ENHANCING THE SCIENCE PROCESS SKILLS AMONG VI STANDARD STUDENTS IN BARGUR BLOCK

ACTION RESEARCH REPORT (2023-24)

ACTION RESEARCHER

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Submitted to

State Council of Educational Research and Training, Chennai-6

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ACKNOWLEDGEMENT

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I express my sincere thanks to the Action Research committee heads Dr.V.Hemalatha, Principal, DIET, Krishnagiri, Dr.Manivel, Principal, DIET, Thiruvannamalai and Mr.Balasubramani, Principal,DIET, Ranipet

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I am thankful to Head Master of GGHSS, Bargur , Bargur Block for co-operate with completion of Action Research work. I thank my colleagues for their suggestions to completing this work.

Place: B.Amutha, Lecturer,

Date: DIET, Krishnagiri

DECLARATION

I hereby declare that Action Research entitled **" ENHANCING THE SCIENCE PROCESS SKILLS AMONG VI STANDARD STUDENTS IN BARGUR BLOCK",** is submitted by me to the SCERT Chennai in the year 2023-24 is the result of our original and independent Action Research work carried out under the co-ordination of Dr.V.Hemalatha, Principal, DIET, Krishnagiri. This work has not submitted earlier for completing any Action Research work or other similar titles in this or any other Institution.

April -2024

Krishnagiri

Signature of the Action Researcher

B.Amutha, Lecturer,

DIET, Krishnagiri.

CERTIFICATE

Dr.V.Hemalatha

Principal

DIET, Krishnagiri.

Certified that this Action Research work entitled **"ENHANCING THE SCIENCE PROCESS SKILLS AMONG VI STANDARD STUDENTS IN BARGUR BLOCK",** is done by Mrs.B.Amutha, Lecturer, DIET, Krishnagiri, the report has been submitted to State Council of Educational Research and Training, Chennai-6.

Principal

DIET, Krishnagiri

ACTION RESEARCH ABSTRACT

1. Action Research Number (2023-24) : TN-KGI06

2. Name of the Action Researcher : B.Amutha, Lecturer

3. Name of the DIET : DIET, Krishnagiri

4. Title:

ENHANCING THE SCIENCE PROCESS SKILLS AMONG VI STANDARD STUDENTS IN BARGUR BLOCK

5.Introduction

Science process skills are skills that focus on the learning process to develop students' skills in understanding the knowledge or concepts, independently discovering and developing necessary facts, concepts, and values. Science process skills are a learning approach that integrates science process skills into the system of integrated material presentation. The learning approach is not only transferring knowledge, but also emphasizing on the process of scientific inquiry. In this learning approach, the teacher acts as a facilitator who guides and manages students' learning activities so that students are able to construct necessary facts, concepts, and new values in their lives independently.

6. Objectives

- To understand the basic concepts of science through science process skills.
- To improve science process skills among VI standard students**.**
- To explore the science process skills.

7. Sample:

The Action Researcher selected 43 students from GGHSSchool Bargur in Bargur block were selected as sample for the study.

8. Tool:

Questionnaire was prepared by the action researcher for Pre-test and Post-test

9. Methodology :

Single group experimental design

10. Intervention:

- Question box
- Teaching cum Demonstration
- Cooperative Learning Approach
- Learning by doing
- Hands on experience

11. Findings

- There is significant difference between the pre-test and the post-test scores.
- The average scores in pre-test 53.81% and in post-test 70.30%. High mean score is found in Post-test.
- Majority of the students felt that science concept through activities retains for a longer period of time.
- Students have varied observing science process skills. Overall students have good observing skills.

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ENHANCING THE SCIENCE PROCESS SKILLS AMONG VI STANDARD STUDENTS IN BARGUR BLOCK

1.INTRODUCTION:

Science process skills are skills that focus on the learning process to develop students' skills in understanding the knowledge or concepts, independently discovering and developing necessary facts, concepts, and values. Science process skills are a learning approach that integrates science process skills into the system of integrated material presentation. The learning approach is not only transferring knowledge, but also emphasizing on the process of scientific inquiry. In this learning approach, the teacher acts as a facilitator who guides and manages students' learning activities so that students are able to construct necessary facts, concepts, and new values in their lives independently.

The learning process done by students who are actively seeking and finding their own natural science concepts can certainly not be separated from the science process skills that they have. Students need the science process skills in their activities to find the right science concepts. Science process skills become the driving wheel of discovery and development of facts and concepts as well as the growth and the development of attitudes and values. Students who are active in learning science through the use of process skills, discussions, and experiments, gain more meaningful learning and dispel perceptions of rote learning.

Science process skills can be classified as basic processes (i.e., observation, measurement, classification, data recording, and number and space relationships), casual processes (i.e., prediction, identifying variables, interpreting data and inferring), and experimental processes (i.e., hypothesis development, using data/formulating model, making experiment, manipulating and controlling variables, decision.

Brotherton and Preece (1995) divided these abilities used in scientific investigations into two process skills; basic and integrated. The main basic process skills are observation,

measurement, classification, prediction and inference. The integrated process skills, which are more advanced cognitive and psychomotor abilities, include formulating hypotheses, controlling variables, defining operationally, experimenting, and modeling.

1.1.NCF 2005 PERSPECTIVES ON SCIENCE PROCESS SKILLS:

According to NCF 2005, "A good science education is true to the child, true to life and true to science. The recommendations of NCF 2005 on teaching of science encourage experimental work. "At the secondary stage the students should be engaged in learning science as a composite discipline, in working with hands and tools to design more advanced technological modules than at the upper primary stage and in activities and analysis on issues surrounding environment and health. Systematic experimentation as a tool to discover/verify theoretical principles and working on locally significant projects involving science and technology are to be important parts of the curriculum at this stage."

1.2.SCIENCE BEGINS WITH OBSERVATION:

Observing is the fundamental science process skill. We observe objects and events using all our five senses, and this is how we learn about the world around us. The ability to make good observations is also essential to the development of the other science process skills: communicating, classifying, measuring, inferring, and predicting. The simplest observations, made using only the senses are qualitative observations.

Observation is essential in science. Observation is more than simply noticing something. It involves perception (becoming aware of something by means of the senses) and the recognition of the subject's importance or significance. Scientists use observation to collect and record data ,which enables them to construct and then test hypotheses and theories. Scientists observe in many ways – with their own senses or with tools such as microscopes, scanners or transmitters to extend their vision or hearing.

1.3.SCIENCE - BASIC PROCESS SKILLS:

Science basic process skills are integrated together when scientists design and carry out experiments or in everyday life when we all carry out fair test experiments. All the six basic skills are important individually as well as when they are integrated together. The six basic skills can be put in a logical order of increasing sophistication, although even the youngest students will use all of the skills alongside one another at various times. The science process skills form the foundation for scientific methods.

Science process occurs naturally, spontaneously in our minds. By logically breaking down the steps in our thinking, we can use science process to find out how to answer our questions about how the world works. Science process is not just useful in science, but in any situation that requires critical thinking. Science process skills include observing qualities, measuring quantities, sorting/classifying, inferring, predicting, experimenting, and communicating.

There are seven basic science process skills:

- ✓ Observation
- ✓ Communication
- ✓ Classification
- ✓ Measurement
- ✓ Inference
- ✓ Prediction
- ✓ Experimenting

OBSERVATION :

Observations are not just seeing or use the sense of sight, but involve the abilities of our five senses, namely the senses of sight, hearing, taste, touch, and smell. Some activities that occur during observation are:

a. Use the five senses, not only the sense of sight;

b. Organizing objects according to certain characteristics

c. Identifying;

d. Identifying the changes of an object;

e. Conduct a quantitative observation

f. Conduct a qualitative observation.

Observations must be free of assumptions and opinions. Observations must honestly report what is received or captured by the five senses. Observations that only use the senses without referring to certain standard units of measurement are called qualitative observations. Meanwhile, observations that use measuring instruments and refer to certain standard units of measurement are called quantitative observations. Quantities obtained from counting include quantitative observations. Observations that only use one sense might not provide a complete description of the object being observed.

Carin suggests seven components to good scientific observation (Carin, 1993). They are:

a. Plan

The purpose of planning is to minimize missing the important things or avoid unnecessary repetition.

b. Sense

Use all five senses and be free from the opinions and assumptions of observers.

c. Question

Critical and asking questions aim to obtain more information on the object of observation.

d. Measurement

Measurements are carried out with measuring instruments and standard units.

e. Similarities and Differences

Observations of these two things are used to group or classify aiming to see a pattern of regularity changes. Pay close attention to the changes.

f. Communications.

Occur both writing and oral using descriptions, diagrams, pictures, and other appropriate methods.

CLASSIFICATION :

Classification is the grouping of objects according to a certain characteristic. Classification may be through following ways:

a. identification of a common trait,

b. sorting by using two or more characteristics based on the similarities and differences.

MEASUREMENT:

Measurement is an activity to compare with a unit of measurement and use in quantitative observations. Measurement activities may be through the following form:

a. measurement of length, volume, mass, temperature, and time in appropriate units;

b. select the appropriate tools and units for the particular measurement task.

COMMUNICATION

Use to expose or write data as clearly as possible. Communication may be through following ways:

a. Presentation the result of the observation;

b. Use graphs or pictures to present the result of observations and data demonstrations;

c. Create posters or diagrams to present the data to others.

INFERENTIAL

Inferential is used for an observed object to explain the occurred phenomena, such as:

a. Associate observations with previous experience or knowledge;

b. Propose explanations for observations.

Example of Inference questions:

What are your assumptions?

I assume this is an insect because it has six legs, and when I've seen insects before they have six legs.

What have you seen before that reminds you of this? Why do you think that's going to happen?

PREDICTING

Predicting is exposing the possible results from an experiment based on observations and previous inferences about what observations may be encountered in the future. While inference seeks to provide reasons for why an observation occurs. The prediction may occur in the following ways:

a. Use appropriate data and observations;

b. Interpretation the generalizations of patterns.

EXPERIMENT:

Experimenting being able to conduct an experiment, including asking an appropriate question, stating a hypothesis, identifying and controlling variables, operationally defining those variables, designing a "fair" experiment, conducting the experiment, and interpreting the results of the experiment.

1.4.NEED OF SCIENCE PROCESS SKILLS:

Science process skills are very important to be developed in science learning because helps students develop their thoughts to make discoveries, therefore they can be assisted using scientific concepts. Science process skills become the provisions of students to develop and obtain new knowledge or knowledge they already have. Science process skills are divided into two namely basic process skills and integrated process skills.

1.5.SIGNIFICANCE OF SCIENCE PROCESS SKILLS :

Science process skills are critical to cultivate in science education because they enable students to think critically and generate findings that can be supported by scientific ideas. Students can build and acquire new knowledge or reinforce existing knowledge by using science process skills. There are two categories of science process skills: integrated process skills and basic process skills. Basic Science Process Skills are Observing, Measuring, Inferring, Classifying, Predicting and Communicating. Integrated Science Process Skills are Controlling Variables, Hypothesizing, Experimentation and Data Interpreting. All these skills are together known as Science Process Skills.

Science process skills help students develop into persons who can access and comprehend information, enabling them to apply the knowledge they learn in practical contexts. These abilities are essential for other cognitive skills like reasoning, problem solving, and logical thinking.Science process skills are very important to be developed in science learning because helps students develop their thoughts to make discoveries, therefore they can be assisted using scientific concepts.

2.NEED AND SIGNIFICANCE OF THE STUDY:

Science process skills need to be utilized by the teacher **to teach the science facts and concepts effectively**. This is because science is not only knowledge but also a systematic way to understand the concept. During school visits the investigator found that

the upper primary students felt difficult to understand the science concepts integrated science process skills in the classroom. Hence the topic has been chosen for the study.

3.STATEMENT OF THE PROBLEM:

The problem is stated as follows **"ENHANCING THE SCIENCE PROCESS SKILLS AMONG VI STANDARD STUDENTS IN BARGUR BLOCK."**

SCIENCE PROCESS SKILLS: Science process skills are skills that focus on the learning process to develop students' skills in understanding the knowledge or concepts, independently discovering and developing necessary facts, concepts, and values

4.DELIMITATIONS OF THE STUDY:

- The Action Researcher was restrict Upper primary VI Std Students in GGHSS,Bargur
- The Action Research Practitioner was focus only on Science Process skill.
- The Action Researcher was selected only VI th Standard Tamil medium 43 Students in GGHSS,Bargur, Bargur Block.

5.OBJECTIVES:

- To understand the basic concepts of science through science process skills.
- To improve science process skills among VI standard students**.**
- To explore the science process skills.

6.HYPOTHESIS:

- Multiple Teaching strategies will improve the science process skills among VI Standard students in GGHSS, Bargur.

7.SAMPLE :

Present study is a single group experimental design. Pre-test was conducted to VI Standard 43 students were selected in GGHSS, Bargur Block. Activities are framed by

the Action Researcher. Treatments were given for the Students. Post-test was conducted after giving the treatment to study the effect of the treatment.

8.TOOL:

A Questionnaire was prepared by the action researcher for Pre-test and Post-test.

It was used to find out the students understanding in basic concepts of science related to the Science process skills.

Different types of questions were probed to test their level of understanding in VI Standard science.

The questionnaire contains different types of questions namely,

- ✓ Multiple choice questions,
- ✓ Description type questions,
- ✓ Fill in the blanks and match it

Total score of the questionnaire is 15 and it is converted to 100

9.DESIGN OF THE STUDY:

Present study is a single group experimental design. Pre-test was conducted to 43 VI Standard 43 students were selected in GGHSS, Bargur Block. Activities are framed by the Action Researcher. Treatments were given for the teachers. Post-test was conducted after giving the treatment to study the effect of the treatment.

10.STRATEGIES:

- **QUESTION BOX**

  Question box activity make learning so meaningful and so much fun. Action Researcher Prepare the list of question given below in VI std Science Term II and put in Question Box. Students allowed to take one question,expressed something about that concept in science.In this activity

students develop their communicating skill and explore their knowledge in classroom.

Examples of Questions:

Watch birds, squirrels, and pillbugs.

Notice what things are the same, what things are different.

• Start collections of flowers, leaves, and seashells. Make drawings. Label parts.

• "Do all leaves have veins?" "Do all leaves change color?"

• "Does the toy boat float better when we add more bubble bath to the water?"

Questions in the Question box:

1.Electricity conducting Material

2. Parts of Leaf

3.Explain about Magnet

4.Digestive system

5.Reversible Changes

6.Irreversible Changes

7.Fast and slow changes

8.Solar and Lunar Eclipse

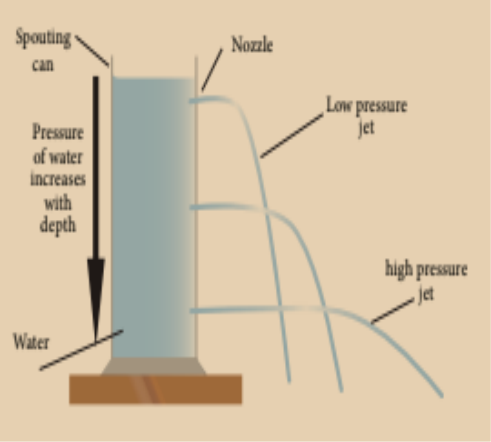
9.Laws of Reflection

10. Environmental Pollution

- **TEACHING CUM DEMONSTRATION**

i**) Activity 1**

Take a measuring jar put three holes in the same direction like bottom, middle and upper on it. In measuring jar pour some water into it. Water flow through the holes with different speed.



In this activity students develop their science process skills observation, Inference, Communicating their ideas. They understand that the pressure in a liquid varies with depth of the point.

ii) Solar and Lunar Eclipse:

Action researcher prepared a model for solar and lunar eclipse that was demonstrated to the students and explained how to solar and lunar eclipse formed. Discussed and raised the questions "What do you think is going to happen? Why do you think that? How can we find out Solar eclipse or Lunar eclipse?"

In this activity Students making an inference is defined as making statements on the causes of the events that happened before based on observation. students can make an inference after observation and inference science process skills in the classroom.

- **COOPERATIVE LEARNING APPROACH**

Group Activity:

Total no.of students divided into 5 groups .Each group allotted content topic discussed

i) Parts of plants

ii) Animals

iii)Electric Resources

iv)Magnet

v) Reversible, Irreversible Changes

LEARNING BY DOING:

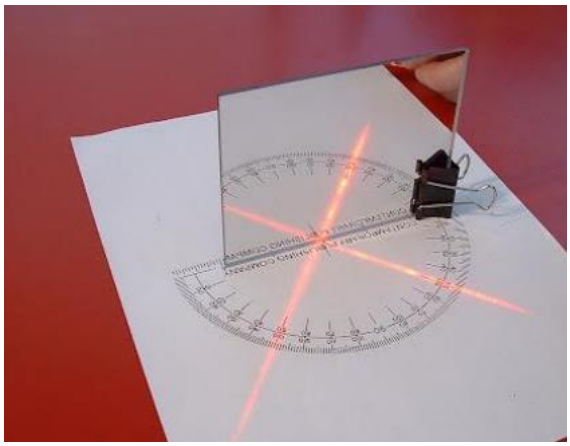
1.Laws of Reflection :

The Action Researcher gave the topic to the group and explained reflection laws

i) The angle of incidence is equql to the angle of reflection when a beam of light strikes the reflecting surface.

ii) The reflected ray, incident ray, and normal lie on the same plane.

Materials provided to the Group Leader and all group members were involved this process of learning**.**

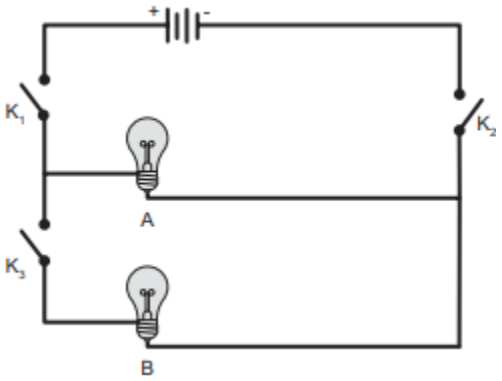


HANDS ON EXPERIENCE:

i)Types of Batteries:

Engage the students with a live demonstration showing the concepts they're studying. Even better, give them a chance to get hands-on and do the science concept activities themselves. The action researcher gave the types of

batteries and material needed for simple circuit to the students. They were eagerly handled and learned concepts in electricity.



ii)Bar Magnet

The action researcher gave the types of magnet and material needed for simple concepts in magnetism to the students. They were eagerly handled and learned concepts in science about magnet.

TABLE -1

PRE -TEST AND POST -TEST ACHIEVEMENT SCORES OF VI STD STUDENTS

S.NO	NAME OF THE STUDENT	PRE-TEST SCORES	POST-TEST SCORES
1	M.Aneesha	40	53
2	**K.Boomika**	47	60
3	M.Jeevitha	67	73
4	V.Kaviya sri	53	60
5	R.Roja	67	80
6	V.Varshini	67	80
7	C.Harini	60	80
8	K.Thanu sri	20	40
9	D.Kaviya	53	67
10	M.Lokeshwari	60	67
11	J.Jayalakshmi	40	60
12	T.Sowmiya	67	87
13	C.Monika	47	53
14	P.Mahalakshmi	53	73
15	**K.Sujitha**	**53**	**67**
16	G.Madhumithasri	40	87
17	V.Deepika	80	87
18	S.Savitha	47	60
19	B.Madhusha	60	73
20	S.Archana	60	80

21	R.Kiruthika	40	67
22	S.Hanshika Shree	73	87
23	G.Geetha	40	60
24	P.Monisha	60	73
25	D.Veronika Keshya	33	53
26	L.Punitha	67	73
27	S.Megavarshini	73	73
28	M.Ramya	40	53
29	M.Donisha	60	67
30	S.Mahalakshmi	53	60
31	R.Ragavi	67	80
32	S.Logavarshini	67	87
33	S.Monisha	27	67
34	M.Sagunthaladevi	47	67
35	S.Logeshwari	60	73
36	M.Amina	53	67
37	R.Manoshree	40	67
38	R.Pooja	60	73
39.	P.Madhusha	60	67
40	S.Pavithra	47	73
41	S.Poorvikaa	73	87
42	R.Kaviya	60	73
43	S.Sowmiya	33	73
	Mean	53.81	70.30

11.DATA ANALYSIS:

Pre test and Post test answer scripts were valued using the scoring key. Total marks are converted to 100. Mean, standard deviation and 't' values were calculated to find out the effect of activities to enhance the achievement of the students.

TABLE:2

DIFFERENCE BETWEEN ACHIEVEMENT SCORES OF PRE TEST AND POST TEST

Test	**Sample(N)**	**Mean(M)**	**Standard deviation (S.D)**	**Observed 't' value**	**'t'table value**	**Remarks At 0.05 level**
Pre-test	43	53.81	13.37	**6.277**	**1.990**	Significant
Post-test	43	70.3	10.86			

- From the above table it is observed that the calculated 't'value is greater than the table t -value.
- There is Significant difference between Pre test Scores and Post test Scores in enhancing the science process skill among VI Standard Students.
- While comparing the average scores, in pre test the VI Standard students scored 53.81% and in post test they scored 70.3%.
- High mean score is found in Post-test.

12.FINDINGS:

- There is significant difference between the pre-test and the post-test scores.
- The average scores in pre-test 53.81% and in post-test 70.30%. High mean score is found in Post-test.
- Majority of the students felt that science concept through activities retains for a longer period of time.
- Students have varied observing science process skills. Overall students have good observing skills.
- Science process skills are developed by experience, the ability to understand the concepts and the quality of the teacher in delivering the science concepts.

13.SUGGESTIONS:

Teaching learning process, integrating the science process skills with classroom lessons and field investigations will make the learning experiences richer and more meaningful for students. Students can make good observations because observing is a basic science process skill. The ability of students to make an observation is also important for the development of other science process skills.

Students will be learning the skills of science as well as science content. The students will be actively engaged with the science they are learning and thus reach a deeper understanding of the content. Finally active engagement with science will likely lead students to become more interested and have more positive attitudes towards science.

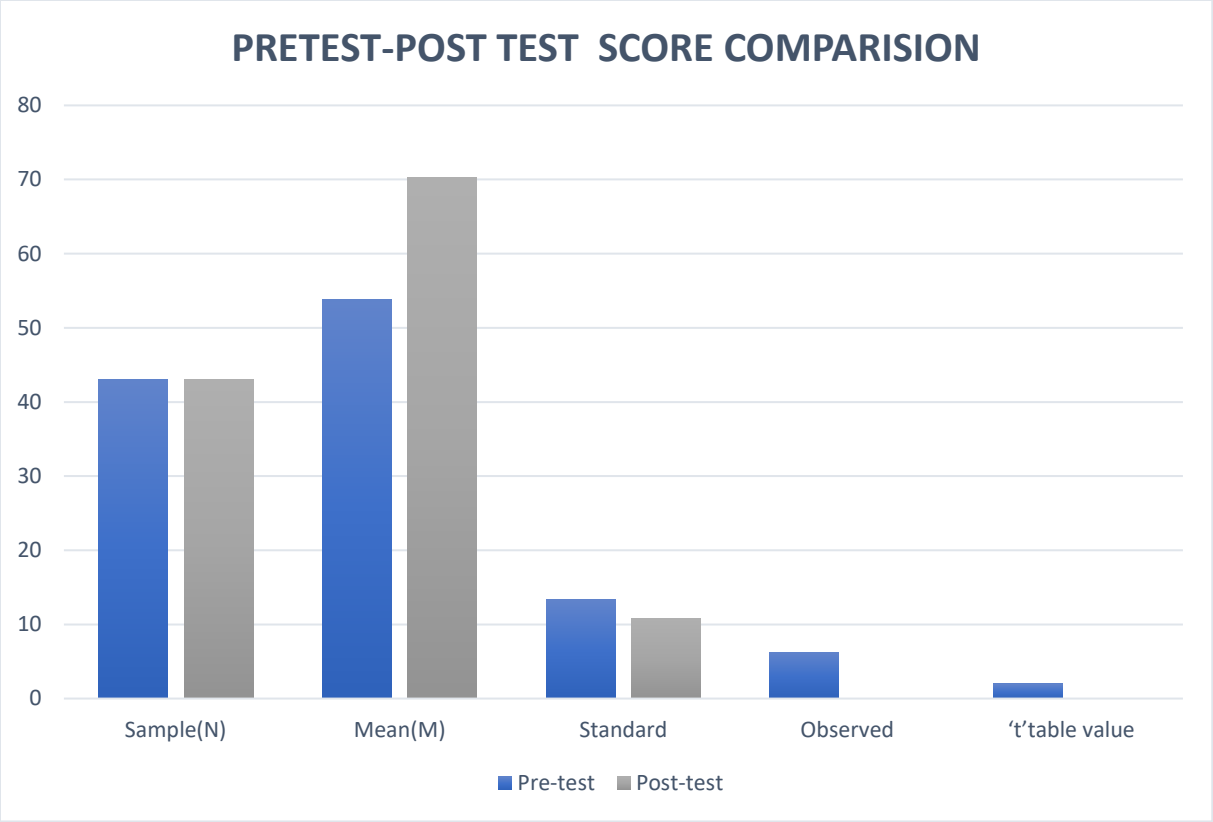
14.CONCLUSION:

Science process skill is very important for the students to acquire a knowledge. It plays a crucial role in the process of learning, and connects students to new knowledge using their current abilities. Scientific process skills are influenced by experience, the ability to understand the topic and the quality of the teacher in delivering the topic.

Based on the results of the Action research conducted, it can be concluded that the skills of the process of science are very important for students. Scientific process skills can be seen when a person performs an experiment in the classroom.

ANNEXURE 1

DIFFERENCE BETWEEN ACHIEVEMENT SCORES OF PRE TEST AND POST TEST



ANNEXURE 2

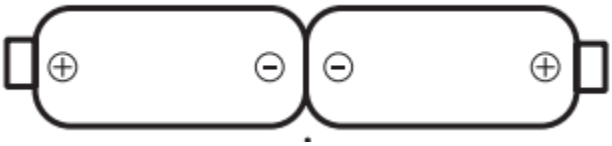
மாவட்ட ஆசிரியர் கல்வி மற்றும் பயிற்சி நிறுவனம், கிருஷ்ணகிரி

செயலாராய்ச்சி முன்/ பின் தேர்வு

1.கீழ்க்கண்டவற்று எது மின்சாரத்தை கடத்தும்?

a) புத்தகம் b) கண்ணாடி c) இரும்பு சங்கிலி d) கயிறு

2.கடிகாரத்தில் படத்திலுள்ளவாறு பொருத்தினால் டார்ச் விளக்கு



a) ஒளிரும் b) ஒளிராது

3.முட்டையை வேக வைக்கும் போது _____மாற்றம் நிகழ்கிறது.

4.பட்டாசு வெடித்தல் _____ மாற்றம் (மெதுவான/ வேகமான)

5.விதை முளைத்தல் _____மாற்றம் (மெதுவான/ வேகமான)

6.காற்று _____அடைத்துக் கொள்ளும்.

7.எரிதலுக்கு _____தேவை

8.தாவரங்கள் உணவு தயாரிக்கும் முறைக்கு_____
என்று பெயர் .

9.ஒருவரின் ஆடையில் எதிர்பாராத விதமாக தீ பற்றி பிடித்தால் என்ன செய்ய வேண்டும்.

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10. கீழுள்ளவற்றை முறைப்படுத்தி எழுதுக.

இரைப்பை ---- பெருங்குடல் ---- உணவு குழல்----தொண்டை----வாய் ----சிறுகுடல்--- மலக்குடல்

11. நமது உடலில் உணவு மூலக்கூறுகள் உடைக்கப்பட்டு சிறிய மூலக்கூறுகளாக மாற்றப்படும் நிகழ்வு இவ்வாறு அழைக்கப்படுகிறது?

a) தசை சுருக்கம் b)சுவாசம் c) செரிமானம் d)கழிவு நீக்கம்

பொருத்துக.

12. எலும்பு மண்டலம் – ஆக்சிஜன்

13. காது –நுண் காற்று பைகள்

14. நுரையீரல்கள் – உள்ளுறுப்புகளை பாதுகாக்கிறது.

15. மூக்கு – ஒலி

ANNEXURE 3 – PHOTO GALLARY

Action Researcher conducting Pre test to the students at GGHSS,Bargur

Students involved Group discussion

Students involved Group discussion and shared their ideas

Action Researcher fecilitated the the science process skills to the students.

Students involved the Experimentation

Group Leader Presentation about their topic and ideas

Reference:

1.Tamilnadu Text book VI Std Science

2. Text book VII Std Science

3.Tamilnadu Text book VIII Std Science

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