FACILITATING UNDERSTANDING OF THE CONCEPT ORGANISATION OF LIFE AMONG VIII STUDENTS

Action Research

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CERTIFICATE

This is to certify that the action Research entitled **FACILITATING UNDERSTANDING OF THE CONCEPT ORGANISATION OF LIFE AMONG VIII STUDENTS** was carried out by Dr. G.MURUGAN, Senior Lecturer, DIET Pudukottai -Dt during the year 2023-2024.

Principal
District Institute of Education and
Training, Pudukkottai.

Place :
Date :

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G.MURUGAN

CONTENTS

FACILITATING UNDERSTANDING OF THE CONCEPT ORGANISATION OF LIFE AMONG VIII STUDENTS

1. INTRODUCTION

Educational technology allows students to learn and appreciate new technologies as soon as they emerge. Today's learners are more inclined toward using new technologies more efficiently. Understanding the emerging innovations allows them to weigh the positive and negative outcomes of new tools before implementing them in professional careers and studies. Educational technology allows scholars to comprehend the dynamics of new ideas, how they can be integrated into the classroom, and possible outcomes. As a result, they become familiar with different techniques. Educational technology creates multiple avenues for learners to improve skills and expand knowledge of various aspects through online programs. As a student, you have the responsibility to research and learn more about the topics that inspire you to work hard and meet your academic goals. For example, if you are passionate about information technology, you can acquire new knowledge relevant to your field. Consequently, you can develop new ideas and share them with your colleagues for a wonderful working relationship. Educational technology can support both the teaching and learning of science concepts and science processes. Technology allows teachers and students to model and explore concepts that are otherwise impossible or difficult to explore, to support student inquiry and to clarify and display student thinking.

science is one of the most important channels of knowledge. It has a specific role, as well as a variety of functions for the benefit of our society: creating new knowledge, improving education, and increasing the quality of our

lives. Science must respond to societal needs and global challenges. science came from Old French, meaning knowledge, learning, application, and a corpus of human knowledge. It originally came from Science encompasses the systematic study of the structure and behaviour of the physical and natural world through observation and experiment, and technology is the application of scientific knowledge for practical purposes. In the Latin word scientia which meant knowledge, a knowing, expertness, or experience Science explores new knowledge methodically through observation and experimentation. Beyond the fact that technology is both a process and a result of science, technological developments provide the tools used in many forms of scientific study and experimentation, from centrifuges used for the separation of fluids to computer programs used in the study of quantum physics. In teaching students the scientific process of inquiry and problem-solving, it is necessary to utilize current technologies. Students will need to use field-appropriate technologies to research questions, construct and execute experiments, and analyze results.Science teachers can use many modern technologies to great effect in the classroom. Computer software and tablet apps have obvious applications in classroom activities, but the technologies inherent in automated cameras, LCDs and experiment monitoring systems can also aid in science education.

1.1 ORGANIZATION OF LIFE

The organization of life in biology encompasses various levels, each representing different degrees of complexity and organization. Here's an overview:

1. Atom: At the smallest scale, life is composed of atoms, the basic units of matter. Atoms combine to form molecules, which serve as the building blocks of life.

2. Molecule: Molecules are combinations of atoms bonded together. In living organisms, molecules such as DNA, proteins, carbohydrates, and lipids play crucial roles in structure, function, and metabolism.

3. Organelle: Organelles are specialized structures within cells that perform specific functions. Examples include the nucleus, mitochondria, chloroplasts, and endoplasmic reticulum. Organelles are found in eukaryotic cells.

4. Cell: Cells are the basic structural and functional units of life. They can be either prokaryotic (lacking a nucleus) or eukaryotic (with a nucleus). Cells carry out essential processes such as metabolism, growth, reproduction, and response to stimuli.

5. Tissue: Tissues are groups of similar cells that work together to perform a specific function. In multicellular organisms, tissues are organized into organs.

6. Organ: Organs are structures composed of different tissues working together to perform a particular function. Examples include the heart, lungs, brain, and liver.

7. Organ System: Organ systems consist of multiple organs that work together to carry out a coordinated set of functions necessary for the survival of an organism. Examples include the circulatory system, respiratory system, and nervous system.

8. Organism: An organism is an individual living entity capable of carrying out life processes such as growth, reproduction, and response to stimuli. Organisms can be unicellular (consisting of a single cell) or multicellular (consisting of multiple cells).

9. Population: A population consists of a group of individuals of the same species living in the same area and interacting with one another. Populations are the basic units of evolution and ecology.

10. Community: A community is an assemblage of populations of different species living together in the same area and interacting with one another.

11. Ecosystem: An ecosystem includes all living organisms (biotic factors) in a particular area, along with the nonliving components (abiotic factors) such as air, water, soil, and sunlight. Ecosystems exhibit complex interactions between organisms and their environment.

12. Biome: A biome is a large-scale ecological community characterized by distinct climate, vegetation, and animal life. Examples include tropical rainforests, deserts, grasslands, and tundra.

13. Biosphere: The biosphere encompasses all living organisms on Earth and the environments in which they live. It includes the atmosphere, hydrosphere (water), lithosphere (land), and extends from the deepest ocean trenches to the highest mountain peaks.

1.1.1 CELL

This hierarchical organization reflects the interconnectedness and complexity of life, from its molecular basis to the global ecosystem.

Cells are the fundamental units of life, providing structure, carrying out metabolic functions, and enabling reproduction. Here's an overview of cells:

1. Cell Membrane: Also known as the plasma membrane, it surrounds the cell, separating its internal environment from the external environment. The cell membrane regulates the passage of materials in and out of the cell, allowing nutrients to enter and waste products to exit.

2. Cytoplasm: The cytoplasm is the jelly-like substance that fills the interior of the cell. It contains various organelles suspended in a fluid called cytosol. Metabolic reactions occur within the cytoplasm.

3. Nucleus: In eukaryotic cells, the nucleus houses the cell's genetic material in the form of chromosomes, which are composed of DNA. The nucleus is surrounded by a double membrane called the nuclear envelope and contains the nucleolus, where ribosomal RNA (rRNA) is synthesized.

4. Organelles:

- Mitochondria: Mitochondria are the powerhouses of the cell, responsible for generating energy in the form of adenosine triphosphate (ATP) through cellular respiration.

- Endoplasmic Reticulum (ER): The ER is a network of membranes involved in protein synthesis and lipid metabolism. Rough ER has ribosomes attached to its surface, while smooth ER lacks ribosomes.

- Golgi Apparatus: The Golgi apparatus modifies, sorts, and packages proteins and lipids produced by the ER for transport to their final destinations within or outside the cell.

- Ribosomes: Ribosomes are the sites of protein synthesis, where amino acids

are assembled into polypeptide chains based on instructions from messenger RNA (mRNA).

- Lysosomes: Lysosomes contain digestive enzymes that break down macromolecules, old organelles, and foreign substances, playing a role in cellular recycling and waste disposal.

- Vacuoles: Vacuoles are membrane-bound sacs involved in storage, transportation of substances, and maintaining turgor pressure in plant cells.

- Chloroplasts: Found in plant cells and some protists, chloroplasts are the sites of photosynthesis, converting light energy into chemical energy in the form of glucose.

- Cytoskeleton: The cytoskeleton is a network of protein filaments that provides structural support, helps maintain cell shape, facilitates cell movement, and enables intracellular transport.

5. Genetic Material:

- DNA (Deoxyribonucleic Acid): DNA carries the genetic instructions for building and maintaining an organism. In eukaryotic cells, DNA is housed in the nucleus.

- RNA (Ribonucleic Acid): RNA plays various roles in gene expression, including messenger RNA (mRNA), transfer RNA (tRNA), and ribosomal RNA (rRNA).

6. Cellular Processes:

- Metabolism: Cells carry out metabolic processes to obtain energy and synthesize biomolecules required for growth, repair, and reproduction.

- Cell Division: Cells reproduce through processes such as mitosis (in somatic cells) and meiosis (in gametes), ensuring growth, development, and reproduction of organisms.

Cells exhibit remarkable diversity in structure and function, yet they share fundamental features that reflect their common evolutionary origins and essential roles in life processes.

1.1.2 TISSUE

Tissues are groups of similar cells that work together to perform a specific function. In multicellular organisms, tissues are organized into various types, each tailored to carry out specialized tasks. Here are some key types of tissues:

1. Epithelial Tissue: Epithelial tissue covers the surfaces of the body, both inside and out. It serves as a protective barrier against physical injury, pathogens, and dehydration. Epithelial tissue also facilitates absorption, secretion, and sensation. Examples include the epidermis (outer layer of skin), lining of the digestive tract, and the epithelium of blood vessels.

2. Connective Tissue: Connective tissue provides support, structure, and connectivity to other tissues and organs. It consists of cells dispersed within an extracellular matrix, which may include fibers such as collagen, elastin, and reticular fibers embedded in a gel-like substance. Connective tissue includes various types such as:

- Bone: Provides support and protection, stores minerals, and houses bone marrow.

- Cartilage: Provides flexibility and cushioning at joints and in structures like the nose and ears.

- Adipose Tissue (Fat): Stores energy, insulates the body, and cushions organs.

- Blood: Transports oxygen, nutrients, hormones, and waste products throughout the body.

- Dense Connective Tissue: Forms tendons (connect muscle to bone) and ligaments (connect bone to bone), providing strength and stability.

3. Muscle Tissue: Muscle tissue is specialized for contraction, generating force and enabling movement. There are three types of muscle tissue:

- Skeletal Muscle: Attached to bones, responsible for voluntary movements such as walking and running.

- Smooth Muscle: Found in the walls of hollow organs (e.g., intestines, blood vessels) and responsible for involuntary movements such as peristalsis and vasoconstriction.

- Cardiac Muscle: Found in the heart, responsible for involuntary contraction

and pumping blood throughout the body.

4. Nervous Tissue: Nervous tissue consists of neurons (nerve cells) and glial cells. Neurons transmit electrical signals called nerve impulses, allowing for communication within the nervous system. Glial cells support and protect neurons, maintain homeostasis, and participate in signal transmission. Nervous tissue forms the brain, spinal cord, and peripheral nerves.

These types of tissues can combine to form organs, which then work together in organ systems to carry out complex physiological functions necessary for the survival and well-being of the organism.

1.1.3 ORGANS

Organs are structures composed of different tissues working together to perform specific functions necessary for the survival and well-being of an organism. Each organ is specialized to carry out particular tasks within the body. Here are some examples of organs and their functions:

1. Heart: The heart is a muscular organ that pumps blood throughout the body, supplying oxygen and nutrients to tissues and removing waste products.

2. Brain: The brain is the control center of the nervous system, responsible for processing sensory information, initiating and coordinating motor responses, and regulating various physiological functions such as heartbeat, breathing, and temperature.

3. Lungs: The lungs are respiratory organs responsible for exchanging oxygen and carbon dioxide between the air and the bloodstream. Oxygen is taken in from the air and carbon dioxide is expelled from the body during breathing.

4. Liver: The liver is a vital organ involved in numerous metabolic processes, including detoxification of harmful substances, synthesis of proteins, storage of glycogen, and production of bile for digestion.

5. Kidneys: The kidneys are responsible for filtering waste products and excess substances from the bloodstream to form urine, which is excreted from the body. They also play a crucial role in regulating fluid balance, electrolyte levels, and blood pressure.

6. Stomach and Intestines: The stomach and intestines are part of the

digestive system, where food is broken down into nutrients that can be absorbed by the body. The stomach secretes digestive enzymes and acids to start the digestion process, while the intestines absorb nutrients and water from digested food.

7. Skin: The skin is the body's largest organ and serves as a protective barrier against physical injury, pathogens, and UV radiation. It also regulates body temperature, stores fat, and houses sensory receptors for touch, pressure, pain, and temperature.

8. Pancreas: The pancreas is both an endocrine and exocrine gland. It produces hormones such as insulin and glucagon that regulate blood sugar levels and enzymes that aid in digestion by breaking down carbohydrates, proteins, and fats in the small intestine.

9. Spleen: The spleen plays a role in the immune system by filtering blood, removing old or damaged red blood cells, and producing white blood cells (lymphocytes) and antibodies.

10. Bladder: The bladder is a hollow organ that stores urine produced by the kidneys until it is expelled from the body during urination.

These examples highlight the diversity of organs in the human body and their essential roles in maintaining homeostasis and supporting life functions. Each organ is part of a larger organ system, and together they work in harmony to ensure the overall health and functioning of the organism.

1.1.4 ORGAN SYSTEM

The organ system is a group of organs that work together to perform specific functions in the body. There are several organ systems in the human body, each with its own set of functions and organs. Some of the major organ systems include:

1. Nervous System: Comprised of the brain, spinal cord, and nerves, it regulates and coordinates the body's activities and responses to internal and external stimuli.

2. Respiratory System: Includes the lungs and airways, responsible for breathing and gas exchange (oxygen and carbon dioxide) between the body and the environment.

3. Circulatory System: Consists of the heart, blood vessels, and blood,

which transport nutrients, oxygen, hormones, and waste products throughout the body.

4. Digestive System: Involves organs like the stomach, intestines, liver, and pancreas, responsible for processing food, extracting nutrients, and eliminating waste.

5. Endocrine System: Comprises glands such as the pituitary, thyroid, and adrenal glands, which produce hormones that regulate various bodily functions.

6. Muscular System: Consists of muscles and tendons that enable movement, maintain posture, and generate heat.

7. Skeletal System: Comprised of bones, cartilage, and ligaments, providing structural support, protecting internal organs, and enabling movement.

8. Immune System: Includes organs like the spleen, thymus, and lymph nodes, as well as white blood cells, defending the body against pathogens and foreign substances.

9. Urinary System: Involves organs like the kidneys, ureters, bladder, and urethra, responsible for filtering blood, producing urine, and maintaining fluid balance.

10. Reproductive System: Specific to each gender, it includes organs like the ovaries, fallopian tubes, uterus, and vagina in females, and the testes, epididymis, vas deferens, and penis in males, responsible for reproduction.

Each organ system has its own unique structure and function, but they all work together in harmony to maintain the body's overall health and homeostasis.

1.1.5 ORGANISM

An organism is a living entity that consists of one or more cells, capable of carrying out various life processes such as metabolism, growth, reproduction, and response to stimuli. Organisms can range from simple, single-celled organisms like bacteria to complex multicellular organisms like plants and animals.

Here are some key characteristics of organisms:

1. Cellular Organization: All organisms are composed of one or more cells. The

cell is the basic unit of structure and function in living organisms.

2. Metabolism: Organisms carry out metabolic processes to obtain energy from their environment and utilize it for growth, repair, and reproduction. Metabolism includes processes such as photosynthesis (in plants) and respiration (in animals).

3. Homeostasis: Organisms maintain internal stability through processes like temperature regulation, pH balance, and nutrient regulation. Homeostasis ensures that the internal environment remains optimal for cellular functions.

4. Growth and Development: Organisms grow by increasing in size or by producing more cells. Development involves a series of changes in an organism's structure and function over time.

5. Reproduction: Organisms reproduce to pass on their genetic material to offspring. Reproduction can occur through sexual or asexual means, depending on the organism.

6. Response to Stimuli: Organisms respond to various stimuli from their environment, such as light, temperature, and chemicals. These responses help organisms survive and adapt to their surroundings.

7. Evolution: Organisms have the capacity to evolve over time through genetic variation and natural selection. Evolutionary processes drive the diversity of life on Earth.

Organisms can be classified into different kingdoms based on their characteristics, such as bacteria (prokaryotes), protists, fungi, plants, and animals. Each kingdom comprises a wide variety of species with unique adaptations and life strategies.

2. Need and Significance of the Study

Investigator during the school visit found majority of the students should poor attainment in the competency of atomic structure in the subject science.

This lesson includes what is cell, tissue, organs, organ system and organisms. The investigator decided to improve the higher level attainment of competency through multimedia packages instead of conventional method of teaching.

3. STATEMENT OF THE PROBLEM:

FACILITATING UNDERSTANDING OF THE CONCEPT ORGANISATION OF LIFE AMONG VIII STUDENTS THROUGH ICT.

4. OBJECTIVES OF THE STUDY

- ➢ Identify the reason for Students inability to achieve the competency.
- ➢ Design the strategies to enable the pupils to achieve above competency.
- ➢ Implement the strategies

5. Action Hypothesis

If the teacher teaches the concept through developed Multimedia (E-content) "Organization of Life", the students will understand the concepts thoroughly.

6. DESIGN OF THE STUDY

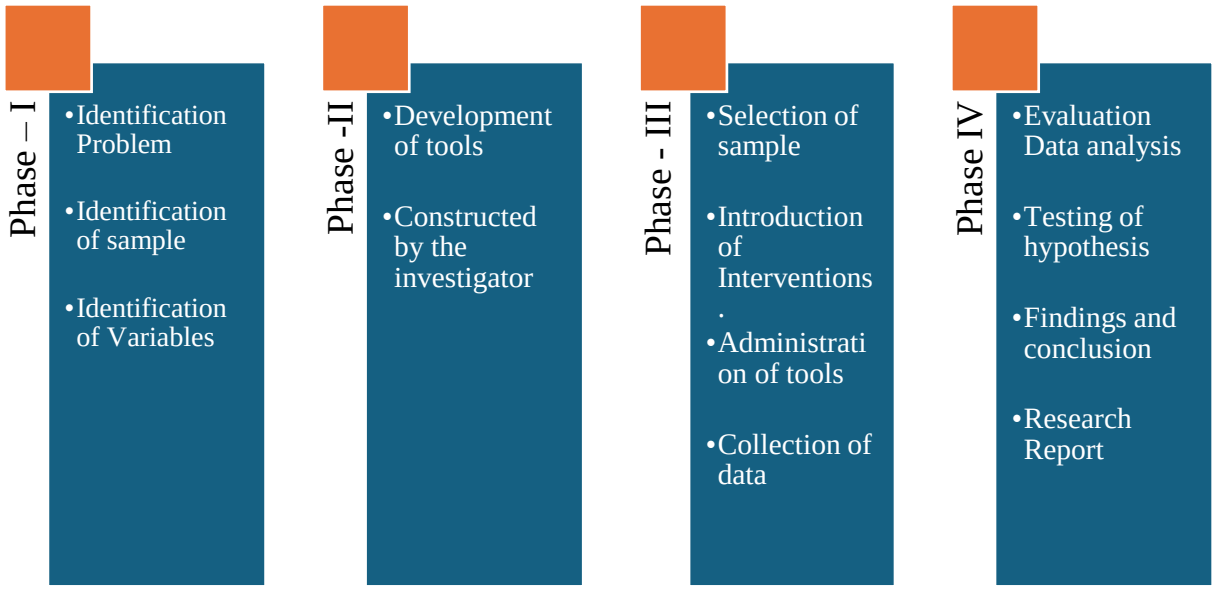
Type	Source
Nature of experiment	Single group experimental design
Independent variable	Teaching of competency using teaching design (Prepare by Investigator) consisting of various activities
Tools used	Achievement test Questionnaire (Pre & Post test), Worksheets and Multimedia Presentation.
Sample selected	School – P.U.M.S, Perunkondanviduthy, Pudukkottai Block

Data Analysis	Pre test and Post test data collection Difference in average percentage of attainment between pre test and posttest.

7. **Methodology**

The investigator followed the single group experimental design. The self-made achievement test was selected and administered to the VIII standard PUMS, Perunkondanviduthy, Pudukkottai Block. The pretest was conducted after the classroom transaction. Researcher used an activity and multi-media projector with explanation as an innovative approach. A post test was conducted, and the scores were tabulated.

8. FLOW CHART OF EXPERIMENTATION



9. Administration of the Pre-Test

Pretest was given to the students of class VIII standard for the concept of "**ORGANISATION OF LIFE**". Pre- test question contains ten questions, they are objective type questions. The average percentage scored by the students in Pre-test is 31.78%.

Implementation Stage

The investigator follows the following strategies to enhance students learning the concept of ORGANISATION OF LIFE.

- Multimedia Power Point Presentation
- Lecture cum Demonstration Method and Experimental Method
- **ORGANISATION OF LIFE** – Video

ADMINISTRATION OF THE POST TEST

Post test was administered to the students of class eigth after treatmentof Multimedia and activities. The post - test question contains ten questions; they are objective type questions. The marks were tabulated and analyzed. The average percentage scored by the students in Post test is 67.5%.

10. INTERVENTION

MULTIMEDIA POWER POINT PRESENTATION

A Multimedia was prepared by the researcher with the help of software developer. Multimedia encompasses a variety of content formats, including text, images, audio, and video, integrated into a cohesive

learning experience. The Multimedia was shown to the students and the following concept was explained.

VIDEO – ORGANIZATION OF LIFE

PRET TEST AND POST TEST

11. ANALYSIS OF DATA

The data collected through pre and post-test and resulted.

(i)Table Showing Average Percentage in Pre-Test

No of children	Average Percentage
14	31.78

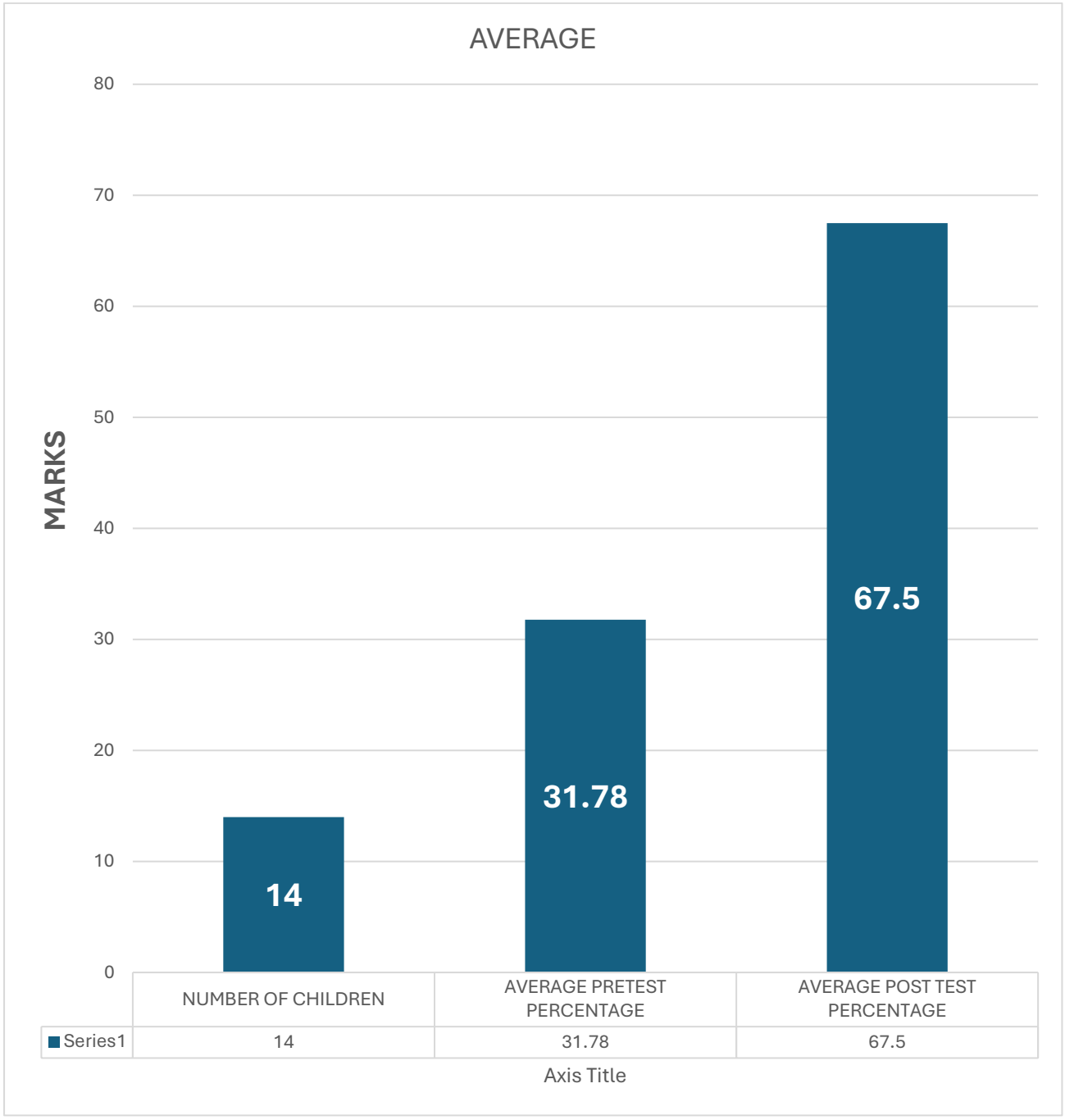
(ii)Table showing Average percentage in post-Test

No of children	Average Percentage
14	67.5

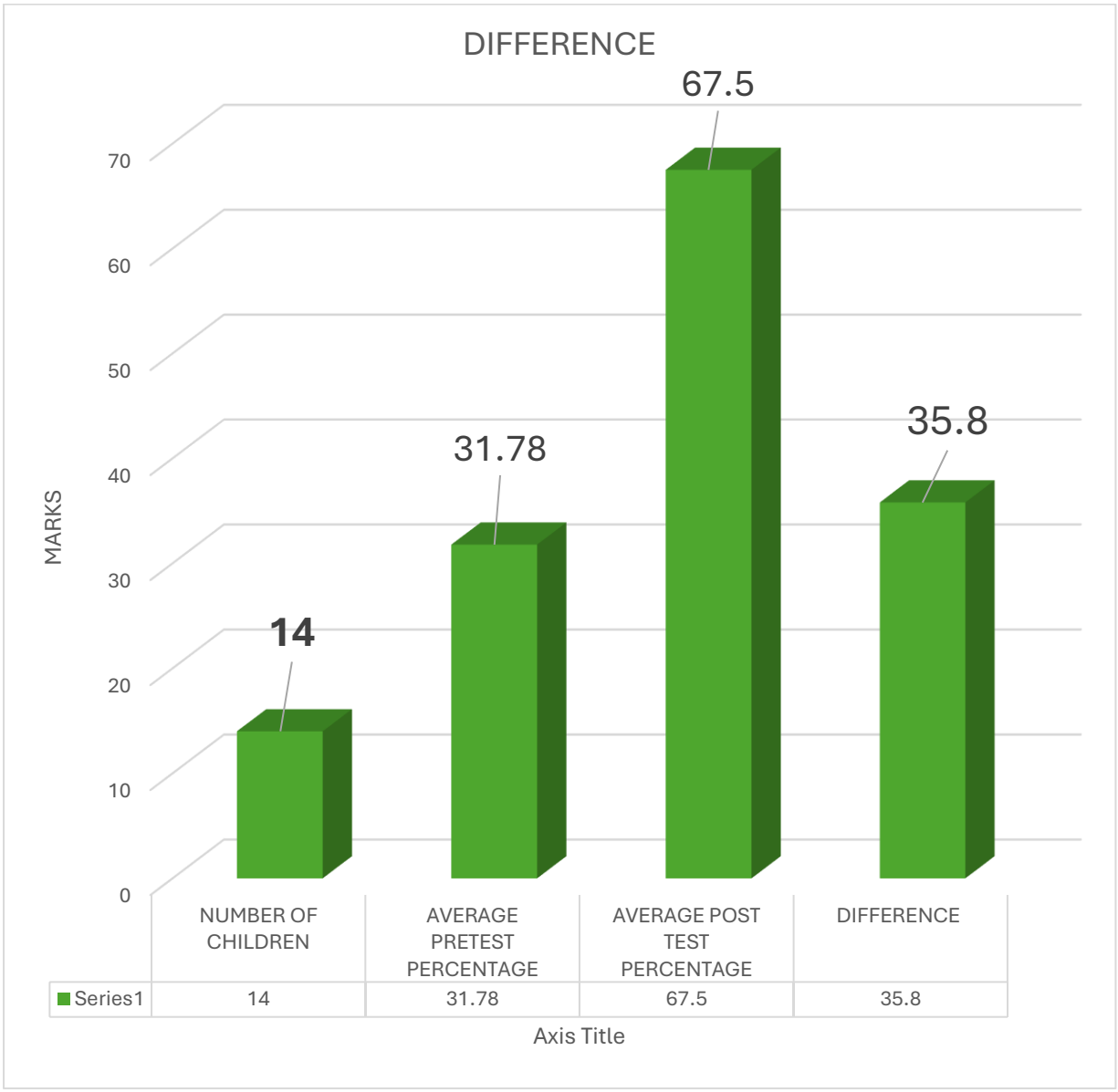
iii) **Difference in the average percentage of students between the pre-Test and post- test.**

Number of children	Average (Pre-Test) Percentage	Average Percentage (post-test)	Difference in the average percentage % pre & post test
14	31.78	67.5	35.8

AVERAGE BETWEEN PRETEST AND POST TEST



DIFFRENCE BETWEEN PRETEST AND POSTTEST



12. DISCUSSION

From the pre-test it was observed that there was a problem for students of VIII std in understanding the concept “Organization of life ”. There is a difference between pre-test and post-test after adopting the CAI strategy. So the CAI is effective in improving the achievement of students in the competency “Energy”. The present investigation attempts to study the package of CAI strategy adopting for VIII std students in Science at P.U.M.S, Perunkondanviduthy, Pudukkottai Block. After executing the framed activities post-test was administrated and average percentage of post -test is 67.5 %.

13. FINDINGS

- In the Pre-test the average percentage of the class is 31.78%
- ➢In the post – test the average percentage of the class is 67.5%
- ➢The difference in the average percentage of the class between pre and Post test is 35.8%

14. LIMITATIONS

1.This study is confined to students of VIII standard only.

2. This study is confined to VIII std students of P.U.M.S, Perunkondanviduthy, Pudukkottai Block

3. This study is limited to adopting Multimedia (E-conent) demonstration to the particular competency.

15. CONCLUSION AND SUGGESTION

It is concluded from the above findings that there is a substantial improvement in the average percentage of the class between the pre-test and post-Test This improvement is resulted due to the adaptation of

Multimedia (E-content) strategy i.e., developed computer software with demonstration and other necessary teaching aids mentioned in the teaching design .In this study computer developed Multimedia for the students of VIII std was introduced and compared with conventional method of teaching. Modern theories stressed the Educational Technology (E-Content) is the most suitable startergy to children at lower Classes. This will make the children more affectionate towards subject and teachers. By nature child is active. He must do something or the other. The child possesses an innate interest in activities. Learning is a dynamic and active experience. The teacher should go organize and plan that child is goaded to activity through proper interest. The experience gained through this E-content strategy may induce teacher to design activities on their own to other competencies also.

16. EDUCATIONAL IMPLICATIONS

➢ As this action research established the positive results in the attainment of the competency "Micro Organisms" in the selected model school. This type of CAI (developed computer software) strategy may also be tried for other competencies in the subject science.

➢ CAI method of teaching is very helpful to the learners who are facing difficulty in understanding the scientific concepts.

➢ CAI to establish confidence over the subject among the students.

➢ CAI approach may also be tried for other subjects also.

CONCLUSION AND SUGGESTION

➢ It is concluded from the above findings that there is a substantial improvement in the average percentage of the class between the pre-test and post-Test for the competency "Facilitating understanding of the

Concept organisation of life among VIII Standard Students through ICT".

➢ This improvement is resulted due to the adaptation of CAI strategy The experience gained through this CAI strategy may induce teacher to design activities on their own to other competencies also.

Mark Statement

Sl.. No.	Name of the Student	Pre Test	Post Test
1.	K.Malayappan	25	55
2.	T.Arun	40	70
3.	M.Dharshini	35	60
4.	P.Akalya Sri	20	55
5.	A.Rajarajeshwari	30	65
6.	R.Mahalakshmi	25	60
7.	T.Dhanushka	45	85
8.	P.Elavarasi	40	80
9.	C.Mahalakshmi	30	65
10.	C.Mangaleswari	25	55
11.	V.Lavanisha	35	75
12.	C.Subasri	20	55
13.	L.Uma Maheswari	40	85
14.	V.Yamuna	35	80
Total		**445**	**945**
Average		**31.78**	**67.5**