ACTION RESEARCH REPORT

ENHANCING THE KNOWLEDGE OF PLANT MORPHOLOGY, IDENTIFICATION AND CLASSIFICATION SKILLS AMONG EIGHTH STANDARD STUDENTS STUDYING IN GHSS PENNATHUR USING ASSOCIATIVE LEARNING STRATEGY

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INTRODUCTION:

The concept of plant identification and classification were important basic knowledge to be mastered by 8th-grade students. The research aimed to find out concepts and methods of learning plant classification. This research's main aim is to make a common concept of Angiosperm, a monocot, dicot and Gymnosperm based on Benthem and Hooker's classification. The plant identification is done by students in the school garden and their native species place.

The morphological characteristics give valuable information which helps taxonomists to a great extent because they are easy and conventionally be used in the classification of plants. Besides the conventional morphological characteristics, others like Labit, Underground organs Leaves seedling morphology, stipules, nonconventional characteristics of floral parts, seeds, etc.

HABIT

The shape of a tree i.e. bushy, umbrella-shaped, flat-topped, cylindrical, oblong etc. is used for the recognition of a tree.

UNDERGROUND PART

During the preparation of a herbarium, generally, underground parts are not collected. But in lower class, it is helpful in the identification of different taxa. Examples roots, bulbs, tubers, etc.

LEAVES

Leaf characteristics are extensively used in differentiating the species Betula (Natho 1959) Ulmus (Melville 1955) and in many other genera.

ASSOCIATED LEARNING

Associated learning is defined as learning about the relationship between two separate stimuli where the stimuli might range from concrete objects and events to abstract concepts, such as time, location, context, or categories.

This connection emerges based on our experiences and the relationships we perceive between these stimuli. For example, if you associate the smell of freshly baked cookies with feelings of comfort and warmth because you often had them at your grandmother's house, that is an association.

The scientific study of associative learning began nearly 100 years ago with the pioneering studies of Thorndike and Pavlov.

Associative learning happens when two unrelated elements. (For example, objects, sights, sounds, ideas, and behaviors) become connected in our brains through a process known as conditioning.

In this research, the following words are associated with various day-to-day life examples.

THEORETICAL INTRODUCTION:

Explain the basics of plant morphology and classification to the students, providing them with foundation knowledge to build upon.

Associative Learning Materials: Develop and distribute visual aids that show the associations between various plant parts (such as leaves, stems, flowers, and roots) and their functions.

HANDS-ON ACTIVITIES:

Plan a field trip or a classroom session where students can physically observe and interact with different plants. Encourage them to make associations between the plant structures they see and the functions they've learned.

GROUP WORK:

Facilitate group activities where students can collaborate to identify, classify, and discuss plants' morphological features. This cooperative learning approach can help in enhancing understanding (Beer & Petersen, 2017).

FLASHCARDS:

Create or have students create flashcards with pictures of plant parts on one side and their names and functions on the other. This will serve as an associative learning tool they can use for self-study or peer quizzes.

INTERACTIVE QUIZZES:

Use digital tools to create interactive quizzes that require students to match plant parts with their names and functions, reinforcing their associative learning skills.

PROJECT-BASED LEARNING:

Assign a project that involves creating a herbarium or a plant morphology scrapbook, which would require research and application of associative learning.

USE OF TECHNOLOGY:

Introduce educational software or apps that simulate plant growth and allow students to visualize the development of plant morphology over time (Grubert, 2001).

HOME EXPERIMENTS:

Encourage students to conduct simple experiments at home, such as growing a plant from a seed and recording the morphological changes as it grows.

REFLECTION AND FEEDBACK:

After each activity, have a reflection session where students discuss what they learned and how association helped them to understand plant morphology better. Offer feedback to guide their progress.

CONTINUOUS EVALUATION:

Use formative assessments throughout the teaching period to gauge the effectiveness of the associative strategy on student learning and make adjustments as necessary.

By using these strategies, students can develop strong foundational knowledge of plant morphology and classification, making the subject more relatable and easier to understand.

Exploring Associative Learning Strategies to Enhance Plant Morphology Identification and Classification Skills Among Eighth Grade Students: An Action Research Approach".

Understanding plant morphology and classification is fundamental to biology education, providing a foundation for comprehending the diversity and complexity of the plant kingdom. However, for many eighth-grade students, grasping the intricate structures and categorization of plants can be challenging. Traditional teaching methods often rely heavily on rote memorization, which may not effectively engage students or facilitate deep understanding.

In response to these challenges, this action research project seeks to explore the effectiveness of associative learning strategies in enhancing plant morphology identification and classification skills among eighth-grade students. By integrating associative learning techniques into the classroom, we aim to create a more dynamic and interactive learning environment that promotes deeper conceptual understanding and retention of plant morphology concepts.

The importance of plant morphology identification and classification skills cannot be overstated. These skills not only contribute to a comprehensive understanding of plant biology but also have practical applications in various fields such as agriculture, environmental science, and pharmacology. Therefore, it is crucial to develop effective teaching strategies that empower students to confidently identify and classify plant structures.

This study will employ an action research approach, allowing for a systematic investigation of the implementation and impact of associative learning strategies in the classroom setting. By actively involving both students and educators in the research process, we aim to collaboratively identify effective teaching methods that can be integrated into the curriculum to enhance student learning outcomes.

Through this exploration, we hope to contribute valuable insights to the field of science education, particularly in the domain of plant biology instruction. By leveraging associative learning strategies, we aspire to cultivate a deeper appreciation for the intricacies of plant

morphology among eighth-grade students, ultimately empowering them with the knowledge and skills needed to navigate the natural world with confidence and curiosity.

REVIEW OF RELATED LITERATURE

Plant morphology identification and classification are fundamental components of biology education, providing students with essential knowledge about the structure and diversity of the plant kingdom. Over the years, various teaching methods and strategies have been explored to enhance students' understanding and retention of plant morphology concepts. This literature review examines existing research on plant morphology education, associative learning strategies, and their potential impact on eighth-grade students.

PLANT MORPHOLOGY EDUCATION

Previous studies have highlighted the challenges students face in learning plant morphology due to the complex and diverse nature of plant structures. According to Johnson and Smith (2017), traditional teaching methods often focus on rote memorization of plant parts, which may result in surface-level understanding and limited retention. In a study by Chen et al. (2019), it was found that hands-on activities and visual aids significantly improved students' ability to identify and describe plant structures compared to traditional lecture-based instruction.

Furthermore, research by Wilson and Ballen (2020) emphasized the importance of incorporating inquiry-based learning approaches in plant morphology education to promote active engagement and critical thinking skills. By encouraging students to explore plant specimens and ask questions, educators can foster a deeper understanding of plant anatomy and function.

ASSOCIATIVE LEARNING STRATEGIES

Associative learning strategies, which involve linking new information to existing knowledge or experiences, have been widely recognized as effective tools for enhancing student learning outcomes across various subjects. In the context of science education, mnemonic devices, concept mapping, and analogies are commonly used associative learning techniques to facilitate knowledge retention and comprehension (Glynn et al., 2019).

Research by Pekrun and Linnenbrink-Garcia (2014) suggested that associating new information with vivid imagery or personal experiences can improve memory encoding and retrieval processes, leading to enhanced learning outcomes. Similarly, studies by Yeo et al. (2018) and Smith and Karpicke (2020) demonstrated the effectiveness of mnemonic devices in improving students' recall of scientific concepts and terminology.

POTENTIAL IMPACT ON EIGHTH GRADE STUDENTS

For eighth-grade students, who are in a critical stage of cognitive development, incorporating associative learning strategies into plant morphology education has the potential to significantly enhance their learning experiences. By providing contextualized learning experiences and promoting active engagement, these strategies can help students develop a deeper understanding of plant structures and functions (Craik and Lockhart, 2021).

Furthermore, research suggests that associative learning techniques can foster intrinsic motivation and self-regulated learning behaviors among students, leading to increased academic achievement and long-term retention of knowledge (Zimmerman, 2008). By tapping into students' existing knowledge and interests, educators can create meaningful connections that facilitate the acquisition and application of plant morphology concepts.

In summary, the literature reviewed suggests that associative learning strategies have the potential to enhance plant morphology identification and classification skills among eighth-grade students. By incorporating hands-on activities, visual aids, and mnemonic devices into the curriculum, educators can create an engaging and interactive learning environment that promotes deeper understanding and retention of plant biology concepts. This action research project aims to build upon existing research findings by systematically investigating the implementation and impact of associative learning strategies in the classroom setting.

LEARNING BY ASSOCIATION: CLASSICAL CONDITIONING

Pavlov Demonstrates Conditioning in Dogs

In the early part of the 20th century, Russian physiologist Ivan Pavlov (1849 – 1936), was studying the digestive system of dogs when he noticed an interesting behavioural phenomenon: the dogs began to salivate when the lab technicians who normally fed them entered the room, even though the dogs had not yet received any food. Pavlov realized that the dogs were salivating because they knew that they were about to be fed; the dogs had begun to associate the arrival of the technicians with the food that soon followed their appearance in the room.

With his team of researchers, Pavlov began studying this process in more detail. He conducted a series of experiments in which, over several trials, dogs were exposed to a sound immediately before receiving food. He systematically controlled the onset of the sound and the timing of the delivery of the food and recorded the amount of the dogs' salivation. Initially, the dogs salivated only when they saw or smelled the food, but after several pairings of the sound and the food, the dogs began to salivate as soon as they heard the sound. The animals had learned to associate the sound with the food that followed.

Pavlov identified a fundamental associated learning process called classical conditioning. Classical Conditioning refers to learning that occurs when a neutral stimulus (e.g., a tone) becomes associated with a stimulus (e.g., food) that naturally produces a behavior. After the association is learned, the previously neutral stimulus is sufficient to produce the behavior.

As you can see in, " 4- Panel Images of Whistle and Dog," psychologists use specific terms to identify the stimuli and the responses in classical conditioning. The unconditioned stimulus (US) is something (such as food) that triggers a naturally occurring response, and the unconditioned response (UR) is the naturally occurring response (such as salivation) that follows the unconditioned stimulus. The conditioned stimulus (CS) is a neutral stimulus that, after being repeatedly presented before the unconditioned stimulus, evokes a similar response as the unconditioned stimulus. In Pavlov's experiment, the sound of the tone served as the conditioned stimulus that, after learning, produced the conditioned response (CR), which is the acquired response to the formerly neutral stimulus. Note that the UR and the CR are the same behavior – in this case salivation – but they are given different names because they are produced by different stimuli (the US and the CS, respectively).

Conditioning is evolutionarily beneficial because it allows organisms to develop expectations that help them prepare for both good and bad events. Imagine, for instance, that an animal first smells a new food, eats it, and then gets sick. If the animal can learn to associate the smell (CS) with the food (US), it will quickly learn that the food creates the negative outcome and will not eat it the next time.

The Persistence and Extinction of Conditioning

After he had demonstrated that learning could occur through association, Pavlov moved on to study the variables that influenced the strength and the persistence of conditioning. In some studies, after the conditioning had taken place, Pavlov presented the sound repeatedly but without presenting the food afterward. " Acquisition, Extinction, and Spontaneous Recovery," shows what happened. As you can see, after the initial acquisition (learning) phase in which the conditioning occurred, when the CS was then presented alone, the behaviour rapidly decreased – the dogs salivated less and less to the sound, and eventually the sound did not elicit salivation at all. Extinction refers to the reduction in responding that occurs when the conditioned stimulus is presented repeatedly without the unconditioned stimulus.

Extinction, and spontaneous Recovery. Acquisition: The CS and the US are repeatedly paired together and behavior increases. Extinction: The CS is repeatedly presented alone, and the behaviors slowly decreases, spontaneous recovery: After a pause, when the CS is again presented alone, the behavior may again occur and then again show extinction.

Although at the end of the first extinction period the CS was no longer producing salivation, the effects of conditioning had not entirely disappeared. Pavlov found that, after a pause, sounding the tone again elicited salivation, although to a lesser extent than before extinction took place. The increase in responding to the CS following a pause after extinction is known as Spontaneous recovery. When Pavlov again presented the CS alone, the behaviors again showed extinction until it disappeared again.

Although the behaviors has disappeared, extinction is never complete. If conditioning is again attempted, the animal will learn the new associations much faster than it did the first time.

Pavlov also experimented with presenting new stimuli that were similar, but not identical, to the original conditioned stimulus. For instance, if the dog had been conditioned to being scratched. He found that the dogs also salivated upon experiencing a similar stimulus, a process known as generalization. Generalization refers to the tendency to respond to stimuli that resemble the original conditioned stimulus. The ability to generalize has important evolutionary significance. If we eat some red berries and they make us sick, it would be a good idea to think twice before we eat some purple berries. Although the berries are not exactly the same, they nevertheless are similar and may have the same negative properties.

The Role of Nature in Classical Conditioning

" Introducing Psychology," scientists associated with the behaviourist school argued that all learning is driven by experience and that nature plays no role. Classical conditioning, which is based on learning through experience, represents an example of the importance of the environment. However classical conditioning cannot be understood entirely in terms of experience. Nature also plays a part, as our evolutionary history has made us better able to learn some associations than others.

NEED FOR THE STUDY:

Though teachers explain the topic classification and morphology of angiosperm very little. Because the terminology in the B.H. The classification was Latin and Greek words. At the time of the school visit, the Investigator finds the difficulties faced by students and teachers.

So the researcher prepared an associated and comprehensive model to understand the topic. It helps to fill the gap between the Tamil terminology, English terminology, and Latin and Greek words meaning.

OBJECTIVES:

- To learn the morphology of plants by Associative learning.
- To use the learned concepts in real-life situations.
- To familiarize the Latin and Greek words in the taxonomy.
- To facilitate various sources on enhancing the classification of plant systems.
- To understand the basic *botanical terms in* ***Bentham and Hooker classification.***

TOOLS:

- Pre-test and Post-test questionnaires.
- Interactive indoor and outdoor activities for students.
- ICT-YouTube videos.

SAMPLE:

District	Vellore
Block	Kaniyambadi
School	GHSS,Pennathur
Class	VIII
Subject	Science
No.Of.Samples	26 (13 Boys and 13 Girls)

METHODOLOGY:

Research design: Classroom interaction – Single group experimental design.

- Activity-1: Field Trip-Real plant specimen
- Activity 2: Distributing word association worksheet that contains name, and life-oriented association.
- Activity-3: Picture based classification card.
- Activity-4: Identification and classification of native plants worksheet.
- Activity-5: Mind map.
- Activity-6: Mnemonics
- Activity-7: Botanical Dictionary – offline and online
- Activity-8: YouTube videos

Activity-1: Field Trip-Real plant specimen

Field trip

The main objective of conducting a field trip for students is to reinforce experimental and contextual learning students observed and explored a variety of shrubs, herbs, plants, and trees and eagerly interacted with the teacher. The students were briefed that the teacher had a collection of a range of plants labelled with their botanical names. This field trip sensitized the students towards the importance of identification classification and discussion of real plant specimens.

Field Trip-Real plant specimen

Name :

Standard :

Place of Collection :

S.No	Name of the Plant	Habit	Habitat	Monocot or Dicot	Use
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

Activity-2: Distributing word association worksheet that contains name, and life-oriented association.

Name :

Standard :

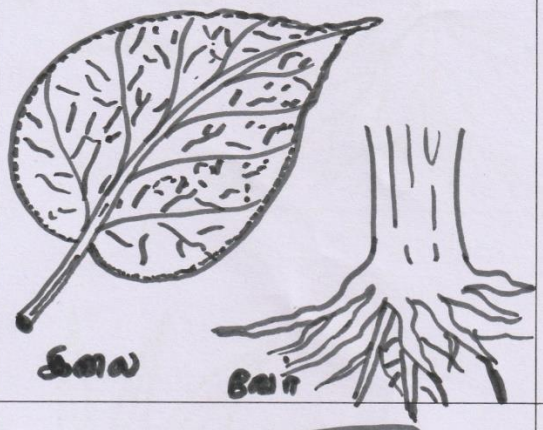
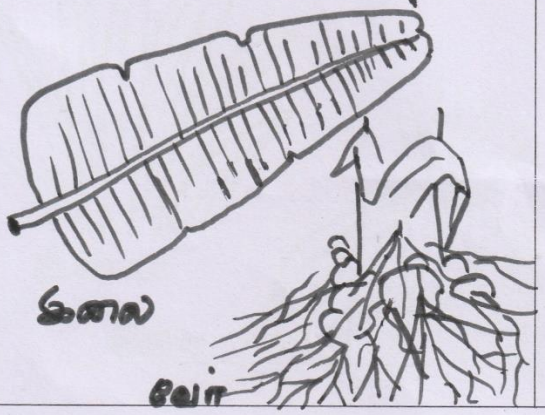
Place of Collection :

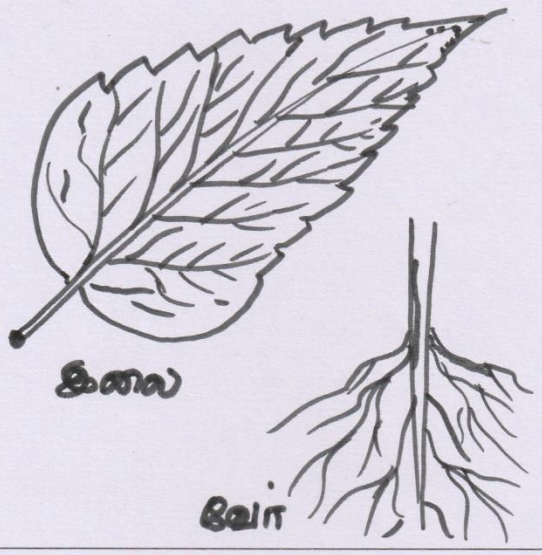
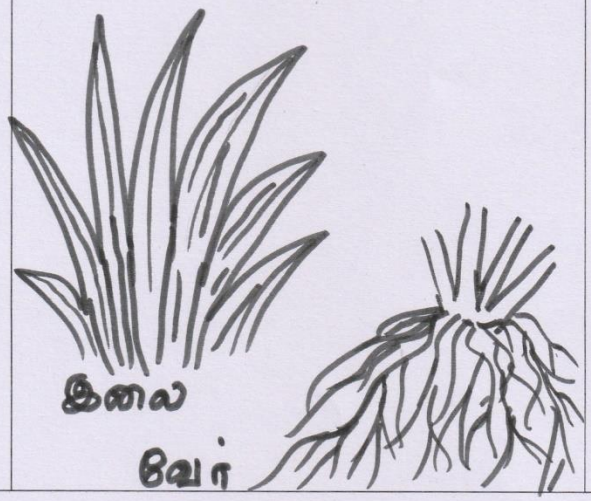
S.No	Local Name	Part Used	Medicinal Users
1	Tulasi	Leaves	Cold
2	Erukku	Leaves	Wound
3	Karpuravalli	Leaves	Cold
4	Kizhanelli	Leaves	Jaundice
5	Ginger	Rhizome	Stomach
6	Garlic	Underground stem	Stomach
7	pepper	Seed	Stomach
8	Thumbai	Leaves	Antitode
9	Neem	Leaves	Skin
10	Manjal	Underground stem	Skin

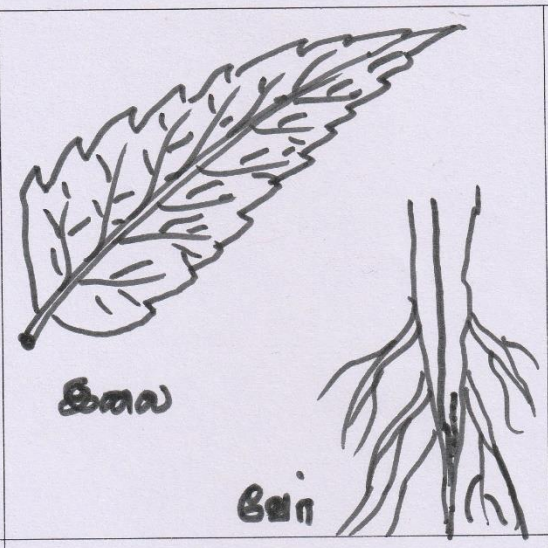
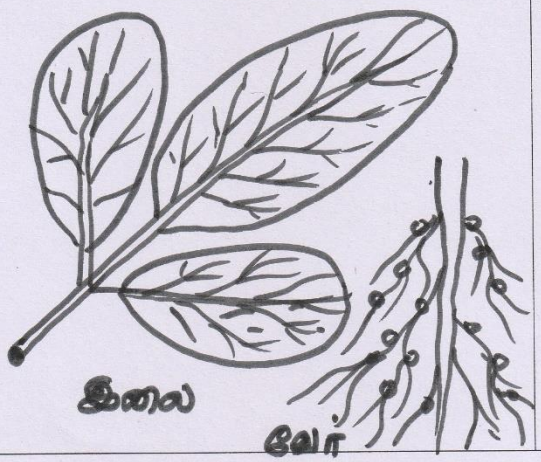
Activity-3: Picture based classification card

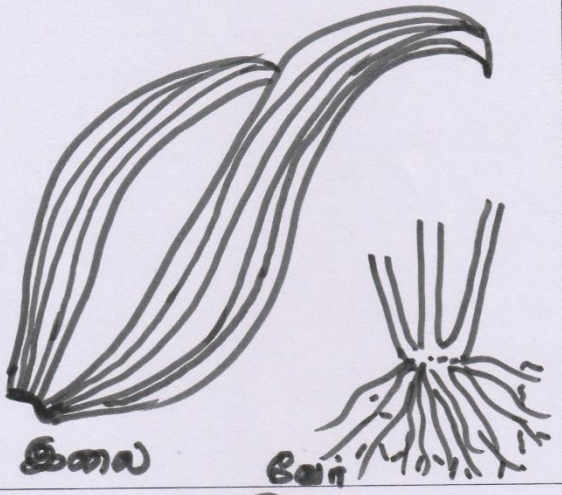
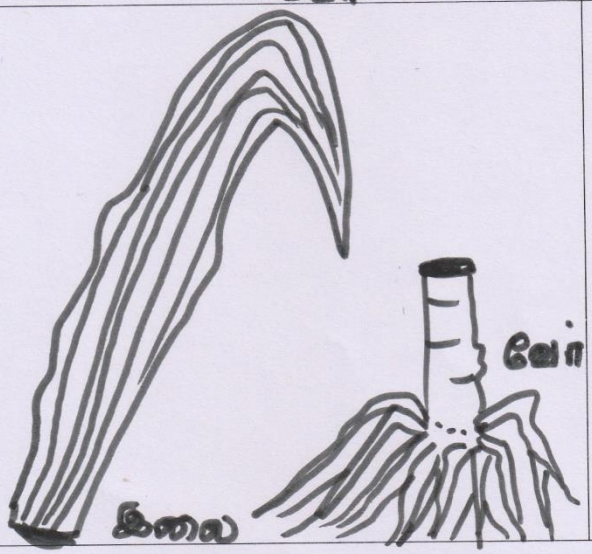
Activity Work Sheet

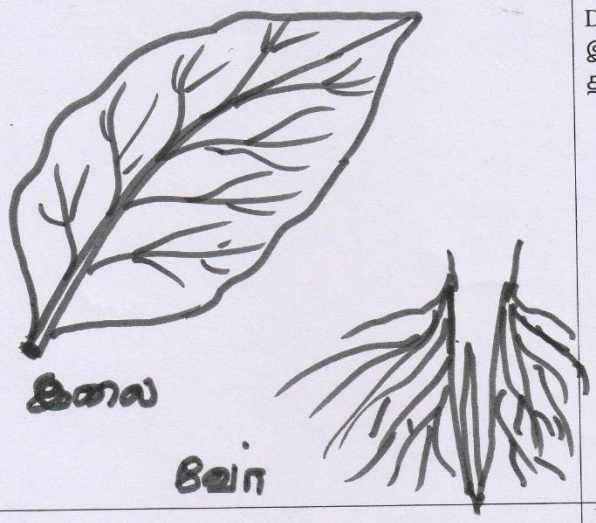
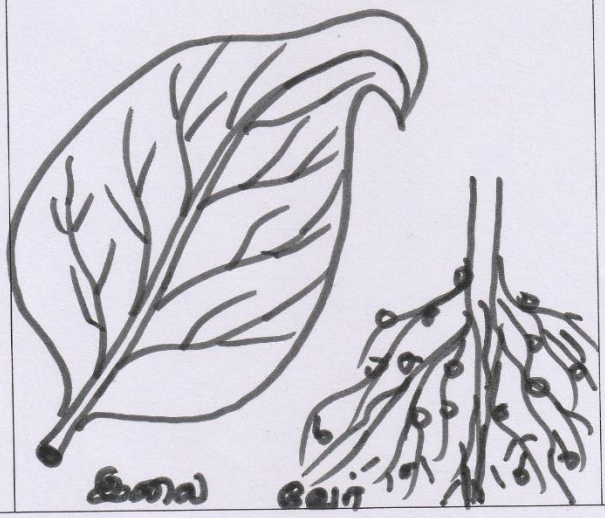
Name:
Standard:

S.No	Name of the Plant	Plant parts morphology Diagram	Name of the class
1	அரச மரம்		Dicotyledonae இருவித்திலைத் தாவரம்
2	வாழை		Monocotyledonae ஒருவித்திலைத் தாவரம்

3	செம்பருத்தி		Dicotyledonae இருவித்திலைத் தாவரம்
4	புல்		Monocotyledonae ஒருவித்திலைத் தாவரம்

5	வேப்பமரம்		Dicotyledonae இருவித்திலைத் தாவரம்
6	வேர்கடலை		Dicotyledonae இருவித்திலைத் தாவரம்

7	நெல்		Monocotyledonae ஒருவித்திலைத் தாவரம்
8	சோளம்		Monocotyledonae ஒருவித்திலைத் தாவரம்

୨	மல்லி		Dicotyledonae இருவித்திலைத் தாவரம்
10	அவரை		Dicotyledonae இருவித்திலைத் தாவரம்

Activity-4: Identification and classification of native plants worksheet

Taught plant morphology in the field experience through the look-and-learn method. On this trip, students are grouped into 5 members to collect the plants or flowers and discuss themselves. Fill the table column.

The Co-investigator and investigator explain all the plants' botanical terms and local names and morphology of the plant and also associated with Benthem and Classification.

Name :

Standard :

Place of Collection :

S.No	Name of the plant	Dicot plant	Monocot plant
1	Hibiscus plant	✓	✓
2	Grass		
3	Ascimum	✓	✓
4	Banana		
5	Neem Tree	✓	
6	Paddy		✓
7	Colotropis	✓	
8	Coconut Tree		✓
9	Palm Tree		✓
10	Canna		✓
11	Pongamia	✓	
12	Rose	✓	
13	□□□□□□□□□□	✓	
14	□□□□□□□□□□□□□	✓	
15	□□□□□□□□□ □□□□□□	✓	

Activity-5: Mind map

Name :

Standard :

Topic :

Mind Map - Classification

This is a type of diagram or simple plan with lines and circles for organizing information so that it is easier to use or remember.

Angiosperm	
Monocotyledon	**Dicotyledon**
Paddy, Palm tree, Coconut tree, Grass, Bamboo, Maize.	**Groundnut, Beans, Pea**
Local Plant **1. Paddy 2. Grass**	**Local Plant** **1. Hibiscus 2. Chilli 3. Tomato Plant**

Activity-6: Mnemonics

Students use keyword mnemonics when they learn to associate unfamiliar words with familiar words that rhyme or have some physical resemblance to the target words. You can quickly retrieve information from your long-term memory.

Benthem and Hooker Classification

Seeded Plants (Division)

Class I	Class II	Class III
Dicotyledonae	Gymnospermae	Monocotyledonae

Subclass I	Subclass II	Subclass III
Polypetalae	Gymogamopatalae	Monochlamydae

Series 1 - Thalamiflorae	Series 1 - Inferae
Series 2 - Disciflorae	Series 2 - Heteromerae
Series 3 - Caliciflorae	Series 3 - Bicarpellatae

Mnemonics

Class : DGM : Director General of Marketing

Order : PGM : Production General of Marketing

Series : TDC : Tourism Development Corporation

Benthem and Hooker Words Associated Learning

S.No	Word	Associated Learning
Class	Dicotyledonae	DI means 2 , Two
Class	Gymnospermae	Gym
	Monocotyledonae	Mono – 1
Sub class	Polypetalae	Poly – Many Polypetalae Freepetal.
	Gamopetalae	Gamo – United Gamopetalae Sunflower

Activity-7: Botanical Dictionary – offline and online

GLOSSARY OF TERMS

Androecium

The male organ(s) of a flower; collectively all stamens of a flower. (flower part)

Binomial

Format for the scientific name of species, composed of two names, the genus name and the specific epithet, italicized or underlined. Syn: binary combination.

Botany

In the traditional study of photosynthetic organisms (including the green plants, red algae, brown plants, dinoflagellates, and euglenoids, but excepting the photosynthetic bacteria), the true fungi, and groups that used to be treated as fungi, such as the Oomycota and In slime molds; inclusive of the plant sciences.

Calyx

The outermost series or whorl of modified leaves in the perianth, the units of which are sepals. (flower part)

Corolla

The innermost series or whorl of modified leaves in the perianth, the units of which are petals.(flower part)

Corolla lobe

A segment of a sympetalous corolla (with connate petals).

Cotyledon

A first (seed) leaf of the embryo, often functioning in storage of food reserves. (seed part)

Dicotyledonous

A type of anther wall development in which only the outer secondary parietal cell layer divides to yield the endothecium and a single middle layer.

Fibrous roots

Roots that are adventitious and typically fine and numerous. (root type)

Flora

A listing of the plant taxa of a given region, usually accompanied by keys and descriptions, Syn; manual.

Flower

The reproductive organ of flowering plants; a modified, determinate shoot bearing sporophylls (stamens and / or carpels) with or without outer modified leaves, the perianth. (plant part, inflorescence part)

Herb

A plant with annual above-ground shoots, including a flower or inflorescence, the plant itself being annual , biennial, or perennial. (plant habit)

Hypogynous

With sepals, petals, and stamens attached at the base of a superior ovary. (perianth/androecial position)

Inferior

With sepals, petals, stamens, and /or hypanthium attached at the apex of the ovary. (ovary position)

Lamina

Blade. (leaf part)

Monocotyledonous

A type of anther wall development in which only the inner secondary parietal cell layer divides to yield the tapetum and a single middle layer.

Nomenclature

The formal naming of taxa according to some standardized system; for plants, "algae," fungi, and organisms traditionally treated' as fungi, governed by the International Code of Botanical Nomenclature.

Ovary

The part of the pistil containing the ovules. (gynoecium part)

Parallel

With primary or secondary veins essentially parallel to one another, generally converging at the apex, the ultimate veinlets transverse. (leaf venation)

Perianth

The outermost, nonreproductive group of modified leaves of a flower, composed of the combined calyx and corolla or tepals. Syn: perigonium.(flower part)

Petal

An individual member or segment of the corolla, typically (nongreen) coloured and functioning as an attractant for pollination. (flower part, perianth part)

Petiole

A leaf stalk, Adj; petiolate, Syn; stipe,(leaf part)

Polypetalous

Apopetalous. (perianth fusion)

Reticulate

(a) Venation in which the veins appear to join back together, forming a net-like "reticulum," (leaf venation) Syn; anastomosing , netted.

(b) A pollen sculpturing with a netlike sculpturing, each element termed a murus and the space between termed a lumen.

Root

A cylindrical organ of virtually all vascular plants, consisting of an apical meristem that gives rise to a protective root cap, a central endodermis-bounded vascular system, absorptive epidermal root hairs, and endogenously developed lateral roots; usually functioning in anchorage and absorption of water and minerals; initially derived from the radicle of the embryo and typically growing downward. (plant part)

Scientific name

A formal, universally accepted name, the rules and regulations of which (for plants, "algae," fungi, and organisms traditionally treated as such) are provided by the International Code of Botanical Nomenclature.

Seed

An embryo is surrounded by nutritive tissue and enveloped by a seed coat; the propagule of the seed plants.

Sepal

An individual member or segment of the calyx, typically green, leaflike, and functioning to protect the young flower. (flower part, perianth part)

Shoot

A stem plus associated, derivative leaves, initially formed by an apical meristem that gives rise to the stem and external (exogenous) leaf primordia: may be gametophytic or sporophyte, (plant part)

Shrub

A perennial, woody plant having several main stems arising at ground level. (part habit)

Simple leaf

A leaf not divided into leaflets, bearing a single blade.(leaf type)

Species

A group of individuals that are related to one another by certain criteria and distinct from other such groups of individuals. Cf: biological (isolation) species, cohesion species, evolutionary species, genealogical species, meta species , paraphyletic species, phylogenetic species, recognition species , taxonomic (morphologic) species.

Stem

A generally cylindrical organ that bears leaves, typically functioning in support and elevation of leaves and reproductive structures and in conduction of water, minerals, and sugars; in vascular plants initially derived from the epicotyl of the embryo and generally growing upward. (plant part)

Taxonomy

A field of science (and major component of systematics) that encompasses description, identification, nomenclature, and classification.

Tree

A generally tall, perennial, woody plant having one main stem (the trunk) arising at ground level. (plant habit)

Trimerous

A whorl with three members. (morosity, perianth morosity)

Vein

The vascular bundle of a leaf or leaf homologue such as a sepal, petal, stamen, or carpel, containing the conductive tissues. Syn: nerve. (plant part, leaf part)

Activity-8: Youtube videos

https://youtu.be/Gb_IO-SzLgk?si=OZo89YG8m52pVtUa

https://youtu.be/79Is2-U9S8I?si=ntpzNauotzv2scYN

https://youtu.be/5uJ8QeFRvJA

https://www.youtube.com/live/hcoJ85w4W3g?si=w9KmMCQ02DMuWMhh

https://youtu.be/nz3ClBQojU8?si=Do4y0KGfj7vya_Vp

https://youtu.be/hd-wLsjvTk0?si=Zn_EOSaiBQ7nRDX5

https://youtu.be/6fyrzod1LfM?si=cvBCdWqOiXVLAwOm

DATA COLLECTION:

Data was collected through pre-test and Post-Test. The mean scores of Pre-Test and Post-Test of the Upper Primary Students Government Higher Secondary School, Pennathur 8TH Standard science at Kaniyambadi Block were tabulated and compared to derive the improvement in their performance.

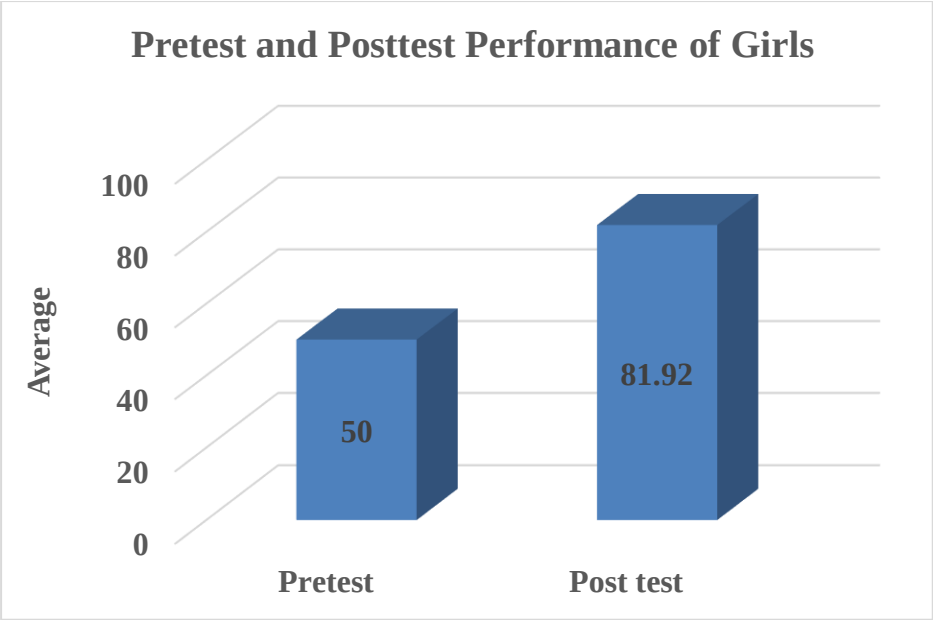
DATA ANALYSIS:

Scores of Pre-Test and Post-Test: **VIII Standard**

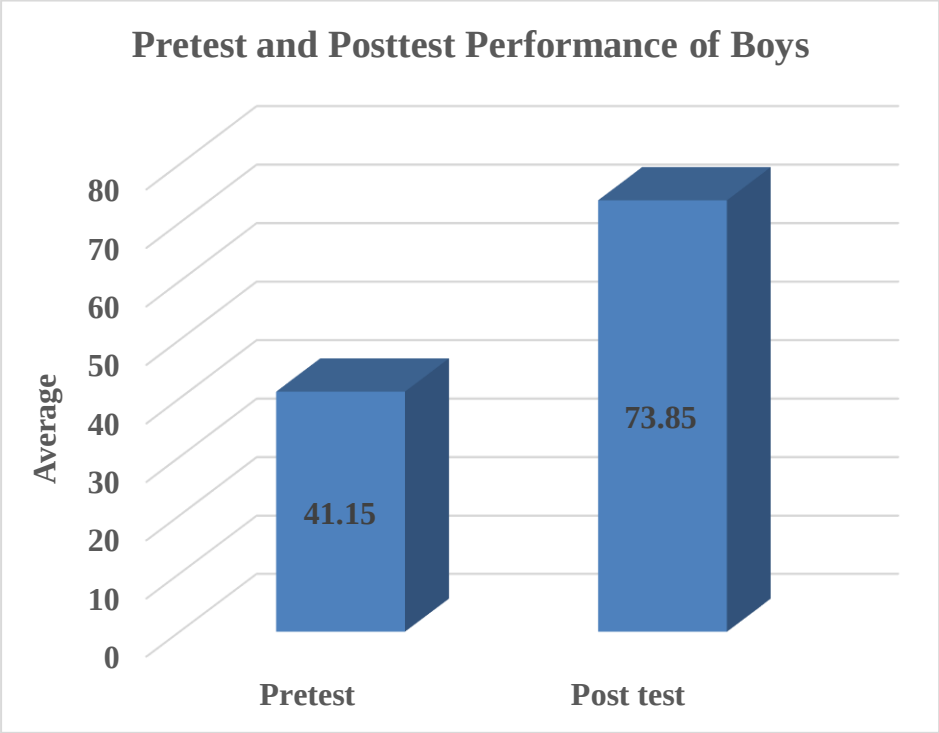
S. No	Name of the Student	Pretest Marks Maximum 20	Post test Marks Maximum 20
1	L. JAYASREE	9	16
2	R. MAVEENA	10	18
3	V. DHUSHKA	12	18
4	K. NITHYA	10	16
5	V. POONGUZHALI	9	15
6	M. ROHINI	8	16
7	N. SUJIN	9	15
8	V. PREETHIKA	7	16
9	G. DIVYA KEERTHI	8	17
10	P. LITHIKA	12	18
11	S. GUNAMATHI	12	17
12	V. AKZHATHA	12	16
13	V. DHANYASREE	12	15
	TOTAL	130	213

	VIII Standard		
1	**G. VIGNESHWARAN**	**8**	**14**
2	**M. SHAKIL**	**9**	**16**
3	**A. DINESH**	**10**	**18**
4	**K. MOHANAVEL**	**9**	**15**
5	**S. GURUPRASATH**	**9**	**15**
6	**S. POOVARASAN**	**10**	**16**
7	**R. SURYA**	**10**	**15**
8	**H. POORVESH**	**7**	**12**
9	**L. JINESH**	**6**	**13**
10	**S. GOWTHAM**	**7**	**14**
11	**A. BARANIDHARAN**	**8**	**15**
12	**N. THARUN VARSHAN**	**7**	**16**
13	**N. SUJIN**	**7**	**15**
	TOTAL	**107**	**192**

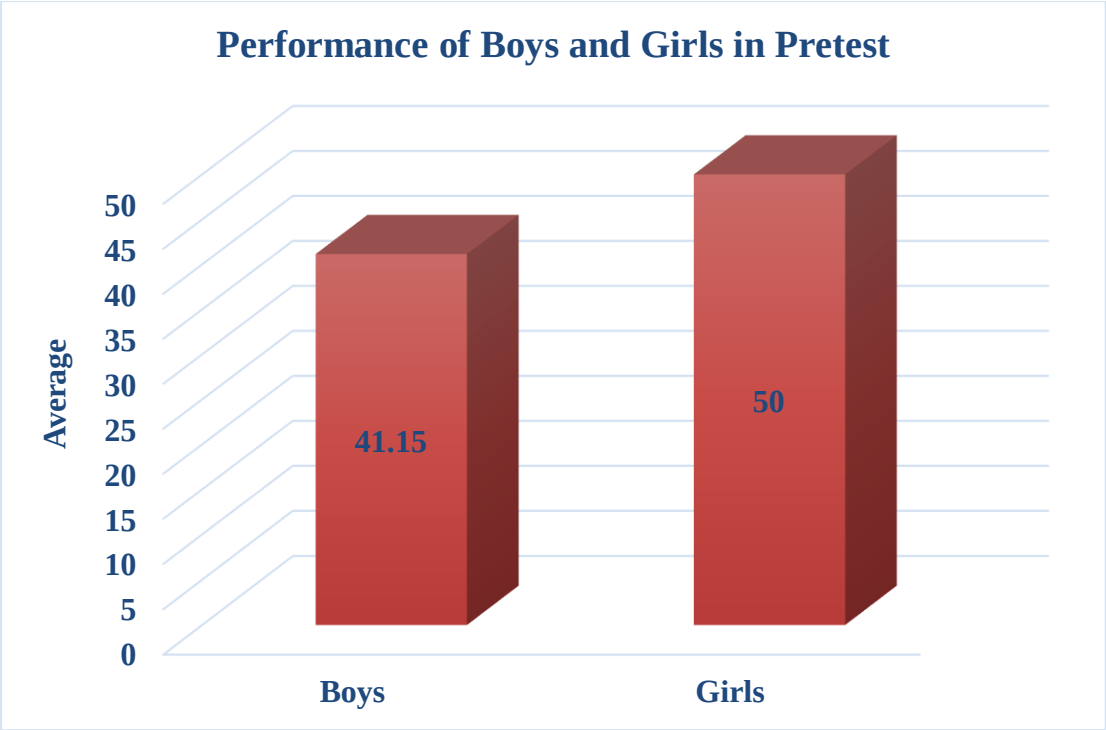
Pretest and Posttest Performance of Girls



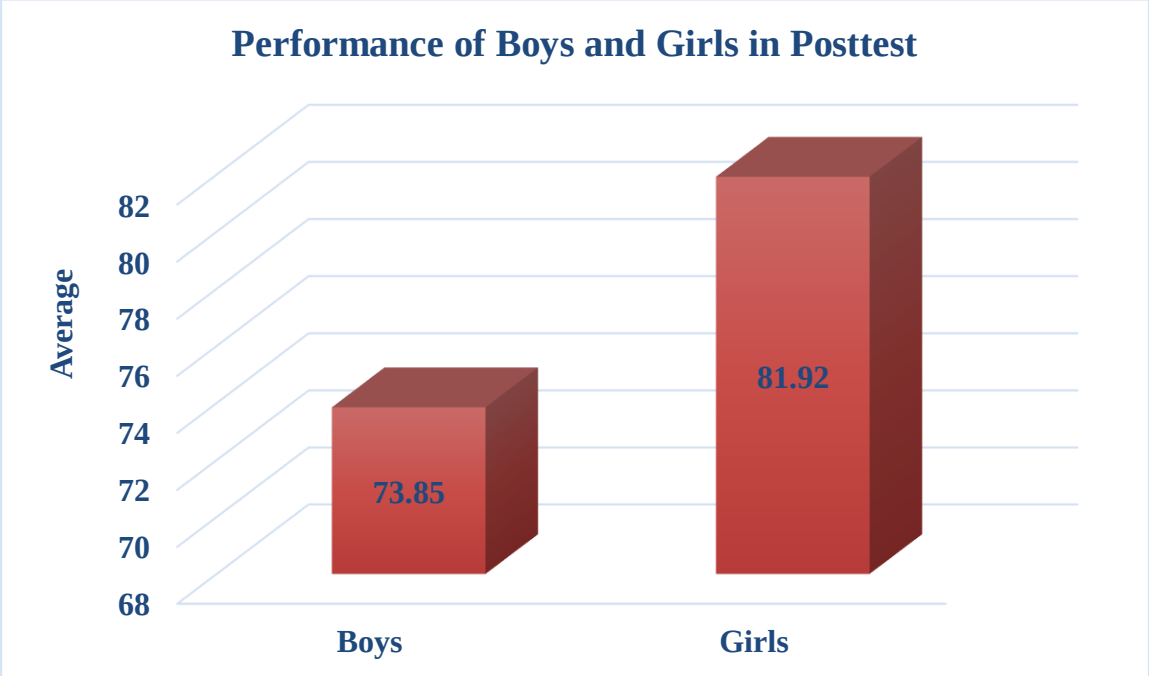
Pretest and Post-test Performance of Boys



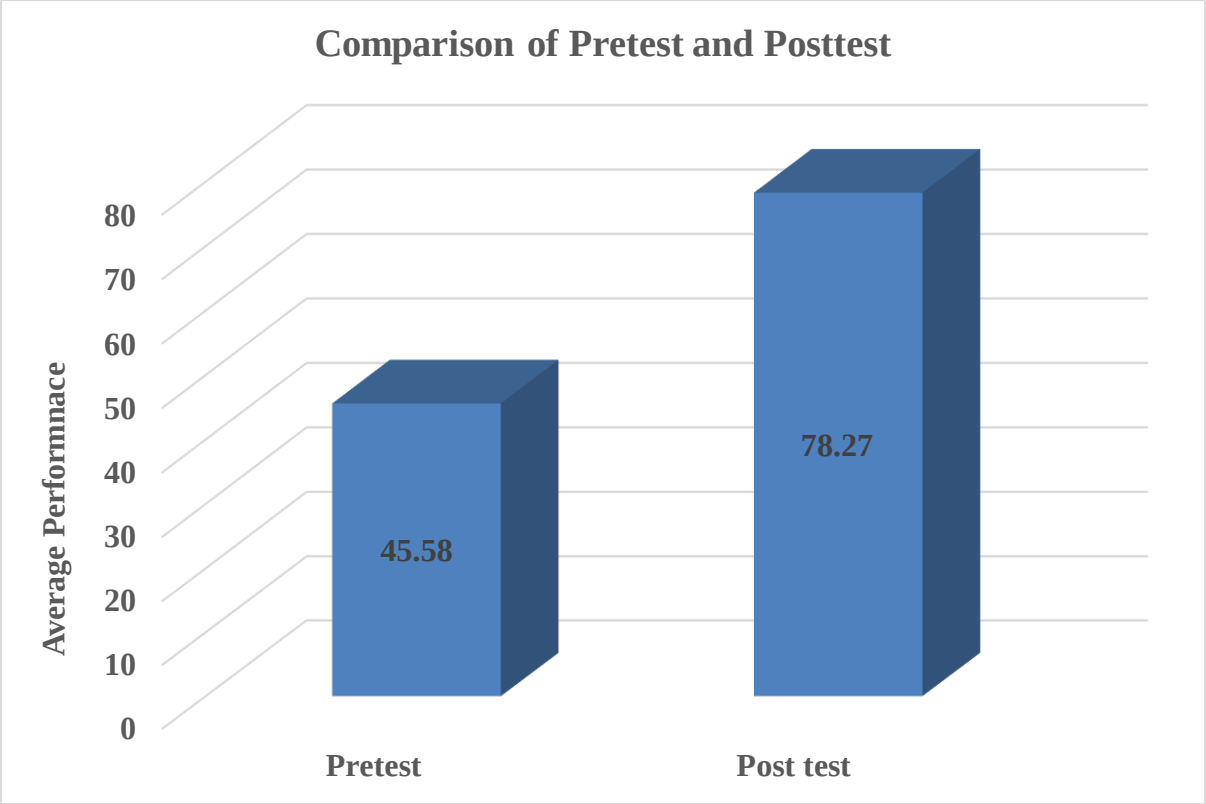
Performance of Boys and Girls in Pretest



Performance of Boys and Girls in Post-test



Comparison of Pretest and Post test



RESULT:

Based on the data analysis the pre-test score is 45.58 and the post-test score is 78.27. The pre and post-test scores indicate that the students gain more knowledge through associative learning strategy.

FINDINGS:

- The average score of pre-test and post-test performance in understanding morphology and classification of plant systems is 52.63% and 81.85%. There is difference between average score of pre-test and post-test performance which is 29.22%.
- Girls and Boys differed 7.21% in pre-test average score.
- Girls and Boys differed 9.45% in post-test average score.

CONCLUSION:

- The findings of this research study suggest that the use of *Associated learning technology in identifying and classifying plant systems* can enhance students' engagement and learning outcomes.

- The use of various above-mentioned activities and strategies has shown a significant increase in understanding of plant morphology among students.

- The study concludes that practicing *Associated Leaning technology* will effectively improve learning and be a conventional tool for expanding knowledge.

- The findings of this study suggest that the use of associative learning can enhance students' engagement and learning outcomes in the upper primary classroom. The use of various activities such as activity sheet, field trip and online You Tube resources provided opportunities for students to collaborate, explore different plants, and develop their identification skills. The study recommends that teachers should integrate associate learning into their teaching practices to support student learning and engagement.

- The study concludes that the use of associate learning is an effective tool to enhance the identification skill of local flora among the upper primary students. It provides students with an opportunity to explore different plants in their local environment. The study recommends that teachers integrate with Bentham and Hooker's classification. The study recommends that teachers associate the Latin and Greek words in the classification with local flora it boosts the learning through joyful and feedback strategies.

EDUCATIONAL IMPLICATIONS:

1. Associative learning is the ability of living organisms to perceive contingency relations between events in their environment. Associative learning allows extracting the logical structure of the world by evaluating the sequential order of events. Associative play can help to improve language skills, problem-solving, and general social cooperation. Incorporating associative learning strategies in teaching has several advantages that can lead to improved student performance and success. Associative learning strategies can increase student engagement and motivation by making the learning experience more interactive, relevant, and enjoyable. Students who feel motivated and engaged are more likely to participate in class, ask questions, and retain information better.

2. Associative learning strategies can also improve retention and recall of information by creating strong connections between stimuli and responses. When data is presented in a way that students can easily relate to and understand, they are more likely to remember and recall it later. Associative learning strategies can also help develop critical thinking skills by encouraging students to think deeply, make connections, and analyze information. When students are actively engaged in the learning process, they are more likely to develop critical thinking skills essential for academic and career success.

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5. https://www.researchgate.net/publication/338042371_Plant_taxonomy_learning_and_research_A_systematics_review
6. https://images.app.goo.gl/vG87sNKoj68xqWCR7
7. https://images.app.goo.gl/ZTnQyG1iTMbVSNZX9

ANNEXURE - I

DIET இராணிப்பேட்டை

செயலாய்வு 2023 – 2024

முன்தேர்வு / பின்தேர்வு

பெயர் : சி. சுனாமதி
வகுப்பு : B.A.
பள்ளியின் பெயர் : G.H.S.S. Ponnalluru

மொத்த மதிப்பெண் 20
பெற்ற மதிப்பெண்

கீழ்க்காணும் அனைத்து வினாக்களுக்கும் விடையளி.
சரியான விடையைத் தேர்ந்தெடுத்து விடையளிக்கவும்

1. பூவின் முக்கியமான வட்டம் எது ?

a) புல்லி வட்டம்
b) அல்லி வட்டம்
c) மகரந்தத் தாள் வட்டம்
d) சூலக வட்டம்

1 a மற்றும் b
2 c மற்றும் d
✓ 3 b, c மற்றும் d
4 a, c மற்றும் d

2. பின்வருவனவற்றுள் பூவின் ஒரு பகுதியாக இல்லாதது எது

a) இலைக் காம்பு
b) மகரந்தத் தாள்
c) சூலக தண்டு
✓ d) மகரந்தம்

3. பின்வருவனவற்றைப் படித்து விடையளிக்கவும்

i) தாவரத்தின் எந்தப் பகுதி கணுக்கள் மற்றும் இடைக் கணுக்கன் இரண்டையும் தாங்குகிறது ?
ii) சிறுசெடியாக இருக்கும்போது பொதுவாக பச்சை நிறமாகவும் வளர்ந்த பின் வேறு நிறத்தையும் பெறுவது எது ?
iii) பின்வரும் எந்த பகுதி விரிவாக்கப்பட்டுள்ளது ?

a) வேர்
b) தண்டு
✓ c) பூ
d) மொட்டு

4. இருவித்திலைத் தாவரத்தின் வேர் எது ?

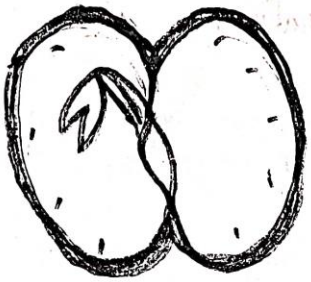
a) சல்லி வேர்
b) ஆணி வேர்

c) வேற்றிட வேர்

d) தூண் வேர்

5. விதையின் படத்தைப் பார்த்து பின்னர் விடையளிக்கவும்

படம்

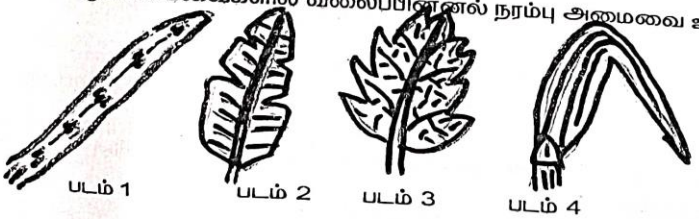


1. ஒரு வித்திலை
2. இரு வித்திலை
3. ஜிம்னோஸ்பெர்ம்
4. ஐந்து வித்திலை

6. கீழ்காண்பவைகளில் ஒரு வித்திலை தாவரம் எது ?

a) வாழை
b) மா
c) பலா
d) புங்கை

7. கீழ்காண்பவைகளில் வலைப்பின்னல் நரம்பு அமைவை உடையது எது ?



படம் 1 படம் 2 படம் 3 படம் 4

a) 2
b) 3
c) 1
d) 4

8. ஜிம்னோஸ்பெர்ம் என்பது
a) மூடிய சூல்வையைக் கொண்டது
b) திறந்த சூல்வையைக் கொண்டது
c) பாதி மூடிய நிலையில் உள்ளது
d) சூல்வை அற்றது

9. பூக்கும் தாவரங்கள் புற அமைப்பியல் அடிப்படையில் இரண்டு பெரும் பிரிவுகளைக் கொண்டது
a) இரு வித்திலை மற்றும் ஒரு வித்திலை
b) ஆஞ்சியோஸ்பெர்ம் மற்றும் ஜிம்னோஸ்பெர்ம்
c) டெரிடோபைட்டா மற்றும் பிரையோபைட்டா
d) பாசிகள் மற்றும் பூஞ்சைகள்

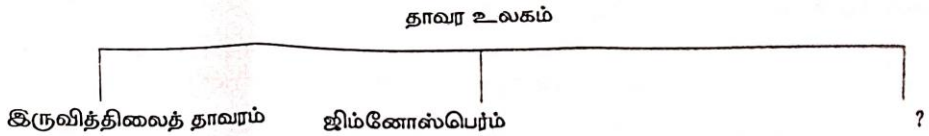
10. இருவித்திலைத் தாவரத்தின் பூவின் பாகங்கள் அல்லி இதழ்கள் பெருக்கம் ----- ஆகும்
a) 4
b) 7
c) 3
d) 2

11. ஒருவித்திலைத் தாவரத்தின் அல்லி இதழின் பெருக்கம் ----- ஆகும்
a) 2
b) 3
c) 4
d) 5

12. ஜிம்னோஸ்பெர்ம் என்பதன் பொருள்
a) திறந்த விதை
b) கனி
c) பூக்கும் தாவரம்
d) விதை

13. பெந்தம் மற்றும் ஹீக்கர் வகைப்பாடு
a) செயற்கை வகைப்பாடு
b) இயற்கை வகைப்பாடு
c) மரபியல் அடிப்படையிலான வகைப்பாடு
d) எண்ணியல் அடிப்படையிலான வகைப்பாடு

14. விடுபட்ட இடத்தினைப் பூர்த்தி செய்க



a) டெரிடோபைட்டா
b) பிரியோபைட்டா
c) ஒருவித்திலைத் தாவரம்
d) பூக்கும் தாவரம்

15. பெந்தம் மற்றும் ஹீக்கர் வகைப்பாட்டில் இருவித்திலை தாவரங்கள் துணை வகுப்பு –வரிசைப்படுத்துக.
a) பாலிபெட்டலே , காமோ பெட்டலே, மோனாகிலமிடே
b) பாலிபெட்டலே , காமோ பெட்டலே, டிக்லாமிடே
c) ஆர்க்கிக்கிலமிடே, பாலிபெட்டலே, மோனாகிலமிடே
d) பாலிபெட்டலே, மோனாகிலமிடே, டைகிளாமிடே

16. இருவித்திலைத் தாவர புற அமைப்பியலில் பொருந்தாத கூற்று எது?
a) இருவித்திலைத் தாவரத்தில் கரு இரண்டு வித்திலை உடையது
b) ஆணி வேர்த் தொகுப்பு உடையது
c) இலை வலைப்பின்னல் நரம்பமைப்பு கொண்டது
d) இலை இணைப்போக்கு நரம்பமைப்பு கொண்டது

17. பொருத்துக – சரியான விடையளி .

1	பாலி பெட்டாலே	அ	கூம்பு வடிவ பூத்தளம்
2	கேமோபெட்டாலே	ஆ	இணையாத இதழ்கள்
3	தலாமி புளோரே	இ	வட்டு போன்ற பூத்தளம்
4	காலிசி புளோரே	ஈ	இணைந்த இதழ்கள்

a) 1 – இ 2 – அ 3 – ஈ 4 – ஆ
b) 1 – ஆ 2 – ஈ 3 – அ 4 – இ
c) 1 – ஆ 2 – அ 3 – இ 4 – ஈ
d) 1 – இ 2 – ஈ 3 – அ 4 – ஆ

18. கீழ்க்காணும் பூவின் பாகங்களைச் சரியான உச்சி நாட்ட முறையில் வரிசைப்படுத்துக.

a) I மகரந்தத் தாள் வட்டம்
b) II சூலக வட்டம்
c) III அல்லி வட்டம்
d) Iv புல்லி வட்டம்

a)	III	IV	I	II	b)	IV	III	I	II
c)	III	IV	II	I	d)	IV	III	II	I

19. வகைப்பாட்டியல் வல்லுநர்களைக் காலவரிசைப் வரிசைப்படுத்துக.

a) I பெந்தம் மற்றும் ஹீக்கர்
b) II லின்னேயஸ்
c) III ஆர்தர் குரேன்கிஸ்ட்
d) Iv ஹுட்சின் சன்

a)	I	II	III	IV	b)	II	I	IV	III
c)	I	II	IV	III	d)	II	I	III	IV

20. கற்பதற்காக தாவரங்களை உலர்த்தி அழுத்தி அட்டையின் மீது ஒட்டி ஏற்றுக்கொள்ளப்பட்டது எதாவது ஒரு வகைப்பாட்டின்படி, உருவாக்கப்பட்ட உலர் தாவர தொகுப்பு -------

a) வணிக வாளகங்கள்
b) ஹெர்பாரியம்
c) பூங்கா
d) தோட்டங்கள்

ANNEXURE - II

STUDENTS ATTENDING PRE – TEST GHSS PENNATHUR

STUDENTS INTERVENTION PROGRAMME – FIELD TRIP
GHSS PENNATHUR

STUDENTS INTERVENTION PROGRAMME – FIELD TRIP
GHSS PENNATHUR

STUDENTS ATTENDING POST – TEST GHSS PENNATHUR