variable overhead variance is given by:

1,000 units should have cost (x \$8)	8,000
But did cost	<u>9,450</u>
Variable production o/hd total variance	<u>\$1,450 (A)</u>

The variable overhead expenditure variance

This is the difference between what the variable production overhead did cost and what it should have cost.

4,200 hrs should have cost (x \$2)	8,400
But did cost	<u>9,450</u>
Variable production o/hd expenditure variance	<u>\$1,050 (A)</u>

The variable overhead efficiency variance

This is the same as the direct labour efficiency variance in hours, valued at the variable production overhead rate per hour.

Labour efficiency variance in hours	200 hrs (A)
Valued @ standard rate per hour	x \$2

Variable production o/hd efficiency variance	\$400 (A)
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Fixed overhead variances

The total fixed production variance is an attempt to explain the under- or over-absorbed fixed production overhead.

Remember that
 overhead absorption rate = $\frac{\text{Budgeted fixed production overhead}}{\text{Budgeted level of activity}}$

If either the numerator (top number) or the denominator (bottom number) or both are incorrect then we will have under- or over-absorbed production overhead. The following variances could therefore arise:

- If actual expenditure \pm budgeted expenditure (numerator incorrect) = **expenditure variance**.
- If actual production/hours of activity $>$ budgeted production/hours of activity (denominator incorrect) = **volume variance**.
- The workforce may have been working at a more or less efficient rate than standard to produce a given output = **volume efficiency variance** (similar to the variable production overhead efficiency variance).
- Regardless of the level of efficiency, the total number of hours worked could have been more or less than was originally budgeted (employees may have worked a lot of overtime or there may have been a strike and so actual hours worked were less than budgeted) = **volume capacity variance**.

The fixed overhead variance

This is the difference between fixed production overhead incurred and fixed production overhead absorbed (= the under- or over-absorbed fixed production overhead).

Overhead incurred	25,000
Overhead absorbed (1,000 units x \$24)	24,000
Overhead variance	\$1,000 (A)

The fixed overhead expenditure variance

This is the difference between the budgeted fixed production overhead expenditure and actual fixed production overhead expenditure.

Budgeted overhead (1,200 x \$24)	28,800
Actual overhead	25,000
Expenditure variance	\$3,800 (F)



The fixed overhead volume variance

This is the difference between actual and budgeted production volume multiplied by the standard absorption rate per unit.

Actual production at std rate (1,000 x \$24)	24,000
Budgeted production at std rate (1,200 x \$24)	28,800
Volume variance	\$4,800 (A)

The fixed overhead volume efficiency variance

This is the difference between the number of hours that actual production should have taken, and the number of hours actually worked (usually the labour efficiency variance), multiplied by the standard absorption rate per hour.

Labour efficiency variance in hours	200 hrs (A)
Valued @ standard rate per hour	x \$6
Volume efficiency variance	\$1,200 (A)

The fixed overhead volume capacity variance

This is the difference between budgeted hours of work and the actual hours worked, multiplied by the standard absorption rate per hour.

Budgeted hours (1,200 x 4)	4,800 hrs
Actual hours	4,200 hrs
Variance in hrs	600 hrs (A)
x standard rate per hour	x \$6
Volume capacity variance	\$3,600 (A)

Note: the fixed overhead volume capacity variance is unlike the other variances in that an excess of actual hours over budgeted hours results in a favourable variance and not an adverse variance as it does when considering labour efficiency, variable overhead efficiency and fixed overhead volume efficiency. Working more hours than budgeted produces an over-absorption of fixed overheads, which is a favourable variance.

Selling variances

So far we have considered the variances in expenditure – materials, labour and overhead. We can also establish variances relating to sales which normally arise due to either selling price or volume or both.

The selling price variance

The selling price variance is a measure of the effect on expected profit of a different selling price to standard selling price. It is calculated as the

difference between what the sales revenue should have been for the actual quantity sold, and what was actually achieved.

Revenue from 900 units should have been (x \$150)	135,000
But was (x \$140)	126,000
Selling price variance	<u>\$9,000 (A)</u>

The sales volume variance

The sales volume variance is the difference between the actual units sold and the budgeted quantity, valued at the standard profit per unit. In other words it measures the increase or decrease in standard profit as a result of the sales volume being higher or lower than budgeted.

Budgeted sales volume	1,000 units
Actual sales volume	900 units
Variance in units	100 units (A)
x standard margin per unit (x \$ (150 – 102))	x \$48
Sales volume variance	<u>\$4,800 (A)</u>

Reasons for variances

The following table shows some of the reasons that give rise to variances:

Category	Reasons
Material price	(F) – unforeseen discounts received, greater care taken in purchasing, change in material standard (A) – price increase, careless purchasing, change in material standard
Material usage	(F) – material used of higher quality than standard, more effective use made of material (A) – defective material, excessive waste, theft, stricter quality control
Labour rate	(F) – use of workers at rate of pay lower than standard (A) – wage rate increase
Labour efficiency	(F) – output produced more quickly than expected because of work motivation, better quality of equipment or materials; higher skilled labour used (A) – lost time in excess of standard allowed, output lower than standard set because of deliberate restriction, lack of



Category	Reasons
	training, sub-standard material used
Overhead expenditure	(F) – savings in cost incurred, more economical use of services (A) – increase in cost of services used, excessive use of services, change in type of services used
Overhead volume	(F) – production greater than budgeted (A) – production less than budgeted

Figure 1

Examining variances

Not all variances need to be analysed. A manager must consider the circumstances under which the variances resulted and the materiality of amounts involved. It is also important to understand that not all unfavourable variances are bad. For example, buying raw materials of superior quality (at higher than anticipated prices) may be offset by reduction in waste and spoilage. Likewise, favourable variances are not always good.

The challenge for a good manager is to take the variance information, examine the causes, and take necessary corrective measures to fine tune business operations.

In concluding this discussion of standards and variances, remember that care should be taken in examining variances. If the original standards are not accurate and fair, the resulting variance signals can prove quite misleading.

Activity 3.3



Activity

For the organisation that you are involved with, answer the following questions:

1. Does the organisation prepare standard costs? If so:
 - a. What type of standards do they use – ideal or achievable?
 - b. How often are variance reports produced?
 - c. Does management investigate all variances?
 - d. How often are standards revised?
2. If your organisation does not use standard costs, describe how your organisation controls costs.

Activity 3.4



Activity

1. Spratt Limited is developing standards for its products. One product requires an input that is purchased for \$62.00 per kilogram from the supplier. By paying cash, the company gets a discount of 6 per cent off this purchase price. Shipping costs from the supplier's warehouse amount to \$4.45 per kilogram. Receiving costs are \$0.50 per kilogram. Each unit of output requires 0.48 kilogram of this input. The allowance for waste and spoilage is 0.04 kilogram of this input for each unit of output. The allowance for rejects is 0.13 kilogram of this input for each unit of output.

Required:

- a. Determine the standard price per kilogram of this input. Show your workings.
 - b. Determine the standard kilograms of this input per unit of output. Show your workings.
2. Pittfield Limited is developing direct labour standards. The basic direct labour wage rate is \$13.90 per hour. Employment taxes are 10 per cent of the basic wage rate. Fringe benefits are \$4.28 per hour. A particular product requires 0.90 direct labour-hours per unit. The allowance for breaks and personal needs is 0.07 direct labour-hours per unit. The allowance for clean-up, machine downtime, and rejects is 0.12 direct labour-hours per unit.

Required:

- a. Determine the standard rate per direct labour-hour.
- b. Determine the standard direct labour-hours per unit of product.



- c. Determine the standard labour cost per unit of product to the nearest cent.
3. Lindos Limited's standard and actual costs per unit for the most recent period, during which 400 units were actually produced, are given below:

	Standard	Actual
Materials:		
Standard: 2 foot at \$1.50 per foot	\$ 3.00	
Actual: 2.1 foot at \$1.60 per foot		\$ 3.36
Direct labor:		
Standard: 1.5 hours at \$6.00 per hour	9.00	
Actual: 1.4 hours at \$6.50 per hour		9.10
Variable overhead:		
Standard: 1.5 hours at \$3.40 per hour	<u>5.10</u>	
Actual: 1.4 hours at \$3.10 per hour		<u>4.34</u>
Total unit cost	<u>\$17.10</u>	<u>\$16.80</u>

Required:

From the foregoing information, calculate the following variances. Show whether the variance is favourable (F) or unfavourable (U):

- a. Materials price variance.
 - b. Materials quantity variance.
 - c. Direct labour rate variance.
 - d. Direct labour efficiency variance.
 - e. Variable overhead rate variance.
 - f. Variable overhead efficiency variance.
4. The following materials standards have been established for a particular product:

Standard quantity per unit of output	5.2 meters
Standard price	\$15.60 per meter

The following data pertain to operations concerning the product for the last month:

Actual materials purchased	8,500 meters
Actual cost of materials purchased	\$139,400
Actual materials used in production	8,200 meters
Actual output	1,640 units

Required:

- a. What is the materials price variance for the month?
- b. What is the materials quantity variance for the month?



5. Metzger Limited's variable overhead is applied on the basis of direct labour-hours. The standard cost card for product M70T specifies 7.7 direct labour-hours per unit of M70T. The standard variable overhead rate is \$6.30 per direct labour-hour. During the most recent month, 400 units of product M70T were made and 3,000 direct labour-hours were worked. The actual variable overhead incurred was \$18,000.

Required:

- a. What was the variable overhead rate variance for the month?
 - b. What was the variable overhead efficiency variance for the month?
6. Stafford Limited, which makes landing gear for aircraft, has provided the following data for a recent month:

Budgeted production	8,400	gears
Standard machine-hours per gear	9.4	machine-hours
Budgeted supplies cost	\$2.40	per machine-hour
Actual production	8,500	gears
Actual machine-hours	79,030	machine-hours
Actual supplies cost (total)	\$210,524	

Required:

Determine the rate and efficiency variances for the variable overhead item supplies and indicate whether those variables are favourable or unfavourable.



Unit summary



Summary

In this unit you learned:

- the purpose of and an explanation of standard costing;
- the application of standard costs for materials, labour and overhead costs; and
- to calculate variance analysis for materials, labour and overhead costs as well as selling variances.



Activity feedback

Activity 3.1

Your answers will depend on the organisation you choose.

Activity 3.2

1. Key Limited

The company's production budget is as follows:

	January	February	March	April
Budgeted sales (units)	20,000	35,000	60,000	40,000
Add: Desired ending inventory	7,000	12,000	8,000	6,000
Total needs	27,000	47,000	68,000	46,000
Deduct: Beginning inventory	4,000	7,000	12,000	8,000
Units to be produced	23,000	40,000	56,000	38,000

The materials purchases budget (based on the above production budget) would be as follows:

	January	February	March	Quarter
Units to be produced	23,000	40,000	56,000	119,000
Switches per unit	×3	×3	×3	×3
Production needs	69,000	120,000	168,000	357,000
Add: Desired ending inventory ...	36,000	50,400	**34,200	34,200
Total needs	105,000	170,400	202,200	391,200
Deduct: Beginning inventory	*20,700	36,000	50,400	20,700
Required purchases	84,300	134,400	151,800	370,500

* January beginning inventory = (23,000 x 30%) x 3 = 20,700

** March ending inventory = (38,000 x 30%) x 3 = 34,200

2. Glendale Limited

The direct labour budget for the next two months, assuming that the direct labour work force is fully adjusted to the total direct labour-hours needed each month, is as follows:

	June	July
Required production in units	5,600	6,100
Direct labor-hours per unit	0.29	0.29
Total direct labor-hours needed	1,624	1,769
Direct labor cost per hour	\$7	\$7
Total direct labor cost	\$11,368	\$12,383



3. Govan Limited

	November
a.	
Budgeted direct labor-hours	5,400
Variable overhead rate	\$5.10
Variable manufacturing overhead	\$27,540
Fixed manufacturing overhead	78,840
Total manufacturing overhead	<u>106,380</u>
Less depreciation	20,520
Cash disbursement for manufacturing overhead	<u>\$85,860</u>
b. Total manufacturing overhead (a)	\$106,380
Budgeted direct labor-hours (b)	5,400
Predetermined overhead rate for the month (a)/(b)...	\$19.70

4. Bowling Limited

	July
Budgeted unit sales	6,300
Variable selling and administrative expense per unit	\$8.30
Budgeted variable expense	\$52,290
Budgeted fixed selling and administrative expense	93,870
Total budgeted selling and administrative expense	<u>146,160</u>
Less depreciation	16,380
Cash disbursements for selling and administrative expenses ...	<u>\$129,780</u>

5. Domin Corporation

Domin Corporation
Activity Variances
For the Month Ended April 30

	Planning Budget	Flexible Budget	Activity Variances
Customers served (q)	<u>31,000</u>	<u>35,000</u>	
Revenue (\$4.80q)	\$148,800	\$168,000	\$19,200 F
Expenses:			
Wages and salaries (\$33,000 + \$1.60q)	82,600	89,000	6,400 U
Supplies (\$1.00q)	31,000	35,000	4,000 U
Insurance (\$12,200)	12,200	12,200	0
Miscellaneous (\$7,400 + \$0.20q)	13,600	14,400	800 U
Total expense	<u>139,400</u>	<u>150,600</u>	11,200 U
Net operating income	<u>\$9,400</u>	<u>\$17,400</u>	\$8,000 F

6. Ahrns Tech

Ahrns Tech Revenue and Spending Variances For the Month Ended July 31			
	Flexible Budget	Actual Results	Revenue and Spending Variances
Students (q1)	1,470	1,470	
Courses (q2)	149	149	
Revenue (\$362q1)	\$532,140	\$544,100	\$11,960 F
Expenses:			
Faculty wages (\$2,500q2)	372,500	371,110	1,390 F
Course supplies (\$51q1 + \$24q2) ..	78,546	78,856	310 U
Administrative expenses (\$45,200 + \$15q1 + \$20q2)	70,230	71,070	840 U
Total expense	521,276	521,036	240 F
Net operating income	\$10,864	\$23,064	\$12,200 F

Activity 3.3

Your answers will depend on the organisation you choose.

Activity 3.4

1. Spratt Limited

- a. Determine the standard price per kilogram of this input. Show your workings.
- b. Determine the standard kilograms of this input per unit of output. Show your workings.

a. Standard price

Purchase price	\$62.00
Less cash discount	(3.72)
Shipping costs from the supplier's warehouse	4.45
Receiving costs	0.50
Standard price per kilogram	<u>\$63.23</u>

b. Standard quantity

Material requirement per unit of output, in kilograms	0.48
Allowance for waste and spoilage, in kilograms	0.04
Allowance for rejects, in kilograms	0.13
Standard quantity per unit of output, in kilograms	<u>0.65</u>



2. Pittfield Limited

a. Standard rate per direct labor-hour:

Basic wage rate per hour	\$13.90
Employment taxes	1.39
Fringe benefits	4.28
Standard rate per direct labor-hour	<u>\$19.57</u>

b. Standard direct-labor hours per unit of output:

Basic labor time per unit	0.90 DLHs
Allowance for breaks and personal needs	0.07 DLHs
Allowance for cleanup, machine downtime, and rejects	0.12 DLHs
Standard direct-labor hours per unit	<u>1.09 DLHs</u>

c. Standard labor cost per unit:

Standard rate per direct labor-hour (a)	\$19.57
Standard direct-labor hours per unit (b)	1.09
Standard labor cost per unit (a) × (b)	<u>\$21.33</u>

3. Lindos Limited

a. Materials price variance = $AQ(AP - SP)$
 $= (2.1 \times 400) \times (\$1.60 - \$1.50) = \84 U

b. Materials quantity variance = $SP(AQ - SQ)$
 $= \$1.50(2.1 \times 400 - 2.0 \times 400) = \60 U

c. Direct labour rate variance = $AH(AR - SR)$
 $= (1.4 \times 400) \times (\$6.50 - \$6.00) = \280 U

d. Direct labour efficiency variance = $SR(AH - SH)$
 $= \$6.00(1.4 \times 400 - 1.5 \times 400) = \240 F

e. Variable overhead rate variance = $AH(AR - SR)$
 $= (1.4 \times 400) \times (\$3.10 - \$3.40) = \168 F

f. Variable overhead efficiency variance = $SR(AH - SH)$
 $= \$3.40(1.4 \times 400 - 1.5 \times 400) = \136 F

4. a. Materials price variance = $(AQ \times AP) - (AQ \times SP)$
 $= \$139,400 - (8,500 \times \$15.60) = \$6,800 \text{ U}$

b. $SQ = \text{Standard quantity per unit} \times \text{Actual output}$
 $= 5.2 \times 1,640 = 8,528$

Materials quantity variance = $SP(AQ - SQ)$
 $= \$15.60(8,200 - 8,528) = \$5,117 \text{ F}$

5. Metzger Limited

a. Variable overhead rate variance = $(AH \times AR) - (AH \times SR)$
 $= \$18,000 - (3,000 \times \$6.30) = \$900 \text{ F}$

b. Variable overhead efficiency variance = $SR(AH - SH^*)$
 $= \$6.30(3,000 - 3,080) = \504 F

* $SH = \text{Standard hours per unit} \times \text{Actual output} = 7.7 \times 400 = 3,080$



6. Stafford Limited

Standard machine-hours allowed for the actual output = $9.4 \times 8,500$
= 79,900

Variable overhead rate variance = $(AH \times AR) - (AH \times SR)$
= $\$210,524 - (79,030 \times \$2.40) = \$210,524 - \$189,672 = \$20,852$ U

Variable overhead efficiency variance = $(AH \times SR) - (SH \times SR)$
= $(79,030 \times \$2.40) - (79,900 \times \$2.40) = \$189,672 - \$191,760 =$
\$2,088 F