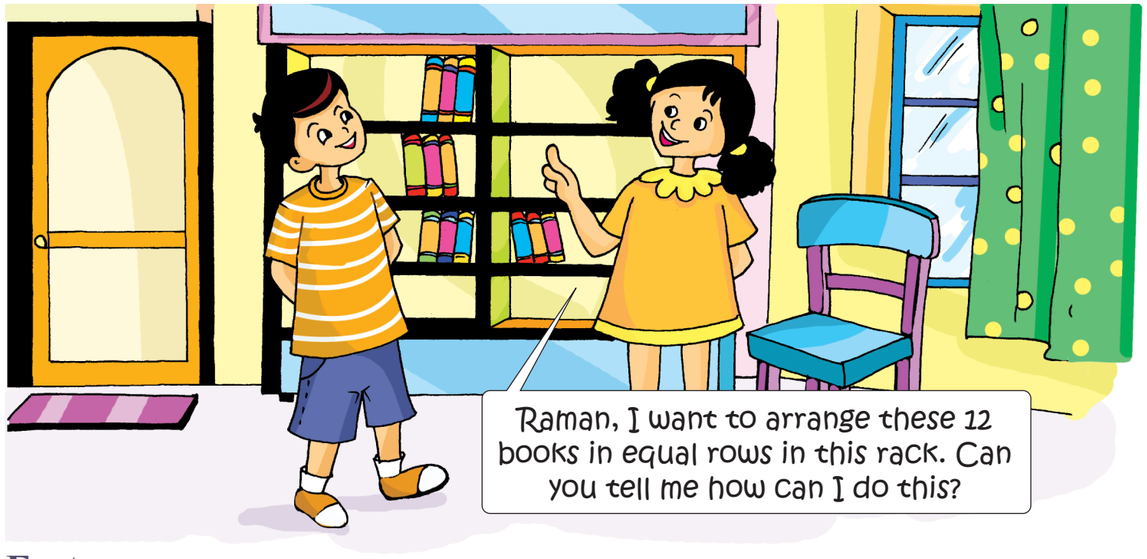
unit Factors and Multiples

Chapter Overview

Start the class by narrating certain peculiar situations to the students. Example:
Ask them if they have to distribute candies in groups of 2, 3 or 4 students then what is the least number of candies one requires?
Strike off the numbers by trial and error method and reach the answer.
Now tell the students this can be done for bigger numbers by finding the factors and multiples.

This chapter will enable the students to:

- understand factors and multiples
- LCM and HCF
- prime and composite numbers



Factors

A factor is a number that divides another number without leaving any remainder.

For example:

$30 \div 5 = 6$; $30 \div 2 = 15$; $30 \div 1 = 30$; $30 \div 3 = 10$; $30 \div 6 = 5$;
$30 \div 10 = 3$; $30 \div 15 = 2$; $30 \div 30 = 1$

In all the above cases, remainder is zero and thus 1, 2, 3, 5, 6, 10, 15, 30 are the factors of 30.

Note that 1 is a factor of every number and every non-zero number is a factor of itself as we have seen here.

We can use square grid/multiplication to find factors as well.

$1 \times 6 = 6$

$2 \times 3 = 6$

$3 \times 2 = 6$

$6 \times 1 = 6$

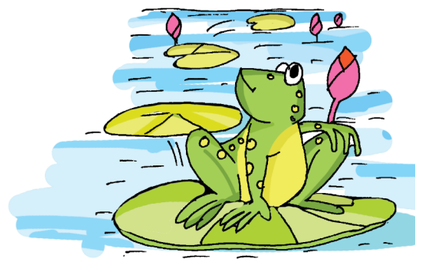
Thus, 1, 2, 3 and 6 are the factors of 6. Observe that all the factors of a number are less than or equal to the number itself.

Multiple:

A multiple of any number is a number that can be divided exactly by that number. The multiples can be formed by multiplying the number by 1,2, 3, 4, 5..... etc.

Example: Find the multiples of 5

$5 \times 1 = 5$
$5 \times 2 = 10$
$5 \times 3 = 15$
$5 \times 4 = 20$
$5 \times 5 = 25$
$5 \times 6 = 30$
$5 \times 7 = 35$



Thus 5, 10, 15, 20, 25, 30, 35..... are the multiples of 5

Odd and Even Numbers:

Any number that is exactly divisible by 2 is an even number.

e.g., 2 ,4, 6, 8, 10, 12, ...

Any number that is not exactly divisible by 2 is an odd number.

e.g., 1, 3, 5, 7, 9, 11, ...

Lowest Common Multiple (LCM)

Find any two common multiples of 4, 5 and 10
The multiples of 4 are: 4, 8, 12, 16, **20**, 24, 28, 32, 36, **40**
The multiples of 5 are: 5, 10, 15, **20**, 25, 30, 35, **40**, 45, 50
The multiples of 10 are: **20**, 30, **40**, 50, 60

Observe that common multiples of 4, 5 and 10 are 20 and 40. Since 20 is smaller, we say 20 is the LCM of 4, 5 and 10.

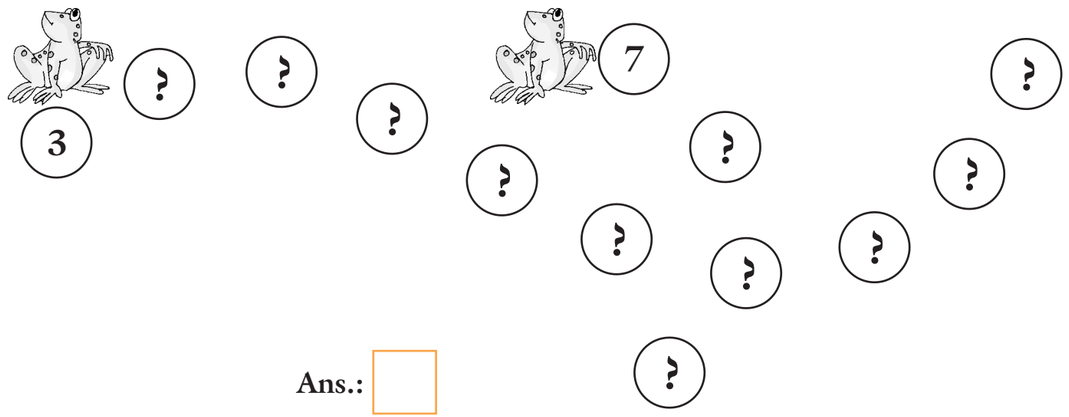
Facts of Multiple:

- Each number is it's own multiple as well as the multiple of 1.
- Zero is a multiple of every number.
- A multiple of a number cannot be less than the number.

Facts about Factors:

- 1 is the factor of each number.
- Each number is the greatest factor itself.
- There is no remainder, when a number is divided by its factor.

Can you find at which point the two frogs will meet if the first frog sits at point 3 and take jumps of 3 and the second frog sits at point 7 and take jumps of 7 respectively?



Ans.: ☐

Rules of Divisibility

Divisibility by 2: All even numbers are divisible by 2
e.g., 17 is an odd number hence is not divisible by 2
24 is an even number hence divisible by 2.

Divisibility by 3: If digits of a number add up to a sum which is divisible by 3, the number is divisible by 3.
e.g., Is 84 divisible by 3?
The sum of digits in the number 84 = (8 + 4 =12) , 12 is divisible by 3 and thus 84 is divisible by 3.

Divisibility by 5: Any number that ends in 5 or 0 in ones digit/place is divisible by 5
e.g., Are 45 and 57 divisible by 5?
45 has 5 in the ones place hence divisible by 5, whereas 57 has 7 in the ones place hence it is not divisible by 5.

Divisibility by 6: All numbers divisible by 2 and 3 are divisible by 6
Is 72 divisible by 6?
72 is an even number, so it is divisible by 2.
In 72 the digits add up to 7 + 2 = 9 , 9 is divisible by 3 and thus 72 is divisible by 3.
Hence 72 is divisible by 6.

Divisibility by 9: If the digits of a number add up to give the number 9, then the number is divisible by 9.e.g., Is 108 divisible by 9?
Add the digits of 108 = (1+0+8 = 9)
The digits add up to 9 hence the number is divisible by 9.

Divisibility by 10: Any number that ends with a zero in ones place is divisible by 10,
e.g., 30 is divisible by 10 but 35 is not divisible by 10.

Exercise 3.1

1. Find any two factors of the given numbers.

S.No.	Number	S.No.	Number
a.	42	f.	24
b.	54	g.	63
c.	12	h.	56
d.	48	i.	36
e.	72	j.	45