Chapter 7 Assessment

Assessment is the means of obtaining information which allows teachers to make professional judgements about pupils' progress. Assessment may include written work, practical tasks, oral questioning and discussions, classroom observations, etc. It can serve both formative and summative purposes.

Formative assessment refers to the ongoing assessment of pupils' learning and progress throughout the course. It includes a combination of assessing pupils' performance in classroom discussions, their performance in classwork and homework and the results of their tests. Its purpose is to determine how pupils are progressing towards the learning targets. Teachers can use the information gained from the assessment to provide appropriate feedback to pupils about their strengths and weaknesses and to support them in making further progress. This can be done by providing immediate feedback to pupils during lesson time or by giving written comments to them when correcting the assignments. Teachers can also use the information gained as a basis for planning learning for individuals and for groups of pupils.

Summative assessment refers to the assessment of pupils' overall progress at important intervals, such as the end of a school term, a school year or a Key Stage. Summative assessment is designed to provide a comprehensive, summary description of performance and progress in pupils' learning. The information gained can be used as a basis for planning further learning in a subsequent phase of schooling; it may also be used for other purposes such as pupil placement.

7.1 Assessment and the Learning Targets

The learning targets and objectives describe the desired breadth and depth of content which pupils need to learn and as such they constitute the basis for what is to be assessed.

7.2 Assessment Scheme: Tasks and Exercises

In TOC, the assessment scheme includes a range of procedures to cover various learning targets and also to provide the opportunity for the full range of pupils to demonstrate their individual capabilities. Just as a teaching and learning programme comprises tasks and exercises so too does the assessment scheme.

Exemplar assessment tasks and exercises in Mathematics for pupils in Key Stage 2 can be found below:

Exemplar Assessment Tasks

Exemplar 1

NUMBER Dimension

Module : Operations on whole numbers (N7)

Unit : Inverse proportion by unitary method (N7-7)

Assessment Objective : Solving simple problems on inverse proportion by the unitary method

Assessment Task (Expected Band of Performance : 4)

A bag of rice is just enough to be consumed by 5 persons in 12 days. If this bag of rice is to be consumed by 15 persons, how long can it last ?

_____

_____

Exemplar 2

NUMBER Dimension

Module : Operations of fractions, decimals and percentages (N8)

Unit : Applications of percentages (N8-9)

Assessment Objective : Solving simple problems on percentages

Assessment Tasks (Expected Band of Performance : 4)

There are 40 students in P.6B and 25 % of them wear glasses. How many students wear glasses ?

Exemplar 3

NUMBER Dimension

Module : Operations of fractions, decimals and percentages (N8)

Unit : Averages (N8-6)

Assessment Objectives : . Calculating the average of a group of numbers
. Solving problems

Assessment Task (Expected Band of Performance : 3)

There are two bus stops near Fanny's school and she can take either one of the bus-routes to go home.

The following is the waiting time of the two buses after school recorded in a survey taken in the past five days by the Traffic Information Group of the Students' Union :

Waiting time of Route 1 Bus :

Monday	Tuesday	Wednesday	Thursday	Friday
6 min	9 min	7 min	10 min	8 min

Waiting time of Route 2 Bus :

Monday	Tuesday	Wednesday	Thursday	Friday
15 min	2 min	1 min	2 min	16 min

Answer the following questions according to the above information.

(a) What is the daily average waiting time of Route 1 Bus ?

_____

(b) What is the difference between the longest waiting time and shortest waiting time of Route 1 Bus ?

_____

(c) What is the average waiting time of Route 2 Bus ?

_____

(d) What is the difference between the longest waiting time and shortest waiting time of Route 2 Bus ?

_____

(e) If you are Fanny, which route would you choose ? _____

Why ?

_____

_____

_____

Exemplar 4

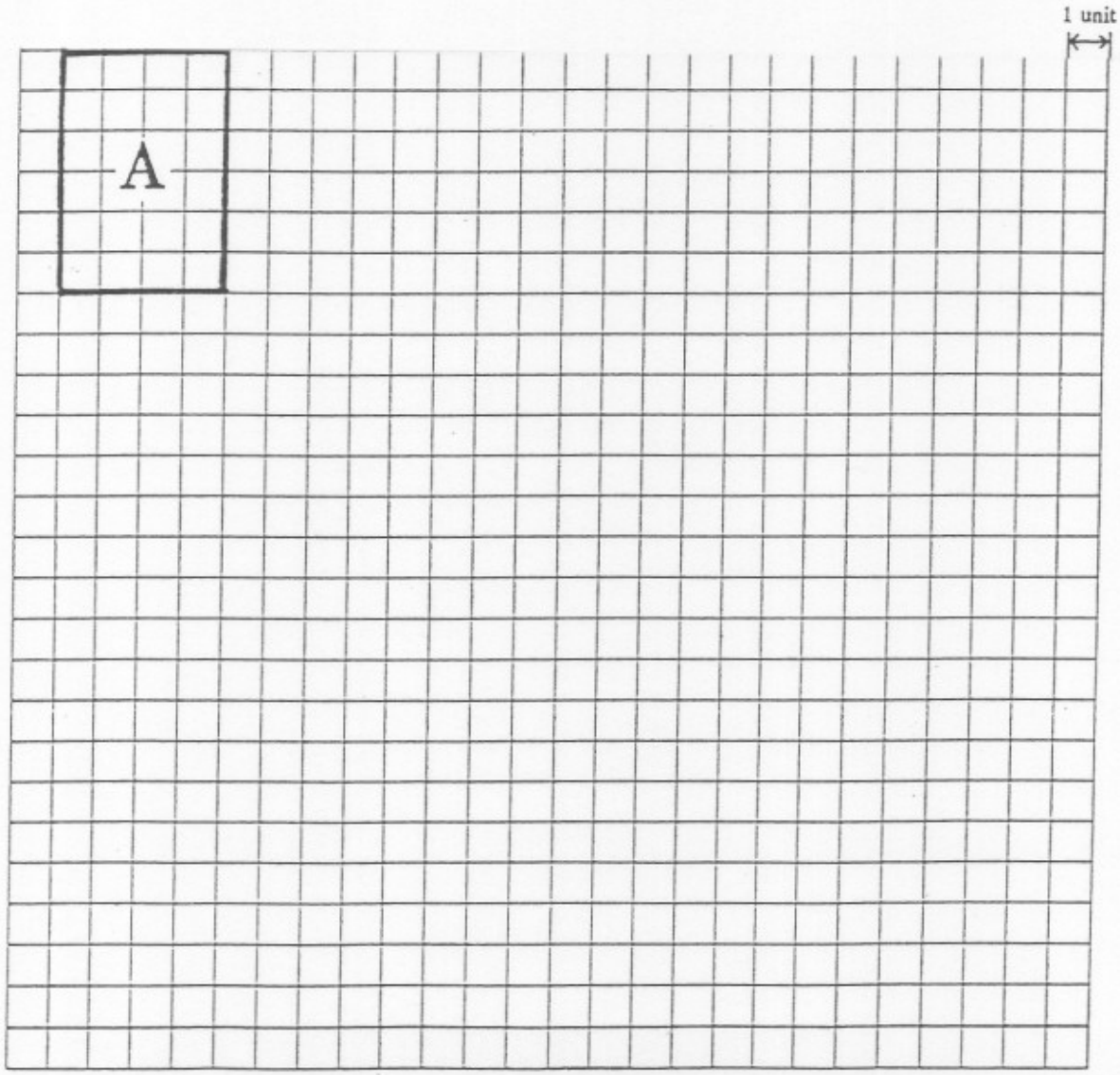
MEASURES Dimension

Module : Further measurement (M2)

Unit : Square centimetre, square metre, areas of squares and rectangles (M2-3)

Assessment Objective : Understanding and using the formula for area of rectangles

Assessment Task (Expected Band of Performance : 3)



(a) On the squared paper above, diagram A is a rectangular flower bed. Find its area in square units.

_____

(b) Draw on the squared paper two rectangles B and C with areas equal to rectangular flower bed A but of different shapes.

(c) Design and draw on the same squared paper three flower beds D, E and F of different shapes which are bounded by straight lines and have areas each equal to that of rectangular flower bed A.

Exemplar 5

MEASURES Dimension

Module : Further measurement (M2)

Unit : Metre per second and kilometre per hour (M2-7)

Assessment Objective : Solving simple problems on speed

Assessment Task (Expected Band of Performance : 4)

In a sports ground, the length of one lap of the runway is 400 m. Winnie takes 120 seconds to complete one lap. What is her average speed in metre per second ?

Exemplar 6

ALGEBRA Dimension
Module : Algebra (A1)
Unit : Algebraic symbols (A1-1)
Assessment Objective : Using algebraic symbols in recording

Assessment Task: (Expected Band of Performance : 3)

Use an equation to represent the following statements :

My brother is now x years old. 5 years later he will be 18 years old.

_____

Exemplar 7

ALGEBRA Dimension

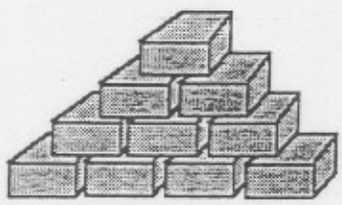
Module : Algebra (A1)

Unit : Solving simple equations (A1-3)

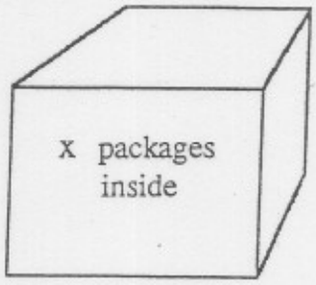
Assessment Objectives : . Solving simple equations involving two steps in the solution
. Solving simple problems by equations

Assessment Task: (Expected Band of Performance : 4)

A school sold exercise books to pupils at the beginning of the school year. Mr. Chan, the class teacher of P.5B, received from the general office one box and 10 bags of exercise books as shown in the following diagram. He then distributed them to P.5B pupils.



10 packages of exercise books
Each package costs $28



One box of exercise books

Use algebraic expressions to answer question (a) and question (b) :

(a) How many bags of exercise books did he receive altogether from the general office ? _____

(b) After selling all the exercise books , how much money did Mr. Chan receive ?

_____

(c) Mr. Chan received $ 896 after selling all the exercise books. Using an equation, find out the total number of bags of exercise books in the box.

_____

Exemplar 8

SHAPE & SPACE Dimension

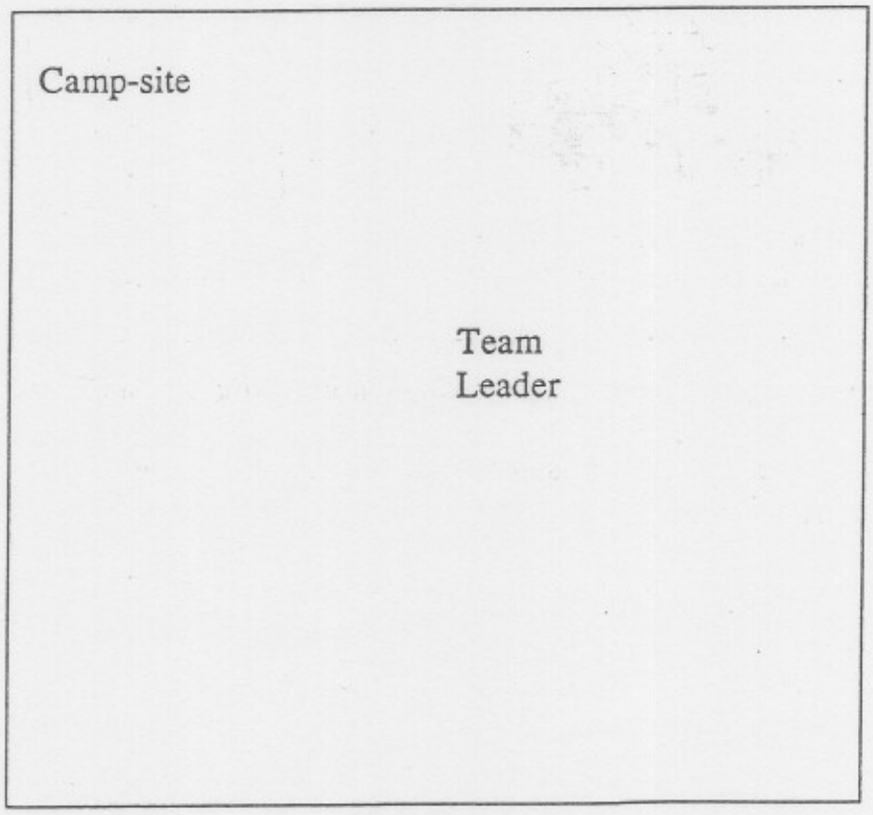
Module : Further 2-D and 3-D shapes (S2)

Unit : Circles (S2-2)

Assessment Objective : Recognising the relation among circumference, centre and radius

Assessment Task (Expected Band of Performance : 4)

Five boy scouts go camping with their team leader. They are free to pit their camps at the camp-site but their camps must be at equal distance from their team leader. If the position of the team leader is given, where should they pit their camps? Make your suggestion and draw it on the space below.



Module : Statistical charts (D2)

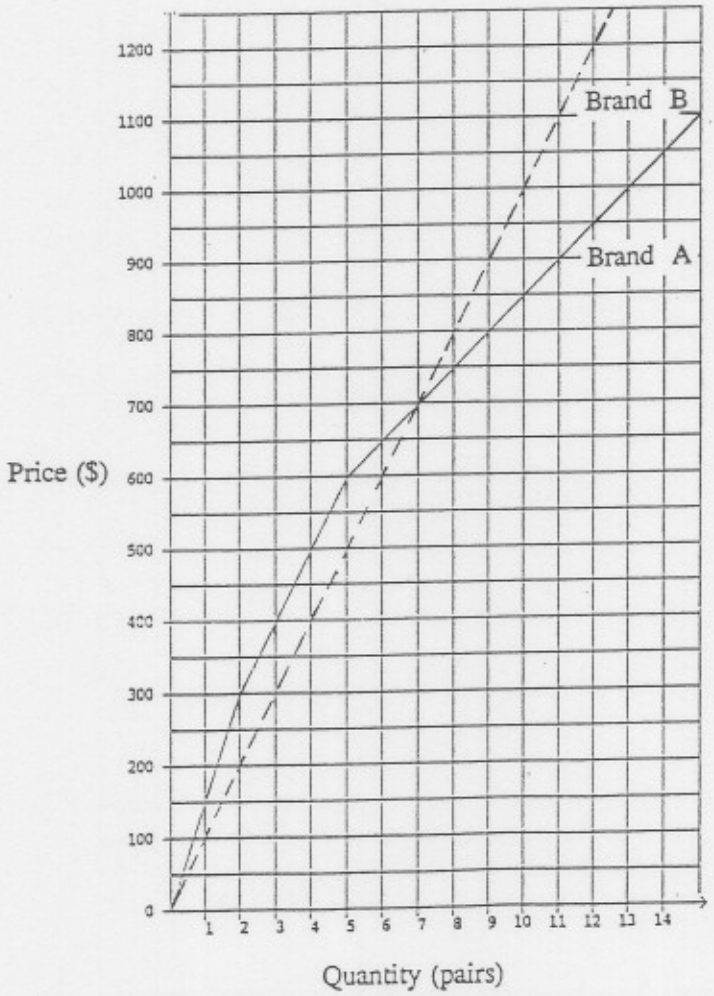
Unit :Further techniques on straight line graphs (D2-4)

Assessment Objective : Understanding and reading straight line graphs and broken line graphs

Assessment Task (Expected Band of Performance : 4)

Linda and her family go to a jeans shop to buy jeans. They find that the price list of two brands is as follows :

Price List of Jeans



Study the above figure and answer the following questions.

(a) If they buy 4 pairs of jeans, which brand should they choose to save money ? How much can they save ?

_____

_____

(b) If they buy one dozen pairs of jeans , which brand should they choose to save money ? How much can they save ?

_____

_____

(c) If they buy two dozen pairs of jeans B, how much should they pay ?

_____

_____

Exemplar 10

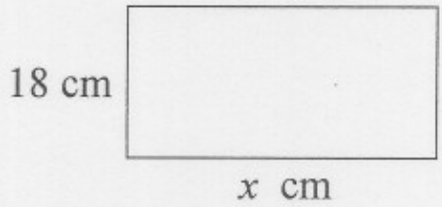
ALGRBRA and MEASURES Dimensions

Modules : Further Algebra (A2), Further measurement (M2)

Units : . Solving simple equations (A2-4)
. Square centimetre, square metre, areas of squares and rectangles (M2-3)

Assessment Objectives : . Solving practical problems by equations
. Using formulas for the areas of squares and rectangles

Assessment Task: (Expected Band of Performance : 4)



(a) The length of a rectangular tile is x cm and its width is 18 cm. If its perimeter is 84 cm, find the value of x ?

(b) Find the area of the rectangular tile.

(c) A rectangular swimming pool has length 14.4 m and width 7.2 m. Its base is to be covered with the above tiles. How many tiles are required ?

Examplar Assessment Exercises

Exemplar 1

NUMBER Dimension

Module : Nature of numbers (N6)

Unit : H.C.F. and L.C.M. by listing (N6-1)

Assessment Objective : Finding the common multiples and L.C.M. of two numbers by listing

Assessment Exercise (Expected Band of Performance : 3)

Find the L.C.M. of 10 and 15 by listing.

_____

_____

Exemplar 2

NUMBER Dimension

Module : Operations of fractions, decimals and percentages (N8)

Unit : Multiplication and division of decimals (N8-5)

Assessment Objective : Performing multiplication of two numbers up to two decimal places

Assessment Exercise (Expected Band of Performance : 4)

0.25 x 1.06 = ?

_____

Exemplar 3

MEASURES Dimension

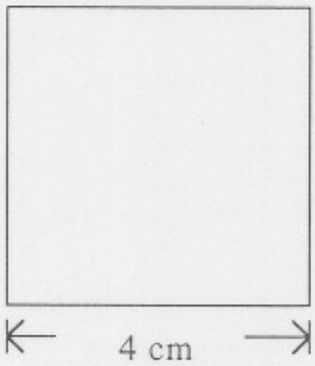
Module : Further measurement (M2)

Unit : Square centimetre, square metre, areas of squares and rectangles (M2-3)

Assessment Objective : Calculating the areas of squares by formula

Assessment Exercise (Expected Band of Performance : 3)

The figure below is a square of side 4 cm. Find its area.



Exemplar 4

MEASURES Dimension

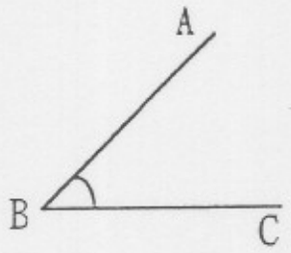
Module : Further measurement (M2)

Unit : Angle measures in degrees (M2-8)

Assessment Objective : Measuring the sizes of angles using a protractor

Assessment Exercise (Expected Band of Performance : 4)

Use a protractor to measure, in degrees, the size of $\angle B$.



Exemplar 5

ALGEBRA Dimension

Module : Algebra (A1)

Unit : Solving simple equations (A1-4)

Assessment Objective : Solving simple equations, limiting to those requiring at most two steps in the solution

Assessment Exercise : (Expected Band of Performance : 4)

Solve the following equation :

$$\frac{x}{4} + 1.2 = 6$$

Exemplar 6

SHAPE & SPACE Dimension

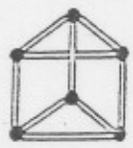
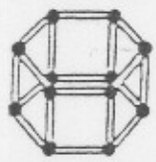
Module : Further 2-D and 3-D shapes (S2)

Unit : Properties of pyramids and prisms (S2-3)

Assessment Objective : Finding out the number of edges and vertices of pyramids and prisms by inspection

Assessment Exercise (Expected Band of Performance : 3)

From each of the figures below, count the number of edges and vertices and fill in the ( ) provided.

				
Number of edges	9	( )	12	( )
Number of vertices	6	5	( )	12

Exemplar 7

SHAPE & SPACE Dimension

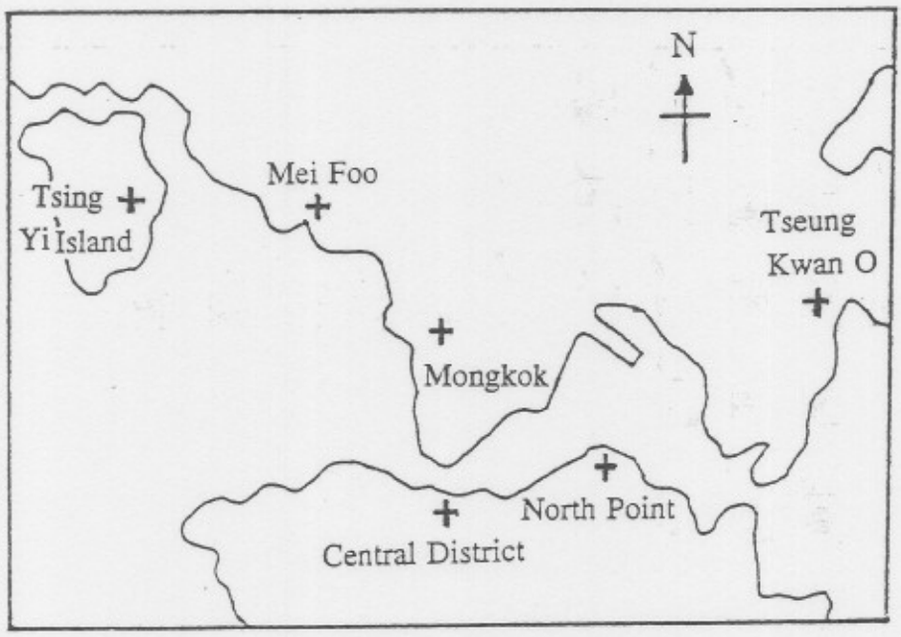
Module : Further 2-D and 3-D shapes (S2)

Unit : 8 compass points (S2-4)

Assessment Objective : Recognising the 8 compass points and using them to describe directions

Assessment Exercise (Expected Band of Performance : 3)

Study the following and fill in the spaces with suitable answers.



(a) The direction of Central District from Mongkok is _____

(b) The direction of Tsing Yi Island from Mei Foo is _____

(c) The direction of North Point from Tseung Kwan O is _____

(d) The direction of Mei Foo from Mongkok is _____

Exemplar 8

DATA HANDLING Dimension

Module : Statistical charts (D2)

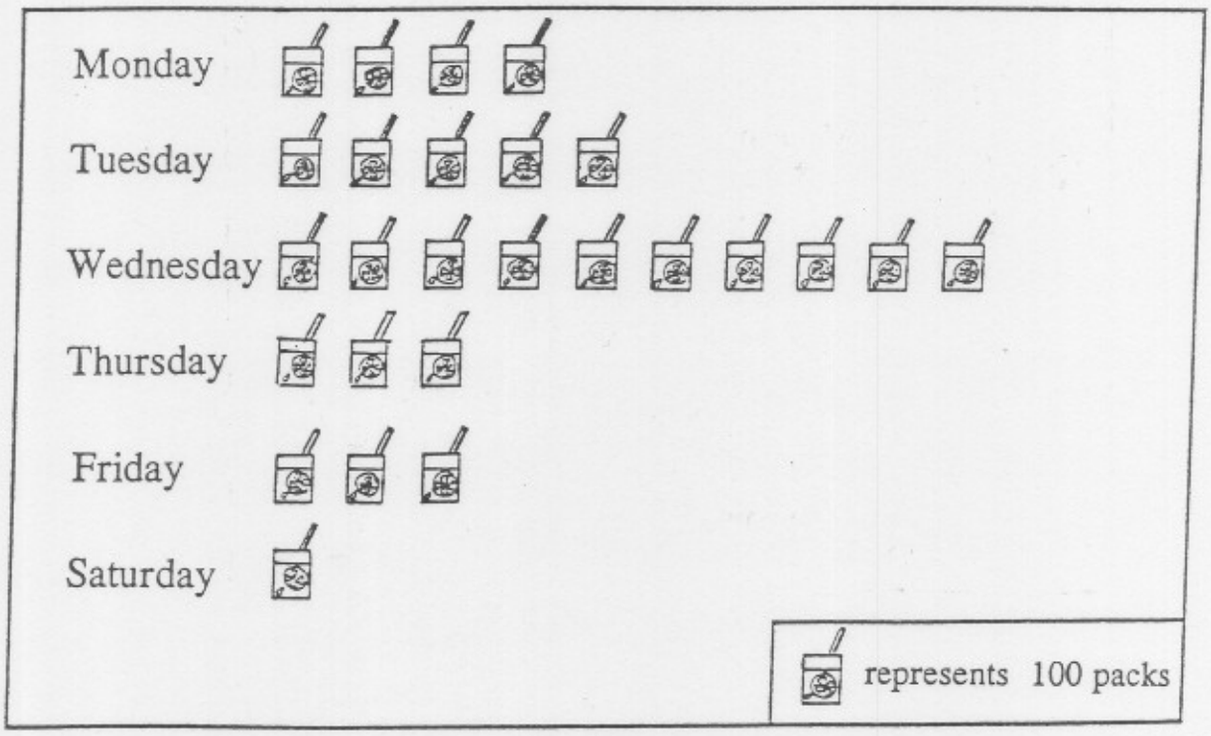
Unit : Pictograms of greater frequency counts (D2-1)

Assessment Objective : Understanding and reading pictograms

Assessment Exercise (Expected Band of Performance : 3)

The following is the chart of the sale of drinks of a school tuck shop in a week.

Chart of the sale of drinks in a week



(a) On which day is the sale of drinks the greatest ? How many packs are sold?

_____ , _____ packs

(b) On which two days are the sales of drinks the same ?

_____ and _____

Exemplar 9

DATA HANDLING Dimension

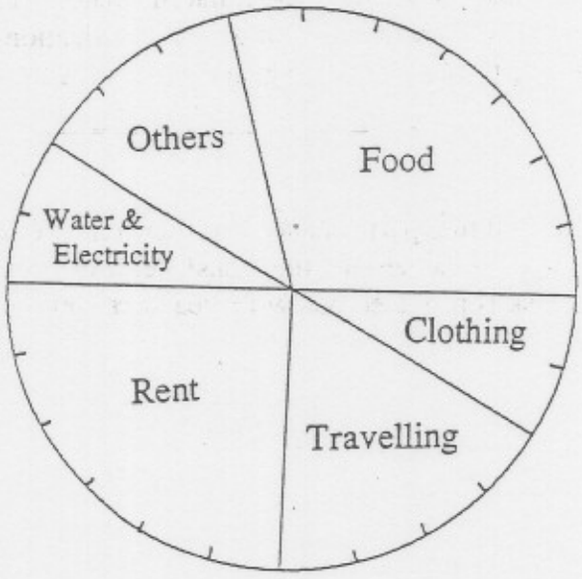
Module : Statistical charts (D2)

Unit : Pie charts (D2-5)

Assessment Objective : Understanding and reading pie charts

Assessment Exercise (Expected Band of Performance : 4)

Mr. Lee 's monthly expenditure



(a) How many items are there in Mr. Lee's monthly in expenditure ?

_____

(b) If the pie chart is divided into 24 equal parts, how many parts are there for 'Rent' ?

_____

(c) Which item is the greatest in Mr. Lee's monthly expenditure ?

_____

7.3 Criteria for Judging Performance

Criteria for Judging Performance are the characteristics which teachers need to look for when judging the quality of a piece of work.

In Mathematics there are two broad criteria for judging pupils' performance in carrying out tasks or doing exercises. They are the Process criterion and the Product criterion. Each broad criterion comprises a number of components. The following table shows typical examples of components for each broad criterion:

Criterion	Examples of components
Process	Understanding the task and exercise Describing the task Selecting methods of solution Collecting data Processing data Using measuring instruments
Product	Accuracy of answers (both intermediate and final) Drawing conclusions and giving justifications Using mathematical language and representations

Based on the criteria for judging performance and their relative importance, teachers can draw up their marking schemes for the tasks/exercises. An example of such a marking scheme for a task is provided below for teachers' reference.

Marking Scheme for Exemplar Assessment Task 3 (Please see page 65)

Question	Points for Mark Allocation	Mark(s)
(a)	* Can indicate the knowledge to add together the daily waiting times	1
	* Know to divide the sum by 5	1
	Obtain an accurate answer (8 minutes)	1
(b)	* Can indicate the knowledge of the longest and shortest time interval	1
	* Know to subtract the two time intervals	1
	Obtain an accurate answer (4 minutes)	1
(c)	Process similar to (a), obtain an accurate answer (7.2 minutes)	1
(d)	Process similar to (b), obtain an accurate answer (15 minutes)	1
(e)	Can indicate the advantage of the choice of route, with proper reasoning, 1-3 marks awarded according to the degree of satisfaction in their explanations (see sample answers below)	3
	TOTAL:	11

Sample answers for (e)

(i)	Because the waiting time of No. 1 Bus is more even, it is easier to manage the time in returning home. So No. 1 Bus is chosen.	3
(ii)	Because the average waiting time of No. 2 Bus is shorter, it saves some time in the entire week. So No. 2 Bus is chosen.	3
(iii)	I will choose No. 1 Bus because the difference in waiting time is less than that of No. 2.	2
(iv)	I will choose No. 1 Bus because No. 2 Bus has the longest waiting time on Monday and Friday.	1

* Remark: The main point in awarding marks is the correctness of the method adopted and not the accuracy of the calculations.

7.4 Bands of Performance

In target-oriented assessment, eight bands of performance are developed to describe progress and attainment from Primary 1 to Secondary 5. Awarding of bands need only be carried out at the end of a Key Stage.

Though there is no direct relationship between age/year level and bands of performance, it is possible to hypothesize a rough relationship between Key Stages and the expected range of bands of performance for the majority of pupils. This relationship is set out below:

				8
				7
			6	6
Range of			5	5
Bands of		4	4	4
Performance		3	3	
	2	2		
	1			
	Key Stage 1	Key Stage 2	Key Stage 3	Key Stage 4

7.5 Descriptors of Performance in Mathematics for Bands 3 and 4

Descriptors of the performance in Mathematics for Bands 3 and 4 are listed below. Similar descriptors for Bands 1 and 2 can be found in Appendix D.

7.5.1 NUMBER Dimension

Band 3

The pupil is generally able to read, write and order large whole numbers, simple fractions and decimals; recognize composite numbers and small prime numbers; understand the concepts of rounding off, common multiples & common factors and direct proportion; understand and use basic properties of the four operations and perform simple mixed operations with whole numbers, simple fractions and decimals and check the results by estimation; compute the L.C.M. and H.C.F. of 2 numbers and the average of a small group of data; solve simple problems involving the above in daily life and straightforward mathematical contexts .

Band 4

The pupil is generally able to recognize squares and square roots of whole numbers; understand the concepts of percentages and inverse proportion; recognize the Chinese and Roman numeration systems and the development of some calculating devices; find prime numbers within 150 and use the

index notation to represent composite numbers; compute the L.C.M. and H.C.F. of 2 or 3 numbers and perform mixed operations with whole numbers, simple fractions and decimals; perform conversion between decimals, fractions and percentages; solve simple problems involving the above in daily life and straightforward mathematical contexts .

7.5.2 MEASURES Dimension

Band 3

The pupil is generally able to recognize further units of capacity such as millilitre; recognize the relationship between various units of length, weight, capacity and time; understand the concept of area and recognize the units square centimetre and square metre; perform simple activities related to measures, including the finding of areas of common figures such as rectangles, squares, parallelograms, triangles, trapeziums and polygons by formula or by counting squares; solve simple problems involving the above in daily life and straightforward mathematical contexts .

Band 4

The pupil is generally able to understand the concepts of volume and speed and recognize the units cubic centimetre, cubic metre, metre per second and kilometre per hour; recognize the relationship between the radius, diameter and circumference of a circle; understand the idea of scale, understand the idea of an angle and its measurement in degree; perform simple activities such as recognizing the 24-hour clock, finding the volumes of common objects and drawing angles & simple plans; solve simple problems involving the above in daily life and straightforward mathematical contexts .

7.5.3 ALGEBRA Dimension

Band 3

The pupil is generally able to recognize the use of symbols to stand for unknown numbers and record facts using algebraic symbols; solve very simple equations; solve simple problems involving the above in daily life and straightforward mathematical contexts.

Band 4

The pupil is generally able to solve simple equations, limiting to those requiring at most two steps in the solution, and check answers; recognize and appreciate simple number patterns such as square numbers, triangle

numbers and rectangular numbers; solve simple problems involving the above in daily life and straightforward mathematical contexts .

7.5.4 SHAPE & SPACE Dimension

Band 3

The pupil is generally able to understand intuitively the properties of some common plane and solid figures such as quadrilaterals, pyramids and prisms; design nets and make simple solids; recognize the directions N, E, S, W, NE, SE, NW and SW, and use them to describe directions; solve simple problems involving the above in daily life and straightforward mathematical contexts.

Band 4

The pupil is generally able to recognize the properties of circles ; find the positions of objects from the measurement of bearings and distances by surveying; solve simple problems involving the above in daily life and straightforward mathematical contexts.

7.5.5 DATA HANDLING Dimension

Band 3

The pupil is generally able to collect and group data of greater frequency counts and present and interpret the data by pictograms, bar charts, compound bar charts and line graphs; understand average and make estimates from bar charts; solve simple problems involving the above in daily life and straightforward mathematical contexts.

Band 4

The pupil is generally able to interpret simple pie charts; design and use suitable graphs to present data, look for relationships (including direct proportion), patterns or trends from graphs; solve simple problems involving the above in daily life and straightforward mathematical contexts.

7.6 Awarding of Bands of Performance

In Mathematics, bands will be awarded according to the pupil's performance in tests, each of which shall comprise a number of assessment tasks and exercises. These tests shall be drawn from a bank of mathematics tests centrally developed and pre-tested by the Education Department.

Descriptors for various Bands of Performance in each dimension can be found in paragraph 7.5 above and Appendix D. Band-related assessment tasks and exercises similar to those given in paragraph 7.2 shall be developed, sampling items from individual band descriptors. These tasks and exercises shall be compiled to form tests each of which pitched towards a particular band for a particular dimension.

Each test shall include a marking scheme drawn specifically for the test in accordance with the Criteria for Judging Performance as described in paragraph 7.3. Each test shall also have a threshold score which is the lowest marks a pupil should obtain in order to be judged to have reached the band level the test is designed for. Threshold scores for tests are to be determined during the pre-testing process. As items in tests might vary slightly in difficulty, so might the threshold scores for parallel tests.

To award bands of performance to their pupils, schools are advised to choose from the bank tests at the appropriate band levels for individual pupils to work through at the end of a Key Stage.