CDT Materials

Class – IV

Subject – Mathematics

1. <u>Number System</u> : The ways of representation of numbers using digits or other symbols in a consistent manner.

Types of numbers:-

1. Natural Numbers - Counting numbers 1, 2,3,4,5 are called natural numbers.

e.g., 1, 2, 3, 4, 5, 6,…..

2. Whole Numbers - All counting numbers together with zero form the set of whole numbers.

(i) 0 is the only whole number which is not a natural number.

(ii) Every natural number is a whole number.

3. Integers - All natural numbers, 0 and negatives of counting numbers. e.g., 0,-1-2,

-3,1,2,3…..

4.Even Numbers - A number divisible by 2 is called an even number, e.g.,2,4,6,8,14, 52 etc.

5. Odd Numbers - A number not divisible by 2 is called an odd number. e.g.,1,3,5,7,9,11, etc.

6. Prime Numbers - A number greater than 1 is called a prime number, if it has exactly two factors, namely 1 and the number itself. e.g., 3, 11, 7…..

7. Composite Numbers - Numbers greater than 1 which are not prime, are known as composite numbers, e.g. 9,10,12, 15, 36 etc.
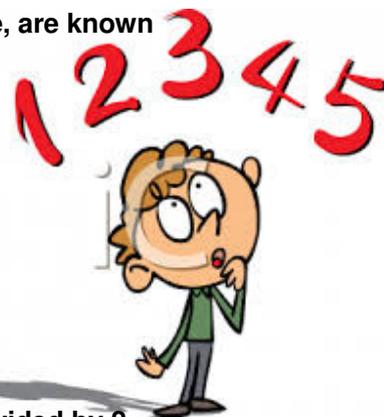
(i) 1 is neither prime nor composite.

(ii) 2 is the only even number which is prime.

(iii) There are 25 prime numbers between 1 and 100.
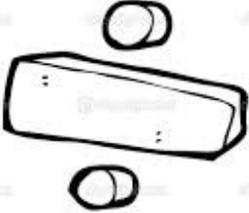
8. Even, Odd Numbers

A number is even if the remainder is zero when the number is divided by 2.

A number is odd if the remainder is one when the number is divided by 2.

Tests of Divisibility:-

There are some common methods to detect whether the number is divisible by a number or not.

1. Divisibility By 2 - A number is divisible by 2 if its unit's digit is any of 0,2,4,6,8.

Example: 5892 is divisible by 2, while 4835 is not.

2. Divisibility By 3 - A number is divisible by 3 if the sum of its digits is divisible by 3.

Example: 43212 is divisible by 3 as sum of its digits 4+3+2+1+2 = 12 is divisible by 3.

3. Divisibility By 4 - A number is divisible by 4 if the number formed by the last two digits is divisible by 4.

example: 5824 is divisible by 4 as last two digits 24 is divisible by 4.

divisibility By 5 - A number is divisible by 5 if its unit's digit is either 0 or 5.

Example: 3720 and 5485 are divisible by 5 as last digit is 0 or 5.

Divisibility By 6 - A number is divisible by 6 if it is divisible by both 2 and 3.

Example: 822 is divisible by 2 and 3 both so it is divisible by 6 also.

Divisibility By 8 - A number is divisible by 8 if the number formed by the last Three digits of the given number is divisible by 8.

Example: 5360 is divisible by 8 as last 3 digits 360 is divisible by 8.

7. Divisibility By 9 - A number is divisible by 9 if the sum of its digits is divisible by 9.

Example: 252 is divisible by 9 as sum of its digits 2+5+2 = 9 is divisible by 9.

8. Divisibility By 10 - A number is divisible by 10 if it ends with 0.

Example: 410, 180 are divisible by 10, while 4755 is not.

2.Plane and solid shapes:-

Plane Shape - Any shape that can be drawn in the plane is called a plane shape.

- ✓ A closed shape with only straight sides as edges is called a polygon.
- ✓ Triangle is the simplest polygon.
- ✓ Circles and semicircles are not polygons because they have curved sides.
- ✓ When all the sides of a polygon are equal, it is equilateral .If all the angles of a polygon are equal, it is equiangular. When a polygon is both equilateral and equiangular, it is a regular shape. Equilateral triangles, squares are regular.

Types of Plane shapes:-

Triangles:- A triangle is a closed shape with three sides. It is classified according to its sides or angles, with three kinds each.

Triangles according to sides:-
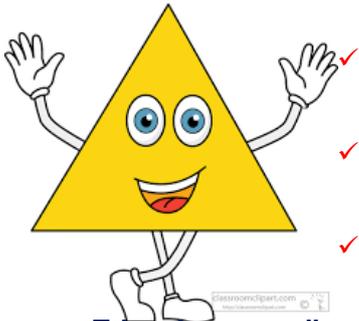
- ✓ **Equilateral triangles:** These have three sides equal and three angles equal. Their angles are always 60°.
- ✓ **Isosceles triangles:** These are the triangles in which two of the sides are equal. The non-included angles of the sides are also equal.
- ✓ **Scalene triangles :** These have no equivalence at all.

Triangles according to angles:-

- ✓ **Right triangles:** These are the triangles with a right angle. The longest side of such triangles is called a hypotenuse.
- ✓ **Obtuse triangles:** These are the triangles with an obtuse angle.
- ✓ **Acute triangles:** These are the triangles with no right or obtuse angle.

Quadrilaterals: A quadrilateral is a closed shape with four sides.

Some common types of quadrilaterals:-

- ✓ **Parallelograms** are shapes where opposite sides and angles are equal.
- ✓ **Rectangles** are parallelograms where all the angles are 90°. Its breadth is the shorter sides, and length is its longer ones.
- ✓ **Rhombuses** are parallelograms where all the sides are equal, and opposite angles are equal.

- ✓ **Squares** are parallelograms that are both rectangles and rhombuses, i.e. all angles are right and all sides are equal.
- ✓ **Trapeziums** have two opposite sides that are parallel.

Common names of some polygons with multiple sides.

Pentagons → 5 sides. **Hexagons** → 6 sides. **Heptagons** → 7 sides. **Octagons** → 8 sides.

Nonagons → 9 sides.   **Decagons** → 10 sides. **Hendecagons** → 11 sides.

Dodecagons→ 12 sides.

Circles – The corner-less closed figure all the parts of boundary of which are equidistant from a fixed point called center of circle.

Area and perimeter:-

In the plane figures, there are two measurements that are important to find: the area and the perimeter. The perimeter is the length around the shape or the length of the boundary of a shape.

- ✓ Perimeter of a Square = 4 x side
- ✓ Perimeter of a Rectangle = 2(length + breadth)
- ✓ Perimeter of any shape = Sum of all the sides.

Area is the size of the shape. They can be calculated using different formulae.

- ✓ Area of a Square = Side x Side
- ✓ Area of a Rectangle = length x breadth
- ✓ Area of any shape = Sum of all the squares of unit sides.

Solid Shapes: -   A solid shape is a three-dimensional figure that has width, depth and height. Examples of solid shapes include cubes, pyramids and spheres.

Some common solid shapes:-

- ✓ **Cuboids** are solid figures having six faces, that are rectangles. Some examples may include a book, a piece of furniture, or a jewelry box.
- ✓ **Cubes** are just a special case of cuboids. Cubes are solid figures that have six faces that are all squares of the same size.
- ✓ **Cone** is a solid figure that has a circular face on one end, called the base, and a point at the other end where the sides meet.
- ✓ **Cylinder** is a solid figure that has two circular bases and one curved side.
- ✓ **Sphere** is a solid figure that is round and has the shape of a ball.
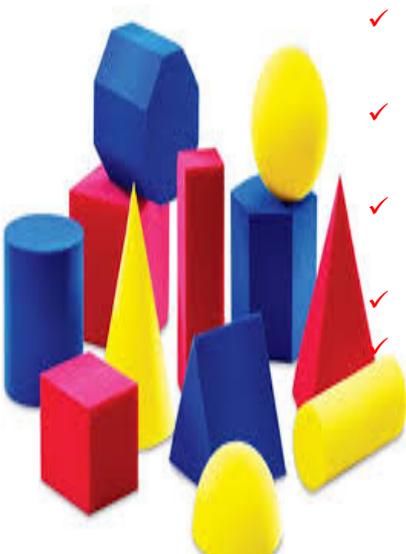
✓ **Pyramid** is a solid figure that has a polygon as its base on one end and triangular faces all meeting at a single point on the other end.

Volume of a solid shape is the amount of space displaced by it.

Volume of a Cube = Side x Side x Side

Volume of a Rectangle = length x breadth x depth

3.Time and Clock: Time is the ongoing sequence of events taking place. We measure time using seconds, minutes, hours, days, weeks, months and years.

Clocks measure time.

To read a clock:

✓ Look at the numbers on the perimeter of the clock face. ...

✓ Locate the shorter hand, which tells you the hour. ...

✓ Find the longer hand, which will point to the minutes. ...

✓ Use the longer hand to find individual minutes between numbers. ...

✓ Read the time. ...

12 hours and 24 hours clock notations:

✓ AM and PM are abbreviations that tell us whether the time occurs in the morning or in the afternoon/evening.

✓ AM occurs in the morning. It stands for ante meridiem which means "before midday". You can think of it as "before noon".

✓ PM occurs in the afternoon and evening. It stands for post meridiem which means "after midday". You can think of it as "after noon".

✓ In the AM/PM system of time, a 12-hour clock is used. That means that the morning goes up until 12:00 noon and it starts over again with 01:00 and goes through 12:00 midnight.

✓ In contrast, a 24-hour clock does not start over after 12:00 noon. The next hour (which we normally think of as 1:00 PM) is 13:00, then 14:00 etc. Time goes all the way up until 24:00 midnight which can also be called 00:00 because it is the start of the next day.

4. Patterns: - Things that are arranged systematically and follow a rule are said to be in pattern.

Number patterns are numbers ordered in a manner following some rules.

- ✓ Look at the last one or two digits or the first digit to see any special manner.
- ✓ Think about common number patterns, like counting by 2s, 5s, or 10s.
- ✓ Find the difference between the numbers.

5. Smart charts: Representing the information in a table, lists or by means of pictorial form is the smart chart.

Types of Charts:-

1. Tally Marks - Tally marks are represented as numbers in groups of five. One vertical line is made for each of the first four numbers; the fifth number is represented by a diagonal line across the four lines.

2. Pictograph: Pictorial representation of statistics on a chart, graph or table is pictograph. **It is a way of showing data using images. Each image stands for a certain number of things.**

3. Bar Graphs: A bar graph contains a bar for each category of a set of qualitative data. The bars are arranged in a manner so that the tallest bar represents the highest value.

4. Pie Chart: A pie chart displays data in the form of a circular plate also called pie. Each slice of pie represents separate category.
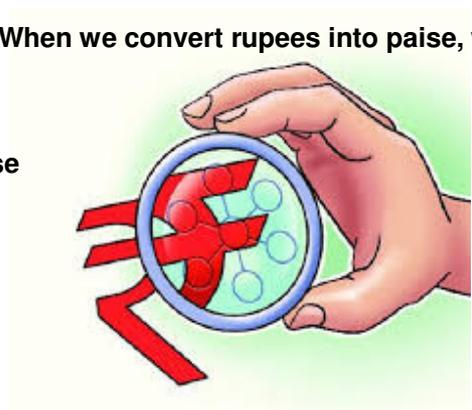
6.Rupees and Paise : Currency is the foundation of national economics.

Conversion of Rupees into Paise:

- ✓ We know that 1 rupee = 100 paise. When we convert rupees into paise, we multiply by 100.

  For example, Rs 7.75 = Rs 7 + 75 paise

= 7 × 100 paise + 75 paise

= 700 paise + 75 paise

= 775 paise

✓ To convert from first we need to remove the point and then remove Rs or Re and write the paise at the end.

For example, to convert Rs 7.75 into paise we express it as 775 paise.

Conversion of Paise into Rupees:

✓ To convert paise into rupees first we need to count two digits from the right and put a point and also write Rs or Re in the beginning.

Examples: (i) 1450 p = Rs 14.50

(ii) 4155 p = Rs 41.55

(iii) 1 p = Rs 0.01

7. Roman Numbers: Numbers in this system are represented by combinations of letters from the Latin alphabet. It originated from ancient Rome and remained the usual way of representing the numbers.

Basics :

✓ Numerals I, V, X, L, C, D, and M are used for 1, 5, 10, 50, 100, 500 and 1000.

✓ Repeating a numeral up to three times represents addition of the number. For example, III represents 1 + 1 + 1 = 3. Only I, X, C, and M can be repeated; V, L, and D cannot be.

✓ Writing numerals that decrease from left to right represents addition of the numbers. For example, LX represents 50 + 10 = 60 and XVI represents 10 + 5 + 1 = 16.

✓ Writing a smaller numeral to the left of a larger numeral represents subtraction but it is applicable only to I, X and C .

- ✓ For larger numbers, a bar over a numeral means to multiply the number by 1000. For example, $\overline{D}$ represents 1000 x 500 = 500,000 and $\overline{M}$ represents 1000 x 1000 = 1,000,000, one million.

8. How many ? How much ? : Addition, Subtraction, Multiplication and Division are most ancient mathematical tools. The fundamental day to day activities are the combination of these four basic mathematics. We must have expertise over the hidden application of these mathematical operations.

- ✓ **Problems containing addition, subtraction or both.**

Example 1: Add the subtraction of 516 and 132 with 945.

Example 2: There were 512 apples in a stock. One more stock of 452 apples was brought and added to first. In total 65 apples were found not worth to sell so thrown away. How many apples can the stockiest sell?

- ✓ **Problems containing multiplication, division and unitary method.**

Example: 1. Words on 25 pages = 825 ; words on 1 page = _____

Example:2. Cost of 16 tickets is Rs. 672. How much will it cost for 9 tickets?

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