CHAPTER: Whole Numbers

Grade: **6**
Board: **CBSE**
Book: **NCERT**

1.

Chapter Summary and Placement

<Read through the following to understand how this chapter is connected with the previous and next grades and also the important concepts covered in it.>

1. This chapter connects to previous knowledge of students about whole numbers and their operations.
2. Knowledge of this chapter is very important and is connected to many other chapters in forthcoming grades like algebra

2.

LEARNING OUTCOMES

<On completion of the chapter, students will be able to:>

1. Defines predecessor and successor of given number, Set of whole numbers
2. Demonstrates addition, subtraction or multiplication on number line
3. Illustrates properties of whole numbers under addition
4. Illustrates properties of whole numbers under multiplication
5. Illustrates distributive property
6. Solves problems based on application of properties of whole numbers
7. Identify patterns in given sequences

4. TEACHING PLAN

Follow this section for getting ideas on teaching the content covered in the chapter. The subtopic given in the first column with the matching learning outcome can be explained using instructions and resources listed subsequently

Subtopic and Learning Objective #1

Subtopic:
Predecessor, successor, Set of whole numbers
LO:
Defines predecessor and successor of given number, Set of whole numbers

1.To make the student identify predecessor and successor

Teacher Activity

As the students are aware of terminology - before number and after number, a quick recap can be done with some examples showing predecessor and successor are nothing else but before number and after number

Check for understanding:

a) Predecessor of 34 is----------
b) 34 is predecessor of----------
c) Successor of 100 is----------
d) 100 is successor of ----------

- Introduce definition of set of whole numbers by showing the necessity of zero [as 3-3=?, we can not get answer if we have only natural numbers set] and hence we need whole number set which is nothing but natural number set with zero.
- Explain smallest whole number, undefinability of largest whole number

Check for understanding:

a) Set of natural numbers together with zero form _____
b) Smallest whole number is _____
c) Largest whole number is _____

Resources Suggested

Blackboard, pen and paper

Subtopic and Learning Objective #2

Sub topic: Addition, subtraction and multiplication on number line
LO:
Demonstrates addition, subtraction or multiplication on number line
1. To make student demonstrate addition, subtraction and multiplication on number line

Teacher Activity

1. Introduce addition, subtraction on number line which is nothing but moving right, left respectively as many places as the number. Multiplication is also moving right but as bundles as shown in ncert text book

Activity 1 can be performed to make class visualize number line movement

Check for understanding:

a) 3 + _____ = 7, how many places the pointer has to move from 3 to get 7 and in which direction it moves?
b) Represent the given difference on number line: 9 - 4=_____
c) Represent 2 x 5 on number line

Resources Suggested

Blackboard, pen and paper

Activity 1

Name of the activity- Frog jump
Type of activity – Group
Use it for – Making the students understand movement on number line
Materials – Pen and paper
Procedure:
Instructions to the teacher

1. Students are divided into small groups
2. Explain as an interesting story by adding a name to frog character: A frog jumps three jumps forward and two jumps backward as a cycle. If it is on starting number of set of whole numbers, how many cycles it has to go through to reach number 10.[Answer: As the result of movement of each cycle is 1 number, it takes 10 cycles to reach 10]
3. The number of jumps and direction of jumps can be varied for each group and perform the activity
4. To demonstrate multiplication through above activity, a frog jumps 3 small jumps forward to get a big leap.If it is on smallest whole number and takes 3 big leaps where it lands on[Answer: 9]. Change numbers for different groups and perform activity.

Subtopic and Learning Objective #3

Sub topic:Properties of whole numbers under addition
LO:
Illustrates properties of whole numbers under addition
1. To make student understand properties of whole numbers under addition

Teacher Activity

1. Introduce closure, commutative, associative and existence of identity element under addition

Check for understanding:

a) Give an example for closure property of whole numbers under addition
b) Give an example for associative property of whole numbers under addition
c) Give an example for commutative property of whole numbers under addition
d) _____ is called additive identity in the set of whole numbers
e) Do natural numbers have additive identity?
f) Give the statement of any one of the property of whole numbers under addition

Resources Suggested

Blackboard, pen and paper

Resource 1 and 2 can be used for better explanation

Subtopic and Learning Objective #4

Sub topic:Properties of whole numbers under multiplication
LO:
Illustrates properties of whole numbers under multiplication
1. To make student understand properties of whole numbers under multiplication

Teacher Activity

1. Introduce closure, commutative, associative and existence of identity element under multiplication

Check for understanding:

a) Give an example for commutative property of whole numbers under multiplication
b) Give an example for closure property of whole numbers under multiplication
c) Give an example for associative property of whole numbers under multiplication
d) _____ is multiplicative identity in set of whole numbers
e) Give the statement of any one of the property of whole numbers under multiplication
f) Do natural numbers have multiplicative identity?

Resources Suggested

Blackboard, pen and paper

Resource 1 and 3 can be used for better explanation

Subtopic and Learning Objective #5

Sub topic: Distributive property
LO:
Illustrates distributive property

1. To make student understand distributive property

Teacher Activity

1. Introduce multiplication is distributive over addition in set of whole numbers
   Activity 2 can be performed for better understanding

Check for understanding:

a) Give an example to show that multiplication is distributive over addition in set of whole numbers

Resources Suggested

Blackboard, pen and paper

Resource 4 can be used for better explanation

Activity 2

Name of the activity-
Type of activity – Individual
Use it for – Application of distributive property
Materials – Pen and paper
Procedure:
Instructions to the teacher:

1. Ask students to take a round of the school and collect information from five classrooms:

Number of windows in each class, w=
Number of entrance doors to each class,d=
Number of fans in each class,f=
Number of lights in each class,l=
Total number of classrooms,c=

2. Make sure that each class have same number of windows, doors, lights and fans otherwise just give the data and ask them to do calculations

3. Find out total number of doors and windows in the school by using distributive property
4. Find out total number of electrical fittings in the school by using distributive property

Subtopic and Learning Objective #6

Sub topic: Application of properties to solve problems
LO:
Solves the problems based on application of properties of whole numbers
1. To make student solve problems by applying properties

Teacher Activity

1. Introduce adding/multiplying the given numbers by suitable rearrangement , finding the product by using distributive property

Check for understanding:

[numbers can be teachers choice but please make sure that sum/product of two numbers in the given numbers land up as multiple of 10]

a) Find the sum of numbers by suitable rearrangement
b) Find the product of given three numbers by suitable rearrangement
c) Without actual multiplication, use distributive property to find the product of 104 x 35

Resources Suggested

Blackboard, pen and paper

Subtopic and Learning Objective #7

Sub topic: Patterns in whole numbers
LO: Identify the patterns

1. To make student understand the pattern

Teacher Activity

1. Introduce relation between elementary shapes and whole numbers as given in NCERT text book and make children to complete patterns

Worksheet 3 can be used as extension of explanation/ practice of patterns

Check for understanding:

a) What is the rule followed in writing set of even numbers? Is the same rule applicable even to write set of odd numbers?

[Answer: start with 0 and add 2 to get next number. Yes, but starting number must be odd that is 1]

b) State the rule used to write the below pattern and write next 2 steps

1+3= 4

1+3+5=9

1+3+5+7=16

[Answer: Rule: sum of first n odd numbers= n x n. n square notation can not be used as powers were not introduced yet]

Resources Suggested

Blackboard, pen and paper

Resource 1

Proprties of Whole numbers

Let a,b , c be any three whole numbers and '$*$'be any pre defined operation[addition, subtraction, multiplication, division]then

Closure property: If a $*$ b, is also a whole number then set of whole numbers ar closed under operation '$*$'

Commutative property: If a $*$ b = b $*$ a, then set of whole numbers is commutative under operation '$*$'

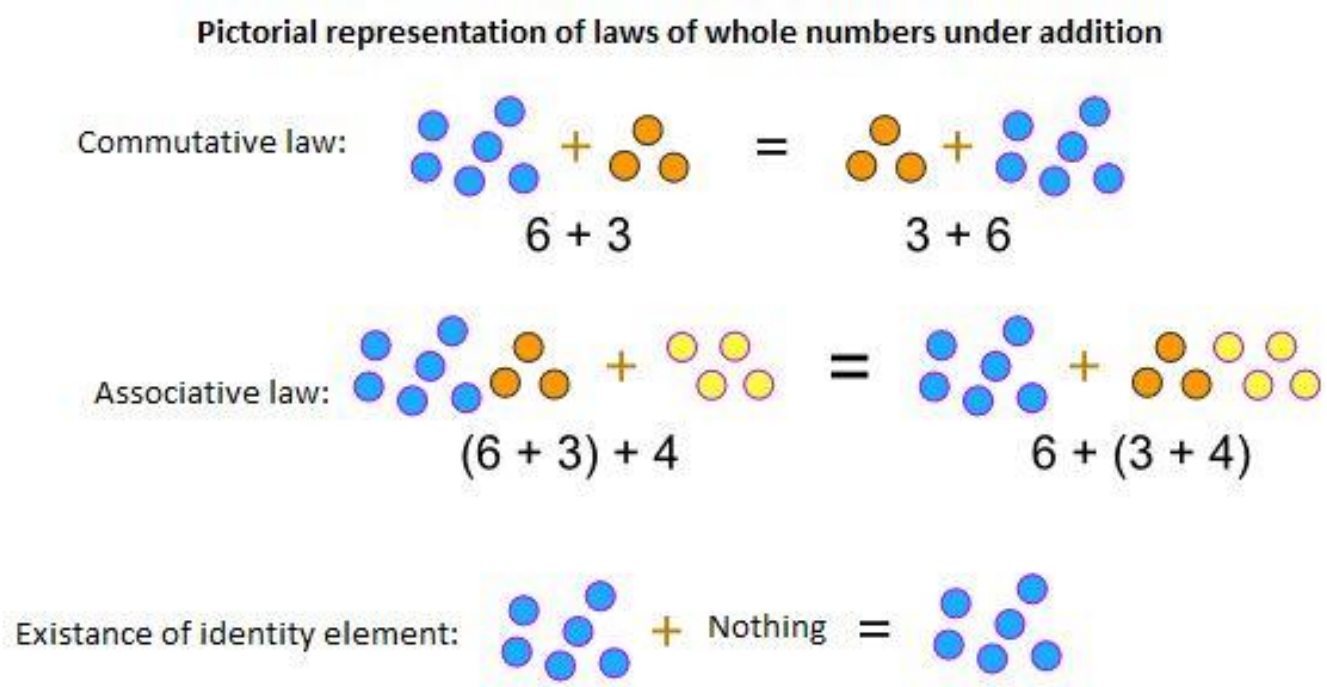
Associative property: If a $*$ (b $*$ c) = (a $*$ b) $*$ c, then set f whole numbers is associative under operation '$*$'

Existance of Identity element: For any element I if a $*$ I = I $*$ a = a, then I is called the identity element for the set of whole numbers under the given operaion '$*$'

Note:

1. '$*$' can be taken as addition/ subtraction/ multiplication/ division to explain the properties.
2. 0 is the identity element for addition and 1 is identity element for multiplication

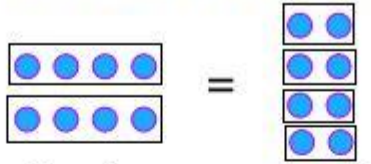
Resource 2


Pictorial representation of laws of whole numbers under addition
Commutative law:
6 + 3
3 + 6
Associative law:
(6 + 3) + 4
6 + (3 + 4)
Existance of identity element:
Nothing

Resource 3

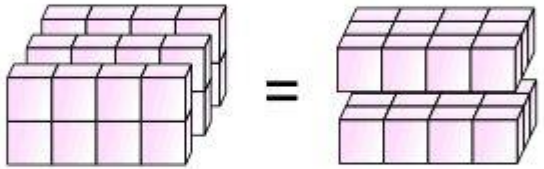
Pictorial representation of laws of whole numbers under multiplication

Commutative law:



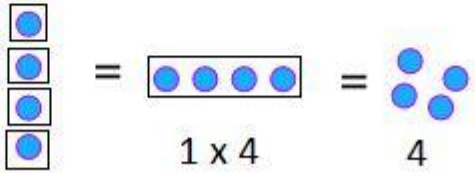
$2 \times 4 = 4 \times 2$

Associative law:



$(2 \times 4) \times 3 = 2 \times (4 \times 3)$

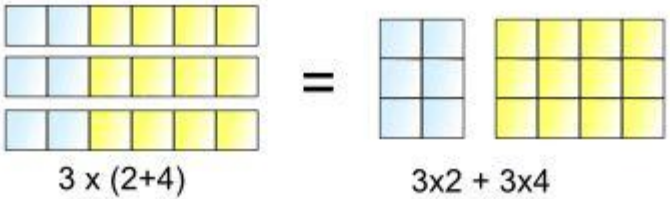
Existance of identity element:



$4 \times 1 = 1 \times 4 = 4$

Resource 4

Distributive Property



3 lots of **(2+4)** is the same as **3 lots of 2** plus **3 lots of 4**

5. WORKSHEETS

Print or copy the worksheet questions on the blackboard and ask the students to attempt them. They can be given as homework or a class test as well.

Worksheet 1

Use it like: test after the chapter is complete, homework

Answer the following:

Identify the following properties and name them

a) a x (b + c) = a x b + a x c

b) a + (b + c) = (a + b) + c

c) a + b = b + a

d) a x (b x c) = (a x b) x c

e) If a + I = I + a = a, then I is called_____

f) a x b = b x a

g) If a x I = I x a = a, then I is called_____

Worksheet 2

Use it like: test after the chapter is complete, homework

Answer the following:

1. Determine the sum by suitable rearrangement

   a) 637+908+363 b) 2062 +353 + 1438 + 547 c) 31+32+33+34+35+36+64+65+66+67+68+69

   d)1+2+3+4+5+995+996+997+998+999 e) 10+11+12+13+14+15+16+17+18+19+20

2. Determine the following products by suitable rearrangement

   a)4x4957x25 b) 8x2685x125 c) 8x25x40x125 d) 250x60x50x8

3. Find the values of the following by using all the properties

a) 538 x 8 + 538 x 2 b) 7869 x 92 + 7869 x 8 c) 4795 x 999 + 4795

d) 887 x 10 x 461 - 361 x 8870

Worksheet 3

Observe the patterns and fill in the blanks.

a) 1 x 8 + 1 = 9

12 x 8 + 2 = 98

123 x 8 + 3 = 987

1234 x 8 + 4 = 9876

12345 x 8 + 5 = 98765

(i) _____

(ii) _____

(iii) _____

b) 9 x 9 + 7 = 88

98 x 9 + 6 = 888

987 x 9 + 5 = 8888

(i) 9876 x 9 + 4 = _____

(ii) _____ x 9 + 3 = 888888

(iii) 987654 x 9 + ____ = 8888888

Worksheet 3

1 x 1 =1

11 x 11 = 121

111x111 = 12321

1111 x 1111 = 1234321

(i) _____

(ii)_____

(iii) _____

6. SOLUTIONS

This section gives you sample answers for activities and questions listed above.

Worksheet 1

a) Distributive property
b) Associative property under addition
c) Commutative property under addition
d) Associative property under multiplication
e) Identity element under addition
f) Commutative property under multiplication
g) Identity element under multiplication

Worksheet 2

1. a) (637+363)+908=1000+908=1908
   b) (2062+1438)+(353+547)=3500+900=4400
   c) (31+69)+(32+68)+(33+67)+(34+66)+(35+65)+(36+64)=100+100+100+100+100=600
   d) (1+999)+(2+998)+(3+997)+(4+996)+(5+995)=1000+1000+1000+1000+1000=5000
   e) (10+20)+(11+19)+(12+18)+(13+17)+(14+16)+15=30+30+30+30+30+15=165
2. a) (4x25)x4957 = 100 x 4957 = 495700
   b) (8x125) 2685 = 1000 x 2685 = 2685000
   c) (8x125)x(25x40) = 1000 x 1000 = 1000000
   d) (250 x 8) x (60 x 50) = 2000 x 3000 = 6000
3. a) 538(8 + 2) = 538 x 10 = 5380
   b) 7869 x (92 + 8) = 7869 x 100 = 786900
   c) 4975 x 999 + 4975 x 1 = 4975 x (999 + 1) = 4975 x 1000 = 4975000
   d) 8870 x 461 - 8870 x 361 = 8870 x (461 - 361) = 8870 x 100 = 887000

Worksheet 3

a) (i) 123456 x 8 + 6 = 987654

(ii) 1234567 x 8 + 5 = 9876543

(iii) 12345678 x 8 + 4 = 98765432b) 9 x 9 + 7 = 88

b) (i) 88888

(ii) 98765

(iii) 2

c) (i) 11111 x 11111 = 123454321

(ii) 111111 x 111111 = 12345654321

(iii) 1111111 x 1111111 = 1234567654321

7. EXTRA RESOURCES

Carry out the following suggested activities/ tasks if you have the time and resources to do them

Teacher can use these videos if time and facilities permit:

1. https://www.youtube.com/watch?v=nTVtOSUk_4g - commutative property
2. https://www.youtube.com/watch?v=KBfnkUGeMvI - Associative property
3. https://www.youtube.com/watch?v=0v-G6OwcKmU - Distributive property