New Syllabus

Primary Mathematics

TEACHING GUIDE

length

breadth

English 15%
Chinese 25%
Science 20%
Mathematics 40%

CHOCOLATE

Let's Think

Let's Explore

6
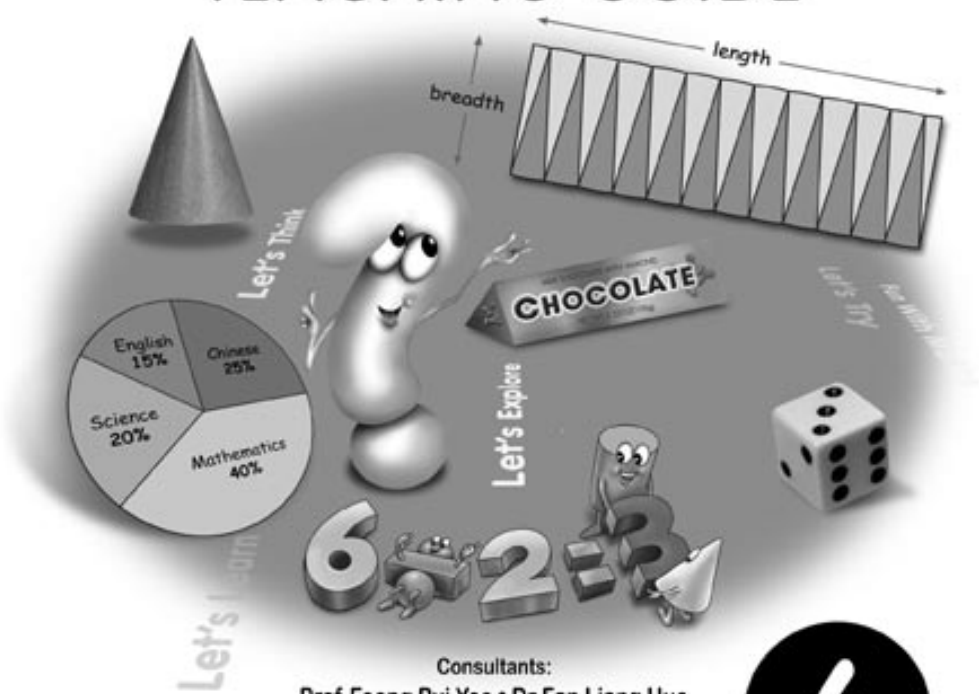
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Contents

Preface

The New Syllabus Primary Mathematics (NSPM) series is designed and written, based on the latest primary mathematics syllabus. In this series, the concrete to abstract approach has been used to introduce new concepts. The knowledge base is built incrementally as the pupils progress up the levels so as to consolidate the linkages between mathematical concepts.

The Teaching Guides have been developed effectively to provide valuable support to the teachers throughout the series. The key features of the Teaching Guides are mentioned below.

1. **Learning Outcomes**

    A set of learning outcomes is listed at the beginning of each topic for all the chapters. At the end of a particular topic, the teacher should be able to evaluate whether or not the objectives have been communicated to the students in an effective manner. The revision sections present in the workbooks will prove very helpful in assessing students' understanding of key concepts.

2. **Instructions**

    Mathematics is usually associated with difficulty and challenge, mainly as a result of the teaching approach used in the class. Teachers should make sure that they are dynamic in their approach to teaching mathematics. Only if the teachers are enthusiastic and dynamic will they be able to inspire the pupils to put in their best efforts, work hard, and learn something.

    Keeping these aspects in mind, step-by-step guidance is provided to the teachers to deliver mathematical concepts in a student-friendly manner. Varied activities have been included in the guides to help generate enthusiasm and enjoyment in the classroom, thereby making mathematics interesting. Where necessary, group work or pair work has been encouraged to enhance learning and understanding of concepts.

    An average teaching duration has been suggested to cover each topic in the class, thereby helping the teachers to plan and vary their lessons accordingly. The teachers can adjust this duration as per their requirements. With careful planning, sufficient time can be allocated to the more important concepts of mathematics, while introducing new and interesting ideas will make the class more lively.

    Teachers should try to create an atmosphere in the class that is conducive to learning. This can be achieved physically by ensuring that the classroom is colourful, exciting, attractive, and full of interesting things that help pupils to link mathematics with daily life. For example, a display table should be set up in the classroom consisting of different items such as shapes, number cards, 3-D figures, etc. that aid teaching. Similarly, on a psychological level, teachers should ensure that the pupils do not feel fearful or intimidated in class. The atmosphere should be peaceful and relaxed to accomplish effective learning.

3. **Answers**

    The guides contain answers to all the questions and activities in the textbook and workbooks.

4. **Additional activities**

    Extra activities have been included in the guides to reinforce and assess the children's understanding of the concepts learnt. These can be done individually or in groups, depending upon the strength of the class and the resources available.

Unit 1: Indices

Learning Outcomes

Pupils should be able to:

- understand that numbers can be expressed as the product of their prime factors
- write a product in a concise manner by using the exponent (power/index number)
- understand and calculate squares and square roots of numbers
- understand and calculate cubes and cube roots of numbers

INDEX NOTATION

Suggested Duration

1 period (40 min)

Instructions

Let's Learn…

Things needed: cards with prime numbers

1. Take three cards of 2 and two cards of 3. Ask the children to multiply these numbers.
2. Write the prime numbers and its product on the board ($2 \times 2 \times 2 \times 3 \times 3 = 72$)
3. Now write the number 72 as the product of its prime factors ($72 = 2 \times 2 \times 2 \times 3 \times 3$)
4. Hold up the cards with 2 and count how many 2s you have and give two its index number. Similarly hold the cards with 3 and count how many 3s you have and give three its index number ($2^3 \times 3^2$).
5. Point out that the small number on the top right corner is the index notation which tells us how many times the base is used as a factor.
6. Take at random few 2s, 3s, 5s, 7s, … and ask the children to show them in index notation.

SQUARES AND SQUARE ROOTS

Suggested Duration

2 periods (80 min)

Instructions

Let's Learn…

1. Refer the pupils to the examples on page 4 of the Student's Book. Recall the idea of calculating the area of a square. Lead the pupils to understand that when taking the square of a number, the number is simply multiplied by itself.

2. Explain how to calculate square roots of larger numbers using prime factorization.

Let's Try…

Ask the pupils to try the exercises on page 8 of the Student's Book.

Homework

Ask pupils to do NSPM Workbook 6A—Worksheet 1.

Answers

Let's Try   page 8

1. (a)   100   (b)   64   (c)   13
2. (a)   a   (b)   7   (c)   11
3. (a)   15   (b)   33   (c)   44

WORK Sheet 1

1. (a) $2 \times 3^3 \times 5^2$ (b) $2^4 \times 7^2$ (c) $2 \times 3^2 \times 5^3$ (d) $2^2 \; 3^2 \times 11^2$
2. (a)   169   (b)   441
3. (a)   16   (b)   45   (c)   68   (d)   52

CUBES AND CUBE ROOTS

Suggested Duration

2 periods (80 min)

Instructions

Let's Learn…

1. Refer the pupils to the example on page 9 of the Student's Book. Recall the idea of calculating the volume of a cube. Lead the pupils to understand that when taking the cube of a number, the number is simply multiplied by itself twice.

2. Explain how to calculate cube roots of larger numbers using prime factorization.

Let's Try…

Ask the pupils to try the exercises on page 11 of the Student's Book.

Homework

Ask pupils to do NSPM Workbook 6A—Worksheet 2 and Practice 1.

Answers

Let's Try

1. (a) 343   (b) 64   (c) 1000
2. (a) 15   (b) 9   (c) 14

WORK Sheet 2

1. (a) 7   (b) 12
2. (a) 18   (b) 11

Practice 1

1. (a) $2^2 \times 3^2 = 36$
   (b) $2^2 \times 3 \times 5 = 60$
   (c) $3^2 \times 7 = 63$
2. (a) $2 \times 3 = 6$
   (b) $2^3 \times 5 = 40$
   (c) $3 \times 7 = 21$
3. (a) 27   (b) 42
4. (a) 15   (b) 16

Unit 2: Fractions

Learning Outcomes

Pupils should be able to:

- divide whole numbers by a proper fraction
- divide a proper fraction by a proper fraction

Do You Know?

The idea is to link the division of 2 pizzas into quarters.

This will lead to 8 pieces. One each for a child.

DIVISION OF A WHOLE NUMBER BY A PROPER FRACTION

Suggested Duration

3 periods (120 min)

Instructions

Let's Learn…

Example 1:

Begin with dividing a whole number by whole number.

The idea is to link division with multiplication of the reciprocal of the divisor,

i.e. $6 \div 2 \longleftrightarrow 6 \times \dfrac{1}{2}$

$\quad\quad = 3 \quad\quad\quad = 3$

Example 2:

Use pictorial way to show the result of dividing 1 into halves to get 2 halves.

Link up $1 \div \dfrac{1}{2} \longleftrightarrow 1 \times 2$

$\quad\quad\quad = 2 \quad\quad\quad = 2$

Examples 3–5:

Show more pictorial examples of dividing a whole number by a proper fraction. In each case, the quotient will be a greater number than the dividend. By induction, let the students conclude that when dividing a whole number by a proper fraction, the answer (quotient) will be greater than the whole number (dividend).

Example 6:

Show pictorially, the division of 3 by $\dfrac{2}{5}$.

Pictorially, $3 \div \dfrac{2}{5} = 7\dfrac{1}{2}$ link up with $3 \times \dfrac{5}{2} = 7\dfrac{1}{2}$.

This will lead to $3 \div \dfrac{2}{5} = 3 \times \dfrac{5}{2} = 7\dfrac{1}{2}$.

Let's Explore

After *Example 8*, expose the students to finding the result of dividing a whole number by unit fraction mentally:

e.g. $2 \div \frac{1}{2} = 4$, $2 \div \frac{1}{3} = 6$, $2 \div \frac{1}{4} = 8$, $2 \div \frac{1}{5} = 10$, … $2 \div \frac{1}{10} = 20$

Let's Try…

Ask the pupils to try the exercises on pages 19–20 of the Students Book.

Homework

Ask pupils to do NSPM Workbook 6A—Worksheet 3.

Answers

pages 19–20

1. (a) 5 (b) 6 (c) $4\frac{1}{2}$
2. (a) 6 (b) 10 (c) 10 (d) 9 (c) $\frac{4}{3}$ (f) $8\frac{2}{5}$
3. 12 4. 21 5. 6

WORK **3**

1. (a) 4 (b) 3, 6 (c) 6 (d) 10 (e) 8 (f) $3\frac{3}{5}$
2. (a) 10 (b) $4\frac{1}{2}$ (c) $1\frac{1}{3}$ (d) 18 (e) $9\frac{1}{3}$
3. (a) 8 (b) 10 (c) 15 (d) 24 (e) 5 (f) 8
   (g) $7\frac{1}{2}$ (h) $2\frac{2}{3}$ (i) 21 (j) $4\frac{2}{3}$ (k) $14\frac{2}{3}$ (l) $7\frac{7}{9}$
4. 25 5. 3 6. 16

DIVISION OF A PROPER FRACTION BY A PROPER FRACTION

Suggested Duration

2 periods (80 min)

Instructions

Let's Learn…

Example 1:

Relate this situation in the verbal form, i.e. how many $\frac{1}{8}$ (one-eighths) are there in $\frac{1}{2}$ (half)?

Show the conversion of division by a fraction into multiplication of the reciprocal as shown below:

$\frac{1}{2} \div \frac{1}{8} = \frac{1}{2} \times \frac{8}{1} = \frac{1}{2} \times 8$

Example 2:

Show $\frac{2}{3} \div \frac{1}{6} = \frac{2}{3} \times \frac{6}{1} = \frac{2}{3} \times 6$

Example 3:

Show $\frac{2}{5} \div \frac{1}{10} = \frac{2}{5} \times \frac{10}{1} = \frac{2}{5} \times 10$

Example 4:

From *Examples 1–3*, the following conversion can be induced.

$\frac{3}{5} \div \frac{3}{10} = \frac{3}{5} \times \frac{10}{3}$

Let's Try...

Ask the pupils to try the exercises on page 25 of the Students Book.

Homework

Ask pupils to do NSPM Workbook 6A—Worksheet 4 and Practice 2.

Answers

Let's Try   page 25

1. (a) 2   (b) 4

2. (a) $1\frac{1}{2}$ (b) $3\frac{3}{4}$ (c) $\frac{4}{5}$ (d) $\frac{3}{7}$

3. 6   4.   9

WORK Sheet 4

1. (a) 3   (b) 3, 2   (c) $\frac{3}{4} \times \frac{8}{1} = 6$ (d) $\frac{2}{3} \times \frac{9}{2} = 3$
   (e) 2   (f) 6

2. (a) 4   (b) 3   (c) 6   (d) 6   (e) $\frac{5}{12}$ (f) $\frac{2}{5}$
   (g) $1\frac{1}{4}$ (h) $\frac{15}{28}$ (i) $1\frac{1}{2}$ (j) $\frac{4}{9}$ (k) $\frac{8}{9}$ (l) $\frac{12}{13}$

Practice 2

3. (a) 36   (b) $\frac{8}{9}$ (c) $2\frac{1}{2}$ (d) $\frac{2}{3}$
   (e) $1\frac{1}{2}$ (f) $\frac{1}{2}$ (g) $3\frac{1}{5}$ (h) $2\frac{1}{2}$

4. (a) $2\frac{2}{5}$ (b) $3\frac{1}{2}$ (c) 6   (d) 30   (e) 15   (f) $5\frac{3}{5}$

5. (a) $2\frac{2}{3}$ (b) 5   (c) $\frac{5}{6}$ (d) $\frac{12}{55}$ (e) $1\frac{7}{9}$ (f) $3\frac{3}{8}$

6. 26   7.   12   8.   6   9.   8

Fun with Maths

Ask the pupils to attempt the exercise on page 26 of the Student's Book.

Unit 3: Ratio

Learning Outcomes

Pupils should be able to:

- express one quantity as a fraction of another
- find how many times one quantity is as large as another
- express one quantity as a fraction of another given their ratio, and vice versa
- find how many times one quantity is as large as another given their ratio, and vice versa
- find the whole/one part when a whole is divided into parts in a given ratio
- solve word problems involving two pairs of ratios
- understand and differentiate between direct and inverse proportion

Do You Know?

Explain to the students that although apples and oranges are two different fruits, they can be compared by number, i.e. the ratio by numbers. On the other hand, in order to find the ratio of money in envelope A (paise) and envelope B (rupees), the money in both envelopes has to be in the same unit (either paise or rupees).

COMPARING TWO QUANTITIES

Suggested Duration

2 periods (80 min)

Instructions

Let's Learn...

When two quantities are of different values, the comparison by division will result in a multiple of 1 or a proper fraction.

e.g. $6 \div 2 = \dfrac{6}{2} = 3$

$2 \div 6 = \dfrac{2}{6} = \dfrac{1}{3}$

The multiple of 1 will indicate the number of times one quantity is, compared to the other quantity.

The proper fraction on the other hand will show the fraction of one quantity over the other quantity.

Let's Try...

Ask the pupils to try the exercises on page 31 of the Student's Book.

Let the students compare 2 quantities by division to yield either a whole number or a fraction. From the result, the students should make the relevant conclusion.

Homework

Ask the pupils to do NSPM Workbook 6A—Worksheet 5.

Answers

Let's Try page 31

1. (a) 4   (b) $\frac{1}{4}$
2. $\frac{4}{5}$ 3. $\frac{2}{5}$ 4. $\frac{2}{7}$

WORK Sheet 5

1. (a) $5, \frac{1}{5}$ (b) $10, \frac{1}{10}$ (c) $2, \frac{1}{2}$ (d) $3, \frac{1}{3}$ (e) $4, \frac{1}{4}$ (f) $6, \frac{1}{6}$
2. (a) 3   (b) $\frac{1}{3}$
3. (a) 5   (b) $\frac{1}{5}$
4. $\frac{12}{13}$

RATIO AND FRACTION

Suggested Duration

2 periods (80 min)

Instructions

Let's Learn...

Begin with finding the ratio of one number to another using the ratio notation.

Follow by comparing one number to another by division, to result in a fraction.

Students should conclude that a ratio and its fractional form express the same relationship.

Let's Explore

Let the students first find the number of pupils in each subset, i.e. number of pupils wearing glasses.

With this value and the total number of pupils in the group, the required ratio or fraction can be obtained.

Let's Try...

Ask the pupils to try the exercises on page 38 of the Student's Book.

Remind the students that the required answer in ratio or fraction must be in the simplest form.

When the 2 quantities are in different units, the units have to be the converted as follows:

3. (d) 45 min to $1\frac{1}{4}$ hour $\longrightarrow$ 45 min to (60 + 15) min

$\longrightarrow$ 45 min to 75 min

The required fraction is $= \frac{45}{75} = \frac{3}{5}$

or   45 min to $1\frac{1}{4}$ hour $\longrightarrow$ $\frac{45}{60}$ hr to $\frac{5}{4}$ hr

$\frac{3}{4}$ hr to $\frac{5}{4}$ hr

The required fraction is $\frac{3}{4} \div \frac{5}{4}$

$= \frac{3}{4} \times \frac{4}{5}$

$= \frac{3}{5}$

Homework

Ask pupils to do NSPM Workbook 6A—Worksheet 6.

Answers

Let's Try   page 38

1. (a) 2 : 1   (b) $\frac{1}{2}$ (c) 2

2. (a) 16 : 19   (b) $1\frac{3}{16}$

3. (a) $\frac{3}{7}$ (b) $1\frac{3}{5}$ (c) $\frac{1}{2}$ (d) $\frac{3}{5}$

4. (a) 4 : 5   (b) 9 : 7

5. (a) $1\frac{1}{2}$ (b) 3

WORK Sheet 6

1. (a) $\frac{1}{2}$ (b) $\frac{3}{7}$ (c) $\frac{5}{4}$ (d) $\frac{10}{3}$

2. (a) 1 : 3   (b) 2 : 5   (c) 4 : 3   (d) 7 : 6

3. (a) 2 : 3   (b) 5 : 12   (c) 4 : 1   (d) 1 : 3   (e) 5 : 3

4. (a) 2 : 3   (b) $\frac{2}{3}$ (c) $\frac{3}{2}$

5. (a) 5 : 3   (b) 3 : 5   (c) $\frac{5}{3}$ (d) $\frac{3}{5}$

6. (a) 3 : 4   (b) 4 : 3   (c) $\frac{4}{3}$ (d) $\frac{3}{4}$

7. (a) 2 : 1   (b) $\frac{17}{18}$ (c) 2   (d) 18 : 17 : 9

8. (a) 3 : 4   (b) 2   (c) 3 : 2 : 4   (d) 4 : 9   (e) $\frac{2}{9}$

PART AND WHOLE

Suggested Duration

2 periods (80 min)

Instructions

Let's Learn…

Emphasize upon drawing a model to represent the ratio.

By unitary method, the other quantity can be found.

Example 1:

(b)   alternative method:

   number of pupils in the class = number of boys + number of girls

   = 12 + 16 = 28

Example 2:

(b)   alternative method:

   the volume of blue paint   = total volume – volume of red paint

   = 10 l – 5.8 l = 4.2 l

Example 3:

(b)   alternative method:

   number of local stamps = number of foreign stamps – 64

   = 160 – 64 = 96

Let's Explore

Example 2:

red paint	:	blue paint	:	total
7		5		(7 + 5) parts

$7\times\dfrac{10}{12}$ $5\times\dfrac{10}{12}$ $12\times\dfrac{10}{12}$

$\approx 5.8\, l$ $\approx 4.2\, l$ $\approx 10\, l$

Example 3:

foreign stamps	:	local stamps	:	extra foreign stamps
5	:	3	:	2 units

$\times 32$ $\times 32$ $\times 32$

160 stamps   96 stamps   64

Example 4:

Side a	:	Side b	:	Side c	:	Total
3	:	5	:	7		(15 units = 3 + 5 + 7)

×5   ×5   ×5   ×5

| 15 cm | | 25 cm | | 35 cm | | 75 |
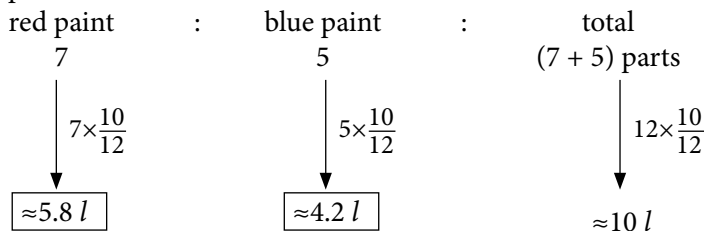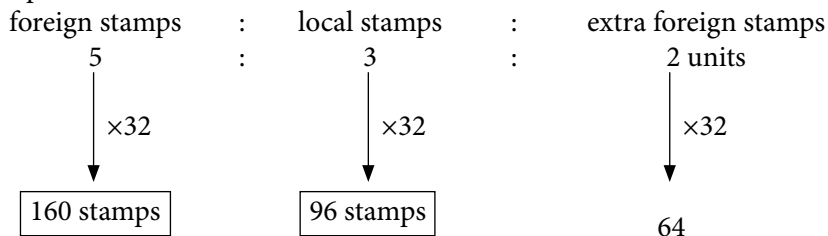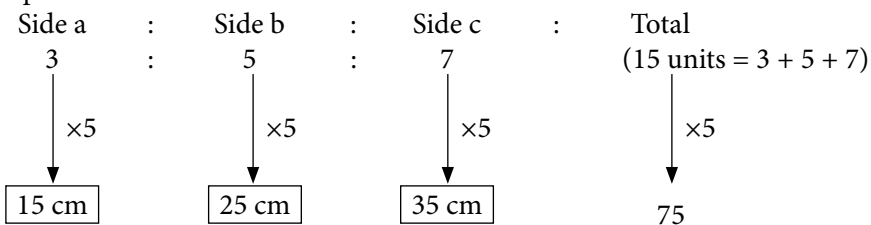
Let's Try…

Ask the pupils to try the exercises on page 44 of the Student's Book.

Homework

Ask pupils to do NSPM Workbook 6A—Worksheet 7.

Answers

Let's Try   page 44

1. 35
2. (a) 720 ml   (b) 1080 ml
3. (a) 100   (b) 40
4. 980   5. 36, 72, 48

WORK Sheet 7

1. (a) 20   (b) 35
2. (a) 75   (b) 200
3. 36 kg   4. 80   5. 128 m^2, 192 m^2
6. 715   7. 100 cm, 140 cm
8. (a) 115   (b) 46   (c) 230   (d) 46
9. Rs 252   10. (a) 108 cm   (b) 234 cm
11. (a) 36   (b) 24

WORD PROBLEMS

Suggested Duration

2 periods (80 min)

Instructions

Let's Learn…

Example 1:

Remind the students: When only ratios are given, the number of pencils in each holder cannot be determined.

e.g.

| A | : | B | = 3 : 2 | (The number of pencils in holder A & holder B can be 3, 2; 6, 4; 9, 6; etc.) |

| B | : | C | = 4 : 1 | (The number of pencils in holder B & holder C can be 4, 1; 8, 2; 12, 3; etc.) |

Only when the number of pencils is stated, can the number of pencils in other holders be found.

Example 2:

(b)   Let the students draw a model showing the ratio involving Class 6A, 6B and 6C as shown below

6A ├┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┤ (16 units)

6B ├┼┼┼┼┼┼┼┼┼┼┼┼┼┤ (14 units)

6C ├┼┼┼┼┼┼┼┼┼┼┼┼┼┼┤ (15 units)

Example 3:

Emphasize that the required answer cannot be found by adding, i.e. 3 + 2 : 12 + 2.

However, the answer can be found if the number of oranges and apples are added is in the correct ratio, e.g.

Original number	Original number
↓	↓
3 oranges + 2	12 apples + 8 (4 times of 2)
↓	↓
5 oranges	20 oranges

Let's Try…

Ask the pupils to try the exercises on page 51 of the Student's Book.

Homework

Ask pupils to do NSPM Workbook 6A—Worksheet 8.

Answers

1. (a)   1 : 4   (b)   4   (c)   4
2. (a)   15 : 3 : 2   (b)   4
3. Rs 25

WORK Sheet 8

1. (a)   5 : 3 : 6   (b)   54
2. 4   3.   4   4.   300 ml   5.   2 cm
6. 16   7.   42   8.   30   9.   1 : 4

DIRECT AND INVERSE PROPORTION

Suggested Duration

2 periods (80 min)

Instructions

Let's Learn...

Refer to the examples in the chapter. Explain the term proportion to the pupils.

Define direct and inverse proportion to the class. Explain that in direct proportion, if one quantity increases, the other quantity also increases, as shown in examples 1 and 2.

Comparatively, in inverse proportion, if one quantity increases, the other quantity decreases, as shown in the examples.

Share some more examples on direct and inverse proportions with the class.

Let's Try...

Ask the pupils to try the exercises on page 55 of the Student's Book.

Homework

Ask pupils to do NSPM Workbook 6A—Worksheet 9 and Practice 3.

Answers

page 55

1. (a)   81 km   (b)   6 hours
2. Rs 7200   3.   16 days   4.   16

WORK Sheet 9

1. (a) direct   (b) inverse   (c) direct
2. 3 hours   3. 180 km

Practice 3

1. 2 : 5; 1 : 3; 5 : 6; 3 : 7; 6 : 5
2. 3 : 1; 1 : 3
3. $\frac{1}{4}; \frac{2}{3}; \frac{5}{6}; \frac{8}{3}; \frac{7}{2}$ 4.   3, $\frac{1}{3}$
5. (a)   2 : 3   (b) $\frac{2}{3}$ (c)   300 ml
6. (a)   40   (b)   25
7. (a)   64 cm   (b)   40 cm   8.   Hanif: Rs 2000, Ariffin: Rs 800
9. (a)   60   (b)   15   10.   21   11.   147

Revision 1 (Workbook 6A)

1. (a) $3^2 \times 5^2 \times 7^3$
   (b) $2^3 \times 7 \times 9^2$
   (c) $2^2 \times 3^2 \times 7^2 \times 9$
2. (a) 19   (b) 25
3. (a) 12   (b) 20
4. (a) $3\frac{1}{2}$ (b) $7\frac{1}{2}$ (c) $12\frac{3}{5}$ (d) $14\frac{2}{3}$ (e) 30   (f) 30
5. (a) $2\frac{1}{2}$ (b) $1\frac{1}{6}$ (c) $\frac{3}{4}$ (d) $\frac{3}{4}$
   (e) $\frac{35}{48}$ (f) $1\frac{19}{45}$ (g) $2\frac{2}{7}$ (h) $\frac{35}{72}$
6. (a) $\frac{3}{5}$ (b) $\frac{1}{7}$ (c) $\frac{6}{1}$ (d) $\frac{7}{10}$
7. (a) 1 : 4   (b) 5 : 1   (c) 4 : 5   (d) 9 : 5
8. (a) 4 : 5 : 7   (b) 7 : 16   (c) $\frac{1}{4}$
9. 24   10. 81
11. (a) 2 : 3   (b) 6   (c) 6
12. (a) 8 : 7   (b) $\frac{7}{8}$
13. (a) 5 : 4 : 6   (b) 6A : 30, 6C : 36

Revision 2 (Workbook 6A)

1. 14   2. 6   3. 16   4. $\frac{6}{7}$ 5. $\frac{7}{18}$ 6. $9\frac{3}{5}$
7. (a) 1 : 4   (b) 1 : 3   (c) 3 : 4   (d) 1 : 4
8. (a) (i) 2   (ii) $\frac{1}{2}$ (iii) 1 : 2   (b) 2
9. 60
10. (a) 4 : 3 : 6   (b) 12 yrs old
11. Rs 105   12. 160
13. (a) 75 kg   (b) 30 kg   (c) 30 kg   14. (a) 2   (b) 5

Unit 4: Percentage

Learning Outcomes

Pupils should be able to:

- find the whole given a part and the percentage
- find percentage increase/decrease
- solve word problems involving percentage

FIND THE WHOLE GIVEN A PART AND THE PERCENTAGE

Suggested Duration

3 periods (120 min)

Instructions

Let's Learn…

Examples showing different situations are given here.

There are cases where the value of a given part and its percentage are directly given.

In this situation the whole (100%) can be found after knowing the value of 1%.

In other cases, the value of a part or its percentage is given and the related percentage or value of the other part is also given.

This will involve an additional step of finding the percentage or value of one part so that the value of 1% can be determined.

Example 4:

Extend the question and ask, 'Find the number of girls in the school.'
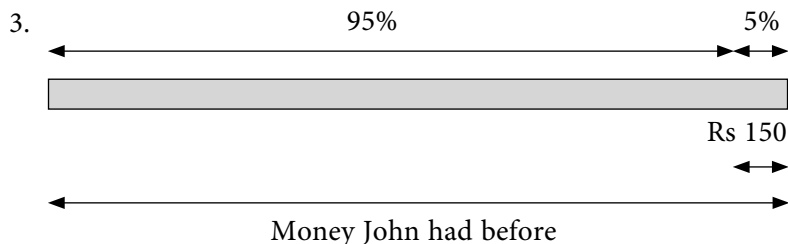
The answer can be found in 2 ways.

      (a)   1% $\longrightarrow$ 12 pupils

              55% girls $\longrightarrow$ 55 × 12 = 660 girls.

      (b)   number of girls = total – number of boys

                         = 1200 – 540

                         = 660

Let's Try…

Ask the pupils to try the exercises on page 61 of the Student's Book.

Encourage the students to draw the relevant model showing the given information:

e.g.

3.

Money John had before

Homework

Ask pupils to do NSPM Workbook 6A—Worksheet 10.

Answers

 page 61

1. 30   2. 175 km   3. Rs 3000   4. 150   5. 1125

WORK **10**

1. Rs 240   2. 1250   3. 205 cm   4. 150 km   5. 330

6. Rs 20 000   7. (a) 2000   (b) 900

8. (a) 700 ml   (b) 210 ml

PERCENTAGE INCREASE AND PERCENTAGE DECREASE

Suggested Duration

3 periods (120 min)

Instructions

Let's Learn...

Example 1:

Begin with working out the percentage increase of 1 kg. This will lead to finding the percentage increase of 2 kg. It is also logical to work out using the following procedures:

First, find the increase in mass, i.e. 42 – 40 – 2 kg.

Then, the percentage increase $= \dfrac{\text{Increase in mass}}{\text{Original mass}} \times 100\%$

$$= \frac{2}{40} \times 100\%$$

$$= 5\%$$

Example 2:

The answer can be found by the following procedure (formula):

$$\text{Percentage decrease} = \frac{\text{Decrease in number}}{\text{Original absentees}}$$

$$= \frac{2}{8} \times 100\%$$

$$= 25\%$$

Example 3:

The answer can be found by:

$$\text{Percentage increase} = \frac{\text{Increase in salary}}{\text{Original salary}} \times 100\%$$

Example 4:

The answer can be found by:

$$\text{Percentage discount} = \frac{\text{Discount amount}}{\text{Original price}} \times 100\%$$

Let's Try…

Ask the pupils to try the exercses on page 68 of the Student's Book.

Homework

Ask pupils to do NSPM Workbook 6A—Worksheet 11.

Answers

Let's Try   page 68

1.	30%	2.	40%	3.	12.5%	4.	20%	5.	Rs 90

WORK Sheet 11

1.	20%	2.	20%	3.	25%	4.	28%	5.	30%
6.	5%	7.	10%	8.	10%	9.	30%	10.	12%

WORD PROBLEMS

Suggested Duration

3 periods (120 min)

Instructions

Let's Learn…

Example 1:

Stress the importance of converting the quantities involved into the same unit. The unitary method can be used to find the required percentage as shown in the example.

A direct way can also be used: $\frac{70}{200} \times 100 = 35\%$

Example 2:

The model shown will relate Rs 630 to 70%. With unitary method, the original price (100%) can be found.

Example 4:

Using the model, show step-by-step the calculations that will lead to the total amount paid for the dinner. This is linked to the solution in *Let's Think* (p 73).

Let's Think...

In *Example 4*:

Lead pupils to realize that the food cost is Rs 1600 and the service charge is only based on the cost of food, which is Rs 1600 × 10%. But the tax (Goods and Services Tax), is based on both the food cost and the service charges. Hence,

tax = (Rs 1600 + Rs 1600 × 10%) × 7%

Total cost = Rs 1600 + Rs 1600 × 10% + (Rs 1600 + Rs 1600 × 10%) × 7%

In *Let's Think*, although the result John got is same as what we got in *Example 4*, the result John got in each step is meaningless.
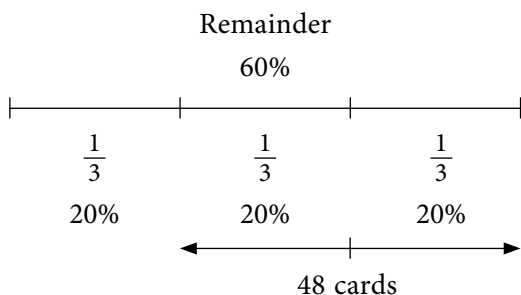
Lead the pupils discuss it and let them understand service charges and tax.

Example 5:

Remind the students, that the remainder consists of both women and children as shown in the model. Let the students check the answer by adding the 3 numbers, i.e. 825 + 270 + 405 = 1500.

Example 6:

alternative method:

From the remainder of 60%

$\frac{1}{3}$ equals 20%
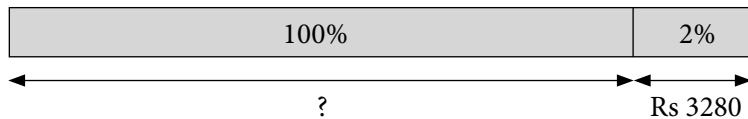
$\frac{2}{3}$ equals 40% (48 cards)

40% is 48 cards

1% is $\frac{48}{40}$ cards

100% is $\frac{48}{40} \times 100 = 120$ cards

Let's Try...

Ask the pupils to try the exercises on page 76 of the Student's Book.

In question 4, explain to the students that the bank gives Mr Kashif 2% of his deposit per year as interest.

100%	2%

?   Rs 3280

2% $\longrightarrow$ Rs 3280

1% $\longrightarrow$ Rs 1640

100% $\longrightarrow$ Rs 164 000

alternative method:

Work it out by reasoning:

Deposit	Interest
Rs 100	Rs 2
Rs 1000	Rs 20
Rs 10 000	Rs 200
Rs 15000	Rs 300

Interest of Rs 3280 must be from deposit: Rs 150 000 + Rs 10 000 + Rs 4000 = Rs 164 000

Homework

Ask pupils to do NSPM Workbook 6A—Worksheet 12 and Practice 4.

Answers

Let's Try page 76

1. (a) 12.5% (b) 7.5%
2. (a) 35 (b) 7
3. (a) Rs 1400 (b) Rs 350
4. Rs 164 000
5. (a) 101 (b) 12%
6. Rs 8431.50

WORK Sheet 12

1. 30% 2. 30% 3. Rs 1000
4. (a) 30 (b) 27 5. (a) 2000 (b) 960
6. (a) Rs 500 (b) Rs 50
7. 1200 8. 76

Practice 4

1. (a) Rs 1600   (b) 200   (c) 450 *l*
2. Rs 20 000   3. (a) 1600   (b) 832
4. Rs 21 000   5. 300 cm
6. (a) 0.625%   (b) 27.5%   (c) 20%   (d) 19%
7. 25%   8. 20%   9. 12.5%   10. 25%
11. (a) 20   (b) 6   12. (a) 375   (b) 225
13. 300   14. Rs 2000

Fun with Maths

Ask the pupils to attempt the fun activity on page 77 of the Student's Book. Ensure that they calculate the correct amount after setting a discount percentage.

Unit 5: Speed

Learning Outcomes

Pupils should be able to:

- understand the concept of speed and average speed
- write speed in different units
- state the relationship between distance, time and speed
- calculate speed, distance or time given the other two quantities
- solve up to 3-step word problems involving speed and average speed

SPEED

Suggested Duration

2 periods (80 min)

Instructions

Let's Learn…

Discuss the race between the hare and tortoise.

What are the units involved in this situation?—distance and time.

What descriptives are linked to this situation?—faster and slower.

This will lead to the concept of speed.

There are other situations where time is involved, e.g. rate of water flowing.

This does not involve distance. So it is not strictly speed, although the word speed of water flow may be used.

The examples will lead to the definition of speed as distance covered in a unit time.

From the examples, different units of speed are shown, e.g. km/h, m/min, cm/s etc.

Give practical examples of situation of speed in km/h, e.g. speed of plane, train, car, etc.

Let's Explore

Ask the pupils to attempt the exercise on page 84 of the Student's Book. Ask a few pupils to share their answers with the class.

Let's Try…

Ask the pupils to try the exercises on page 85 of the Student's Book.

Homework

Ask pupils to do NSPM Workbook 6A—Worksheet 13.

Answers

1. 22 m/min   2. 51 km/h
3. Peter = 6.25 m/s, John = 6.67 m/s
4. (a) ant = 1.5 cm/s, tortoise = 2 cm/s   (b) tortoise

WORK Sheet 13

1. (a) 90 km/h   (b) 8 m/min   (c) 9.3 m/s   (d) 3 cm/s
2. (a) 15 m/min   (b) 70 km/h   (c) 6 m/s   (d) 25 cm/s
3. 67 km/h   4. 25 m/min   5. 48 km/h
6. 95 km/h   7. 80 m/min

DISTANCE, TIME AND SPEED

Suggested Duration

3 periods (120 min)

Instructions

Let's Learn...

Discuss the formula for finding speed:

$$\text{speed} = \frac{\text{distance covered}}{\text{time taken}}$$

Give a situation where a car may travel at different speeds from A to B with a known distance. When the time taken to cover the distance is known, the average speed of the car is given by:

$$\text{speed} = \frac{\text{distance covered}}{\text{time taken}}$$

From the *Example 1*, it will be logical to induce that

Distance covered = speed × time taken

Use *Example 3*, to induce that

$$\text{time taken} = \frac{\text{distance covered}}{\text{speed}}$$

Use abbreviations to show the relationship between distance (d), time taken (t) and speed (s) :

$$s = \frac{d}{t} \qquad d = s \times t \qquad t = \frac{d}{s}$$

Stress the importance of units which are matching, e.g. in *Example 3*, the speed is in km/h and the distance is in km. So the units match.

Example:

A bird can fly at 4 m/s. How long will the bird take to fly a distance of 1 km?

To find the time, the units have to be converted to match, i.e. km to be converted to m.

 1 km = 1000 m

 Time taken $= \dfrac{d}{s}$

      $= \dfrac{1000}{4} = 250$ s

Let's Try...

Ask the pupils to try the exercises on page 90 of the Student's Book.

Homework

Ask pupils to do NSPM Workbook 6A—Worksheet 14.

Answers

Let's Try   page 90

1. 360 m 2. 4 h 3. 90 s 4. 3325 m 5. 8 km

WORK Sheet 14

1. 220 km 2. (a) 30 km (b) 90 km

3. 720 km 4. 250 km 5. 4 h 6. 20 min

7. 6 min 8. 1 h 2 min 9. 11.20 a.m. 10. 910 m

AVERAGE SPEED AND WORD PROBLEMS

Suggested Duration

3 periods (120 min)

Instructions

Let's Learn...

Example 1:

Emphasize the definition of average speed which is total distance over total time.

The required answer cannot be obtained by taking the average of the 2 speeds,

i.e. $\dfrac{6+4}{2} = 5$ m/s.

The term average speed is commonly used to describe the speed of a vehicle for a journey as it is quite impractical for a vehicle to travel at a constant speed for a fixed distance.

Let's Think …

Let the students work out the answers in 2 ways:

(a) $\dfrac{6 + 5}{2} = 5.5$ m/s

(b) Average speed $= \dfrac{\text{Total distance}}{\text{Total time}}$

$= \dfrac{48 + 60}{20}$

$= \dfrac{108}{200}$

$= 5.4$ m/s

The answers are different, but (b) is the correct answer because of the definition of average speed.

Let's Try…

Ask the pupils to try the exercises on page 97 of the Student's Book.

Homework

Ask pupils to do NSPM Workbook 6A—Worksheet 15 and Practice 5.

Answers

Let's Try   page 97

1. 4 h   2.   15 km   3.   9.45 a.m.   4.   71 km/h

WORK Sheet 15

1. 140 m/min   2.   68 km/h   3. $2\dfrac{1}{4}$ 4.   65 km/h

5. 3125 m   6.   12 15   7.   4.40 p.m.   8.   10.40 a.m

Practice 5

1. (a)   80 km/h   (b)   8 h   2.   230 km

3. (a)   50 m/min   (b)   60 m/min   (c)   10 m/min

4. 07 10   5.   85 km/h   6.   (a)   240 km   (b)   4 h

7. (a)   4000 km   (b)   14 30   8.   (a)   8 h   (b)   25 km/h

9. 44 km/h   10.   8.40 a.m.

11.(a)   180 km   (b)   180 km   (c)   360 km

12.30 min   13.   50 km/h

14.(a)   250 km   (b)   62.5 km/h

Fun with Maths

Ask the pupils to try the fun activity on page 98 of the Student's Book. Ask a few pupils to share their answers with other pupils.

Unit 6: Real Numbers

Learning Outcomes

Pupils should be able to:

- understand and relate numbers as a distance from the starting point in opposite directions
- understant what absolute value is
- Relate numbers in opposite directions as positive and negative numbers
- Be able to add, subtract, multiply and divide positive and negative numbers

NEGATIVE NUMBERS

Suggested Duration

1 period (40 min)

Instructions

Let's Learn…

1. Stand in a place where children can associate the starting point of an object clearly (edge of the table, edge of a window, etc.)
2. Take and count the number of steps taken in one direction. Retrace the steps and come back to the starting point, recounting the steps needed to be back. Similarly do the same in opposite direction.
3. On the board draw a number line and retrace the activity.
4. Mark the starting with '0' and the successive steps as 1, 2, 3, 4… in both directions. Point out the distance as distance from the starting point irrespective of the direction as numerical value also known as absolute value of the number
5. Also point out that the directions are opposite and the ones towards the right are called positive and the ones towards the left are called negative numbers.

Let's Try…

Ask the pupils to try the exercises on page 102 of the Student's Book.

Homework

Ask pupils to do NSPM Workbook 6A—Worksheet 16.

Answers

 page 102

1. (a)   <   (b)   >   (c)   >   (d)   <   (e)   >   (f)   >

2. (a)   13   (b)   27   (c)   56   (d)   33

WORK SHEET 16

1. (b)   –17   (c)   47   (d)   81   (e)   –23   (f)   –73   (g)   59   (h)   –66

2. (a)   16   (b)   63   (c)   78   (d)   9   (e)   54   (f)   35

ADDITION AND SUBTRACTION OF INTEGERS

Suggested Duration

2 periods (80 min)

Instructions

Let's Learn…

Things needed: set of 10 cards with + sign and a set of 10 cards with – sign on them

1. Draw a number line on the board and write 3 + 2 = 5

2. Show the movement from 3 to 5 as going two units towards the right. Similarly, write 3 – 2 = 1 and show the movement from 3 to 1 as going two units towards left.

3. Write –3 + 2 on the board and ask the children what you will get when you move two units towards right (-1). Demonstrate it on board.

4. Similarly for –3 – 2, move from –3 two units towards left and you will get –5. Now, write all the equations together on the board pointing out the direction of the movement.

5. From the set of cards pick three + cards and add another two + cards and show the total as +5.

6. Then pick three – cards and add another two – cards and show the total as -5.

7. **Generalize the statement as: when the signs are same, find the sum, and put the same sign.**

8. Now pick three + and two – cards. Pair two + and two – cards and discard them as zero. Point out that the number of cards remaining in hand is one and that of the cards you had more of (i.e. +) hence you get +3 – 2 = + 1.

9. Similarly pick three – and two + cards. Pair two + and two – cards and discard them as zero. Point out that the number of cards remaining in hand is one and that of the cards you had more of (i.e. –) hence you get –3 + 2 = –1.

10. **Generalize the statement as: when the signs are different, find the difference, and put the sign of the bigger numerical value.**

Let's Try…

Ask the pupils to try the exercises on page 105 of the Student's Book.

Homework

Ask pupils to do NSPM Workbook 6A—Worksheet 17.

Answers

page 105

1. (a) −10   (b) −42   (c) 0
2. (a) 34   (b) −56   (c) 18   (d) 34

WORK Sheet 17

1. (a) +29   (b) +8   (c) +12   (d) +35
   (e) +20   (f) 0   (g) +38   (h) +4   (i) −3
2. (a) −8   (b) −3   (c) −30   (d) −15   (e) 0
   (f) −25   (g) −1   (h) 4   (i) −14

MULTIPLICATION AND DIVISION OF INTEGERS

Suggested Duration

2 periods (80 min)

Instructions

Let's Learn…

1. Similar to addition and subtraction explain multiplication and division of positive and negative integers with the pupils. Recall that multiplication is successive additions whereas division is successive subtractions.

2. Generalize the statement: **in multiplication or division of integers, where each integer has the same sign, the answer will be a positive number.**

3. Similarly: **in multiplication or division of integers with different signs, the answer will be a negative number.**

Let's Try…

Ask the pupils to try the exercises on page 107 of the Student's Book.

Homework

Ask pupils to do NSPM Workbook 6A—Worksheet 18 and Practice 6.

Answers

1. (a) 48   (b) –75   (c) –3   (d) –9

WORK Sheet 18

1. (a) –15   (b) –10   (c) 50   (d) 0   (e) –25
   (f) –50   (g) –5   (h) 20   (i) 5
2. (a) –1   (b) –2   (c) 4   (d) 3   (e) –5
   (f) –6   (g) 9   (h) 10   (i) 7

Practice 6

1. (a) 10   (b) 53   (c) 85   (d) 126   (e) 45   (f) 24
2. (a) –31   (b) 13   (c) –34   (d) 57
   (e) 20   (f) –102   (g) 35   (h) –121
3. (a) 7   (b) 22   (c) –18   (d) –70
   (e) –364   (f) 410   (g) –46   (h) –33

Unit 7: Algebra

Learning Outcomes

Pupils should be able to:

- represent an unknown number using a letter
- write simple algebraic expressions
- simplify algebraic expressions
- evaluate simple algebraic expressions by substitution
- solve word problems involving algebraic expressions
- evaluate simple algebraic equations

Do You Know?

Ask the students to identify measurements involving objects around the classroom whose values are unknown, e.g. length of classroom, body mass of a student, etc. Ask the question: How do you express such unknown quantities? It is logical to get responses such as 'The length of the classroom is …… m.' or 'The length of the classroom is …… m.'

UNKNOWN QUANTITIES AND ALGEBRAIC EXPRESSIONS

Suggested Duration

2 periods (80 min)

Instructions

Let's Learn…

From the example of John's and Peter's ages, introduce the concept of using letters (lowercase) to represent unknown values.

Use examples 1–5 to show the use of different letters to represent unknown quantities and forming algebraic expressions involving different operations.

Note that in this level, each algebraic expression only involves 1 variable.

Let's Explore

Let the students work out the required algebraic expressions for section A, Q1 – 3. Where units are involved, the unit can be written at the end of the expression, e.g. $\frac{p + 25}{2}$ cents.

Let's Try…

Ask the pupils to try the exercises on page 114 of the Student's Book.

1. (a)   accept $9 + y$ or $y + 9$

   (d)   accept $6 + 5n$ or $5n + 6$

2. (a) accept $x + $15 or $(x + 15)

   (c) guide the students to arrive at $\frac{p - 200}{5}$ ml

3. (c) guide the students to arrive at the answer $(1000 - 3x)$ cm³

Homework

Ask pupils to do NSPM Workbook 6A—Worksheet 19.

Answers

Let's Try page 114

1. (a) $y + 9$ (b) $p - 3$ (c) $\frac{m}{3}$ (d) $5n + 6$ (e) $4q - 2$

2. (a) Rs $(x + 25)$ (b) $\frac{x}{5}$ metres   (c) $\frac{p - 200}{5}$ ml

3. $2x - 5$ (b) $x + 11$ (c) $1000 - 3x$

WORK Sheet 19

   (a) $y + 4$ (b) $y - 1$ (c) $2 - y$ (d) $3 + y$ (e) $\frac{y}{5}$

   (f) $\frac{y + 7}{3}$ (g) $\frac{5 - y}{4}$ (h) $4y + 8$ (i) $5y - 3$ (j) $6 - 2y$

2. (a) $x + 10$ (b) $y - 4$ (c) $m + 8$ (d) $5p$ (e) $2n + 7$

   (f) $3x - 9$ (g) $\frac{p + 4}{3}$ (h) $\frac{x - 10}{7}$ (i) $4k + 2$ (j) $6q - 5$

3. (a) $(x + 27)$ cm   (b) $(y - 4)$ m   (c) $3m$ cm

   (d) $(120 - h)$ cm   (e) Rs $(x + 5)$ (f) Rs $5p$

4. (a) $y + 3$ (b) $y - 4$ (c) $2y$ (d) $y - 3$

5. (a) $x - 5$ (b) $\frac{x - 5}{3}$

6. $2p$ 7. $3x - 4$

SIMPLIFICATION AND EVALUATION OF ALGEBRAIC EXPRESSIONS

Suggested Duration

3 periods (120 min)

Instructions

Let's Learn…

Simplifying Algebraic Expressions

At this stage, simplification involves only addition or subtraction of the same variable or constants. In writing the simplified expression the unknown term is written in front, e.g. $2m + 8$, not $8 + 2m$.

Before simplification, rewrite the terms using the commutative property, i.e. bring the unknown terms together and the constants together.

Evaluating Algebraic Expressions by Substitution

When the numerical value of the unknown is given, the value of the expression can be found by substitution. Emphasize to the students that there can be only 1 value for the expression for each value of the unknown.

As an enrichment activity, show a situation where the unknown is fractional, e.g. find the value of $3x - 2$, where $x = \dfrac{2}{3}$

As an enrichment activity for example 5 (pg 10), ask the question: Can $2n - 1$ represent an odd number? Prove it.

Let's Explore (p 10)

Ask the students to make a list in the form of a table, such as

	$2y - 1$
$y = 1$	
$y = 2$	
$y = 3$	
...	

What can be concluded for the different values of $2y - 1$ when value of y is known?

Let's Try...

Ask pupils to the excercises on page 118 of the Student's Book.

Homework

Ask pupils to do NSPM Workbook 6A—Worksheet 20.

Answers

Let's Try   page 118

1. (a) $4x$ (b) $4y$ (c) $5m$ (d) $7n + 4$ (e) $5k + 3$
2. (a) 13   (b) 2   (c) 10   (d) 10   (e) 4

WORK Sheet 20

1. (a) $6x$ (b) $9m$ (c) $5k$ (d) $10n$
   (e) y (f) $2x$ (g) $2z$ (h) $5h$
2. (a) $6x + 11$ (b) $9p + 4$ (c) $3k + 8$ (d) $b + 7$
3. (a) 15   (b) 9   (c) 8   (d) $2\dfrac{2}{3}$
   (e) 8   (f) 5   (g) 0   (h) $1\dfrac{1}{2}$

WORD PROBLEMS

Suggested Duration

2 periods (80 min)

Instructions

Let's Learn...

In each word problem, stress the importance of reading and understanding. Determine the letter that represents the unknown. Form the expression with the given conditions. Simplify the expression. Then find the value of the expression by substitution. These steps are clearly shown in examples 1–5.

Let's Try...

Ask the pupils to try the exercises on page 123 of the Student's Book.

Encourage the students to unite the required explanation for each expression, e.g.

2. (a)   The remaining number of apples = $p - 6$

   (b)   When $p = 14$, the remaining number of apples = $14 - 6 = 8$

4.   Time to walk from home to library = x min

   Time to walk from library to school = $(x + 5)$ min

   (a)   Total time taken to walk from home to school via the library

      = $(x + x + 5)$ min

      = $(2x + 5)$ min

   (b)   When $x = 14$ min, time taken to walk from home to school via the library

      = $(2x + 5)$ min

      = $(2 \times 14 + 5)$ min

      = 33 min

Homework

Ask pupils to do NSPM Workbook 6A—Worksheet 21.

Answers

Let's Try   page 123

1. 22
2. (a) $p - 6$ (b)   8
3. (a) $3x + 3$ cm   (b)   18 cm
4. (a) $2x + 5$ minutes   (b)   33 min
5. (a)   Rs $5m$ (b)   Rs 175

1. (a) (i) Rs $(m + 20)$ (ii) Rs $(2m + 20)$
   (b) Rs 1320
2. 101   3. (a) $3x$ (b) 108   4. (a) $2y + 1$ (b) 29
5. (a) $2y - 3$ (b) 9
6. (a) $8x$ cm   (b) 32 cm
7. (a) Rs $3p$ (b) Rs 90
8. (a) $2n - 7$ (b) 53
9. (a) $\dfrac{x - 20}{4}$ (b) 145 cm
10. (a) $(3n + 10)$ cm   (b) 145 cm

ALGEBRAIC EQUATIONS

Suggested Duration

2 periods (80 min)

Instructions

Let's Learn...

Things needed: a pan scale, few cubes of same size and weight

Place 5 cubes in the right pan and 5 cubes in the left pan of the scale.

Add two cubes in one pan and ask the students 'how many cubes should we add in the other pan to balance them?' (2 cubes)

Now, with 7 cubes in each pan, remove three from one pan and ask the students, 'how many cubes must we remove from the other pan to balance them?' (3 cubes)

Generalize the statement: what we add or remove from one pan, we do a similar action for the other pan. Relate the two pans as two sides of the equation.

Enrichment:

Things needed: set of cards with few equivalent expressions written on pairs of cards (like 5 + 2 and 4 + 3 or 1 + 2 + 4)

1. Distribute all the cards amongst the students.
2. The students are required to find their equivalent expression and form an equation.
3. Jumble the cards and play few more times.

Let's Try...

Ask the pupils to try the exercises on page 126 of the Student's Book.

Homework

Ask pupils to do NSPM Workbook 6A—Worksheet 22 and Practice 7.

Answers

1. (a) 1   (b) 4   (c) 3   (d) 9

WORK Sheet 22

1. (a) $a = 6$ (b) $b = 1$ (c) $y = 2$ (d) $p = 2$

Practice 7

1. (a) $\dfrac{2x + 1}{2}$ (b) $5y$ (c) $\dfrac{y}{3}$ (d) $\dfrac{n + 12}{6}$ (e) $2x - 1$ (f) $\dfrac{x - 2}{3}$

2. (a) Rs $(500 - 3x)$ (b) $\dfrac{n - 7}{5}$ (c) Rs $\left(\dfrac{x + 100}{2}\right)$

3. (a) $7x$ (b) $7y + 3$ (c) $9n - 2$

   (d) $4m + 1$ (e) $7f + 2$ (f) $3k + 9$

4. (a) 50   (b) 86   (c) 35   (d) 18   (e) 17   (f) 13

5. (a) $4m - 7$ (b) 41

6. (a) Rs $(4n + 14\,000)$ (b) Rs 28 000

7. (a) $\dfrac{k - 3}{2}$ (b) 9

8. $30k$ cm^2

9. (a) 10   (b) 38   (c) 2   (d) 1

Fun with Maths

As an enrichment activity, encourage the students to create a similar problem where the final result is the number you think of, e.g.

- Think of any number
- Multiply the number by 2 and add 10 to the product
- Divide the sum by 2
- Subtract by 5 after division

The result will be the number you think of because $\dfrac{2m + 10}{2} - 5 = m + 5 - 5 = m$.

evision 3 (Workbook 6A)

1. (a) 5% (b) 15% (c) 6.5%
2. (a) 15% (b) 10% (c) 7%
3. (a) 25% (b) 5% (c) 4%
4. Rs 500 5. 25 6. 15
7. (a) Rs 7000 (b) Rs 2100
8. (a) Rs 2 800 000 (b) Rs 2 240 000
9. 200 10. Rs 2354
11. (a) 75 km/h (b) 75 km/h (c) 730 km/h
12. (a) 264 km (b) $146\frac{2}{3}$ km (c) 22 km
13. 25 m 14. 39 km 15. 72 m
16. (a) 2h (b) 95 km/h 17. 07 15
18. 2800 km 19. 13 10 20. 06 35
21. (a) 60 km/h (b) 2.30 p.m.
22. (a) –5 (b) –29 (c) –46 (d) 85
    (e) 36 (f) –79 (g) –21 (h) –6
23. (a) –66 (b) –216 (c) –64 (d) 66
    (e) –186 (f) –178 (g) 228 (h) –230
24. (a) $x - 5$ (b) $3x + 5$ (c) $3y + 4$ (d) $4y - 3$
    (e) $\frac{p + 6}{5}$ (f) $\frac{q - 11}{3}$ (g) $\frac{x + 28}{4}$
25. (a) $(34x + 150)$g (b) $(3x + 4)$ cm (c) $(2x + 1)$ m
26. (a) $y + 17$ (b) $y - 3$ (c) $y + 5$
27. (a) $5p$ (b) $4m$ (c) $2x$ (d) y
28. (a) $4x + 11$ (b) $3n + 3$ (c) $3b + 10$ (d) $2c + 3$
29. (a) 7 (b) 7 (c) $1\frac{2}{3}$ (d) 20 (e) $18\frac{2}{3}$
30. (a) (i) Rs $(x + 30)$ (ii) Rs $(2x + 30)$ (b) Rs 130
31. (a) (i) $2y$ cm (ii) $6y$ cm (b) 18 cm

Revision 4 (Workbook 6A)

1. 300   2. 550 km   3. 11 200   4. 200 cm
5. (a) 35   (b) 28   6. 6%   7. 65%
8. 2%   9. 400   10. 30   11. Rs 31 250
12. 25%   13. 12.5%   14. 4%   15. Rs 90
16. Rs 1200   17. 600   18. 1600   19. 83 km/h
20. 7 min   21. 150 km   22. (a) 4 km/h   (b) 08 50
23. 52 km/h   24. 48 km/h   25. 20 min   26. 72 km/h
27. (a) 2   (b) 5
28. (a) −7   (b) −6   (c) 64   (d) −16
    (e) −120   (f) −30   (g) −27   (h) −17
29. (a) $\frac{x}{3}$ cm   (b) Rs $(x + 5)$ (c) $\frac{x-7}{2}$ (d) Rs $(10 − 2y)$
30. (a) $(3x + 4)$ cm   (b) $8x$ cm   (c) $(3x + 3)$ cm   (d) $(6x + 2)$ cm
31. (a) Rs $(5x + 60)$ (b) Rs 485
32. (a) $2p + 2$ (b) $2p + 8$
33. (a) Rs $7m$ (b) Rs 210
34. (a) $3n + 3$ (b) 156

Unit 8: Circle

Learning Outcomes

Pupils should be able to:

- describe a circle using correct terminology
- construct circles given the radius/circumference
- use formula to find the circumference of a circle
- find the perimeter of semicircle and quarter-circle
- use formula to find the area of a circle
- find the area of semicircle and quarter circle
- solve word problems involving area and perimeter of circles/semicircles/quarter circles

CIRCLE

Suggested Duration

2 periods (80 min)

Instructions

Let's Learn…

Discuss wheels. Why is it important that wheels are circular? Will square wheels function?

Ask students to name another circular object whose shape is very important for its function—a ball.

Discuss the usage of language—'going in circles', i.e. going round and round.

Stress that a circle is a 2-D figure that can be drawn on paper. But a ball has circular shape too. However, it is a solid—a 3-D object.

Let the students draw a circle in the air with their fingers.

When using a compass to draw circles, let the students draw some concentric circles.

Lead pupils to learn important terms involving a circle: centre, radius, diameter and circumference.

Let's Explore

In addition to knowing that the diameter is twice the length of the radius, let the students discover that any diameter will divide the circle into 2 equal parts, called semicircles.

This can be done by folding the circle into half. The folding line is the diameter. Cutting along the folding line will result in 2 semi-circles.

CIRCUMFERENCE

Suggested Duration
2 periods (80 min)

Instructions
Let's Learn…
Highlight that although the circumference is a curve, its length is still a line (1-D).

Demonstrate the practical way of measuring the circumference of an object (e.g. a circular tin) by using a string.

Let the students use strings to measure the circumference of various circles drawn on paper and complete the given table.

By induction, the students should draw the conclusion—circumference ÷ diameter is a constant, i.e. the same value for any circle.

Tell the students that this value is a constant called *pi* (π). Ask the students to remember the value of π up to 2 decimal places, i.e. 3.14.

The value of π, although being a constant, has an infinite number of decimal places.

Let the students try to divide $\frac{2}{7}$ using the calculator. This fraction is an approximation of π.

From this activity, draw the conclusion that

Circumference $= \pi \times$ diameter

$\qquad\qquad = 2 \times \pi \times$ radius

$\qquad\qquad = 2\pi r$

From the circumference, related problems like perimeters of semicircles and quadrants can be found.

Additional related problems can be introduced, e.g.

Find the perimeter of the following figures:

(a) (formed by 4 semicircles)

(b) (formed by 4 quadrants)

Let's Try...
Ask the pupils to try the exercises on page 138 of the Student's Book.
Homework
Ask pupils to do NSPM Workbook 6B—Worksheet 23.

Answers

Let's Try   page 138

1. (a) 31.4 cm   (b) 37.68 cm
2. 20.41 cm   3. 75.36 cm

WORK Sheet 23

3. (a) 21.98 cm   (b) 15.7 cm   (c) 31.4 cm   (d) 18.84 cm
4. (a) 44 cm   (b) 110 cm   (c) 308 cm   (d) 176 cm
5. 61.7 cm   6. 200 cm

AREA OF A CIRCLE

Suggested Duration
2 periods (80 min)

Instructions

Let's Learn...

The activity (p 140) of cutting a circle into 24 parts and arranging the parts to form a rough rectangle is to deduce the formula for finding the area of a circle.

As the number of parts increases, the area of the rectangle formed is getting closer and closer to the area of the circle.

By deduction,

$$\begin{aligned}
\text{Area of circle} &= \text{length of rectangle} \times \text{breadth of rectangle} \\
&= \tfrac{1}{2} \times \text{circumference} \times \text{radius} \\
&= \pi \times \text{radius} \times \text{radius} \\
&= \pi r^2.
\end{aligned}$$

With this formula, the area of semicircles and quadrants can also be found.

Ask the students to find the area of each of the 24 sectors of the circle cut out at the beginning with radius, say 5 cm.

Let the students explore the areas of circles with related radius.

(a) A circle has a radius twice the radius of another circle. Is its area double that of the other circle?

(b) A circle has a radius half the radius of another circle. Is its area half that of the other circle?

Let the students induce the relationship.

Let's Try…

Ask the pupils to try the exercises on page 144 of the Student's Book.

Homework

Ask pupils to do NSPM Workbook 6B—Worksheet 24 and Practice 8.

Answers

Let's Try   page 144

1. (a) 314 cm²   (b) 1386 cm²
2. 132.7 cm²   3.   226.08 cm²

WORK Sheet 24

1. (a) 50.24 cm²   (b) 113.04 cm²   (c) 78.5 cm²   (c) 153.86 cm²
2. (a) 1386 cm²   (b) 2464 cm²   (c) 616 cm²   (d) 2464 cm²
3. 200.96 cm²   4.   127.17 cm²

Practice 8

1. (a) C = 100.48 cm   (b) C = 69.08 cm
         A = 803.84 cm²   A = 379.94 cm²
2. (a) C = 220 cm   (b) C = 264 cm
         A = 3850 cm²   A = 5544 cm²
3. (a) C = 87.38 cm   (b) C = 143.92 cm
         A = 453.73 cm²   A = 1230.38 cm²
4. (a) C = 46.41 cm   (b) C = 53.55 cm
         A = 132.665 cm²   A = 176.625 cm²

Fun with Maths

Ask the pupils to try the exercise on page 145 of the Student's Book.

Unit 9: Area and Perimeter

Learning Outcomes

Pupils should be able to:

- find the perimeter of composite figures
- find the area of composite figures
- solve word problems involving area and perimeter of composite figures.

Do You Know?

Discuss with the students the difference between perimeter and area.

Perimeter involves length (straight or curve). It is 1 dimensional.

Area is the space enclosed by lines (perimeter). It has 2-dimensions.

e.g.   A table

      Perimeter—the sum of the length of the edges.

      Area—the space enclosed by the edges

PERIMETER OF A COMPOSITE FIGURE

Suggested Duration

3 periods (120 min)

Instructions

Let's Learn...

Discuss with the students the concept of a composite figure.

Composite figures are formed by combination of common figures, e.g. a triangle and a rectangle. However, it can also be formed by a common shape, e.g. only rectangles.
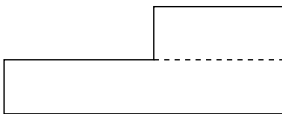
To find the perimeter of a composite figure, the students must first identify the shapes that form the figure. Recall the properties associated with the sides of a shape, e.g. find the perimeter of a figure formed by an equilateral triangle of side 6 cm and a semicircle as shown below:

6 cm
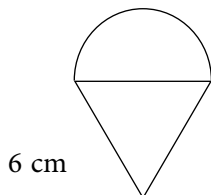
Recall the properties of equilateral triangle and circle.

The perimeter of the figure is 6 cm + 6 cm + $\frac{1}{2}$ × circumference of a circle with radius 3 cm.

Let's Try…

Ask the pupils to try the exercise on page 149 of the Student's Book.

Homework

Ask pupils to do NSPM Workbook 6B—Worksheet 25.

Answers

page 149

1. 45 cm   2. 16.71 cm   3. 12.56 cm

WORK Sheet 25

1. (a) 60 cm   (b) 38 cm   (c) 56 cm   (d) 34 cm
2. (a) 52.66 cm   (b) 83.96 cm   (c) 21.85 cm   (d) 28.71 cm

AREA OF A COMPOSITE FIGURE

Suggested Duration
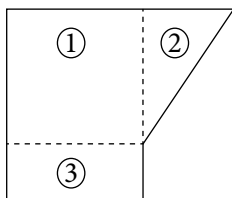
3 periods (120 min)

Instructions

Let's Learn…

Examples 1–2:

The process of finding the shaded area is obvious—the smaller area is subtracted from the bigger area.

Example 3:

There are other possible ways of finding the answer.

The principle is that the composite figure must be divided into common shapes whose area can be calculated, e.g.

Area of composite
= area ① + area ② , + area ③

Let's Try…

Ask the pupils to try the exercises on pages 154–155 of the Student's Book.

Include additional questions for enrichment, e.g. ABCD is a square, find the area of the shaded figure.

(a) A B C D 14 cm

(b) A B C D 14 cm
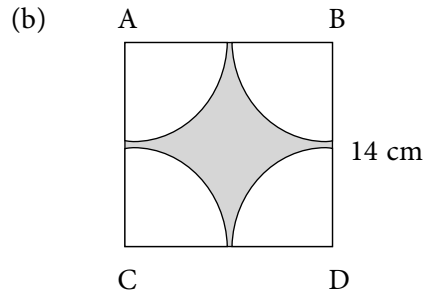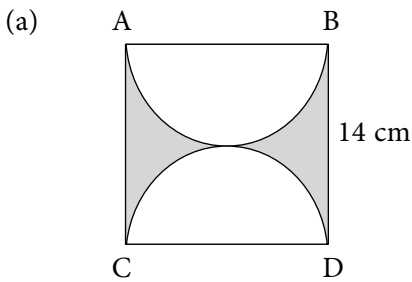
Homework

Ask pupils to do NSPM Workbook 6B—Worksheet 26.

Answers

 pages 154–155

1. 113.12 cm²   2.   79.74 cm²

3. (a)   96 cm²   (b)   84 cm²

4. (a)   95.25 cm²   (b)   22.28 cm²

WORK **Sheet** **26**

1. (a)   50 cm²   (b)   48 cm²   (c)   60 cm²   (d)   1230 cm²

2. (a)   2016 cm²   (b)   252 cm²

3. (a)   13.76 cm²   (b)   15.44 cm²   (c)   133.12 cm²   (d)   160 cm²

WORD PROBLEMS

Suggested Duration

2 periods (80 min)

Instructions

Let's Learn…

Word problems involving perimeter and area of composite figures are usually accompanied by diagrams of the figures. The examples show the process of getting the required answers.

Let's Try…

Ask the pupils to try the exercises on page 160 of the Student's Book.

Homework

Ask pupils to do NSPM Workbook 6B—Worksheet 27 and practice 9.

Answers

1. 18.84 cm
2. (a) 78.39 cm²   (b) 342.6 cm

WORK Sheet 27

1. 176 cm   2. 15.7 cm   3. 18.84 cm   4. 181 m
5. (a) 300.48 m   (b) 4003.84 m²
6. (a) 257 m²   (b) 61.4 m

Practice 9

1. (a) 71 cm   (b) 280.5 cm²
2. 100 cm²   3. 168 cm²   4. 101.68 cm
5. 26.99 cm²   6. 42 cm²
7. 17.7 cm, 7.85 cm²   8. 681.5 mm²

Fun with Maths

Ask pupils to try the fun activity on page 161 of the Student's Book.

Unit 10: Volume

Learning Outcomes

Pupils should be able to:

- find the length of one edge of a cube given its volume
- find one dimension of a cuboid given its volume and the other dimensions
- find the height of a cuboid given its volume and base area
- find the area of a face of a cuboid given its volume and one dimension
- solve word problems involving volume of cube/cuboid

FIND THE UNKNOWN DIMENSION OF A CUBE

Suggested Duration

2 periods (80 min)

Instructions

Let's Learn…

Relate linear, square and cubic notations:

    e.g. 7 (linear)

          $7 \times 7 = 7^2$ (square)

          $7 \times 7 \times 7 = 7^3$ (cubic)

Example 1:

Try to find the length first by trial and error.

   ( ) × ( ) × ( ) = 343

    5 × 5 × 5 = 125

    6 × 6 × 6 = 216

    7 × 7 × 7 = 343

Use prime factorization to find the cube root of 343.

FIND THE UNKNOWN DIMENSION OF A CUBOID

Suggested Duration

3 periods (120 min)

Instructions

Let's Learn…

A solid, like the cuboid has 3 dimensions, i.e. length, breadth and height. If any 2 dimensions are known, the 3rd dimension can be found from the formula,

volume of cuboid = length × breadth × height, as shown in examples 1–3.

Remind the students that each dimension is a linear measurement, e.g. in cm, m, etc.

Let's Try…

Ask the pupils to try the exercises on page 167 of the Student's Book.

Homework

Ask pupils to do NSPM Workbook 6B—Worksheet 28.

Answers

Let's Try   page 167

1. (a)   2 cm   (b)   10 cm
2. (a)   8 m   (b)   18 cm   (c)   14 cm

WORK Sheet 28

1. (a)   4m   (b)   7m   (c)   11 m
2. (a)   27 cm   (b)   8 cm   (c)   7 cm
3. (a)   37 cm   (b)   15 m   (c)   7 m
4. (a)   8 cm   (b)   9 cm   (c)   7 cm

BASE AREA & VOLUME OF A CUBOID

Suggested Duration

3 periods (120 min)

Instructions

Let's Learn…

From the formula,

    volume = length × breadth × height

    base area of a cuboid = length × breadth

Hence,

    volume of a cuboid = base area × height

From this relationship, an unknown value can be calculated when any two values are given.

Emphasize that, given the volume and height, the base area of cuboid $=\dfrac{\text{volume}}{\text{height}}$, which is a square unit, i.e. cm², m², etc.

Given the volume and base area, the height $=\dfrac{\text{volume}}{\text{base area}}$, which is a linear unit, i.e. cm, m, etc.

Given the base area and height, the volume = base area × height, which is a cubic unit, i.e. cm³, m³, etc.

Let's Try…

Ask the pupils to try the exercises on page 171 of the Student's Book.

Homework

Ask pupils to do NSPM Workbook 6B—Worksheet 29.

Answers

Let's Try   page 171

1. 420 cm³   2.   30 cm²   3.   4 cm   4.   4 cm   5.   9 m

WORK Sheet 29

1. (a)   270 cm³   (b)   648 cm³
2. (a)   7 cm   (b)   8 cm
3. (a)   14 cm   (b)   8 cm
4. (a)   11 cm   (b)   12 cm
5. (a)   169 cm², 13 cm   (b)   225 cm², 15 cm

WORD PROBLEMS

Suggested Duration

3 periods (120 min)

Instructions

Let's Learn…

In each example, go through the process and highlight the unit for the required unknowns, e.g. height (linear), volume (cubic), base area (square).

Let's Try…

Ask the pupils to try the exercises on page 176 of the Student's Book.

Homework

Ask pupils to do NSPM Workbook 6B—Worksheet 30 and Practice 10.

Answers

 page 176

1. 3 cm   2.   10 cm   3.   60 cm

WORK SHEET 30

1. 9 cm   2.   11.5 cm   3.   16 cm   4.   368 m^3 5.   13   6.   6 cm

Practice 10

1. 14 cm   2. 9 cm   3. 9 cm   4. 18 cm
5. 6 cm   6. 9 cm   7. (a)   5 cm   (b)   12 cm   (c)   16 cm
8. 10 cm   9. (a)   770 cm^2 (b)   20 cm
10. (a)   30 l (b)   16 cm

Fun with Maths

Allow pupils to work in pairs and try the activity on page 177 of the Student's Book.
Explain that different arrangements result in different base areas.

Unit 11: Solid Figures

Learning Outcomes

Pupils should be able to:

- represent solid figures in 2-D drawings.
- identify the 2-D representation of solid figures
- identify the nets of cubes, cuboids and prisms
- identify the solid which can be formed by a given net
- make 3-D solids from given nets
- identify the nets of pyramids

Do You Know?

Explain that the pyramid has 5 faces—4 isosceles triangles and a square base. There are 2 ways to draw a solid like the pyramid—one as shown (the oblique method) and the other (isometric method) as shown below:
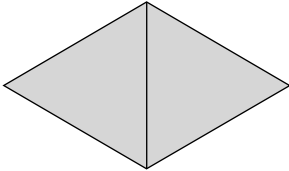
DRAWING OF SOLID FIGURES

Suggested Duration

2 periods (80 min)

Instructions

Let's Learn…

Let the students see the difference between a real solid figure and the drawing of the figure, e.g. a box and a picture of the same box. The real object is a 3-D solid whereas the picture on paper becomes a 2-D drawing. To make the drawing of a 3-D object on paper, there are ways as shown in the examples. The 2-D drawings will look like the 3-D solids.

Let the students identify the name of each 2-D drawing, e.g. cone, pyramid, cylinder, cube, cuboid and prism. With this practice, the students will be able to make a 2-D drawing for a solid with the given name.

As an enrichment activity, let the students make a 2-D drawing of a ball or sphere.

Note: The girl in the illustration on p 183 is stating the properties of a <u>regular</u> prism.

Let's Try...

Ask the pupils to go though the exercises on pages 184–185 of the Student's Book.

Homework

Ask the pupils to do NSPM Workbook 6B—Worksheet 31.

Answers

Let's Try   pages 184–185

1. (b), (d), (f)   2. (a), (d)

WORK Sheet 31

2. (a) yes   (b) yes   (c) no   (d) yes   (e) no   (f) yes
3. (a) no   (b) no   (c) yes   (d) yes   (e) no   (f) no

NETS OF CUBES AND CUBOIDS
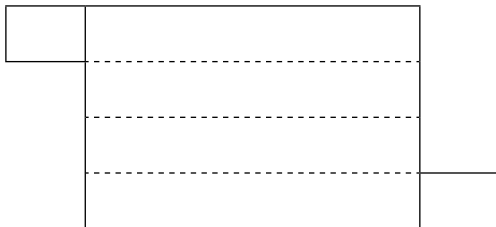
Suggested Duration

2 periods (80 min)

Instructions

Let's Learn...

Make a real cube from cardboard. Open it up to show a layout called a net. Fold it back to form the original cube. The net is a 2-D figure.
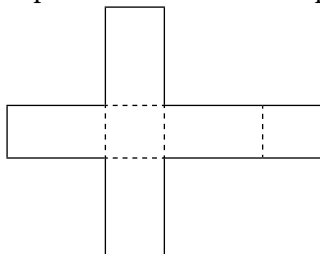
Some 2-D figures look like nets of cubes but cannot form cubes when folded. Discuss with the students the basic conditions of nets of cubes:

(a) There must be 6 faces of equal squares.

(b) The layout of these squares when folded will form a cube.

An example of a net of a cuboid:

A possible net of the toothpaste box could be:
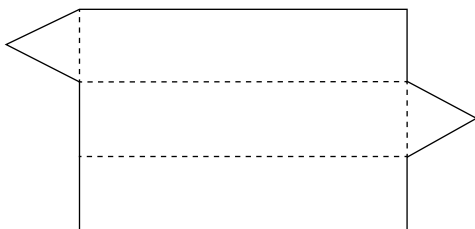
NETS OF PRISMS

Suggested Duration
2 periods (80 min)

Instructions

Let's Learn…
Ask the question: Is there another way of getting a net of this prism?
e.g.

Let's Explore
Remind the students that a prism need not have identical opposite triangular faces. It could be with identical opposite trapezium faces.

Let's Try…
A figure which does not form a solid when folded is not a net. Let the students explain why it is not a net for the mentioned solid.

Ask the pupils to try the exercises on page 194 of the Student's Book.

Homework
Ask pupils to do NSPM Workbook 6B—Worksheet 32.

Answers

Let's Try   page 194

1. (a), (d)   2.   (b)

1. (a) no   (b) yes   (c) no   (d) yes
2. (a) yes   (b) no   (c) yes   (d) yes
3. (a) ✓   (b) ✓   (c) ✓   (d) ✓

NETS OF PYRAMIDS

Suggested Duration

2 periods (80 min)

Instructions

Let's Learn...

The pyramids mentioned here have triangular, square or rectangular bases. A common net of a pyramid will be one with the base at the centre and a symmetrical figure. However, the figure in Q1 (a) (p 97) can be a net of a triangular pyramid.

Let's Try...

Ask the pupils to try the exercises on page 197 of the Student's Book.

Homework

Ask pupils to do NSPM Workbook 6B—Worksheet 33 and Practice 11.

Answers

Let's Try   page 197

1. (a), (b), (d)

WORK Sheet 33

1. (a) (iii)   (b) (iii)

Practice 11

1.

cube, cuboid	(a), (b)
prism	(d), (f)
pyramid	(c), (e)

Revision 1 (Workbook 6B)

1. C = 75.36 cm, A = 452.16 cm^2
2. $(5\pi + 10)$ cm   3. 32 cm^2 4. A = 54 cm^2, p = 36 cm
5. 54.5 cm^2 6. 96.25 cm^2
7. (a) 44 cm   (b) 42 cm^2
8. (a) 12.56 cm   (b) 9.42 cm   9. 15.7 cm
10. 657 cm   11. (a) 16 cm   (b) 30 cm
12. (a) 3 cm   (b) 9 cm
13. 2 cm   14. 48 l
15. 12 min
18. (a) cuboid   (b) cube   (c) prism   (d) pyramid

Revision 2 (Workbook 6B)

1. 200 cm^2 2. 36 cm^2 3. 14 cm^2 4. 203 cm^2
5. 32.28 cm   6. A = 55.74 cm^2, P = 46.84 cm
7. 77 cm^2 8. 222 cm^2 9. 659 cm^2 10. 66 cm^2
11. 396 km   12. 30 min   13. (a) 21 cm   (b) 13 cm
14. (a) 21 cm   (b) 15 cm   15. 10.9 cm   16. 8.4 cm
17. 25 cm   18. 80 cm   19. 50 min   20. 120 l
21. 36 cups   22. (a) no   (b) yes   (c) yes   (d) yes
23. (a) cuboid   (b) cube   (d) pyramid   (d) prism
24. (a) no   (b) yes   (c) no   (d) yes

Unit 12: Pie Charts

Learning Outcomes

Pupils should be able to:

- read and interpret pie charts
- solve 1-step word problems using information presented in pie charts

PIE CHARTS

Suggested Duration

4 periods (160 min)

Instructions

Let's Learn…

Example 1 shows a single pie chart with 2 sectors—where a circle has been divided into 2 fractions $\frac{3}{10}$ and $\frac{7}{10}$. Highlight that the smaller sector represents the smaller quantity, the larger sector the larger quantity.

Example 2 shows the way to create a pie chart with 3 sectors, one is $\frac{1}{2}$ the circle, the others are $\frac{1}{4}$ each. With colours and labels, the pie chart will clearly represent the given information.

Example 3 shows an example of answering relevant questions related to the pie chart. By studying the given information and the data shown on the pie chart, the questions can be answered directly.

Example 4 shows a pie chart divided into fractions.

Explain that the sum of all the fractions should be 1, i.e. the whole circle.

$$\frac{1}{2} + \frac{1}{6} + \frac{1}{4} + \frac{1}{12} = \frac{6}{12} + \frac{2}{12} + \frac{3}{12} + \frac{1}{12}$$

$$\frac{12}{12} = 1$$

Additional questions may be asked, e.g. If John has a total of 36 marbles, find the number of marbles for each colour owned by John.

Blue $= \frac{1}{2} \times 36 = 18$

Green $= \frac{1}{6} \times 36 = 6$

Yellow $= \frac{1}{4} \times 36 = 9$

Red $= \dfrac{1}{12} \times 36 = 3$

For enrichment, additional questions may be included, e.g.

Example 5:

If Jane spent a total of Rs 200 last month, find the amount she spent for each item.

Stationery $= \text{Rs } 200 \times 25\% = 200 \times \dfrac{25}{100} = \text{Rs } 50$

Toys $= \text{Rs } 200 \times 30\% = 200 \times \dfrac{30}{100} = \text{Rs } 60$

Food & Drinks $= \text{Rs } 200 \times 35\% = 200 \times \dfrac{35}{100} = \text{Rs } 70$

Savings $= \text{Rs } 200 \times 10\% = 200 \times \dfrac{10}{100} = \text{Rs } 20$

Let's Try…

Ask the pupils to try the exercises on page 205 of the Student's Book.

Homework

Ask pupils to do NSPM Workbook 6B—Worksheet 34.

Answers

Let's Try page 205

1. (a) 60   (b) 80   (c) taxis
2. (a) 20%   (b) swimming   (c) badminton

WORK Sheet 34

1. (a) 30   (b) cars   (c) lorries
2. (a) 10   (b) orange   (c) apple
3. (a) watching movies   (b) $\dfrac{1}{10}$ (c) playing games
4. (a) $\dfrac{1}{3}$ (b) $\dfrac{1}{4}$ (c) science
5. (a) 35%   (b) 40%   (c) children   (d) women

56

WORD PROBLEMS

Suggested Duration

3 periods (120 min)

Instructions

Let's Learn...

Based on the information given in the pie chart, each question can be answered directly by 1-step processes as shown in examples 1–3.

Let's Try...

Ask the pupils to try the exercises on pages 209–210 of the Student's Book.

Homework

Ask pupils to do NSPM Workbook 6B—Worksheet 35 and Practice 12.

Answers

Let's Try   pages 209–210

1. (a) 3 (b) 36 (c) $\frac{1}{6}$ (d) $\frac{1}{4}$

2. (a) 35% (b) $\frac{2}{5}$ (c) 12

WORK Sheet 35

1. (a) 8 (b) 35 (c) 63

2. (a) 7 (b) 21 (c) 28 (d) $\frac{1}{2}$

3. (a) 12.5% (b) $\frac{7}{8}$ (c) 200

4. (a) 25% (b) $\frac{7}{12}$ (c) 36

5. (a) 45% (b) 85% (c) 6   6. (a) 35% (b) 35% (c) 200

Practice 12

1. (a) Michelle (b) 2 times (c) Rs 30

2. (a) Maira (b) 128 (c) $\frac{7}{32}$

3. (a) 25% (b) 20% (c) dress (d) Rs 1250

4. (a) 20% (b) $\frac{1}{4}$ (c) 12

5. (a) 40% (b) 10% (c) Rs 5400

6. (a) Monday and Thursday (b) 5 (c) 50

Fun with Maths

Ask the pupils to attempt the exercise on page 211 of the Student's Book.

Unit 13: Angles in Geometrical Figures

Learning Outcomes

Pupils should be able to:

- understand the concept of supplementary and complementary angles
- calculate supplements and complements of given angles
- find unknown angles in geometrical figures involving square, rectangle, parallelogram, rhombus, trapezium and triangle

SUPPLEMENTARY AND COMPLEMENTARY ANGLES

Suggested Duration

1 period (40 min)

Instructions

Let's Learn…

Supplementary Angles

Things needed: wooden angles with the measurement specified (5, 10, 15, 20 … 175)

Place the wooden angles on the table with the measurement hidden from view.

Ask a child to come forward and pick up a wooden angle randomly.

The child must experiment with different angles to find the one that will align with the original to make a straight line.

Then the child turns the angles to see the measurement and add them.

Repeat the process few times.

The sum is always 180. (5+175, 10+170, 15+165,….)

The teacher should define supplementary angles.

Teacher can also point out that if one angle is an acute angle, its supplementary angle will be an obtuse angle. Thereby they can predict their answers.

Complementary Angles

Place the wooden angles (5,10,15,…..85) on the table with the measurement hidden from view.

Ask a child to come forward and pick up a wooden angle randomly.

The child must experiment with different angles to find the one that will align with the original to make a corner (90˚).

Then the child turns the angles to see the measurement and add them.

Repeat the process few times.

The sum is always 90. (5+85, 10+80, 15+75, ….)

The teacher should define complementary angles.

The teacher can point out the fact that both the angles will always be acute angles.

Let's Try…

Ask the pupils to try the exercises on page 215 of the Student's Book.

Homework

Ask pupils to do NSPM Workbook 6B—Worksheet 36.

Answers

page 215

1. (a) 80°   (b) 102°   (c) 36°   (d) 84°

2. (a) 27°   (b) 42°   (c) 73°   (d) 9°

WORK Sheet 36

1. (a) 152°   (b) 41°   (c) 84°   (d) 124°

   (e) 63°   (f) 1°   (g) 169°   (h) 67°

2. (a) 32°   (b) 11°   (c) 74°   (d) 38°

   (e) 47°   (f) 57°   (g) 36°   (h) 46°

ANGLES IN GEOMETRICAL FIGURES

Suggested Duration

5 periods (200 min)

Instructions

Let's Learn…

Example 1:

Revise properties related to general triangles, isosceles triangles, right-angled triangles and equilateral triangles.

Example 2:

Revise properties associated with parallelograms, including parallel lines.

Example 3:

Revise properties associated with trapeziums.

Example 4:

Based on the properties of parallelograms and right-angled triangles, the unknown angles can be found.

Example 5:

Based on properties of rectangles, triangles and adjacent angles on straight line, 2 methods are shown.

Let's Try…

Ask the pupils to try the exercises on pages 222–223 of the Student's Book.

Homework

Ask pupils to do NSPM Workbook 6B—Worksheet 37 and Practice 13.

Answers

Let's Try   pages 222–223

1. 90º   2.   41º   3.   53º   4.   158º   5.   68º

6. ∠ACB = 45º, ∠ABC = 45º

WORK Sheet 37

1.   51º   2.   72º   3.   ∠PRS = 36º, ∠SRT = 120º

4.   18º   5.   ∠m = 68º, ∠n = 47º   6.   110º

7.   ∠p = 58º, ∠s = 32º   8.   ∠STP = 68º, ∠TSP = 44º

9.   ∠x = 60º, ∠y = 120º, ∠z = 90º

10. ∠x = 45º, ∠y = 75º

11. ∠AED = 30º, ∠AGF = 120º

12. ∠BED = 110º, ∠DBE = 31º

Practice 13

3. 92º   4.   20º   5.   21º   6.   69º

7. (a)   92º   (b)   16º

8. (a)   30º   (b)   115º

Fun with Maths

Ask pupils to try the fun activity on page 224 of the Student's Book.

Unit 14: Problem-Solving Processes and Strategies

PROBLEM–SOLVING PROCESSES

Answers

![Let's Try] page 232

1. Rs 36   2. 25%   3. Rs 1100

WORK Sheet 38

1. Rs 160   2. 40.1 kg

PROBLEM–SOLVING STRATEGIES

Answers

![Let's Try] page 239

1. 7 and 5   2. 75   3. 60 km   4. 40 cards

WORK Sheet 39

1. 148   2. 3   3. 99   4. 24

Revision A

1. (3)   2. (1)   3. (3)   4. (2)   5. (4)
6. (4)   7. (4)   8. (3)   9. (2)   10. (1)
11. (2)   12. (3)   13. (3)   14. (2)   15. (4)
16. (2)   17. (3)   18. 5000   19. 754 321
20. 3820.5   21. 90   22. $\dfrac{9}{14}$ 23. south-west   24. 11.2 km
25. 13   26. 6%   27. 40º   28. 115.5 cm²
29. 32º   30. $5x + 6$ 31. Rs 380   32. 30 000 cm³
33. 168 cm²   34. Rs 15   35. yes   36. 11.45 a.m.
38. Rs 2263   39. (a) Rs 800   (b) 37.5%
40. 131   41. (a) 5 : 6 : 8   (b) 25
42. 30º   43. 30.5 cm²   44. 20
45. 200 ml   46. 3 l 47. (a) 31.4 cm   (b) 94.2 cm
48. 122º   49. (a) 37   (b) 116
50. (a) Rs 11000   (b) Rs 57 000

Revision B

1. (2)   2. (3)   3. (3)   4. (3)   5. (4)
6. (3)   7. (4)   8. (3)   9. (2)   10. (4)
11. (2)   12. (3)   13. (4)   14. (1)   15. (3)
16. (2)   17. (4)   18. $\dfrac{3}{8}$ 19. 38º   20. 92
21. 32.5%   22. $\dfrac{1}{14}$ 23. $\dfrac{3}{4}$ 24. 4094   25. 90 cm²
26. 320 km   27. 77   28. 13 : 40
29. $17m + 82$ 30. 96 cm²   31. 112
32. 48 cm   33. (a) June   (b) 5600   34. 225   35. 60º
36. Rs 763   37. 37.5 kg   38. (a) 40.26 cm   (b) 48.78 cm²
39. 160 cm   40. 25 cm   41. (a) 40   (b) chocolate   (c) 5 : 9
42. 240 km   43. (a) 2240   (b) 5376
44. (a) 26º   (b) 30º   (c) 56º   45. (a) 600   (b) 210   (c) 54
46. (a) $\dfrac{7}{24}$ (b) 312   (c) 104
47. (a) 70 l (b) 30 l (c) 2000 cm²   (d) 44.7 cm

Revision 3 Workbook 6B

1. 3
2. 2
3. 4
4. 3
5. 2
6. 1
7. 2
8. 4
9. 1
10. 4
11. 4
12. 2
13. 4
14. 2
15. 1
16. 0.625
17. $\dfrac{2}{5}$
18. 30 000
19. 176 000
20. 35
21. 6
22. 105°
23. 11 yrs
24. 1
25. 8 : 5
26. 8
27. 20%
28. 39
29. south-west
30. 72 km
31. 44
32. 32 cm²
33. 5 cm
34. $\angle x = 120°$, l$y = 140°$, l$z = 100°$
35. 16 25
36. (a) Rs 150   (b) Rs 50
37. (a) 7 cm   (b) 129 cm
38. 119 cm²
39. 75°
40. Rs 138
41. 11
42. (a) 30   (b) 6
43. 6
44. (a) 11.30 a.m   (b) 80 km/h
45. (a) $6x - 5$ (b) John: 31 yrs, Mary: 5 yrs
46. (a) 140   (b) 10
47. (a) 384 l (b) 76.8 l (c) 20%
48. (a) March   (b) January   (c) 73
49. 6A, 6B, 3C; 15B
50. (a) 64   (b) $\dfrac{1}{64}$

Revision 4 Workbook 6B

1. 2
2. 2
3. 1
4. 3
5. 1
6. 3
7. 4
8. 3
9. 4
10. 2
11. 4
12. 1
13. 1
14. 3
15. 4
16. 13.5 km/h
17. 80%
18. 1728 cm^3
19. 27
20. $\frac{1}{20}$
21. 10 m – 23
22. 57 cm^2
23. Rs 471.80
24. 24 400
25. $\frac{3}{5}$
26. 56 cm
27. 50º
28. 12%
29. Rs 115
30. $5\frac{3}{7}$
31. $2\frac{2}{9}$
32. 225.54
33. 20
34. 90º
35. 1 : 2
36. Rs 480
37. 40º
38. 30
39. (a) 76.48 cm (b) 308.16 cm^2
40. (a) 50 (b) 62%
41. (a) 60 (b) 15
42. (a) 600 (b) 216
43. (a) 6750 cm^3 (b) 15 cm
44. (a) $\frac{p - 12}{4}$ (b) (i) 9.5 cm (ii) 28.5 cm
45. (a) Rs 2000 (b) 880 (c) 6% (d) 25%
46. (a) 55º (b) 75º
47. (a) 60 km/h (b) 9.45 a.m