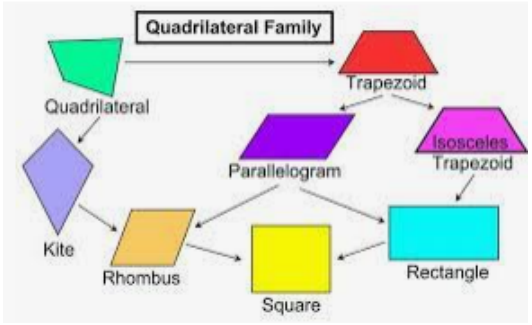
LESSON PLAN - 2

Class: **X** Subject: **Mathematics**

Name of the teacher: School:

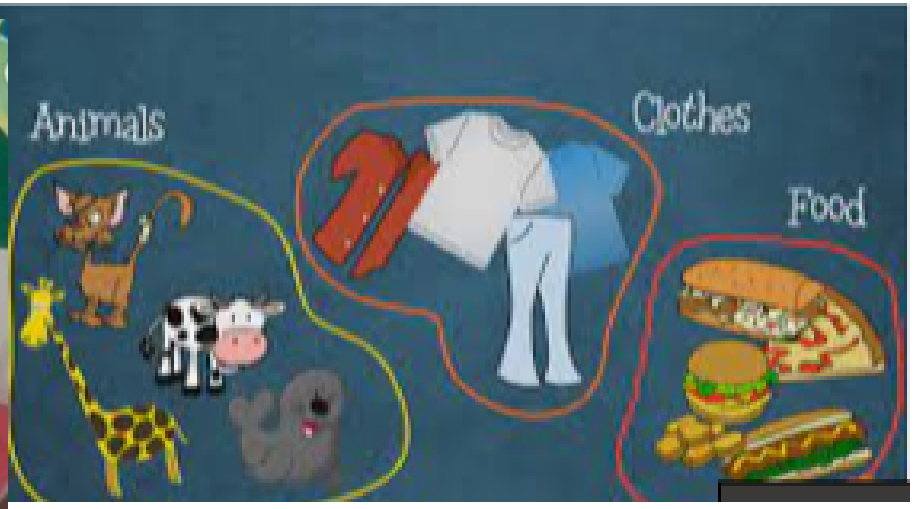
Name of the chapter	Topic	Number of periods required (10)	Timeline for teaching		Any specific information
			From	To	
2. SETS	2.1 introduction 2.2. Set 2.2.1 Roaster and set builder form	2			Historical note about George cantor
	2.3. Types of set 2.4. using diagrams to represent sets 2.5 Universal set and subset 2.6 Venn diagrams	3			Historical note about John Venn
	2.7 Basic operations on sets 2.7.1. Union of sets 2.7.2 Intersection of sets 2.8 Disjoint sets 2.9 Difference of sets	4			
	2.10 Equal sets 2.10.1 Finite and infinite sets	1			Real life examples

Prior Concept / Skills:	
1. Natural Numbers, Whole Numbers, Integers 2. Rational numbers and Irrational numbers. 3. Even and odd numbers. 4. Prime numbers and composite numbers 5. Multiples, factors, prime factors 6. Squares and cubes of numbers 7. Types of quadrilaterals 8. Parallel and intersecting lines 9. Basic concepts of co-ordinate geometry. 10. Euclid division lemma 	
Learning outcomes	**Number of Periods**
Students are able to: 1. Generalize our mathematical understanding into mathematical statements with logic.	2
2. Combine the earlier generalized statements to form a new statement.	2
3. Specified a common property among the things.	2
4. Searched for more properties and tried to elicit those to propose new problems. 5. Apply basic operations on sets	2 2

TEACHING LEARNING PROCESS

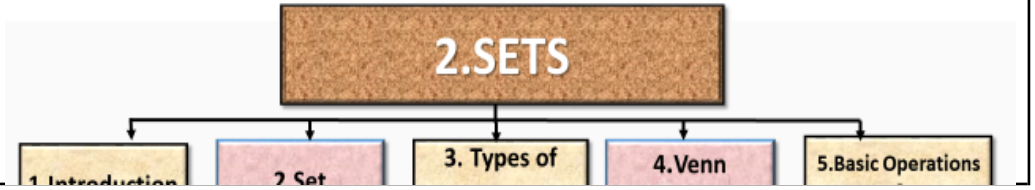
Induction/Introduction(Generating interest, informing students about the outcomes and expectations for the lesson)

- Set concept was introduced by a playing game of collecting different types of objects in our surroundings and grouping into similar objects
- Set theory is a practical implementation of Boolean logic that examines the relationships between groups of objects.
- Set theory has numerous real-life applications in computer systems design, as well as data base searching.
- Sets from real life situations:



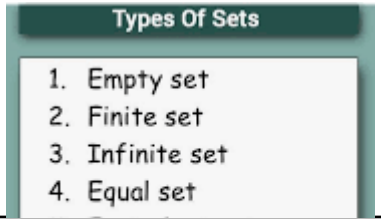
Experience and Reflection(Task/question that helps students explore the concept and connect with their life)

- Understand that mathematics is not full of problems, there is something that makes beautiful and is joyful.
- Observe the things and write their common property
- Apply a process or an operation to make general statements with logic



- Write Roaster and set builder form of sets
- Represent sets using Venn Diagrams
- Solve problems in sets by basic operations on sets like union, difference
- Differentiate between equal sets and equivalent sets.
- Represent all concepts through Flow chart.

Explicit Teaching/Teacher Modelling (I Do)	**Group Work (We Do)**	**Independent Work (You Do)**	**Notes**
2.1 Introduction: Conduct an Activity of collecting objects/things/information, and explain the process of identifying and grouping the above with some common property. Ex: The numbers in a sequence of arrangement of teeth in dental formula is 2, 1, 2, 3. **2.2 SETS: (2)** Gave definition of set as follows: A set is a collection of things that have follow a rule.	Think about limits of Euclid division Lemma, by discussing with others. • **Think - Discuss** (page.26) $A = \{ 0, 1, 2, 3, 4\}$	• **Do This** (page.26) • **Do This** (page.27)	**Activity:** Collect different things or objects which are having some common property and display in class room.  • Historical Note about George Cantor, who proposed Set theory. 

• The things in the set are called "elements", Set notation uses curly brackets { }, with elements separated by commas, and the common rule decides the elements of set.	Set Name elements of sets separated by commas		
2.2.1 Roster and Set builder form: In general sets can be denoted by capital letters of English alphabets. • Writing a set by listing elements in it is called Roster form of a set. • Writing a set by defining its elements with a 'common property' (rule) is called 'Set builder form' of a set. • Explain with examples. **2.3. TYPES OF SETS: ((3)**	Recall the usage of the symbols ∈ (belongs to), ∉(not belongs to) To represent whether the given element belongs to or not belongs to the given set. A = {a, e, I, o, u} is roster form A = { x: x is an vowel in English alphabet} is set builder form • **Think – Discuss** (page.28) Write answers for problems 6, 7 of **Exercise.2.1** **Differentiate between** Φ and {0} with the help of teacher that - Φ is a null set	• **Do This** (page.28) • **Do This** (page.29) • **Try This** (page.29) Write answers for problems 1 to 5 of **Exercise.2.1** Give some examples to null set.	In roster form, the order of elements is immaterial, but the elements should not repeat. Therefore, a set contains distinct elements. • Write some examples for above cases. Chart showing Types of sets: 

Explain through a situation where there exists no elements, give definition of 'Empty set.'

Empty set is also called as 'Null set' or 'Void set'.

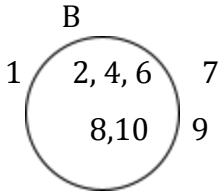
Empty set is denoted by { } or Φ

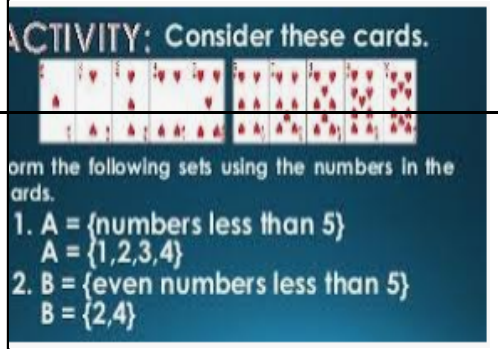
- {0} is a set containing an element 0.

The first 5 even numbers of set

B = { 2, 4, 6, 8, 10}

This can be represented as





2.4 USING DIAGRAMS TO REPRESENT SETS:

Every set can be represented by a closed curve with the name of the set, the elements belongs to the set are written inside the circle, the elements which are not belongs to the set are written outside the circle.

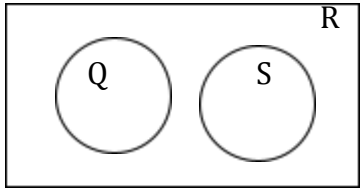
(i)Universal and Subset: If we have some sets, in them the biggest set is called Universal set, and is denoted as 'U' or 'μ' and is represented as a rectangle shape.

where as the remaining sets are called 'sub sets' to the universal sets.

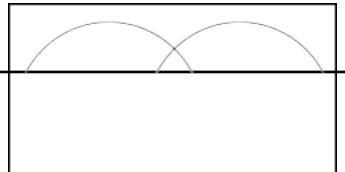
R = { real numbers}

Q = { rational numbers},

S = {irrational numbers}, the R is called Universal set and Q, S are called subsets of R.

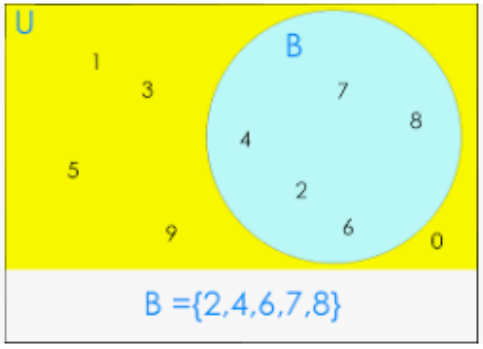


- **Think –Discuss** (page.34)
- The Venn diagrams usually consists of rectangles and circles.



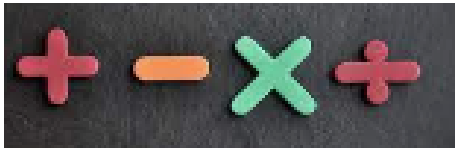
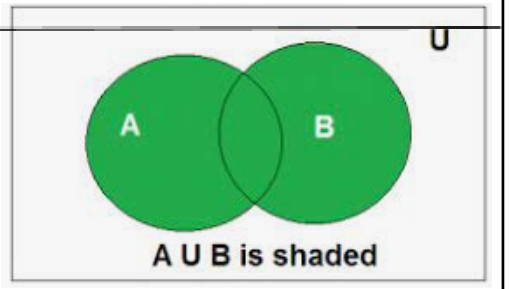
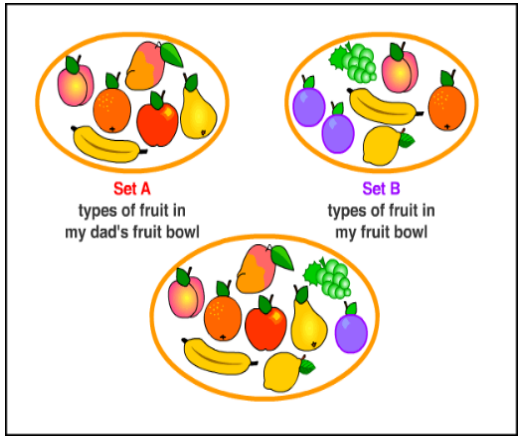
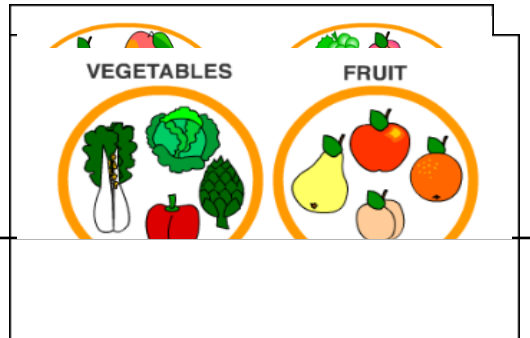
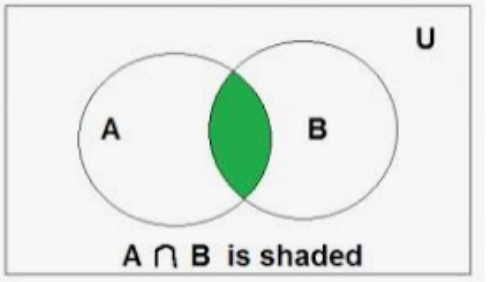
- **Do This** (page.33)
- **Try This** (page.33)

Subset : ⊂
Not subset: ⊄
Subset or equal to :⊆
Super set: ⊃



Historical Note about John Venn:

2.6 VENN DIAGRAMS:

Explain with historical note that Venn-Euler diagram or simple Venn diagram is a way of representing the relationships between sets.		Draw Venn diagrams for some examples.	Arithmetic operations:  Venn diagram of AUB: 
<u>2.7 BASIC OPERATIONS ON SETS:</u> **<u>(4)</u>** As we have addition, subtraction, multiplication and division in arithmetic, in sets also we define the operations of Union, intersection and difference of sets. **2.7.1 Union of Sets:** The union of sets A and B is the set of all the element of A and B. • It is denoted as **A∪B** and read it as 'A union B' • A∪B = { x: x ∈ A **or** x ∈ B} • Explain examples 1, 2, 3 of text book.	Write some sets from real life situations, discuss with others and find A∪B through Venn diagrams  Write some sets from real life situations and discuss with others and find A∩B through Venn diagrams 	The Operations on sets are; Union : ∪ Intersection: ∩ Difference : — Write some sets of their and find AUB.	Venn diagram of A∩B:  Disjoint sets: 

2.7.2 Intersection of sets:

The intersection of A and B is the set of all elements which are common to A and B. or simply the elements which belongs to A and also belongs to B.

- It is denoted as **A∩B** and read it as 'A intersection B'
- $A \cap B = \{ x: x \in A$ **and** $x \in B\}$
- Explain examples 4 and 5 of text book.

2.8 DISJOINT SETS:

Two sets are called disjoint sets if they have no common elements.

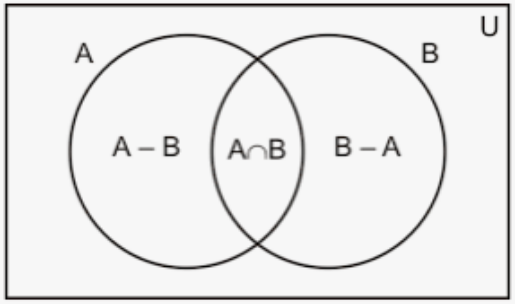
2.9 DIFFERENCE OF SETS:

The difference of sets A and B is the set of elements which belongs to A, but not belongs to B.

We denote the difference of A and B by **A−B** and read it as 'A minus B'

$A-B = \{x: x \in A$ **and** $x \notin B\}$

$B-A = \{x: x \in B$ **and** $x \notin A\}$



- **Think –Discuss** (page.37)
- **Think –Discuss** (page.38)

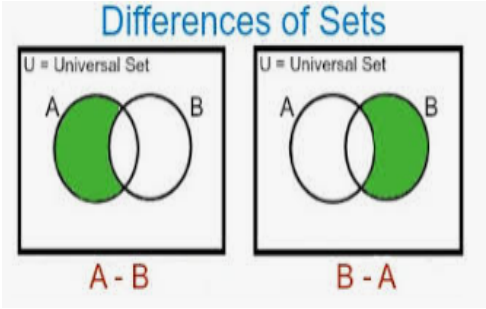
Illustrate equal and not equal sets with more examples.

- Verify that 'every set is subset to itself'.
- The cardinal number of a set A is denoted as n(A).
- **Power set of a set:** The power set P(A)of a set A is a set consisting all the subsets of A
- The number of elements in a set is called "cardinal number"

- **Do This** (page.37)
- **Try This** (page.37)
- **Do This** (page.38)

Write answers for problems 1 to 5 of **Exercise.2.2**

Here A and B are Disjoint sets.



Activity: prepare power sets of sets of 2 or 3 or 4 elements and display in class room.

(i) $A = \{1, 2\}$

$P(A) = \{ \{ \}, \{1\}, \{2\}, \{1, 2\}\}$

$$\mathcal{P}(\{1,2,3\}) = \left\{ \begin{matrix} \{\} \\ \{1\} \quad \{2\} \quad \{3\} \\ \{1,2\} \ \{1,3\} \ \{2,3\} \\ \{1,2,3\} \end{matrix} \right\}$$

(ii)

• Explain example.6 **2.10 EQUAL SETS : (2)** Two sets A and B are said to be equal if every element in A belongs to B (A⊆ B) and every elements in B belongs to A(B⊆A) If A and B are equal sets, then **A = B** • Explain by comparing the elements of sets which sets are equal and which are not equal with examples. • Explain examples. 7to 12 of text book **2.10.1. Finite and Infinite sets:** If it is possible to express the number of elements of a set in definite whole numbers, then that sets are called 'finite sets'. Ex: {x :x is an even number, x<10}	• Write answers for problems 4 and 5 of **Exercise.2.3** Write answers for example.13, 14 • What is the cardinal number of Null set? • **Think –Discuss** (page.44) • **Think –Discuss** (page.45)	If P = {a, b, c} then n(P) = 3 If a set A has n elements in it, then **n(P(A))= 2^n-1** Write answers for problems 1 to 3 of **Exercise.2.3** • **Do This** (page.44) • **Try This** (page.44) Write answers for problems of **Exercise.2.4**	(iii) Power Set of {1,2,3,4} { }, {1},{2},{3},{4}, {1,2},{1,3},{1,4}, {2,3},{2,4},{3,4}, {1,2,3},{1,2,4,},{2,3,4}, {1,2,3,4}

If the number of elements of a set are not finite, then that sets are called "infinite sets'. Ex: {x: x is an even number}			

Check For Understanding Questions

1. Factual:

- Identify and write common property of 1, 4, 9, 16.....
- Write the set of digits in the Ramanujan number
- Match the following
- (i) {1, 2, 3, 4} (a){ x : x is a prime factors of 6}
  (ii) {2, 3} (b){ x : x is an odd natural number less than 10}
  (iii) { M, A, T,H, E, I, C, S} (c) { x : x is a natural number and a divisor of 6}
  (iv) {1, 3, 5, 7, 9} (d) { x : x is a letter of the word MATHEMATICS}
- If A = {2, 5, 6, 8}, B={ 5, 7, 9, 1, 2} find A∪B and A∩B and draw Venn diagrams

2. Open Ended / Critical Thinking:

- Write some example for null sets and singleton sets
- Draw Venn diagram for A⊂B
- If a and B ate disjoint sets, how can you find n(A∪B)?

Write the following sets in respective forms.

S.No.	Descriptive Form	Set Builder Form	Roster Form
1	The set of all natural numbers less than 10		
2		{x : x is a multiple of 3,	

SIGNATURE OF THE TEACHER

SIGNATURE OF THE HEAD MASTER

VISITING OFFICER WITH REMARKS