LESSON PLAN – 5(24-25)

Class: **X** (September) Subject: **Mathematics**

Name of the teacher: School:

Name of the chapter	Topic	Number of periods required (10)	Timeline for teaching		Any specific information
			From	To	
5. ARITHMETIC PROGRESSIONS	**5.1** introduction	1			Real life situations
	5.2 Arithmetic Progressions	3			Historical note
	5.3 n^{th} term of an Arithmetic Progression	3			
	5.4 Sum of first n terms in Arithmetic Progression	3			

Prior Concept / Skills:

1. Knowledge of number system
2. Odd and Even numbers
3. Simple methods of calculating the numbers.
4. Patterns from real life situations like petals of sunflower, holes of honeycomb..

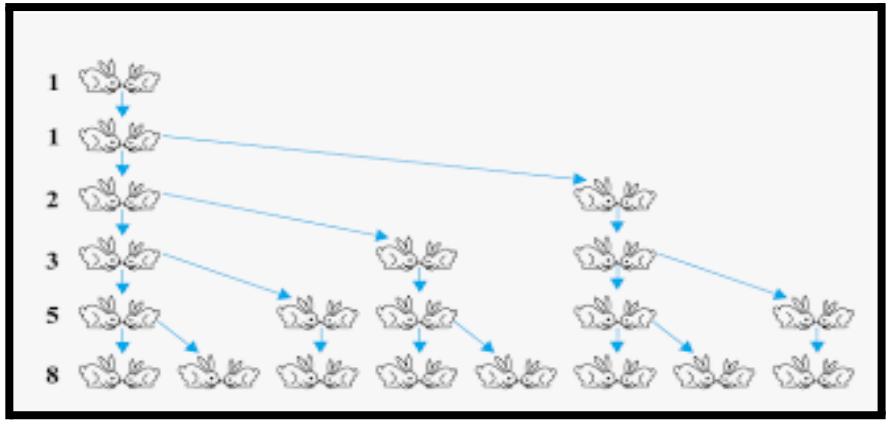
5. Number patterns collected from NMMS, Bank exams etc.,

Learning outcomes	Number of Periods
Students are able to: 1. Represent the patterns mathematically	1
2. observe and analyze patterns in their daily life situations to check if they form an Arithmetic Progression	2
3. Develops strategies to apply the concept of A.P. to daily life situations.	3
4. Derive n^{th} term and sum of n^{th} term of AP	4

TEACHING LEARNING PROCESS

Induction/Introduction(Generating interest, informing students about the outcomes and expectations for the lesson)

- Introduce the concept of by taking situations like width of space for spectators, dimensions of metal sheet for a box..
- applications of quadratic equations
- Historical note – Calculations in Babylonia time.

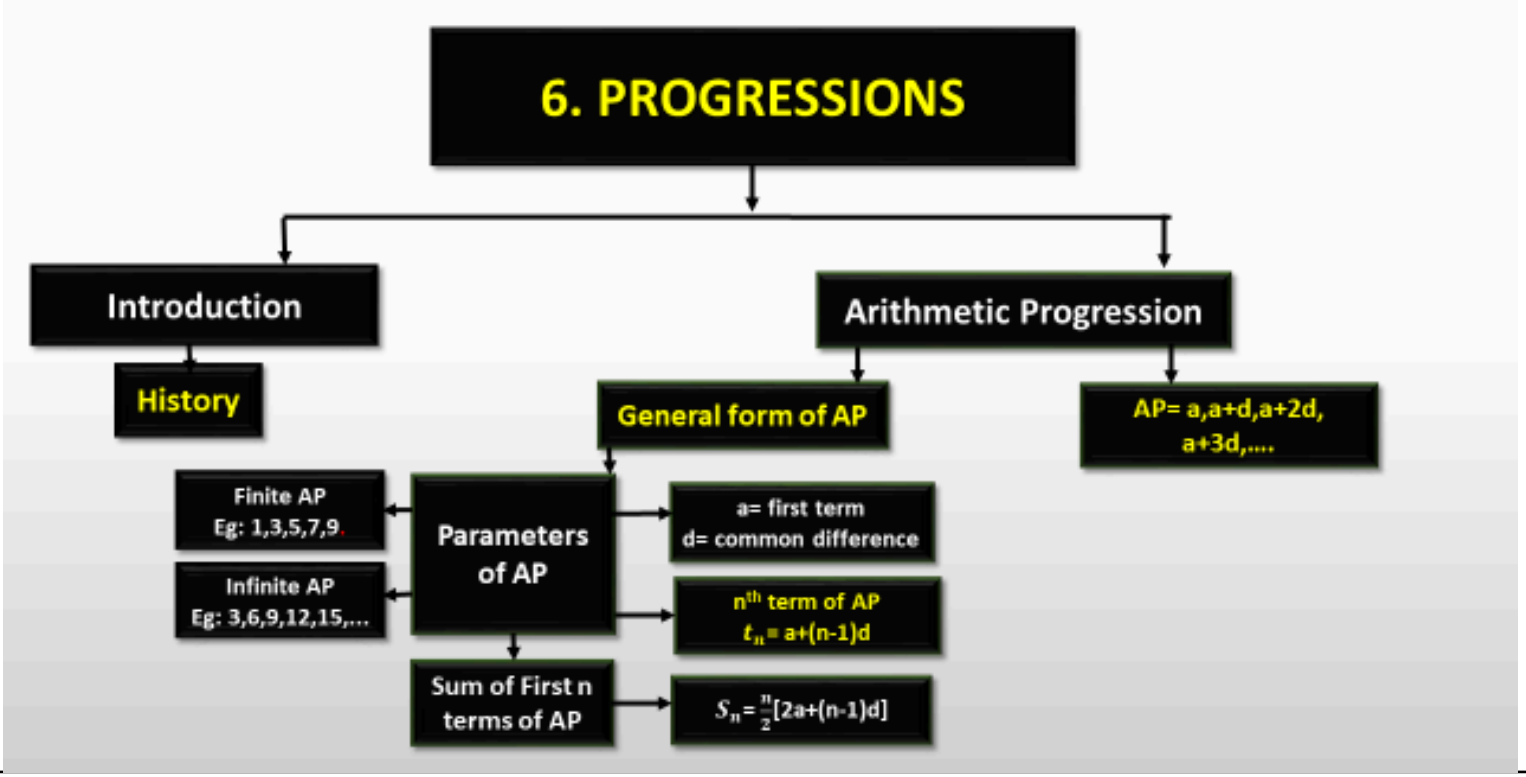


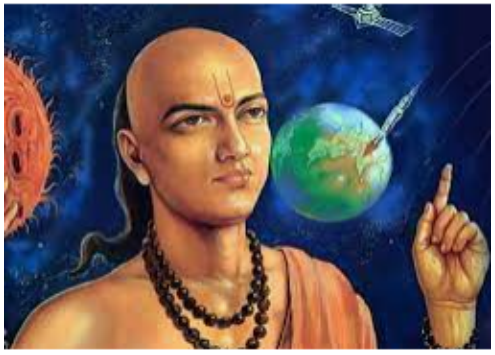
Experience and Reflection(Task/question that helps students explore the concept and connect with their life)

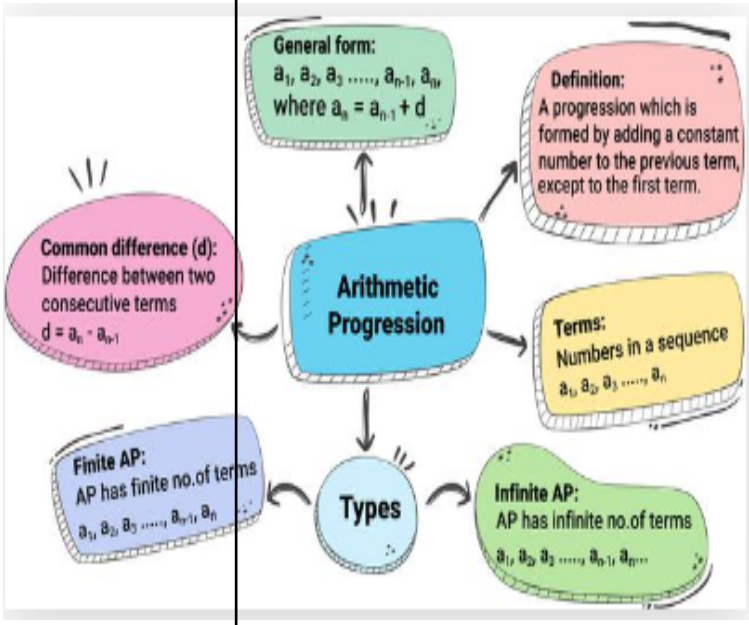
After completion of lesson, students should know

- Sequence, Series and Arithmetic Progression.
- All formulas and important concepts related to the AP
- Find the n^{th} term of AP from the starting and from the end of the sequences

- Represent all concepts through Flow chart.



Explicit Teaching/Teacher Modelling (I Do)	Group Work (We Do)	Independent Work (You Do)	Notes
5.1 Introduction: (1) At first explain the terms sequence and series. **Sequence:** If different terms are separated by commas then it is called a sequence. **Ex:** 1, 2, 3, 5, 7, 9, 11, 12.. **Series:** If different terms are separated by "+ "or " – " then it is called series. **Ex:** 1 + 2 + 3 + 5 + 7 + 11 + 12 +...	Draw some patterns like The number of unit squares in squares of sides 1, 2, 3 Understand the series behind the 6 examples given in the text book with the help of the teacher	Student can write some examples to sequences and series of their own: (i)3, 6, 9, 12 ... (ii) 3, 9, 27, 81.. (iii)3, 6, 10, ... Some series: (i)1+2+4+8+.. (ii)1+3+9+27+.	**Historical note**: Aryabhata was the first to give formula for sum of squares and cubes of natural numbers. 
5.2 Arithmetic Progressions: (3) Consider some lists of numbers, explain that the successive terms are obtained by adding or subtracting a	From some examples of AP such as a) heights of students in the prayer hall,	Each of the numbers in the list is called a **term**	

fixed number to the preceding terms. Such lists of numbers are called Arithmetic Progressions. Thus introduce the concept of AP. Write few sequences on the board and explain the difference between the A.P and other sequences. We observe that an A.P is a list of numbers formed by adding or subtracting a fixed number to the preceding number except the first number. **General term of AP:** Teacher write general term on board and explain its term and common difference d. a, a + d, a + 2d, a + 3d, ...a + (n – 1)d here, the first term = a, the fixed difference = common difference= d n th term a_n = a + (n – 1)d **Parameters of Arithmetic Progression:** (i)To check whether the given list of numbers form an AP or not	b) minimum temperature recorded for a week, c) cash prizes, d) interest in the savings account...etc understand finite and infinite AP Observe the examples given by teacher and answer Solve the example 1 and 2 problems with the help of the teacher.	 Solve the problems 1,2 and 3 of **Exercise.5.1**	**Activity:** Prepare a flowchart of showing concept about AP

(ii)To find an Arithmetic progressions we need two parameters **a,** the first term and **d**, the common difference. **5.3 n^{th} TERM OF AN ARITHMETCI PROGRESSION: (3)** By consider a real life situation, like finding salary of Reena for 5^{th} years, 15^{th} year, 25^{th} year , when starting salary and annual increment is known, gave formula for nth term of an AP , $a_n = a + (n - 1)d$ ● Explain the examples 3 to 10 of text book. ● Explain the problems 16 to 20 of **Exercise.5.2**	● Solve the problems given in problem 4 of **Exercise 5.1** by discussing with others Solve problems 5 to 15 of **exercise 5.2** by discussing with each other	Solve problems 1 to 4 of **Exercise 5.2**	
5.4 SUM OF FIRST N TERMS IN ARITHMETCI PROGRESSION: (3) By considering the earlier situation how much money will be collected at the time of 21 years, explain why we		Now, student	Historical Note about Carl Fredrich Gauss

need a formula to find sum after 21 years.

How Gauss find sum of terms:

Explain the method of finding sum of first n terms by using Gauss method.

Sum of n terms of an AP:

Explain the method of finding sum of n terms of an AP, by using Gauss method as discussed above.

the sum of arithmetic progression equations are:

$S_n = \frac{n}{2}(2a+(n-1)d)$ (when a, d are known)

$S_n = \frac{n}{2}(a_1 + a_n)$, when first and last terms are known.

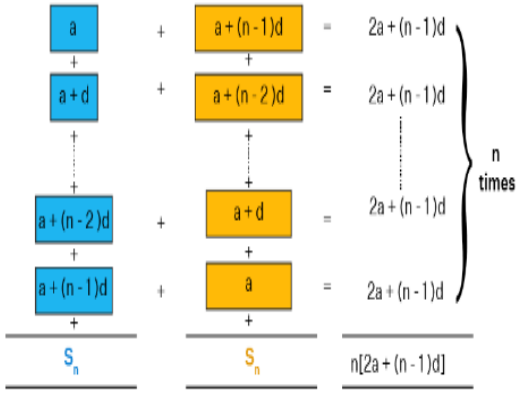
- Explain examples 11 to 16 of text book

Gauss method of finding sum of first 100 natural numbers

1	2	3	4	5	...	99	100
100	99	98	97	96	...	2	1
101	**101**	**101**	**101**	**101**	**...**	**101**	**101**

$$S = \frac{100 \times 101}{2} = 5050$$

Discuss with each other and write steps of finding sum of n terms of an AP, using Gauss method as

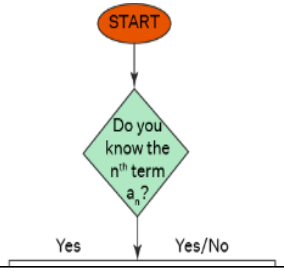


$2S_n = n[2a + (n-1)d]$

$S_n = n[2a + (n-1)d]$

find the amount in the money box of Shakila's daughter collected at the end of 21 years using formula.

Project work: Write steps of finding sum of n terms of an AP, represent the same in a flow chart to get an idea of the formula that has to be used to find the sum of arithmetic progression according to the information available to us and hence find the sum of n terms.



• Explain problems 18 to 20 of Exercise 5.3	• Solve the problems 13 to 17 of **Exercise 5.3**	Solve the problems 1 to 12 of **Exercise 5.3**	

Check For Understanding Questions

1. Factual:)

- 30th term of the AP: 10, 7, 4,..., is....
- In an AP, if d = -4, n=7, an =4, then a is
- Write next four terms of the following sequences form a Arithmetic Progression?

  (i) 7, 14, 21, 28, ...
  (ii) 0.6, 1.7, 2.8 ...
  (iii) – 37, - 33, - 29, ...

2. Open Ended / Critical Thinking:

1. How many terms of an AP must be taken for their sum to be equal to 120 if its third term is 9 and the difference between the seventh and second term is 20 ?

2. Find the arithmetci progression whose first term and common differences are given by (i) $a = -7$, $d = 6$ (ii) $a = 256$, $d = 0.5$
3. The present value of a machine is ₹40,000 and its value depreciates each year by 10%.
4. Find the estimated value of the machine in the 6^{th} year.

SIGNATURE OF THE TEACHER

SIGNATURE OF THE HEAD MASTER

VISITING OFFICER WITH REMARKS