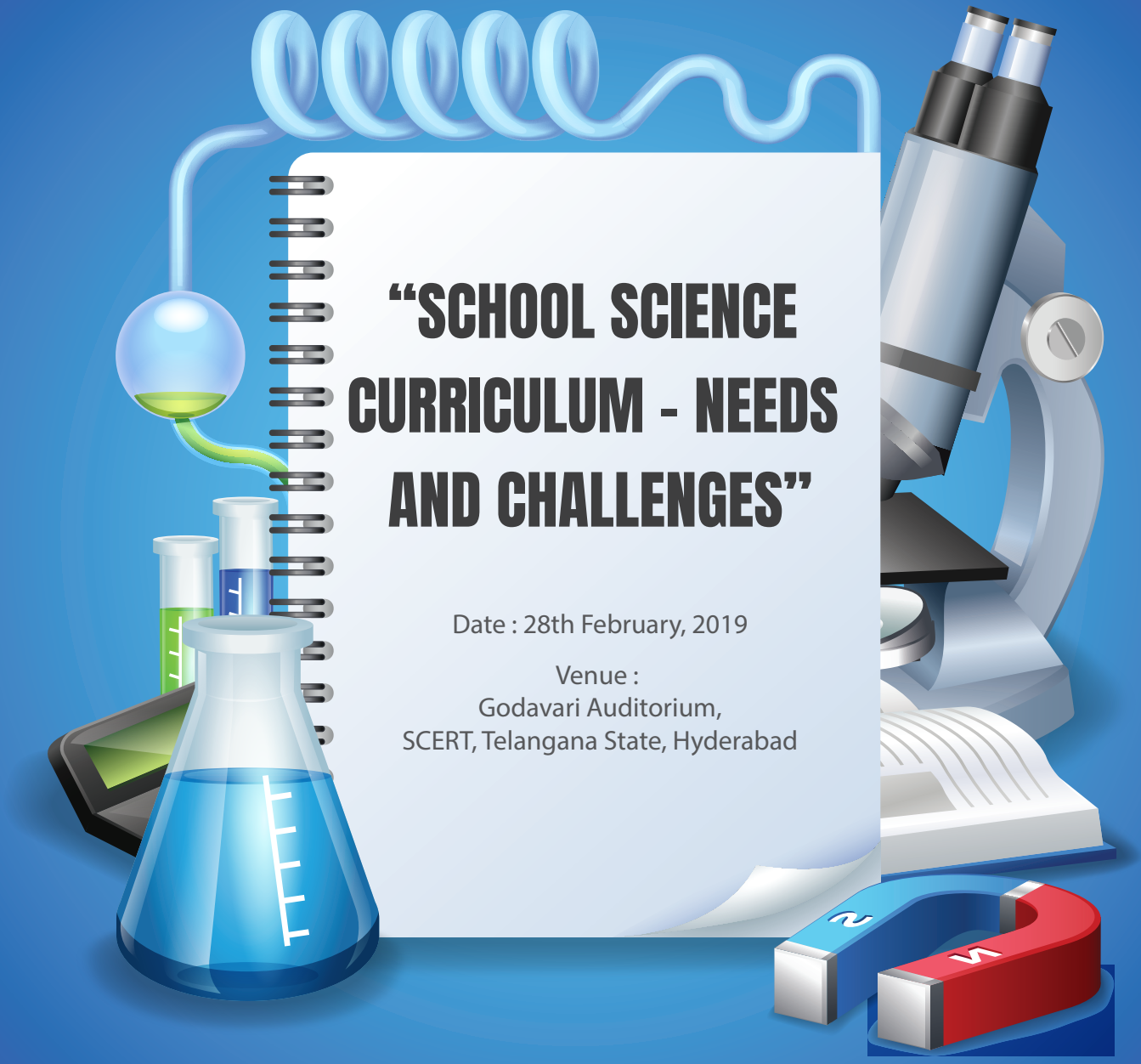
STATE LEVEL SCIENCE SEMINAR



"SCHOOL SCIENCE CURRICULUM - NEEDS AND CHALLENGES"

Date : 28th February, 2019

Venue :
Godavari Auditorium,
SCERT, Telangana State, Hyderabad

STATE COUNCIL OF EDUCATIONAL RESEARCH & TRAINING
TELANGANA, HYDERABAD

PROMISING ACHIEVERS

50 students undergone Summer Camp organized by National Institute of Technology, Warangal from 1st – 31st May, 2018.

Students Performing lab activities at NIT, Warangal

Basani Arthi Reddy 10th class, St. Gabrial High school, Khajipet, Warangal (U). Won 3rd prize in National Science Seminar "Industrial Revolution (IR) 4.0: Are We Prepared?" awarded cash prize Rs.12,000/-

STATE LEVEL SCIENCE SEMINAR

28th FEBRUARY, 2019

"SCHOOL SCIENCE CURRICULUM – NEEDS AND CHALLENGES"

Venue : Godavari Auditorium, SCERT, TS, Hyderabad.

DEPARTMENT OF MATHEMATICS AND SCIENCE

STATE COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING,

TELANGANA, HYDERABAD

Smt. B. Seshu Kumari
Director, SCERT
Telangana, Hyderabad

FOREWORD

The State Council of Educational Research and Training, being the apex organization at the state level in the area of School Education is striving for Academic Excellence in the areas of School Education as well as Teacher Education. For the academic growth of students, teachers and teacher educators across the state, SCERT organizes various activities such as, trainings symposia, conferences, science exhibitions, seminars etc., in different subject areas.

Every year, we celebrate 28th February as 'National Science Day' in commemoration of the historic discovery made by Sir. C.V. Raman for which he was awarded Nobel Prize in Physics in the year 1930. On this occasion, I am glad, the Department of Mathematics and Sciences of SCERT took initiative to organize science seminar on "SCHOOL SCIENCE CURRICULUM – NEEDS AND CHALLENGES".

We received papers from enthusiastic teachers and teacher educators. We thank each one of those who have sent the papers. A committee was constituted to scrutinize the papers, which after scrutiny has selected 26 papers for presentation. We congratulate all those whose papers are selected. These papers are compiled in this compendium. We thank the members of scrutiny committee who have taken pain to go through each paper carefully and made selection of good papers.

This compendium is available in our website www.scert.telangana.gov.in.

Director, SCERT, TS

Date : 28-2-2019
Place : Hyderabad

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Constructivist Approach in Science Learning

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Abstract

Constructivism is a theory of knowledge that argues that humans generate knowledge and meaning from an interaction between their experiences and their ideas. It is important to note that constructivism is not a particular pedagogy. In fact, constructivism is a theory describing how learning happens, regardless of whether learners are using their experiences to understand a lecture or following the instructions. The theory of constructivism suggests that learners construct knowledge out of their experiences. However, constructivism is often associated with pedagogic approaches that promote active learning, or learning by doing.

Constructivism is an umbrella term that includes a number of learning theories. Despite minor variations, each shares a set of core assumptions. Reasearch has established that Constructive learning methods of science teaching have been much more successful than the traditional methods.

Teachers can use various strategies to promote and strengthen the students' abilities to think and think about their thinking. To find out the effectiveness of constructivist instruction we have adopted parallel group experimental design. Two equivalent groups were randomly selected from IX standard. One group was treated as the control group and the other the experimental group. Two groups were taught the content, one group through the conventional method and another group Constructivist approach. Pre test and post test for both groups were conducted. From the findings of the study it is concluded that the constructivist instructional strategy is more effective than the traditional teaching strategy for improving achievement levels. Implications of the study are discussed and recommendations were given.

Keywords: constructivism, classroom environment, achievement in Science, pedagogic approaches.

Introduction

Constructivism is a learning strategy that draws on students' existing knowledge, beliefs, and skills. With a constructivist approach, students synthesize new understanding from prior learning and new information. The constructivist teacher sets up problems and monitors student exploration, guides student inquiry, and promotes new patterns of thinking. Working mostly with raw data, primary sources, and interactive material, constructivist teaching asks students to work with their own data and learn to direct their own explorations. Ultimately, students begin to think of learning as accumulated, evolving knowledge. Constructivist approaches work well with learners of all ages, including adults. Fundamentally, constructivism says that people construct their own understanding and knowledge of the world through experiencing things and reflecting on those experiences.

Cognitive researches display that most of the people have misunderstandings about nature. According to Yeany (1986), Constructivist Learning Model can be used for connecting all of the dominant researches in science education (Yager, 1991). Perkins (1999), express that even most of the college students have higher grades, they have misunderstandings, teachers are particularly responsible for these misunderstandings. Students who only listens the lecture or read the text can not learn the permanent knowledge says cognitive psychologists. Permanent knowledge can be formed through applying new information and connecting new information with each other. According to Colburn (2000), constructivist philosophers propose that individuals structure their own life philosophy and knowledge by themselves. At the center of the constructivism lies the idea that the learner structures the knowledge and applies it (Perkins, 1999).

Learning by structuring proposes that human brain is not an empty container that waits for filling. The children don't wait for someone to fill their brains. They structure the knowledge actively in their brains and reconstruct it. With another words, constructivist learning is learning by individually and with social activities and as a result of these activities making conclusions (Brunning et. al., 1999).

How Constructivism come about?

Vygotsky (Lev Semyonovich Vygotsky November 17, 1896 – June 11, 1934) believed that learning needs to be engaging. Vygotsky believed that learning takes place as children are interacting with each other and exploring their environment. He believed that learning is simultaneous to social interaction and exploration. In other words, he did not feel as though one was more important than the other.

Piaget (Jean Piaget 9 August 1896 – 16 September 1980) believed that children learn through organization and schemas. He believed that by organizing concepts and ideas, children place them into schemas. He believed that children are in control of the knowledge that they are provided and move forward in construct their own learning by taking part in social activities and exploration

Maria Montessori believed Children learn through experience, if children are proved the tools for their development age level, they will be successful learners. Children learn by participating in hands on group activitiesand that children should be free to explore their environments.

Constructivism is an umbrella term that includes a number of learning theories. Despite minor variations, each shares a set of core assumptions. Constructivist learning environments (Jonassen-1999) provide multiple representations of reality, Emphasize knowledge construction inserted of knowledge reproduction, Emphasize authentic tasks in a meaningful context rather than abstract instruction out of context, Provide learning environments such as real-world settings or case-based learning instead of predetermined sequences of instruction, Encourage thoughtful reflection on experience, Enable context- and content- dependent knowledge construction, Support collaborative construction of knowledge through social negotiation, not competition among learners for recognition and avoid oversimplification and represent the complexity of the real world.

Teachers can use various strategies to promote and strengthen the students abilities to think and think about their thinking. The Biological Science Curriculum Study (BSCS), has developed an instructional model for constructivism, (Roger Bybee) called the 'Five Es'

What is a 5E instructional model?

This model describes a teaching sequence that can be used for entire programs, specific units and individual lessons. Energy4me lesson plans support the 5E constructivist learning cycle, helping students build their own understanding from experiences and new ideas. The 5Es represent the five stages of a sequence for teaching and learning: Engage, Explore, Explain, Elaboration and Evaluate. The 5E model was developed by The Biological Science Curriculum Study (BSCS).

Engage

Pique students' interest and get them personally involved in the lesson while pre-assessing prior understanding. Students are introduced to the instructional task during the ENGAGE stage. They make connections between past and present learning experiences and think about what they'll learn during the upcoming activities. Energy4me activities are designed to ENGAGE students. Through activities and experiments, the lesson plans stimulate students' curiosity and encourage them to ask their own questions.

Explore

Get students involved in the topic so they can develop their own understanding. EXPLORATION experiences provide students activities that help them identify and improve upon current concepts (i.e., misconceptions), processes and skills. Learners have hands-on fun in lab activities that help them use prior knowledge to generate new ideas, explore questions and possibilities, and design and conduct a preliminary investigation. The teacher acts as a facilitator, providing materials and guiding the students' focus.

Explain

Provide students with an opportunity to communicate what they have learned and figure out what it means. During the EXPLAIN stage, students begin to communicate what they have learned by demonstrating their conceptual understanding, process skills or behaviors. Students share ideas with each other and with their teacher, who provides an explanation of the curriculum that is meant to guide them toward a deeper understanding. These segments introduce vocabulary in context and correct or redirect misconceptions.

Eloborate

Allow students to use their new knowledge and continue to develop a deeper and broader understanding. During the ELABORATION stage, students expand on the concepts they have learned, make connections to other related concepts and apply their understandings to the world around them through additional activities. Teachers challenge and extend students' conceptual understanding and skills.

Evaluate

Asses how much learning has taken place. The EVALUATION phase helps students and teachers assess how much learning and understanding has taken place. It allows teachers to evaluate student progress toward achieving the educational objectives. Evaluation and assessment can occur at any point during the instructional process.

To find out the effectiveness of 5E constructivist instruction we have adopted parallel group experimental design. Two equivalent groups were randomly selected from IX standard.

One group was treated as the control group and the other the experimental group. Two groups were taught the content -one through the conventional method and another group 5E instructional model. Pre test and post test for both groups were conducted.

Objective of the study

- To find out the relative effectiveness of 5E constructivist instruction and conventional instruction in terms of academic achievement of IX standard.

Hypotheses

- There will be no significance difference in the mean gain scores of experimental and control group of the students on written pre test and post test
- There will be no significance difference in the mean gain scores of experimental and control group of the students on oral post test

Sample

The sample of the present study is delimited to IX class students (two sections) were selected randomly. One section consists of 40 students, was treated as control group and another section as experimental group. (40 students) of Govt. Practicing High School, Hanamkonda.

Tools

The following tools were used
Pre test and post test (Achievement Tests)
5 E instructional model in science
Mean and standard deviation were used for the analysis and interpretation

Procedure

In this study the investigator adopted parallel group experimental design. Two equivalent groups were randomly selected from IX standard.

One group was treated as the control group and the other the experimental group. Two groups were taught the content -one through the conventional method and the another group 5E instructional model. Pre test and post test for both groups were conducted.

The significance of difference between the mean gain scores of experimental group and control group on written test was studied through‘t’ test

The significance of difference between the mean scores of experimental group and control group on oral test was studied through‘t’ test

Data Analysis

- To find out the relative effectiveness of 5E constructivist instruction and conventional instruction in terms of academic achievement of IX standard.

The effectiveness of the 5E consrtictivist instruction was studied through

(i) **Written test**

	No. of students	Mean gain score	't' value	Level of significance
Control group	40	25125	3.63	0.01
Experimental group	40	7.435		0.05

From the above data it is evedent that the 't' value of 3.63 is greater than the table value of 2.64 and 1.99 for 78 dgree of freedom at .01 and 0.5 levels respectively so the null hypotheses that there will be no significant difference between the mean gain scores of experimental group is significantly greater than the mean gain score of control group.
This shows that the 5E constructivist instruction has been found effective.

The effectiveness of the 5E consrtictivist instruction was also studied through

(ii) **Oral test**

Significance of the difference between the post test mean scores of experimental and control group has been shown in the table (ii)

	No. of students	Mean gain score	't' value	Level of significance
Control group	40	2.55	7.6	0.01
Experimental group	40	4.07		0.05

From the above the computed 't' value of 7.6. is greater than the table t value 2.64 at .01 level of 78 DF. So the null hypotheses that there will be no significant difference between the mean scores of experimental group and control group is rejected. The mean score of the experimental group has been found significantly greater than the mean score of the control group. So the experimental group was found to be significantly better than that by the control group.

Findings

The mean gain scores of experimental group has been found significantly greater than the mean score of control group.

The students were found to have favourable reactions towards the 5E instructional model in teaching biological science.

Constructivism, shifts emphasis from teaching to learning, Individualizes and contextualizes students' learning experiences, Helps students develop processes, skills and attitudes, Considers students' learning styles, Focuses on knowledge construction, not reproduction, Uses authentic tasks to engage learners, Provides for meaningful, problem-based thinking, Requires negotiation of meaning, Requires reflection of prior and new knowledge, Extends students beyond content presented to them.

The 5E constructivist instruction method can be used widely in teaching biological science in all standards. The constructivist teach, students scored higher both in the post test.

Implications of the study

This strategy is time consuming and teachers require lot of patience and well trained , dedicated enough to follow its requirements patiently. As the constructivist model of teaching is time consuming, students should be given sufficient time for reflecting group discussion etc, so teachers show resistance in adopting constructivist model of teaching. Syllabus cannot be completed in time and the teacher is not trained in constructivist methodology. As technology play vital role in constructivist approach of teaching, the In-service and pre-service teacher should be given training and in teacher training institutes constructivist methods should be included in teaching science.

Conclusion

The teacher should be trained in developing the lesson plans in 5E instructional model and provide necessary resources to use in the class room. In constructivist class room students are encouraged to discuss each other and allowed to reciprocal learning. So cooperative learning is possible with constructivism, this enhances the interest and motivation among the students.

The teacher helps the learners, acts as fecilitator, guide or mentor, creats the learning environment which facilitates the students thinking and motivates them to explore to arrive at his own conclusion.

Science teachers can follow the below points to move towards constructivist approach. Seeking out and using student questions and ideas to guide lessons and whole instructional units. Accepting and encouraging students initiation of ideas, Promoting student leadership, collaboration, location of information, and taking action as a result of the learning process; Using student thinking, experiences, and interests to drive lessons (this means frequently altering teachers' plans); Encouraging the use of alternative sources for information both from written materials and experts; Using open-ended questions and encouraging students to elaborate on their questions and their responses; Encouraging students to suggest causes for events and situations, and encouraging them to predict consequences; Encouraging students to test their own ideas, i.e., answering their questions, their guesses as to causes, and their predictions of certain consequences; Seeking out student ideas before presenting teacher ideas or before studying ideas from the textbooks or other sources; Encouraging students to challenge each other's conceptualization and ideas;

Using cooperative learning strategies that emphasize collaboration, respect individuality, and use division of labor tactics; Encouraging adequate time for reflection and analysis; respecting and using all ideas that students generate; and Encouraging self-analysis, collection of real evidence to support ideas, and reformulation of ideas in light of new experiences and evidence.

From this study it is concluded that the constuctivist approach is a very effective means of science teaching.

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THE EFFECT OF CONSTRUCTIVIST '7E' MODEL AND SIMULATIONS IN TEACHING PHYSICS AT SECONDARY SCHOOL LEVEL

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1. INTRODUCTION

1.0 Introduction

Education is one of the potent instruments to cope with the greatest challenges of the century and it is the teacher's noble mission to reveal the intellectual and creative potential of every pupil as for as possible and to make every one competent to meet the present day problem. The improvement in the quality of education largely depends on the quality of instruction imparted in the classroom. The quality of education has to be enhanced for fostering all round development of the individual. To achieve the educational objective in the class room teaching process the constructivist teaching-learning process is more significant. The basic idea of constructive is that the learner must construct knowledge; the teacher cannot supply it (Bringuier, 1980). The Constructivist paradigm is advocated by Jean Piaget (1981) and Burner (1990), stress that whatever gets in to the mind has to be constructed by the individual through knowledge discovery.

According to constructivist approach, learning is an instruction between the learner and the learning environment. During this interaction, prior knowledge is used as a basic to interpret and construct new understanding. In a Constructivist setting, the students have autonomy for their own learning, opportunities for peer collaboration and support, occasion for learner – generated problems that derive the curriculum, time for self-observations and evaluation and outlets for reflections. One of the important models for Constructivist learning is 7-E Learning model.

Many researchers have developed models and strategies derived from the constructivist theory, for instance, learning cycle, concepts maps, the V model, constructive analysis model, the realistic model, co-operative learning strategy, and teaching strategies based on the constructivist thought.

1.1 Learning Cycle

The learning cycle is a methodology that provides students with experiences in generating both declarative and procedural knowledge and is grounded in Piaget's theory of Cognitive development (Lawson, 1988). The learning cycle rests on constructivism as its theoretical foundation. Atkins and Karpius developed a three-stage model. The Science Curriculum Study programme uses a five step learning cycle called 5-E model. The modified version of 5-E model is 7-E learning cycle.

1.2 7-E Learning Model

7-E learning cycle is a template for planning and getting the most out of the enquiry activities. The phases in the 7-E learning are Elicit, Engage, Explore, Explain, Elaborate, Evaluate and Extend. The purpose of the first phase, elicit,is to assess student's knowledge of the content. The engage phase is intended to motive students and to capture their interest in the topic. The third phase is exploration phase where teacher provides students with opportunities for experience to construct their own understanding of the concept. The purpose of the explain phase is to allow opportunities for students to verbalizing the concept. The fifth phase is elaboration phase where the students can apply the content to other situations. The sixth phase is evaluation phase. The purpose of this phase is to assess student's understanding of the content. The last phase is extend phase. This phase challenges student understands to apply what they have learned.

1.3 Simulations importance

Simulations have potentials to improve students' comprehension of abstract concepts and have opportunities to vary initial values in experiments.

1.4 Statement of Problem

Over the years, the teaching of science and particularly physics has been based on lecture method. The results of students in these subject areas as measured by their grades in the secondary school certificate examinations have not shown any significant improvement over the years. This development in a way indicates an instructional method failure and ineffectiveness. Personal interactions of researchers with physical science teachers showed a near empty

knowledge of learning cycle and its application in teaching by teachers. The situation therefore calls for education of science teachers on the procedures of learning cycle and a demonstration of its effectiveness in science teaching and learning. The statement of the problem therefore is, will the application of learning cycle in the teaching of concepts in physics improve science teachers and students' knowledge of the procedures involved in its use and demonstrates its superiority over the current method used for teaching physics in schools?

1.6 Objectives of the Study

As an account for the aim of this research paper, there are two objectives of the research

1. To study and comparative science achievement before and after using 7E learning cycle model and simulation of physical science students.
2. To study and comparative Attitude toward Physics before and after using 7E learning cycle model and simulations of physical science student s.

1.7 Hypothesis of the Study

1. Physical Science students who study with 7E learning cycle model and simulation have physics achievement posttest score higher than 70% and posttest higher than pretest.
2. Physical Science student who study with 7E learning cycle model and simulation have Attitude toward Physics posttest score higher than 70% and posttest higher than pretest

2. METHODOLOGY

Research design of the study

This research was a pre-experimental design. Research design used is one group pretest and posttest design. (John & James, 2005)

O1	**X**	**O2**
Pre test	**Treatment**	**Post test**
Concepts Achievement Test Attitude Scale Toward Physics	Instruction based on 7E Model and simulation	Concepts Achievement Test Attitude Scale Toward Physics

2.2 Treatment

Pretest: Before staring the experimental research, the sample group has been applied a scale of physics concept achievement and Attitude Toward physics pretest by the science achievement test and the Attitude Scale Toward physics (ASTP) test.

Experimental: The experimental were taught by lesson plan on static electricity using the 7E learning cycle model and simulation. The sample group was informed about the purpose of the study then using the 7E learning cycle model process, the interaction between teacher-students and students-students; participation and contribution of students into learning environment and teacher as well as the physical conditions and material availability of the classroom. Students in the sample group were instructed with the 7E learning cycle model. In instruction, teaching and learning activities and lessons plans were designed to maximize student's active involvement in the learning process. Teacher only provide questions, suggested approaches, gave feedbacks, and assesses understanding.

Posttest: After finished experimental the sample group have been applied a scale of posttest that the test same pretest.

2.3 Population of the Study

This study consisted of 47, 10th grade students of a Physical science Course from Zilla Parishad High School, kambalapally in the 2018-19 academic year. The data analyzed for this research were taken from 47 sample group students participating instruction based on 7E learning cycle model and simulation designed physics instruction.

2.4 Variables

*Independent Variables:*The independent variable were and Traditional Method of Teaching, 7E learning cycle model and simulation; instruction based on 7E learning cycle model and gender.

*Dependent Variables:*The dependent variables were students' understanding of Electromagnetism concepts and their attitudes toward physics as a school subject.

2.5 Instruments

7E learning cycle model and simulation Lesson plan: Lesson plan on static electricity using the 7E learning cycle model and simulation for use in teaching physics students. A physics lesson designed with these phases was constructed for static electricity subject of 10th grade students. Simulations have potentials to improve students' comprehension of abstract concepts and have opportunities to vary initial values in experiments. Phet simulations which were constructed by Colorado University were used in explanation and elaboration phases of learning cycle.

*Concepts Achievement Test (CAT):*A Concepts Achievement Test achievement test on static electricity, the test was multiple-choice. This test developed by the researcher. The test contained 30 multiple choice questions. Each question had one correct answer and four distracters.

Attitude Scale Toward physics (ASTP): This scale was developed by Geban et al. (1994) to measure students 'attitudes toward physics as a school subject. This instrument consisted of 15 items in 5 point likert type scale (fully agree, agree undecided, partially agree,fully disagree).

2.6 Data Analysis

Mean, percentage, and standard deviations of measured quantities were determine and t-test for dependent samples and for one samples done for hypothesis testing.

2.7 Limitations:

1. This study was limited to 10th students of Zilla Parishad High School.
2. This study was limited to the unit of Electromagnetism subject.
3. This study was limited to 10th grade students of Zilla Parishad High School.

3. RESULTS AND CONCLUSION

3.1 RESULTS

Concepts Achievement Test

Improvement in Concepts Achievement Test after applying 7E learning cycle model and simulation, research data of this Concepts Achievement can be summarized in Table 1 below

TABLE 1: Research data of physics achievement

N	Test	Mean Score	S.D.	%	t-test	p
47	pretest	33.96	3.45	57.76	25.892**	.000
	posttest	48.86	2.03	76.18		

Table 1 shows that physics achievement pretest mean score obtained by student is 33.96 (57.76 %). After learning, their posttest means score is 48.86 (76.18 %). This is a comparative that there is improvement from pretest to posttest, the result show that the posttest mean score was higher than 70% and it was also higher that pretest.

Attitude scale toward Physics

Improvement in Attitude scale toward Physics after applying 7E learning cycle model, research data of this science lesson design ability can be summarized in Table 2 below.

TABLE 2 Research data of science lesson design ability

N	Test	Mean Score	S.D.	%	t-test	p
47	pretest	11.89	2.55	49.32	14.495**	.000
	posttest	18.08	2.24	71.67		

Table 2, shows that Attitude scale toward Physics pretest mean score obtained by the student is 11.89 (49.32%). After learning, their posttest means score is 18.08 (71.67%). This is a comparative that there is improvement from pretest to posttest, the result show that the posttest mean score was higher than 70% and it was also higher that pretest.

3.2 CONCLUSION

Based on the findings obtained in the study, it can be conclude the following points:

1. The science students who have been learning with the 7E learning cycle model and simulations have physics achievement pretest mean score 33.96 (57.76 %). after learning, their posttest means score is 48.86 (76.18 %). the result show that the posttest mean score was higher than 70% and it was also higher that pretest

2. The science students who have been learning with the 7E learning cycle model and simulations have attitudes towards physics 11.89 (49.32%). after learning, their posttest means score is 18.08 (71.67%). the result show that the posttest mean score was higher than 70% and it was also higher that pretest.

The major purpose of this study was to determine the effects of learning cycle as an instructional strategy on physics students' achievement. It was concluded that the method seems an appropriate instructional model that could be used to solve the problems of science teaching and learning since it facilitates learning, retention and its effectiveness not being limited by sex. Based on the results of this study concluded that high school students' understanding of electromagnetism concepts can be improved through learning 7E models and simulation. A national vision of science teaching and learning is being promoted that accentuates the need to restructure science education. Several national reform documents illustrate the need to make science classrooms across the country active and inquiry based environments. With much research to support inquiry-based teaching and learning, many teachers are opting for this non-traditional teaching approach. The incorporation of learning cycles in the classroom aids teachers

in the pursuit of the development of effective inquiry-based science lessons. The 7E Instructional Model serves as a flexible learning cycle that assists curriculum developers and classroom teachers create science lessons that illustrate constructivist, reform-based, best teaching practices.

4.0 SUGGESTIONS

Of late years, until especially 2000, while curriculum has been renewed in many states of India; continuous sweeping changes in India have attracted attention. India is one of the countries affected from this development in last fifteen years. Changes made in science curriculum are the most striking instance of this. It takes attention that there are a lot of activities prepared according to constructivist approach in curriculum renewed in India and other countries. Activities prepared according to constructivist approach are implemented in science curriculum prepared in India and science books written according to this curriculum. This study is very important in this regard, too. Some suggestions inferred thanks to results of research are given below.

According to 7E Model, While teaching a subject, giving examples from real world and wanting students to give examples similar to these the teachers given help students both research and link between real world and the subject. When the students have active roles in their learning, they learn and use the knowledge they have learned in the real world more easily. These make students more eager to science lessons to which they are usually reluctant.

When the subject is taught according to 7E Model, students use technological equipments more effectively. Using computer, internet and other technological equipments of students increases the effectiveness of this approach. In the implementation of 7E Model, Computers and computer-aided programs have been used. It is concluded that using computer is very effective for helping students understand the subject more perfectly. Using the computer in the learning atmosphere help they reach their goals more early.

Research related to 7E model and results of research show that 7E Model is a model which increases desire of researching, satisfies expectation of students, includes activities helping students have active roles in their learning. Because of this, Ministry of education should use this model in the curriculums which will be prepared.

According to result of this research; 7E Model is an approach that students have an active role in their learning. Besides, it is taken up seriously by them and it is thought to be an effective method. If teachers are trained before they begin to work, they will have an idea about characteristics and implementation of this model so they will have opportunities for implementing this method in their lessons.

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Title of the Topic: **"INOVATIVE METHOD OF TEACHING PHYSICAL SCIENCE WITH LOW-COST APPARATUS FROM LOCALLY AVAILABLE MATERIAL"**

Theme: "**SCHOOL SCIENCE CURRICULAM – NEEDS AND CHALLENGES**"

Sub Theme: "**INNOVATIVE SCIENCE TEACHING FOR CREATIVE MINDS**"

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ABSTRACT

Learning science should start with hands on experiences that the child is familiar with and not with abstract definitions about what science is. Low cost apparatus from locally available materials believed to enrich the capacity to observe, explain and do real science in secondary schools and increases the quality of learning. Hence the purpose of this research is to design and produce appropriate low cost apparatus from locally available materials that can be used in teaching-learning science in secondary schools. For this the study aimed to find out the awareness of teachers in procuring at the low cost apparatus from locally available material for the teaching of science. The descriptive survey method was used in the study. A self constructed check list was used to collect the data. Average, percentage was used for data analysis. The study was delimited to the science teachers in the Inavolu and Wardhannapet mandals of Warangal Urban district and Raghunathpally and Tharigoppula mandals of Jangaon district of Telangana state. The sample consisted of 80 teachers. Comparatively the low cost materials offered an alternative solution to do science in classrooms under difficult financial constraints.

Keyword*: Science, Laboratory, Science Equipment in Laboratory, Teaching Material.*

1.1 INTRODUCTION

Indian education commission (1964-66) defined the Education ought to be related to the life, need and aspirations of the people and thereby made powerful instrument of social economic and cultural transformation. Teacher is a very important part of education. Teacher is the custodian and architect of student's future. In the words of D.S Khotari, The future of every country is in the four walls of classroom. According to National Council of Educational Research (NCERT), science has been made a compulsory throughout the school stage. Experimentation provides a stimulus for exploration and thinking. Children that learn by blending language with experiences, they learn to think.

Science is mainly an experimental, observational and laboratory oriented discipline, thus chemistry lessons must be developed to reflect this. Currently there is an urgent need everywhere in the world to have low-cost instruments and low-cost experiments for teaching chemistry. The situation is particularly serious in developing countries. In spite of various efforts, shortage of school laboratory apparatus continues to be a major problem which should be of serious future concern. There should be a gradual shift from importing expensive apparatus to a reliance on low cost apparatus designed and manufactures by utilizing locally available resources.

1.2 USAGE OF LABORATORY IN TEACHING SCIENCE

Understanding Science is not an easy task because the way it is taught is restricted to only conventional practices from the beginning as the teaching makes it as a dull subject. Teaching science offers significant challenges, including low level student interests, varying level of student, and a need to deal with abstract concept. That's why, it is an important to use of laboratory in teaching science. But, science teaching in schools both at the Primary and Secondary levels suffers from lack of laboratory and adequate equipment in that. Most of the teaching is going through books with no adequate hands on activities and with no excitement in doing experiments.

1.3 LOW COST AND NO COST TEACHING EQUIPMENT IN TEACHING SCIENCE

Low cost and No cost teaching equipment in teaching science refers to aid prepared with simple materials with no cost by involving teacher and student. In expensive aid could be prepared easily with no money to make learning effective, comprehensive and fascinating. The science teacher with a certain amount of skill and enthusiasm can replace many pieces of apparatus by an adequate if unconventional, improvised substitutes. No cost teaching aids have an advantage of offering learning by doing approach to the teaching learning process. When teachers and students plan, produce or create their own educational materials, they invariably manifest pride and pleasure in utilizing them to the maximum. Effective science teaching depends on three factors, teacher, experimentation and materials. Locally produced low cost and no cost equipment, teaching aids or models can serve the needs of the teacher, the student and the curriculum more effectively and is easier to maintain.

1.4 PROCUREMENT OF LOW COST AND NO COST TEACHING MATERIAL

Main task of the teacher is to procurement of no cost teaching aids by using locally available materials. The science teachers who have real interest in the field prepare their own bag of experimentation material with the help of available resources. By sufficient encouragement from the superiors, parents and the community, the quality and effectiveness of this bag of laboratory may be improved.

1.5 ADVANTAGES OF LOW COST AND NO COST TEACHING MATERIAL

This paper emphasis that, the science experimentation in the class room can be conducted by using no-cost material that are the things in the school bags of children like scale, pen, pencil, notebook, paper etc.

1) Experiments with resources in the classroom make science doing instead of talking
2) It promotes pupils maximum participation in the learning process
3) It helps to have more knowledge and understanding
4) It provides firsthand experience and manipulation skills in a variety of ways
5) Develops scientific attitude in children
6) Cultivates research mindedness in children
7) Promotes interaction between teachers and students
8) Promotes interaction and encourages co-operative attitude among students
9) It accelerates the rate of learning and increases the span of retention
10) Develops self confidence and self reliance of pupils
11) Helps the students to make use of their leisure time
12) It also facilitates the propagation of new curricular ideas
13) It helps to improve efficiency of pupils as well as science teachers

1.6 NEED AND SIGNIFICANCE OF THE STUDY

The study deals with the experimentation in the classroom with the resources available and its importance to teach science concepts in the present situation at secondary level. Since most of the secondary schools are situated in rural areas, they are not able to procure the needed equipments. Another factor is secondary schools suffer for want of adequate funds to procure teaching aids. Teachers should realize the present situation and they must encourage the children to college the resources available in the immediate environment to prepare the science lab equipment in a school bag with the material like, pen, pencil, paper, notebook etc. If the science concepts are taught with the help of experimentation, the children remember these concepts for a long time.

We know the resources in the classroom environment are useful to demonstrate accordingly in conceptual understanding. And we can get the material in the school bags like, scale, pen, pencil, notebook, paper etc. also helpful for experimentation activity orientation class. And we also can get the polythene cover, magnet, syringe, balloons, thread, bottle, glass, plate, straws, electric motor, toys etc. in the classroom environment.

The teacher can prepare a bag for classroom experimentation and to expose the students to process skills with which the available material in the classroom. For example, if we use a scale in the school bag, the below mentioned concepts can be taught,

1) To measure lengths,
2) Can develop concept of least count,
3) Can measure the radius of a wire,
4) Can show the concept of friction,
5) Can identify the gravity point,
6) Can use as simple balance and types of levers,
7) Can exemplify the transparent material,
8) Can use as Prism,
9) Can find the weight without weighing machine.

As per the **annexure** enclosed, many science concepts can be explained by using of school bag material.

2.1 OBJECTIVES

1. To study the general awareness of the teachers about the laboratory and experimentation.
2. To study about the school laboratory and its usage in classroom science teaching for experimentation.
3. To evaluate the involvement of teachers in procuring of resources of teaching material in the classroom environment and conducting experiments.
4. To study the school management or school headmaster, whether co-operates in procuring laboratory material.
5. To find out whether there is any significant difference among science teachers on above four objectives with respect to students and science teachers classified on the basis of

i. Gender
ii. Medium of instruction
iii. Locality of the students
iv. Management of the school

2.2 HYPOTHESES FOR THE STUDY

1. There is no significant difference between male and female teachers on having general awareness about the low cost apparatus from locally available material for teaching science.
2. There is no significant difference between teachers teaching in English medium and Telugu medium on having general awareness about the low cost apparatus from locally available material for teaching science.

3. There is no significant difference between Urban and Rural teachers on having general awareness about the low cost apparatus from locally available material for teaching science.
4. There is no significant difference between Government and Private teachers on having general awareness about the low cost apparatus from locally available material for teaching science.

3.1 METHODOLOGY

In this study, the primary aim of the investigator is to study the impact low cost apparatus from locally available material for teaching science among science teachers in the Inavolu and Wardhannapet mandals of Warangal Urban district and Raghunathpally and Tharigoppula mandals of Jangaon district of Telangana state.

3.2 SAMPLES FOR THE STUDY

Table 1

Total No of Sample	80															
Locality wise	40 (Urban)								40 (Rural)							
Management wise	20 (Govt)				20 (Private)				20 (Govt)				20 (Private)			
Medium wise	10 (E)		10 (T)		10 (E)		10 (T)		10 (E)		10 (T)		10 (E)		10 (T)	
Gender wise	5 M	5 F	5 M	5 F	5 M	5 F	5 M	5 F	5 M	5 F	5 M	5 F	5 M	5 F	5 M	5 F

*E – English and T – Telugu, M – Men and W – Women

3.2 TOOL OF DATA COLLECTION

Tools are nothing but the instruments that help the researcher to gather data. For the purpose of data collection, a self made questioner is prepared and simple random sampling technique was used to analyze the data from the available sample.

3.3 CONSTRUCTION OF TOOL

According to my knowledge no standardized tool was available for this study. In order to frame relevant items, exploration had done with various sources of information like books, journals, magazines, newspapers and internet. Initially 25 items were included in the first draft of the questioner. It was then shown to various experts and keeping in view their suggestions some items were deleted as well some were modified and even added. Eventually, final draft of the check list was prepared comprising of 20 items.

3.4 ADMINISTRATION OF THE QUESTIONER

This questioner can be administered individually at various schools. After establishing a good rapport, the subject can be asked to respond to anyone alternative of each statement by marking tick mark (√) against it under 'Yes' or 'No' options. There is no time limit for recording the respondents and the average time needed to give responses is usually around 20 minutes.

4.1 DATA ANALYSIS

1. There is no significant difference between male and female teachers on having general awareness about the low cost apparatus from locally available material for teaching science.
2. There is no significant difference between teachers teaching in English medium and Telugu medium on having general awareness about the low cost apparatus from locally available material for teaching science.
3. There is no significant difference between Urban and Rural teachers on having general awareness about the low cost apparatus from locally available material for teaching science.
4. There is significant difference between Government and Private teachers on having general awareness about the low cost apparatus from locally available material for teaching science.

4.2 RESULTS AND DISSCUTIONS

1. There is no significant difference between male and female teachers on having general awareness about the low cost apparatus from locally available material for teaching science. 53% of male teachers are aware of procuring the locally available low cost material and 47% of female teachers are aware of procuring the locally available low cost material.
2. There is no significant difference between teachers teaching in English medium and Telugu medium on having general awareness about the low cost apparatus from locally available material for teaching science. 45% of teachers teaching in English medium are aware of procuring the locally available low cost material and 55% of teachers teaching in Telugu medium are aware of procuring the locally available low cost material.
3. There is no significant difference between Urban and Rural teachers on having general awareness about the low cost apparatus from locally available material for teaching science. 42% of urban teachers are aware of procuring the locally available low cost material and 58% of rural teachers are aware of procuring the locally available low cost material.
4. There is no significant difference between Government and Private teachers on having general awareness about the low cost apparatus from locally available material for teaching science. 83% of Government teachers are aware of procuring the locally available low cost material and 27% of Private teachers are aware of procuring the locally available low cost material.

4.3 CONCLUSION

By utilizing locally available low cost material as a tool for our science teaching, the teacher as well as the students can get the experience of science and respect to the material. Particularly the teacher can get satisfaction in his teaching learning process if he prepares a bag of material as SCIENCE KIT. Also the students can get confidence on their skills and conceptual understanding and mould their future fruitfully.

4.4 SCOPE OF FUTURE WORK

Much of research work can be done in this field as the teachers and the students can explore the science with experimentation with the resources available in the classroom and school environment. It is also important to concise the all concepts into simple way to demonstrate with no cost or low cost material. Then only the classroom laboratory experimentation can be done with low expenditure in less budget allocation countries like India.

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Title of the topic : An effective methods of learning truths of nature (science)

Objectives : I am inculcating the following objectives through my teaching learning practice.

- To makes them to explore the nature around them.
- To investigates about the invisible bio world .
- Tries to make videos, captures images, about the scientific world.
- To makes them to practice knowledge through ICT classes.
- To develops curiosity about learning by doing through experimentation.

Design of the innovation : I am actually not following the innoval methods but I strongly say that teachers who are not using foldscope and you tube channel but I did. I give my students **fold scope** to explore the invisible world. me and students are running you tube channel called **science activities and experiments.**

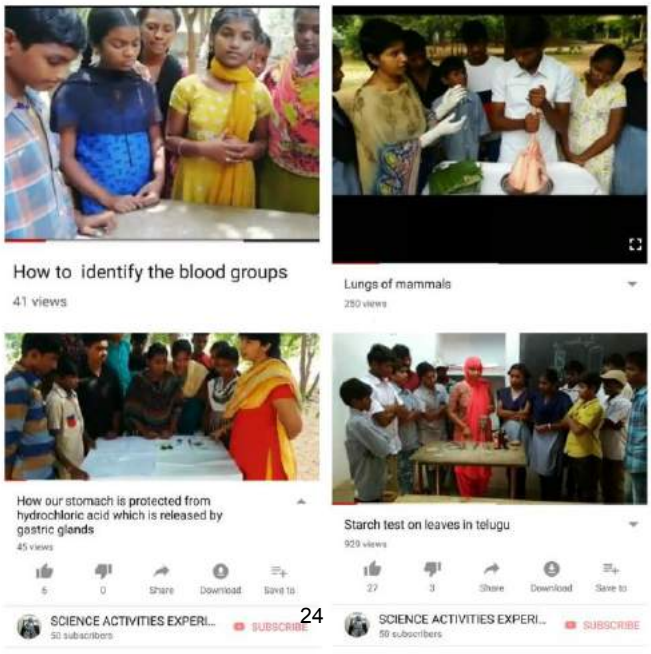
To upload a video in you tube : plan –pupil collects necessary materials –preparation work—do activity/experiment –video shoot by a student in mobile –uploading the video in you tube –views, appreciation – pupil go another video making.

Fold scope : collects matter and materials by pupil – slide preparation – observation –draws what they observed – discusses with me about their observation.

ICT classes : observes – reads – exercise – doing experiments – watches videos, images – field visits—discussion – inquires –applies knowledge .

Experimentation is one the best learning method and field visits gives them direct experiences. ask them to prepare a questionnaire and makes to conduct quiz to their peer group or to lower classes etc. are good practices in the class room to makes the children most enthusiastic towards science learning.

Description of the innovation : pupil do experiment/activity in the class room/school and explains about it .for example “structure of lungs” video making they fetch the required material ,and prepares the explanation and explains to their classmates. one of them shots the video .i always checks their work and finally if I feel is everything ok we will uploads the video. Some of the videos which we had uploaded.



I used to give my students foldscope whenever they are free. Pupil prepares slides and observes in foldscope. They tries to investigstes microbial world around them. They draws the diagrams what they had observed.

My students actively participated in ICT classes for example 9th English medium practiced ecosystem module .in that we went to field visit there they asked me more number of questions to explore ecosystem. They watched videos and images and discussed with me about it .pupil prepared their own ecosystem with help of me.

when I take my tenth and ninth students to the field visit to krushi vignana kendram gaddipally . they observed the processes there and tries to apply those methods at home for

example mokshagna prepared wormi wash and gopala Krishna did grafting on citron tree with lemon. discussed about the processes with the peer .

My students do the experiments on their own ,whenever my suggestions required I do.

I always makes my students active participants in all activities.pupil prepares questionnaire and conducts quiz program to their peer group and lower classes children too. Questioning skill develops in pupil.

Out come : pupil trying to take videos about the relationship between living and non living things ,ecosystem ,whatever the different things occurs around them.

Finds different microbial things through fold scope in water, soil, on walls etc…

Makes enthusiastic learners.

Becomes inquirers.

Learning by doing and learning by living .

Implications : It is easy to buy foldscope for every bioteacher ,available through online,cost is less when compared to compound microscope.

These methods makes pupil as curious learners even though they have individual differences.

References : science activities and experiments channel run by me and my students.

Zphs gaddipally, suryapet.

Foldscope and its uses.

Krushivignana kendram gaddipally

STATE COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING, TELANGANA, HYDERABAD

THEME : SCHOOL SCIENCE CURRICULUM – NEEDS AND CHALLENGES

SUB THEME : Innovative Science Teaching for Creative minds

STATE LEVEL SCIENCE SEMINAR on the occasion of NATIONAL SCIENCE DAY FEBRUARY 28th

PERSONAL DETAILS

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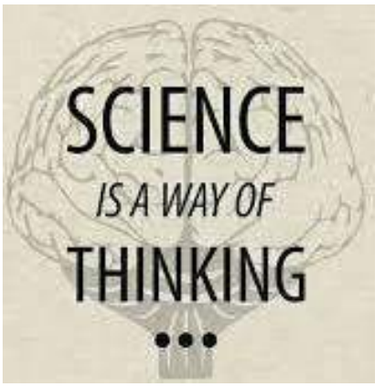
INTRODUCTION:

Curriculum is a tool in the hands of an artist to mould his material according to his ideas in his studio ---

పరిసరాల విజ్ఞాన బోధన యొక్క ముఖ్య ఉద్దేశ్యాలు

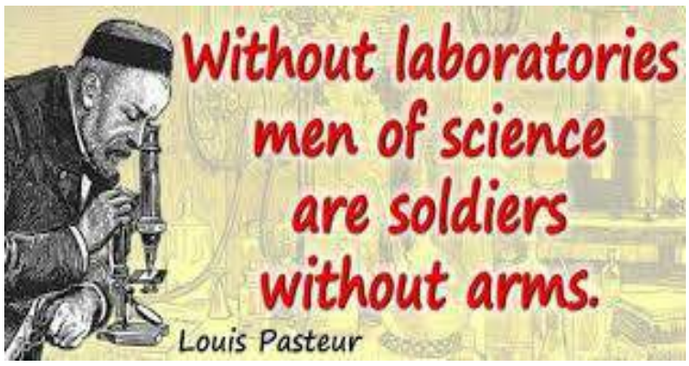
1) **పరిసరాల గురించి తెలుసుకోవడం(Learning about Environment)**
2) **పరిసరాల ద్వారా తెలుసుకోవడం(Learning through Environment)**
3) **పరిసరాల కొరకు తెలుసుకోవడం(Learning for Environment)**

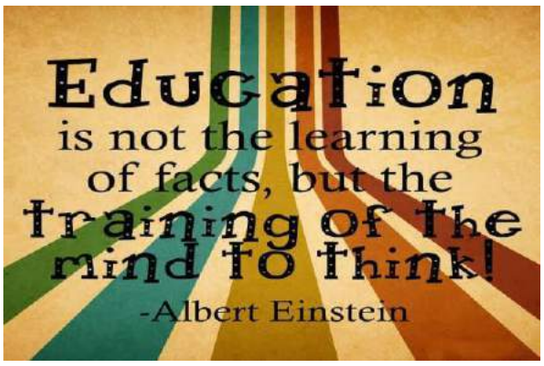
పరిసరాల విజ్ఞానం యొక్క ముఖ్య ఉద్దేశ్యం విద్యార్థులలో అన్వేషించటం, ప్రశ్నించడం, పరికల్పనలు చేయడం, ప్రయోగాలు చేయటం, సమాచార సేకరణ, నమూనాల తయారీ వంటి ప్రక్రియానైపుణ్యాలను పెంపొందించడంతో పాటు పరిసరాలతో సంబంధాన్ని పెంపొందించేందుకు, ప్రత్యక్ష అనుభవాలను పెంపొందించడం. దీంతో పాటు పర్యావరణం పట్ల ఏవిధంగా ప్రవర్తించాలో మరియు విద్యార్థులను బాధ్యతాయుతమైన పౌరులుగా తీర్చిదిద్దటం.



ఎలిమెంటరీ స్థాయిలో పాఠశాలల్లో ప్రయోగశాలల కొరత ఉన్నందున దానిని అధిగమించి తరగతి గదిలో విద్యార్థులలో సైన్స్ పట్ల ఆసక్తిని కలిగించి, వారిలో పరిశీలించడం, ప్రశ్నించటం, పరికల్పనలు చేయటం, ప్రయోగాలు చేయటం వంటి ప్రక్రియానైపుణ్యాలను పెంపొందించేందుకు, మూఢనమ్మకాలను వదిలి శాస్త్రీయ దృక్పథాన్ని అలవరచుకునేలా, సైన్స్ అంటే చదవటం కాదు చేయటం అని తెలపడంతో పాటు, చిన్నతనం నుండే సైన్స్ పట్ల ఆసక్తిని,అభిరుచిని పెంపొందించి వారు భావి శాస్త్ర వేత్తలుగా రూపొందేలా ప్రేరణ ఇవ్వడానికి సైన్స్ భావనలైన పీడనం, ఉష్ణోగ్రత, కాంతి ధర్మాలు వంటి వాటిని సులభంగా అర్థం చేయించడానికి, తరగతి గదిని ప్రయోగశాలగా మార్చి ఆహ్లాదకరమైన అభ్యసన వాతావరణాన్ని కల్పించే ఉద్దేశంతో పరిసరాల నుండి లభించే వ్యర్థాలైన ప్లాస్టిక్ బాటిల్స్, ఇంజక్షన్ బాటిల్స్, సెలైన్ బాటిల్స్, పైపులు, అట్ట ముక్కలు సేకరించి మరియు తక్కువ ఖర్చుతో సేకరించిన అద్దాలు, బ్యాటరీలు, క్యాండిల్స్, ప్లాస్టిక్ బాల్స్ వంటి వాటితో Low cost – No cost Teaching Learning Material ను తయారు చేసి దీనికి SUPER SCIENCE KIT అని పేరు పెట్టడం జరిగింది. ఎందుకంటే మూఢనమ్మకాలు తొలగించి వాటి వెనుక సైన్స్(Science Behind the Magic) ఉందని తెలియజేయాలని ఈ పేరు పెట్టడం జరిగింది. తక్కువ ఖర్చుతో దాదాపు 60 కి పైగా ప్రయోగాలు రూపొందించటం

జరిగినది. వీటి ద్వారా విజ్ఞాన శాస్త్ర ప్రాథమిక భావనలను అర్థం చేయించటంతో పాటు Scienceను Careerగా ఎంచుకొనేలా విద్యార్థులను ప్రోత్సహించటమైనది. విద్యార్థులకు విజ్ఞాన అంశాలను బోధించటం కన్నా ప్రయోగాలు చేయించటం ద్వారానే సులువుగా అర్థం చేసుకుంటున్నారు. బోధనోపకరణాలను ఉపయోగించి బోధించటం ద్వారా తరగతి గది ఆకర్షణీయంగా మారింది.





PROCESS +PRODUCT =SCIENCE

LIST OF THE EXPERIMENTS :

1) **MAGIC MARINE**: పిల్లల్లో ఆసక్తిని పెంపొందించి ఆలోచించేలా చేయటంతో పాటు" పీడనం" అనే భావనను తెలియజేస్తూ, సముద్రంలో నడిచే జలాంతర్గామి పనితీరు వివరించవచ్చు. ఎలాంటి ఖర్చు లేకుండా కేవలం ఒక ప్లాస్టిక్ బాటిల్ తీసుకునిదానిలో ఒక పెన్ మూత వేసి దీనిని తయారు చేయడం జరిగింది. బాటిల్ పై పీడనం కలుగజేసినపుడు లోపలి పెన్ను మూత కిందకు వస్తుంది. వదలగానే పైకి వెళ్తుంది.

2) **MAGIC COIN BOX :** కాంతి పరావర్తన ధర్మాన్ని పిల్లలకు ఆసక్తిగా వివరించేందుకు ఒక అట్ట పెట్టెలో అద్దాన్ని 45డిగ్రీల కోణంలో అమర్చి రూపొందించటం జరిగినది. పై నుండి ఇందులో వేసిన నాణేలు కిందకు రాకుండా అద్దం వెనుక ఉండిపోతాయి.

3) **MAGIC SHOWER :** ఒక ప్లాస్టిక్ బాటిల్ తీసుకునిదాని కింది భాగాన చుట్టూ సూదితో సన్నని రంధ్రాలు చేసి పై భాగాన ఒక రంధ్రం చేయాలి. ఇప్పుడు బాటిల్ లో నీరు నింపి పై రంధ్రం మూయాలి. పిల్లలను స్టార్ట్

అనమని చెప్పి పై రంధ్రం తెరవాలి. ఇప్పుడు నీరు చుట్టు పక్కల రంధ్రాల ద్వారా ఫౌంటెయిస్ లా వస్తుంది. దీని ద్వారా నీటి పార్శ్వ పీడనం తెలియజేయవచ్చు.

4)MAGIC FOUNTAIN : ఒక బాటిల్ లేదా బకెట్ లో నీరు నింపి కొంత ఎత్తున ఉంచాలి. దానిలో ఒక లెవలింగ్ పైప్ ఉంచి చివరన సన్నని పెన్ను మూత ఉంచి నీటిని పీల్చాలి. ఇప్పుడు నీరు ఫౌంటెయిస్ లాగా వస్తుంది. దాని పైన ఒక బంతిని ఉంచితే అది గిరగిరా తిరుగుతుంది. ఓవర్ హెడ్ ట్యాంకుల ఉపయోగాన్ని నీటి అధోపీడనాన్ని వివరించవచ్చు.

4) **MAGIC BULB:** సాధారణంగా బల్బు నిలబెడితే పడిపోతుంది. కానీ దానిలో కొంత భారాన్ని నింపగా అది స్థిరంగా నిలబడుతుంది. చిన్న చిన్న రాళ్లు మైనంతో తయారు చేసిన దీంతో గురుత్వ కేంద్ర భావన వివరించవచ్చు.

5) **SIMPLE MICROSCOPE :** సూక్ష్మదర్శిని భావనను పరిచయంచేయటంతో పాటు దాని పనితీరు వివరించడానికి కేవలం ఒక కుంభాకార కటకం క్లిప్ ల సహాయంతో ఒక డబ్బాలో మట్టి నింపి ఆధారంగా ఒక కర్రముక్క లతో దీనిని తయారు చేసి కింద ఒక గాజు పలక పై పూల పుప్పొడి ఉంచితే కటకం దాన్ని పెద్దగా

చేసి చూపిస్తుంది.

6) **SMOKE WATER:** ధూమపాన నష్టాలు వివరించవచ్చు. ఒక ప్లాస్టిక్ బాటిల్, పైపు,పెన్ను మూత ఉపయోగించి బాటిల్ మూతకు రెండు రంధ్రాలు చేసి ఒక దానిలో పైపు మరో దానిలో పెన్ను మూత పెట్టి నీరు నింపి బాటిల్ తలకిందులుగా పట్టుకొని పైపు లో బీడీ లేదా సిగరెట్ వెలిగించాలి. మరో వైపు మూత ద్వారా నీరు బయటకు వెళ్లి పోతూ, సిగరెట్ పొగ లోనికి వెళ్లి అక్కడ ఉన్న నీటితో కలిసి రంగు మారుతుంది. తీవ్ర దుర్వాసన వస్తుంది.

7) **FLAME WITH WATER:** సాధారణంగా నీటితో మంటలు ఆర్పవచ్చు. కానీ కాల్షియం కార్బైడ్ పై నీరు చల్లగా ఎసిటలీస్ వాయువు విడుదల అవుతుంది. ఇది దహనశీలి. మూఢనమ్మకాలు తొలగించేందుకు ఈ ప్రయోగం చేయవచ్చు.

8) **NAME WITH WATER:** పిల్లలకు ఆసక్తి కలిగించేలా నీటి లో సర్ఫ్ కలిపి క్షార ద్రావణం తయారు చేసి పసుపు కాగితంపై రాయటం ద్వారా ఎరుపు రంగులోకి మారుతుంది.

9) **MAGIC BALLOON :** సాధారణంగా బెలూన్ ను సూదితో గుచ్చితే పగులుతుంది. కానీ దానిపై ప్లాస్టర్ వేసి గుచ్చితే పగలదు. ప్లాస్టర్ బెలూన్ స్థితిస్థాపకతను కాపాడుతుంది.

10) **DIO RAMA:** రెండు దర్పణాలను ఎదురెదురుగా ఉంచినపుడు అవి అనంత ప్రతిబింబాలను ఏర్పరుస్తాయి. బేకరీలలో, సెలూన్ లలో , వస్త్ర దుకాణాల్లో ఈ విధానం ద్వారా కలిగే ఉపయోగాలను వివరించుటకు అట్ట పెట్టెలో అద్దాలు ఉంచి తయారు చేయటం జరిగింది.

11) **CALEDIOSCOPE :** అద్దాలను త్రిభుజ ఆకారంలో అమర్చి మధ్యలో గాజు ముక్కలు వేసి మూయడం ద్వారా దీన్ని తయారు చేసి పరావర్తనాన్ని తెలపవచ్చు.

12) **PERISCOPE** జెడ్ ఆకారంలోని నిర్మాణంలో రెండు అద్దాలను 45°ల కోణంలో ఉంచి దీనిని తయారుచేయటం జరిగినది. దీనివల్ల యుద్ధాలలో బంకర్లలో దాగి సముద్రం లోపల ఉండి పైన ఏం జరుగుతుందో తెలుసుకోవచ్చు.

13) **ANGLE BASED IMAGES :** రెండు దర్పణాలను ప్లాస్టర్ తో అంటించి వాటిని కోణమూనిని పై ఉంచి వాటి మధ్య కోణాన్ని మార్చడం ద్వారా కావాల్సిన సంఖ్యలో ప్రతిబింబాలను ఏర్పరుచవచ్చు.

ప్రతిబింబాల సంఖ్య = (360/కోణం) -1

14) **DENSITY WITH EGGS :** రెండు ప్లాస్టిక్ గ్లాసులలో ఒక దానిలో మామూలు నీరు మరొక దానిలో ఉప్పు కలిపిన నీటిని తీసుకుని వాటిలో కోడిగుడ్లు వేయాలి. నీటిలో ఉప్పు కలపడం ద్వారా నీటి సాంద్రత పెరిగి దానిలో ఉంచిన కోడి గుడ్డు పైకి తేలుతుంది. ఈ ప్రయోగం ద్వారా సాంద్రత భావనతో పాటు మృత్యు సముద్రంలో తేలడానికి గల కారణాలను వివరించవచ్చు.

15) **HOUSE MODEL**: ఇంటిలో వెంటిలేషన్ ఎంత ముఖ్యమో తెలిపి వేడి గాలి తేలికగా మారి పైకి వెళ్లి వెంటిలేటర్ ద్వారా బయటకు వెళ్లి గది చల్లగా ఉంటుంది. ఒక అట్ట పెట్టెకు రెండు రంధ్రాలు చేసి దీన్ని తయారు చేయడం జరిగింది.

16) **నో COST BLUE LITMUS** : మందార పూవు తీసుకుని తెల్లటి కాగితంపై పూయగా కాసేపటికి అది నీలి రంగులోకి మారుతుంది. దీనిపై ఆమ్లాలను వేసినపుడు అది ఎరుపు రంగులోకిమారుతుంది. దీని ద్వారా సులభంగా నీటి ఆమ్లత్వాన్ని గుర్తించవచ్చు.

17) **వాయువుల వ్యాకోచం**: వేడికి వాయువులు వ్యాకోచిస్తాయని శరీరంలో వేడి ఉంటుందని వేడి గాలి తేలికగా ఉంటుందని చూపడానికి ఒక ఇంజక్షన్ బాటిల్ కు రీఫిల్ అమర్చి చూపవచ్చు.

18) **THERMO CONDUCTIVITY (ఉష్ణ వహనం)**: ఒక చెంచా తీసుకుని దాని వెనుక గాడిలో మైనంతో గుండుపిన్నులు అమర్చాలి. చెంచా ఒక పక్క వేడి చేయగా ఉష్ణం అంతటా ప్రసరించి అవి కింద పడతాయి. దీని ద్వారా ఉష్ణం ఒక చోట నుంచి మరో చోటికి వెళ్తుందని చూపవచ్చు.

19) **BASE INDICATER** : తెల్ల కాగితంపై పసుపు రాయగా అది సహజ క్షార సూచికగా పనిచేస్తుంది.

20) **BALLOON ROCKET** : ఒక దారం తీసుకుని దానికి స్ట్రా ముక్క తగిలించి బెలూన్ అంటించి వదలగా చర్యకు ప్రతి చర్య వ్యతిరేక దిశలో ఉండటంతో బెలూన్ ముందుకు వెళ్తుంది

21) **IODINE TEST**: అయోడిన్ కలపడం ద్వారా పిండి పదార్థాలు నీలిరంగులోకి మారుతాయని పిండి పదార్థాలను సులభంగా గుర్తించటం వివరించవచ్చు.

22) **RAINBOW WITH MIRROR** : పళ్లెంలో నీరు తీసుకుని దానిలో అద్దం ఉంచి ఎండలో పెట్టినపుడు నీరు పట్టకంగా మారి అద్దం పరావర్తనం చెందించటం ద్వారా ఇంద్రధనస్సు ఏర్పడుతుంది.

23) **PHONE WITH TEA CUPS** : రెండు టీ కప్పులు తీసుకుని వాటిని ఒక దారంతో కలపటం ద్వారా దీన్ని తయారు చేయవచ్చు. ఒక కప్పులో మాట్లాడితే తీగ ద్వారా తరంగాలు అవతలి కప్పులో వినబడతాయి.

24) **EYE WORKING MODEL** : కుంభాకార కటకం కన్నులాగా పనిచేసే విషయాన్ని వివరించవచ్చు

25) **ELECTRO MAGNET** : విద్యుత్ ద్వారా ఇనుప కడ్డీ అయస్కాంతంగా మారుతుందని బ్యాటరీ రాగి తీగ గుండుసూది ద్వారా వివరించవచ్చు.

26) **GLOBE WORKING MODEL** : ఒక ప్లాస్టిక్ బాటిల్ మూతకు రంధ్రం చేసి రబ్బరు బ్యాండ్ ద్వారా క్యాండిల్ ముక్క బంతిని ఉంచితే అది గ్లోబ్ లాగా పనిచేస్తుంది. దీంతో భూభ్రమణం భూపరిభ్రమణం వివరించవచ్చు.

27) MAGNETIC LINES : అయస్కాంతంపై పేపర్ ఉంచి ఇనుప రజను చల్లగా అయస్కాంత బలరేఖలు ఏర్పడతాయి. దీని ద్వారా అయస్కాంత క్షేత్రం తెలపవచ్చు.

28) TURBINE : జలవిద్యుత్ ఎలా తయారు చేస్తారో వివరించవచ్చు. బాటిల్ కింద రంధ్రం చేసి టర్బైస్ ఉంచగా అది నీటి గతిశక్తికి తిరుగుతుంది.

29) PRESSURE DEPENDS ON HEIGHT :ఒక బాటిల్ ఒక వివిధ ఎత్తులలో రంధ్రాలు చేయగా కింద ఉన్న రంధ్రం ద్వారా నీరు వేగంగా పై రంధ్రం ద్వారా నెమ్మదిగా వస్తుంది. నీటి పీడనానికి ఎత్తుకు సంబంధం ఉంటుందని చూపవచ్చు.

30) BOTTLE ROTATER : బాటిల్ కింద భాగంలో ఒకే వైపు రంధ్రాలు చేయడం ద్వారా నీటి పీడనానికి వ్యతిరేక దిశలో బాటిల్ తిరుగుతుంది.

31) TELESCOPE : కుంభాకార కటకాలను ఒక ప్లాస్టిక్ డబ్బాలో అమర్చి తయారు చేయటం జరిగింది. దీని ద్వారా దూరంగా ఉన్న వస్తువులను దగ్గరగా చూడవచ్చు.

32)JET MOTOR : ఒక ఇంజక్షన్ బాటిల్ కు రెండు రంధ్రాలు చేసి వాటిలో రీఫిల్ లను ఉంచాలి. ఒక దాని నుండి ఊదితే మరొక దాని ద్వారా నీరు బయటకు వస్తుంది.

33)LUNGS WORKING MODEL : ఒక అట్ట ముక్కకు ఊపిరితిత్తుల బొమ్మ గీసి రెండు రీఫిల్ లకు బెలూన్ లను ఏర్పాటు చేసి వాటిని సెలైన్ బాటిల్ కు అనుసంధానించాలి. సెలైన్ బాటిల్ నొక్కి ఉచ్వాసం నిచ్వాసం చూపవచ్చు.

32) WASH IMPORTANCE: చేతులు పరిశుభ్రంగా ఉంచుకోకపోతే క్రిములు ఒకరి నుండి ఒకరికి ఎలా వ్యాపిస్తాయో చేతులకు పసుపు పూసుకుని కరచాలనం చేసి కడిగిన నీటిని పరిశీలించగా ఏర్పడుతుంది.

33) MAGNETIC REPULSIONS : అయస్కాంతం ఆకర్షణ వికర్షణలు చిన్న అయస్కాంతాల ద్వారా వివరించవచ్చు.

34) BALLOON BLOW(ఊదితే ముడుచుకునే బెలూన్) : ఒక ప్లాస్టిక్ బాటిల్ మూతకు రెండు రంధ్రాలు చేసి రెండు పెన్ను మూతలు బిగించి లోపలి దానికి బెలూన్ కట్టి మరొకటి ఖాళీగా ఉంచాలి. ఇప్పుడు ఖాళీగా ఉన్న దానిని ఊదగా లోపల ఉన్న బెలూన్ ముడుచుకొని పోతుంది. గాలి లోనికి పీల్చగా బెలూన్ నిండుతుంది. గాలి అల్ప అధిక పీడనాలను దీని ద్వారా వివరించవచ్చు.

35) DIFFRACTION WITH STAMP : కాంతి వక్రీభవనాన్ని వివరించడానికి ఒక గాజు గ్లాసు కింద స్టాంపు ఉంచి గ్లాసులో నీరు పోయగా స్టాంపు కనబడకుండా పోతుంది.

36) Optical Fibre: సంపూర్ణాంతర పరాపర్తనాన్ని వివరించడానికి దీనిని వాడుతాము.

37) FUEL SEEDS: జీడి జట్రోఫా ఆముదం గింజల ద్వారా ఎలా ఇంధనాలు తయారు చేయవచ్చో వివరించవచ్చు.

38) Drip irrigation : నీటి పొదుపు వివరించడానికి సెలైస్ బాటిల్ పైపుల ద్వారా బిందు సేద్యం గురించి వివరించవచ్చు.

39) Mg OXIDATION :మెగ్నీషియం తీగను మండించటం ద్వారా మెగ్నీషియం ఆక్సైడ్ ఏర్పడి దానికి నీరు కలుపగా మెగ్నీషియం హైడ్రాక్సైడ్ ఏర్పడే విధానాన్ని దాని లాభాలు వివరించవచ్చు.

40) CO2 IN THE AIR: గాలిలో కార్బన్ డై ఆక్సైడ్ ఉంటుందని తెలపడానికి పలకపై పచ్చి చాక్ పీసుతో రాసి గాలి ఊదగా అది తెల్లగా మారుతుంది.

41) OXI ACETELINE FLAME: కాల్షియం కార్బైడ్ నీటితో చర్యనొంది ఎసిటలీస్ గ్యాస్ ఏర్పడుతుంది. దీన్ని వెల్డింగ్ లో వాడుతారు. బాటిల్ లో కార్బైడ్ తీసుకుని నీరు కలిపి సెలైస్ పైపు చివర మంట ద్వారా ఈ జ్వాలను ఏర్పరచవచ్చు.

42) BERNOULI LAW WITH BALLOONS : రెండు బెలూన్ లను ఊది పక్క పక్కనే ఉంచి మధ్యలో ఊదగా రెండు దగ్గరకు వస్తాయి.

43) THUFAN : అల్ప పీడనం వివరించవచ్చు.

44) SHOE RAY BOX: కుంభాకార పుటాకార కటకాలు దర్పణాల ధర్మాలు సులువుగా వివరించవచ్చు.

45) CENTRIFUGE:ఒక బంతికి రంధ్రం చేసి దాని ద్వారా అపకేంద్ర బలం వివరించవచ్చు.

46) CONVEX CONCAVE MIRRORS : ఒక చెంచా లోపలి భాగాన్ని పుటాకార వెలుపలి భాగాన్ని కుంభాకార దర్పణంగా వివరించవచ్చు

47) మండుటకు గాలి అవసరం: ఒక ప్లేట్ లో నీరు తీసుకుని దానిలో కొవ్వొత్తి వెలిగించి దానిపై గ్లాసు బోర్లించగా ఆ నీరు గ్లాసు లోకి వస్తాయి.

OUTCOMES :

1) మా పాఠశాల విద్యార్థి ఉన్నత పాఠశాలకు వెళ్లిన తర్వాత సైన్స్ పట్ల ఆసక్తితో అడవుల సంరక్షణ కొరకు వృక్షమిత్ర అనే ప్రాజెక్టును రూపొందించి ఈనాడు హాయ్ బుజ్జి ఆధ్వర్యంలో నిర్వహించిన రాష్ట్ర స్థాయి వైజ్ఞానిక ప్రదర్శనకు ఎంపికై పది వేల రూపాయల బహుమతి అందుకోవటం జరిగింది.

2) సిద్దిపేటలో జరిగిన రాష్ట్ర స్థాయి వైజ్ఞానిక ప్రదర్శనలో ఉపాధ్యాయ బోధనోపకరణాల విభాగంలో పాల్గొని బెంగళూరులోజరిగిన దక్షిణ భారత వైజ్ఞానిక ప్రదర్శనకు ఎంపికై ఉత్తమ ప్రదర్శన కనబరచి బహుమతి పొందటం జరిగింది.

3) పాఠశాలలో వైజ్ఞానిక ప్రదర్శన ఏర్పాటు చేసి విద్యార్థుల తల్లిదండ్రులను, గ్రామస్తులను ఆహ్వానించగా వారు విద్యార్థులు ప్రదర్శించిన ప్రయోగాలను చూసి ప్రైవేటు పాఠశాలల కన్నా ఉత్తమంగా విద్యార్థుల ప్రగతి ఉందని వారి పిల్లలను కూడా ప్రభుత్వ పాఠశాలకే పంపించారు.

4) విద్యార్థులలో శాస్త్రీయ దృక్పథం పెరిగింది.

5) మూఢనమ్మకాలను నమ్మకుండా మ్యాజిక్ ల వెనుక ఉన్న సైన్స్ ను అర్థం చేసుకుంటున్నారు.

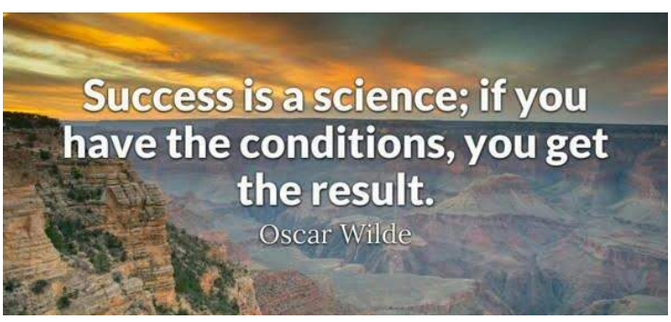
'ఈనాడు-హాయ్‌బుజ్జీ' పోటీల్లో ఇటిక్యాల విద్యార్థుల ప్రతిభ

రాయికల్, మ్యూస్‌టుడే: ఈనాడు-హాయ్‌బుజ్జీ ఆధ్వర్యంలో రాష్ట్ర స్థాయిలో నిర్వహించిన వైజ్ఞానిక ప్రదర్శనలో రాయికల్ మండలంలోని ఇటిక్యాల గ్రామంలోని ఆదర్శ పాఠశాల విద్యార్థులు ప్రతిభ కనబరచి రాష్ట్ర స్థాయిలో 5వ స్థానంలో నిలిచారు. రూ.10వేల బహుమతి అందుకున్నారు. వనవన్యప్రాణి సంరక్షణ, జల సంరక్షణపై వైజ్ఞానిక సమానాలు రూపొందించాలని పోటీ నిర్వహించగా రాష్ట్ర వ్యాప్తంగా అనేక పాఠశాలల నుంచి విద్యార్థులు తమ ప్రాజెక్టులను పంపించారు. వేల ప్రాజెక్టులు రాగా అందులో అత్యుత్తమంగా రూపొందించిన 20 ప్రాజెక్టులను ఎంపిక చేసి ఈనెల 20న హైదరాబాద్‌లో ప్రదర్శన నిర్వహించారు. అందులో 5వ స్థానంలో ఇటిక్యాల విద్యార్థులు రూపొందించిన వృక్ష మిత్ర అనే నమూనా ఎంపికైంది. రూ.10 వేల నగదు బహుమతితో పాటు ట్రోఫీని అందజేశారు. ఇటిక్యాల ఆదర్శ పాఠశాలలో 8వ తరగతి చదువుతున్న విద్యార్థులు మోనం మారుతి, మడాసు కృష్ణకుమార్, దుంపాల నరేన్‌ను ప్రిన్సిపల్ శ్రీనివాస్, సర్పంచి నిరటి శ్రీనివాస్, ఎంపీటీసీ సభ్యురాలు ఏముల సింధూజ, విద్యా కమిటీ నాయకులు రాంరెడ్డి, నాయిని శ్రీను అభినందించారు.

బహుమతి అందుకుంటున్న ఇటిక్యాల ఆదర్శ పాఠశాల విద్యార్థులు

దక్షిణ భారత వైజ్ఞానిక పోటీల్లో ఉపాధ్యాయుని ప్రతిభ

బహుమతి అందుకుంటున్న అభయ్‌రాజ్



STATE LEVEL SEMINAR ON NATIONAL SCIENCE DAY

28TH FEBRUARY 2019.

THEME: *SCHOOL SCIENCE CURRICULUM – NEEDS AND CHALLENGES*

Sub-Theme: Innovative Science Teaching for creative minds.

Topic: SCHOOL'S KITCHEN GARDEN PROJECT

By

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Introduction

Kitchen and food gardens are an increasingly popular way for schools to promote environmental and sustainability learning and connect students with healthy food and life styles. School garden programs are multi-intervention packages incorporating agriculture, nutrition and WASH(Water, Sanitation and Hygiene) education, and community outreach to improve community food security and nutrition. Good nutrition relies on healthy food systems, access to health services and clean environments. A school garden can be regarded as a small food system. A healthy garden can include the production of the plant and animal food and be designed to address biodiversity, healthy diets and eco-friendly environments. These gardens can be used as platforms for environmental education, nutrition, behaviour change and communication.

Objectives of the School Garden Project.

- Creative minds Learn through active and hands on experience.
- Sense of food hygiene and cleanliness of the surroundings.
- Develop students understanding of vegetable production.
- Raise Children's interest in a more varied diet.
- Giving opportunities for children to consume the vegetables they grow.
- Respect for and interest in their school environment.
- To enjoy gardening and have positive attitudes to agriculture.
- To appreciate healthy foods and to change their own eating habits.
- Environmental awareness and understanding, respect for nature and natural resource management.
- Encourage children to acquire attitudes of cooperation, responsibility self-esteem and self-confidence, motivation , enhaced communication and the value of the work.

SCHOOL'S KITCHEN GARDEN

As a part of "Swatch Bharat -Swatch Patashala" programme the Students realized to keep their classrooms and the corridors clean. But, the region backside of the school which is unnoticed and rarely used was dumped with rough papers, plastic bottles and covers etc by The students. This place has been identified for the kitchen garden project, VII class Students are chosen for implementing this project initially. Later students from other classes joined them. Mr Praveen, Mrs M.B Nirmala and Mrs V Padma Priya have been the incharges for the kitchen garden project.

THE PROCESS OF TRANSFORMATION

The Students under the guidance of Mr. Praveen, Mrs M.B.Nirmala and Mrs V. Padma Priya and the staff members started working on the project. They started picking up the waste papers and plastic bottles initially. One period in their regular time-table has been allotted for the work.

They started cleaning the place by removing weeds and the rocks to level the area. The idea is to engage the child on hands on activity.

The soil of the place was not fertile enough to grow the vegetables, the next task was to make it fertile. Center for Sustainable Agriculture(CSA) is an NGO working in this area that collaborates with Schools and provide required help.

A raised-bed for kitchen garden has been constructed with the help of CSA representative where the soil has been raised above the surrounding soil enclosed by the frame of concrete blocks and the soil is enriched with the compost.

Panchagavya is a natural manure whose ingredients are milk, curd, ghee, dung and urine of cow . With the collaboration of an NGO, center for sustainable agriculture (CSA) our students prepared panchagavya and used it as natural manure for the plants in their kitchen ggarden.

The Students were so connected with the project that they stated staying back after the school hours to work. Collaborative skills developed and they started taking pride and respect the hardwork done by each and every student connected with the project. They started requesting other students of the school not to throw waste papers and plastic covers in the kitchen garden area.

CSA provided saplings for the kitchen garden, the students, teachers planted the saplings following the suggestions given by the CSA representation like how much distance to be maintained between the plants, how many and what type of saplings can be planted in each row.

The Students became so responsible that they prepared a time-table themselves who and how to look after the plants. During week long Pongal holidays the students came to the school as per their time-table to water the plants. Now, we have a beautiful kitchen garden in place of unused and dumped with waste school backyard.

Outcome of the Kitchen Garden Project

The School Kitchen garden is an educational tool for students to practice knowledge and skills learned in the classroom through hands-on activities, school garden programs stimulate learning and behavioural change. It improved in students

- Appreciation and care for the environment
- Sense of responsibility, confidence, enhanced communication and well-being.
- Sense of food hygiene and cleanliness.
- Attitudes, preferences and willingness to eat diverse foods
- Healthy dietary habits
- Physical Activity levels
- Academic Performance

References:

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- www.sbs.com.au/food

PAPER PRESENTATION FOR THE STATE LEVEL SCIENCE SEMINAR ON THE OCCASION OF NATIONAL SCIENCE DAY

Presented by

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Telangana-505212

Main Theme

School Science Curriculum - Needs And Challenges

Sub Theme

Innovative Science teaching for creative minds

Organized by

State Council Of Educational Research And Training,

Department Of Mathematics And Science,

Telangana

School Curriculum - Needs And Challenges

Innovative Science Teaching For Creative Minds

Abstract– Efforts have been made to improve science teaching in schools, yet, students performance is poor in science subject. Many innovative teaching strategies have been developed by educators and found to impact significantly on students' academic performance when utilized. Hence, The purpose of this paper is to evaluate the traditional methods of teaching and to suggest other useful teaching methods that can be attempted in imparting knowledge to the students. The use of innovative methods in educational institutions has the potential not only to improve education, but also to empower people, strengthen governance and galvanize the effort to achieve the human development goal for the country.

I. Introduction

Schools have numerous responsibilities, including teaching the students observation, critical thinking, mathematical reasoning, communication and problem-solving skills. The science curriculum needs to be strengthened in, so that it encourages students to more actively explore their environment. Science when properly taught, can help schools fulfill these responsibilities because students can apply the knowledge and skills learned in their academic subjects to solve practical problems in their science classes. In particular, developing student's conceptual understanding and analytical abilities through innovative activities enhances student's self-worth and confidence, and consequently improves their school-wide academic achievement.

II. Objectives

Innovative science teaching requires a lot of structured instructional strategies and the teachers should be knowledgeable about both the scientific context and the innovative methods to teach. The following are a few techniques of teaching that imparts the best learning experience to the students-

a. Using appropriate just-in-time learning stimuli and motivating students to develop conceptual framework and problem solving skills as well
b. Engaging student's preconceptions prior to teaching them new concepts
c. Providing deep foundational knowledge
d. Helping students make appropriate connections within the context of a conceptual framework
e. Organizing knowledge in ways that facilitate information retrieval and application
f. Inculcating scientific methods of teaching
g. Involving students actively in their own learning and helping them to experience science in enjoyable ways including group discussions.

III. Methodology

Currently science curricula in middle schools are failing because teachers and students become discouraged with science because of the emphasis on math and literacy testing, and science gets pushed aside for those content areas. Students' interested to produce innovative things related to what they learned in science but teachers are not able to give importance due to changing of education system. As a future educator, I was interested in looking at productive ways of teaching science that help the students learn and become interested in science.

Here are a few strategies that can be followed-

a. Live Experimentation
b. Argue With Science
c. Group Discussions And Quizzes
d. Reciprocal Teaching

a. Live Experimentation

Design of the Innovation- A class room live experimentation grabs the student's attention towards learning. When the theoretical learning and the practical learning goes hand-in-hand, It is easy for the students to correlate the concept to the real world problems that are existing and are able to be solved. Each class room includes a mini-lab, containing the equipment required to explain the concepts.

Description- Effective teachers of science create an environment in which they and students work together as active learners. An innovative teaching involves differentiating the perspective of the students towards the objects in the real world. For instance, consider determining the volume of a three objects of different shape. Ask the students to find the object with highest volume. The approach of the students is normally to determine the volumes mathematically. the effort of an innovative teaching is to teach students, determine the volume scientifically. yes! correct, use Archimedes principle. Consider explaining kinetic and potential energies to the students. formula $K.E=(mv^2)/2$ and $P.E=(mgh)$ will never allow students to think innovatively, try explaining them with few classroom experiments. Consider Kinematics, the exact definitions in the text book adds grades to the students, but not the concept. Teach differently and the approach of the students to the concepts will change to a great extent. These kind of activities create interest for the students to learn more. Concepts like Air Pressure, Optics, Kinematics, Dynamics, Gravitation, Magnetism, Electricity involve terminology that makes students feel difficult to learn. The aim of an innovative teaching method is to formulate them easily through the basic experiments.

Outcomes-Student's perception towards the subject would totally change. The gap between "What I am learning and Why I am learning" is reduced.

b. Argue With Science

Design- Debating is a great way to engage students with science and help them to get grips with the big issues. Teaming up the students into different groups and providing

them few difficult topics in science to debate is always the most innovative technique. **Description-**Debating helps students to understand why studying science is relevant to their everyday lives, and inspire them to do their own research about a topic that they find interesting. Plus, a bit of friendly class competition never hurts! Besides being fun, debating science also helps to meet targets set by the National Curriculum for Science. For instance, the most popular theory for explaining the origin of the Universe is the Big Bang theory. But many physicists turned to the inflationary theory that covers shortcomings of the Big Bang Theory. Nevertheless, the debate about the origin continues, so ask students to debate over it and come up with a list of interest groups that would be affected by the topic and write it up onto a whiteboard. Divide the class into the different interest groups. Tell the students to discuss the topic from the point of view of their interest group for 10 minutes and then come up with 2 major concerns that they would have about the topic. Each group should nominate a spokesperson who will have 2 minutes to present their group's point of view in front of the whole class. After each group has shared their ideas, a classroom discussion can take place with all pupils still representing their interest group. This should culminate in a whole class vote to either support or oppose the topic.

Outcomes- This innovative technique improves rigorous higher order and critical thinking skills. It enhances the ability to understand even a very difficult topic.

c. Group Discussions and Quizzes

Design-The traditional one-way learning may not always create interest to the students. Group discussions and quizzes can be implemented well at the class room level. **Description-** Consider a topic like Lenz's law. Let the students discuss among themselves. In the process of discussing, students encounter few words like EMF, magnetic flux, magnetic field. This group discussion helps them to get clear idea of the terms that are basic for many of the complex topics. Divide the class into 2 or 3 teams and conduct quizzes on various topics like mechanics, gravitation, light etc. this would develop the spirit of learning among the students.

Outcomes-More interactive teaching and learning is involved which help the students to well-versed with the subject. All-round development of an individual takes place.

d. Reciprocal Teaching

Design- Reciprocal teaching refers to an instructional activity in which students become the teacher in small group reading sessions. Teachers model, then help students learn to guide group discussions using four strategies: summarizing, question generating, clarifying, and predicting. Once students have learned the strategies, they take turns assuming the role of teacher in leading a dialogue about what has been read.

Description- Before Reciprocal Teaching can be used successfully by your students, they need to have been taught and had time to practice the four strategies that are used in

reciprocal teaching (summarizing, questioning, predicting, clarifying).

One way to get students prepared to use reciprocal teaching:

a. Put students in groups of four.

b. Distribute one note card to each student representing his role(Summarizer, Questioner, Clarifier, Predictor).

c. Have students read a few paragraphs of the assigned text selection

d. At the given stopping point, the Summarizer will highlight the key ideas up to this point in the reading.

e. The Questioner will then pose questions

f. The *Clarifier* will address confusing parts and attempt to answer the questions that were just posed.

g. The *Predictor* can offer predictions about what the about the concepts

h. Throughout the process, the teacher's role is to guide and nurture the students' ability to use the four strategies successfully within the small group. The teacher's role is lessened as students develop skill.

Outcomes-It encourages Students to think about their own thought process during reading, helps them learn to be actively involved and monitor their comprehension as they read and teaches students to ask questions during reading and helps make the text more comprehensible.

IV. Implications

In these days of technical knowledge and scientific advancements, our education system is looking at developing the student's perspective towards science and technology. Science will always be learned in a more interactive and innovative way rather than the traditional teaching methods. The innovative techniques when implemented in schools lead to the students progress in those areas and helps them to understand the concepts better.

Few other techniques like twinning can also be implemented to expand and share the knowledge between the students of two different schools.

V. References

[1] Dr. Damodharan V. S. ACCA, AICWA and Mr. Rengarajan.V AICWA.Innovative Methods Of Teaching

[2] https://www.researchgate.net/publication/258023165_role_of_teachers'_in_curriculum_development_for_teacher_education

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Theme: School Science Curriculum – Needs and challenges.
Sub-theme: Innovative Science teaching for creative minds.
Title of the topic: Mastery based learning approach for Physical Science.

Objectives of this seminar paper:

- To explore the ways and means to make the student community in pursuit of science as a career.
- To improve the professional skills among the teaching community.
- To encourage the students to develop investigation skills.
- To encourage the students to apply the scientific concepts in real life situations and concerned to the environmental issues.

Design of innovation of Mastery based learning (MBL) in Science: MBL is a shift from teaching and assessing all learners at the same time to individualizing and personalizing education through collaboration and innovation among the learners.

Description of innovation of Mastery based learning (MBL) in Science: Each learning unit is broken down into achievable and measurable learning tasks. Each New Learning Task (NLT) is checked for gaps before the learning commences. Mapped prerequisites are checked through gap tests and gaps are subsequently closed by repeated administration of assessments. After the prerequisite learning gaps are closed, the learner must be assigned a new learning task guided by the teacher. Evidence of progress and mastery is created through a battery of diverse formative assessments. Competent learners are recommended Enrichment Tasks specifically designed to develop academic rigour and enable deeper learning.

Outcome of innovation: The learners shift from 'all-finish-at-the-same-time' practice that leaves them with academic gaps to mastering the concepts and skills at their own developing pace. Individualized learning helped young learners achieve more milestones and develop self-regulated learning skills like metacognition, collaboration and innovation.

Implications: Learners of 21st century are expected to be more independent in learning approaches and develop effective communication and collaboration skills for global solutions. Personalized learning ecosystems in the context of technology facilitate evolution of holistic education with evidence-based academic rigour.

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https://www.teachthought.com/the-future-of-learning/blended-continuous-learning-in-the-21st-century-classroom/

INTRODUCTION

Vice Principal (Curriculum Development) of Focus High School (FHS), Mr. Syed Mustafa Hussain, has motivated for all staff members to practice Mastery-based Learning at our School. We are implementing the same in our School.

I have observed that school students are not gaining clear understanding in describing motion with classical way of teaching, especially with time constraint.

I was really interested in taking up a challenging task of teaching the students of Class 8 the basic concepts of describing motion and plotting graphs to provide foundation for NEET/IIT. So, the specific research question was how to teach the C8 students these things when they haven't studied concepts of graphs in their previous years - neither in their earlier math class nor science class.

DESCRIPTION OF THE RESEARCH CONTEXT

In class, I made students analyze motion using Pearson's animation web link.
https://media.pearsoncmg.com/aw/aw_activphysics/ap/pt1a/Media/DescribingMotion/AnalyMotUsingDiag/Main.html
These links helped students understand the difference between positive and negative velocities and positive and negative accelerations. The diagrams helped them for checking the signs of velocity and acceleration in kinematic problem solving.

In project I made them to estimate and then calculate the time taken to reach TS Central Library or City civil court from FHS DS branch using the average speed calculated while walking along the corridor. They also used Google map (connection with Social science - MAP reading) to locate the destinations and measure distance using scale given in the map.
I have designed a game.

I also made students to gain understanding of location of different ordered pairs in different quadrants of a given grid by making them play a computer program Scratch game.
X-y coordinates challenge
https://scratch.mit.edu/projects/24920597/
Coin hunter XY coordinates game
https://scratch.mit.edu/projects/173605760/#fullscreen

I got these scratch projects when I completed a course of Scratch as part of the Google Code to Learn 2018 faculty training program.
https://drive.google.com/open?id=1ns6ka77WHrmQl3lMT5XgqttlB7Qiy8O2

After building the conceptual understanding of coordinate system or graphs students started learning about gradients. I demonstrated slopes (connection to Math graphs) in the class with a duster kept on a meter ruler and by giving mnemonics for positive, negative and zero slopes.

In this part of the course students started to interpret graphs by relating them to motion diagrams and by observing the graphs in different cases.
https://media.pearsoncmg.com/aw/aw_activphysics/ap/pt1a/Media/DescribingMotion/AnalyMotUsingGraphs/Main.html

After understanding the Describing motion chapter students were encouraged to use either bicycle to reach the School from their homes or use public transportation keeping in mind solutions of environmental issue of reducing pollution.

Different simulations were shared with students and few were played class.

https://phet.colorado.edu/en/simulations/category/physics

DATA COLLECTION & ANALYSIS

This study proved that the group which had MBL teaching strategies got sound conceptual understanding than the normal classroom teaching which was done for C9 students for the same topics.

FINDINGS/ CONCLUSIONS

This group study finding shows that implementation of teaching strategies of MBL has positive impact on learning and applying the basic concepts in real life situations.

This link connects to the article contributed by me and published in our School Fenestra Newsletter: 2018-19 based on action research and professional development implementation.

ONE DAY STATE LEVEL SEMINAR ON

"SCHOOL SCIENCE CURRICULUM – NEEDS AND CHALLENGES"

I) PERSONAL DETAILS

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II) SUB THEME

Innovative science teaching for creative minds

III) TITLE OF THE TOPIC

Application of Mathematics tools in Science.

Introduction:

A major argument for including different areas & verbal problems at secondary and higher secondary level curriculum has always been their potential role for the development in students of skills in knowing when & how to use their mathematical knowledge for approaching & solving in practical situations. The application of mathematics to solve the problem such as in the fields like Physics, Engineering, Chemistry, Biology etc.

In general at secondary level or higher-secondary level student will study the different concepts of the mathematics, lets us examine few of them as follows:

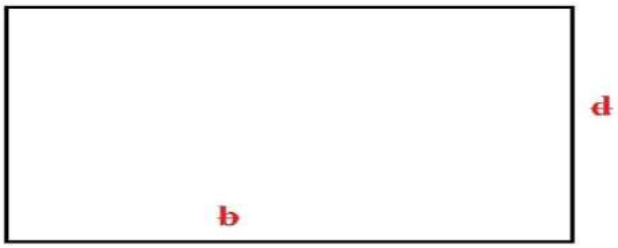
1. Concept of perimeter & Areas of different 2D Shapes
2. Concept of perimeter & Areas of Sectors .
3. Areas of minor segments
4. Concept of Trigonometric Ratios.
5. Concept of Derivatives to be applied in Maxima & Minima.

Lets us have a brief discussion on the above concepts, which leads to apply to determine the flow of the water through the different shaped channels i.e. cannels in the most economical manner in the field of the Fluid Mechanics.

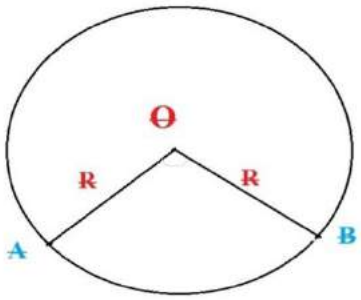
1. **Perimeter and Area of the Rectangle :-**

Perimeter (P) = 2b + 2d

Area (A) = b X d.



2.Perimeter and Area of a Sector of a Circle : -

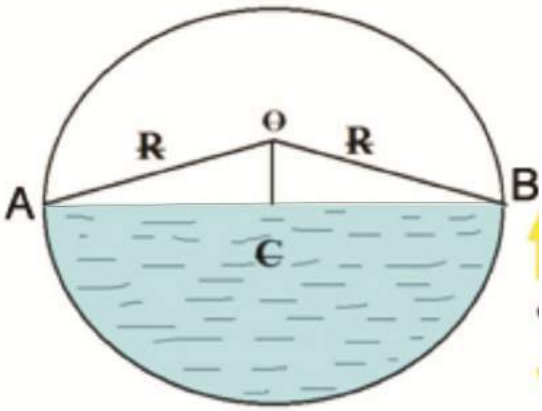


Perimeter (P) = Rθ Where θ *is the Radian*

Area (A) = $\frac{1}{2}R^2\,\theta$

= $\frac{\theta}{2\pi} \times \pi R^2$

3. Area of the Minor Segment: -



Area of the sector OADBO = $\frac{2\theta}{2\pi}$ $\times \pi R^2$

= $R^2\theta$.

Now from the Δobc we have

Sin θ = $\frac{BC}{R}$ = BC = R Sin θ .

Cos θ = $\frac{OC}{R}$ = OC = RCos θ.

Area of the ΔOAB = $\frac{1}{2}$ × Base × Height.

= $\frac{1}{2}$ × AB × OC.

= $\frac{1}{2}$ ×2BC×OC (∴ AB = 2BC).

= $\frac{1}{2}$ × 2R Sin θ × 2 RCos θ .

= $\frac{1}{2}$ × $R^2$2 Sin θ Cos θ .

= $\frac{1}{2}$ × R^2 × $Sin2\theta$ (∴ sin2 θ = 2$sin\,\theta cos\theta$).

Area of the Minor Segment ADBA = Area of the sector OADBO – Area of ΔOAB .

= $R^2\theta$ - $\frac{1}{2}$ × R^2 × $Sin2\theta$

= $R^2(\theta - \frac{1}{2} \times Sin2\theta)$.

3

The above part of Derivation is based on the application of the concept of Trigonometrically ratios as we have discussed at 10^{th} class under tangents & secants.

4.Maxima and Minima : -

Let y = p(x) be a continuous function in x on IR,Then we have

$$\frac{dy}{dx} = p'(x).$$

$$\frac{d^2y}{dx^2} = p''(x).$$

For the Minimum & Maximum then $\frac{dy}{dx} = 0$ i.e. $p'(x) = 0$ we get the critical vales of x,Which satisfies the equation of $p'(x) = 0$.

At each value of x, the sign of $\frac{d^2y}{dx^2}$ will be evaluated i.e. $\frac{d^2y}{dx^2} > 0$ (p(x) is Minimum).

$\frac{d^2y}{dx^2} < 0$ (p(x) is Maxima) .

This is also called as second derivative test, as it has been discussed at the higher secondary level.

Let us study that how these basics concepts which have discussed earlier can be applied in the field of civil engineering while dealing to determine the discharge of water through different channels I.e. annals under the fluid mechanics.

Most Economical Section of the Channels (Cannals)

A section of a channel is said to be most economical when the cost of construction of the channel is minimum. But the cost of construction of a channel depends upon the excavation and the lining.To keep the cost down or minimum, the wetted perimeter, for a given discharge should be minimum. This condition is utilized for determining the dimensions of a economical sections of different forms of channels.

Most of the economical sections is also called the best section or most efficient section as discharge, passing through a most economical section of channel for a given cross-sectional area (A), Slope of the bed (i) & Resistance of co-efficient is minimum. But the discharge "Q" is given by the equation as follows:

Discharge = Area X Velocity

Q = A x V.

Where "V" = $C\sqrt{mi}$ "m" = $\frac{A}{P}$

Q = $AC\sqrt{\frac{A\times i}{P}}$ Let "K" = $A\,C\sqrt{mi}$

Q = $A\,C\sqrt{mi}$

Q = $\frac{AC\sqrt{A\times I}}{\sqrt{P}}$

Q = $\frac{K}{\sqrt{P}}$

Q = $K \times \frac{1}{\sqrt{P}}$

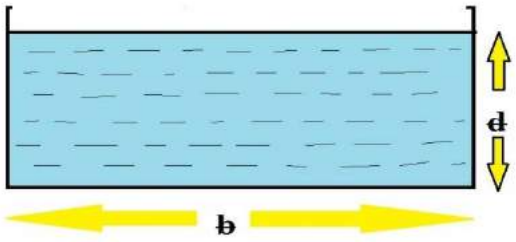
From the above equation the discharge "Q" will be maximum when the wetted perimeter p is minimum. This condition will be used for determining the best section of a channel i.e. best dimension of a channel for a given area.

The conditions to be economical for the following shapes of the channels will be considered:

1. Rectangular Channel Sections
2. Circular Channel Sections
3. Trapezoidal Channel Sections

1. Rectangular Channel Sections:

The condition for the most economical channel section is that for a given area, the perimeter should be minimum. Consider a rectangular channel as given in the figure below:



Let the b = width of the channel,

d = Depth of the flow.

Area of the flow i.e. A = b ×d ……..eq.1

Wetted perimeter P = d + b + d = b+2d …..eq.2

From equation 1 we have b = $\frac{A}{d}$

By substituting the value of 'b' In equation 2,then we have as follows

P = $\frac{A}{d}$ + 2d.

For the most economical section, P should be minimum for a given area or $\frac{dP}{dd}$ = 0.

$\frac{dP}{dd}$ = A ($\frac{-1}{d^2}$) + 2.

0 = 2 –($\frac{A}{d^2}$)

($\frac{A}{d^2}$) = 2.

A = $2d^2$…… Eq 3

But the A = b x d

Substitute equation 3 in the area formula then we have as follows.

$2d^2$ = b X d.

B = 2d.

The Hydraulic Mean depth m = $\frac{A}{P} = \frac{b \times d}{b+2d}$

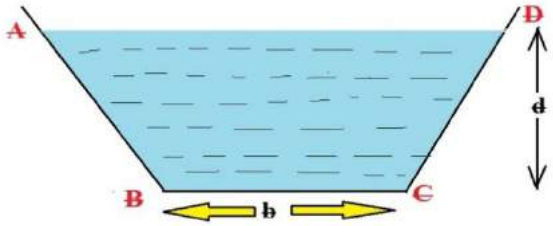
$= \frac{d \times 2d}{2d+2d}$

$= \frac{d \times 2d}{4d} = \frac{d}{2}$

It is clear that rectangular channel will be most economical when m = $\frac{d}{2}$ i.e. Hydraulic depth is half the depth of the flow.

2. Most Economical Trapezoidal Channel Section: -

This channel will be most economical when its wetted perimeter is minimum, consider a Trapezoidal section of the channel as given in the figure.



Let b = Width of the Channel at bottom,

D = depth of the flow.

Angle made by the sides width with horizontal = θ.

Area of the flow (A) = $\frac{1}{2}$ (BC + AD) × d.

$= \frac{1}{2}$ (b+b+2nd) × d.

$= \frac{1}{2}$ (2b+2nd) × d.

$= \frac{2}{2}$ (b+nd) × d.

= (b + nd).d …….. eq.1.

We have $\frac{A}{d}$ = b+ nd.

b = $\frac{A}{d}$ - nd ..... eq.2.

Now the wetted perimeter P = AB+BC+CD

P = BC+CD + CD ($\therefore AB = CD$)

P = BC+2CD.

P = b + 2d$\sqrt{n^2 + 1}$ .....eq.3.

Substituting the value of the b in the equation 3 the we get as follows:

P = $\frac{A}{d}$ - nd+2d$\sqrt{n^2 + 1}$.

For the most economical section, the P should be minimum or $\frac{dP}{dd}$ = 0.

$\frac{dP}{dd}$ = -$\frac{A}{d^2}$ – n + 2$\sqrt{n^2 + 1}$ = 0

- $\frac{A}{d^2}$ – n + 2$\sqrt{n^2 + 1}$ = 0.

$\frac{A}{d^2}$ + n = 2$\sqrt{n^2 + 1}$.

Substituting the value of A = (b + nd) X d in the above equation.

$\frac{(b + nd) X d}{d^2}$ + n = 2$\sqrt{n^2 + 1}$.

$\frac{b+nd}{d}$ + n = 2$\sqrt{n^2 + 1}$.

$\frac{b+2nd}{d}$ = 2 $\sqrt{n^2 + 1}$.

$\frac{b+2nd}{2}$ = d$\sqrt{n^2 + 1}$.

Here $\frac{b+2nd}{2}$ is the Half of the top width.

d$\sqrt{n^2 + 1}$ = CD = One of the sloping side.

Hydraulic mean depth m = $\frac{A}{P}$

= $\frac{(b+nd)d}{2(b+nd)}$

= $\frac{d}{2}$

Hence for a trapezoidal section to be most economical hydraulic mean depth must be equal to the half of the depth of the flow

3.Flow through Circular Channel Section:

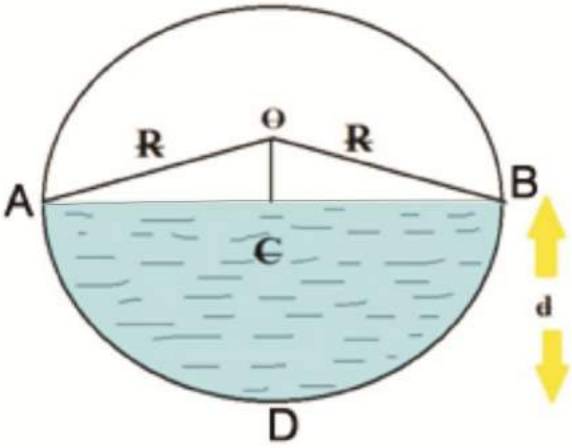
The flow of a water through a circular pipe, when the level of water in the pipe is below the top of the pipe is classified as an open channel flow. The rate of the flow through circular channel is determined from the depth of the flow and angle subtended by the liquid surface at the center of the channel.

Let the d = Depth of water,

2θ = Angle subtended by the water surface AB at the center.

R = radius of the channel

P = Wetted perimeter.



P = $\frac{x}{2\pi} \times 2\pi R$

= $\frac{2\theta}{2\pi} \times 2\pi R$

=2R θ ..... Eq 1.

Wetted area (A) = Area of the ADBA

= Area of the sector OADO – Area of the Δ ABO.

= $\frac{2\theta}{2\pi} \times 2\pi R^2$ - $\frac{1}{2}$ x AB x OC ($\therefore AB = 2BC$).

$R^2\theta$ - $\frac{1}{2}$ X 2BC X OC.

$R^2\theta$ – RSin θ X RCos θ ($\therefore BC$ = RSin θ) & ($\therefore OC$ = RCos θ).

$= R^2\theta - \frac{1}{2}R^2$ (2 Sin θ RCos θ).

$$= R^2\theta - \frac{1}{2}R^2(Sin2\,\theta\,)$$

$$= R^2\left(\theta - \frac{sin2\theta}{2}\right)$$

Thus the Hydraulic mean depth m = $\frac{A}{P}$

$$m = \frac{R^2\left(\theta - \frac{sin2\theta}{2}\right)}{2R\theta}$$

$$= \frac{R}{2\theta}\left(\theta - \frac{sin2\theta}{2}\right).$$

As we have discussed the most economical rectangular channel & most economical trapezoidal channel conditions, we can discuss in the case of circular channel also.

IV) CONCLUSION

The concepts of the mathematical science which we study at the secondary level & Higher secondary level can be widely applied in different branches of sciences such as Optics, Electricity, Engineering, Biology, Economics. Moreover the learning of Mathematics is the part & parcel of the real life world. It is now hard to find a field of study doesn't use the concepts of mathematical tools.

V) REFERENCES

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2. 10+1, & 10+2 Textbooks by NCERT, New Delhi, India.
3. Fluid Mechanics by Dr. R.K.Bansal,laxmi Publications(p) Ltd., New Delhi.

1 DAY STATE LEVEL SEMINAR ON
"SCHOOL SCIENCE CURRICULUM - NEEDS AND CHALLENGES"
ON 28th FEBRUARY, 2019.

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II. THEME:- SCHOOL SCIENCE CURRICULUM - NEEDS AND CHALLENGES

III. SUB-THEME:- INNOVATIVE SCIENCE TEACHING FOR CREATIVE MINDS

IV. TITLE OF THE TOPIC:- **JOY OF LEARNING**

V. AIM:- SCIENCE TEACHING అనగా కేవలం "పుస్తకంలో ఉన్న పాఠం చెప్పడం కాదు. అత్యంత సులభ ప్రయోగాల ద్వారా అంత:సూత్రాన్ని అర్థం చేసుకునేలా చేయడం."

VI. INTRODUCTION:- ముఖ్యంగా సైన్సు ఏం చెపుతుంది అంటే "చెప్పింది నమ్మకండి - చేసి చూడండి" అని. కావున విద్యార్థుల యొక్క అభ్యసనా స్థాయిలను, విద్యా ప్రమాణాలను, ప్రగతిని మరియు ప్రతిభను పెంపొందించాలంటే కేవలం పుస్తకంలోని పాఠం మాత్రమే సరిపోదు. వాటికనుగుణంగా వినూత్నంగా "మన పరిసరాలనుండి అతి తక్కువ ఖర్చుతో మరియు ఖర్చులేకుండా అందుబాటులో ఉన్న పరికరాలతో అత్యంత సులభ బోధనాభ్యసనా సామాగ్రి తయారుచేసుకొని విద్యార్థులు కూడా చేయగలిగే చిన్నచిన్న ప్రయోగాల ద్వారా విద్యాబోధన చేస్తూ వారి ప్రతిభానైపుణ్యాలను పెంపొందింపచేయాలి. కావున విజ్ఞానశాస్త్ర బోధనాభ్యసనా ప్రక్రియ అనేది క్రింది లక్ష్యాలతో జరగాలి.

VII. OBJECTIVES:-

1. విద్యార్థులు ఆలోచనాపరులుగా మారేటట్లు చేయుట.
2. విజ్ఞానశాస్త్ర జ్ఞానాన్ని నిత్యజీవితంలో వినియోగించుట.
3. అభివృద్ధి చెందుతున్న శాస్త్ర - సాంకేతిక పరిశోధనా రంగాలపై ఆసక్తిని పెంచుట.
4. స్వయంగా నేర్చుకునేతత్వాన్ని, కృత్యాధార అభ్యాసనంను పెంపొందించుట.
5. మన పరిసరాలలో అందుబాటులో ఉన్న వస్తువులతో నమూనాలు, ప్రయోగాలు తయారు చేసే విధంగా ప్రోత్సహించుట.
6. సమాజంలో మూఢనమ్మకాలను పారద్రోలుట.
7. వ్యాసరచన, వక్తృత్వ, నాటికలు, క్విజ్, టాలెంట్‌టెస్ట్‌లు, చిత్రలేఖన పోటీలు, NGC,NCSC, INSPIRE, SCIENCE FAIR లలో ఉత్సాహంగా పాల్గొనేటట్లు చేయుట.

VIII. DESIGN OF THE INNOVATION:-

విద్యార్థులలో శాస్త్రీయ ఆలోచనను పెంచుటకు మరియు సైన్సు ఉపాధ్యాయురాలిగా నా బాధ్యతను మరింత అభివృద్ధి పరచుకొనుటకు గాను నేను పాఠ్యపుస్తకంలోని ప్రయోగాలకు అనుగుణంగా ఇంకా అత్యంత సులభ పద్ధతికై JOY OF LEARNING 5 రోజుల శిక్షణా కార్యక్రమంలో LOW COST-NO COST బోధనాభ్యాసనా సామాగ్రితో అత్యంత సులభ ప్రయోగాలు ముందుగా నేను నేర్చుకొని మా విద్యార్థుల కొరకు తయారుచేయడమైనది. ఉపాధ్యాయులకు బోధన అనేది ఎంత సులభతరంగా ఉంటేనే విద్యార్థుల యొక్క అభ్యసనా స్థాయిలను, విద్యాప్రమాణాలను, ప్రగతిని మరియు వారి ప్రతిభను కూడా పెంచగలుగుతాము.

IX. DESCRIPTION OF THE INNOVATION:-

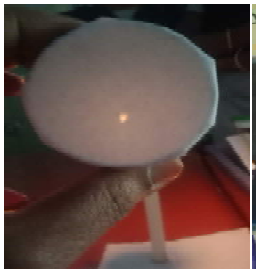
ప్రభుత్వ పాఠశాలలలో ముఖ్యంగా Slow Learners మరియు Irregular Students మాత్రమే ఉంటున్నారు. వారి అభ్యసనా స్థాయిలను పెంచుటకు, 10వ తరగతిలో 100% ఉత్తీర్ణత పొందుటకు, A1 Grades సాధించుటకు, పై స్థాయిలో ఉన్నత చదువులలో కూడా సైన్సు కోర్సులపై ఆసక్తి కనపరచుటకై Joy of Learning ద్వారా బోధనాభ్యాసన చేయడానికై మా పాఠశాలలో చేపట్టిన కార్యక్రమాలు:-

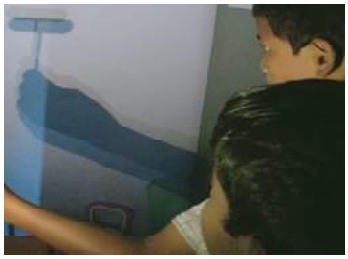
- పాఠశాలలో ప్రత్యేకంగా ఒక గదిని కేటాయించుకొని CV Raman “SCIENCE CLUB” ను ప్రత్యేకంగా ఏర్పాటు చేయడమైనది. కేవలం ప్రభుత్వం అదించిన పరికరాలే కాకుండా LOW COST-NO COST పరికరాలతో 8,9,10వ తరగతుల విద్యార్థులు తయారుచేసిన వాటినే ఎక్కువగా వినియోగించడం జరుగుతుంది.


మా విద్యార్థులతో చేయించిన అత్యంత సులభ ప్రయోగాలు:-

1. 

కాంతి ఋజుమార్గంలో ప్రయాణించుట & టిండాల్ ప్రభావము.

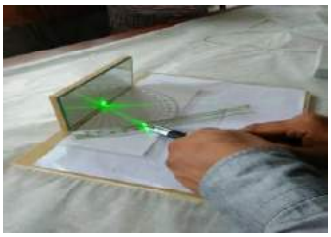
2. 

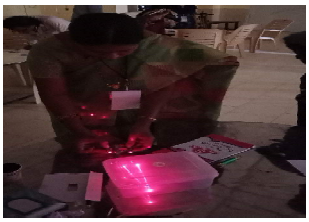
పిన్‌హోల్ కెమెరాలో తలక్రిందుల ప్రతిబింబం.[61] Shadows Intersection of Two Shadows.

3.   

సమతల దర్పణం, పుటాకార, కుంభాకార దర్పణాల నమూనాలు. (Acrylic Mirror Sheet తో)

4.   

కాంతి పరావర్తనం Reflection of Plane Surfaces Reflection of Irregular Surfaces.

5.   

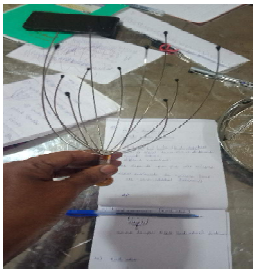
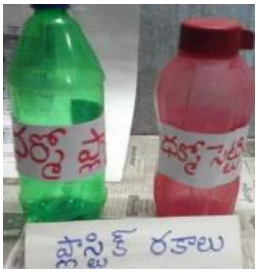
Refraction. Convergence Divergence

6.   

Optical Fibres కాంతి కిరణ చిత్రాలు - Laser Light తో స్లింకీ ద్వారా తరంగాలు - రకాలు చూపించుట

7.   

ఘన పదార్థాలలో ధ్వని వేగం ఎక్కువ అని చూపించుట. Clay తో తయారుచేసిన అణువుల ఆకృతులు.

8.    

Head Massager తో అనునాదం ప్లాస్టిక్ - రకాలు ఘన, ద్రవ, వాయు పదార్థాలు అణువుల అమరిక

9.

పరమాణు గడియారం నమూనా

సాంద్రత

మూలకాల వర్గీకరణ పట్టిక With Pictures

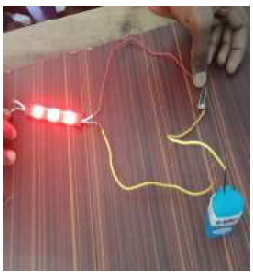
10.

వజ్రము నమూనా

గ్రాఫైట్ నమూనా

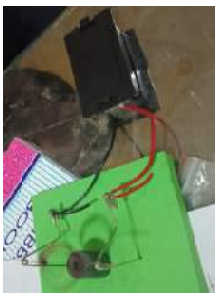
C_{60} నమూనా

11.



సాధారణ విద్యుత్ వలయం

శ్రేణి సంధానం-
సమాంతర సంధానం.



విద్యుత్ మోటారు

డైనమో

12.

ఆయర్‌స్టడ్ ప్రయోగం

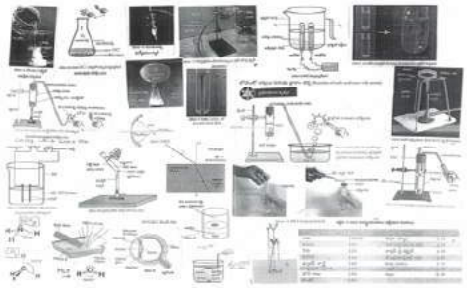
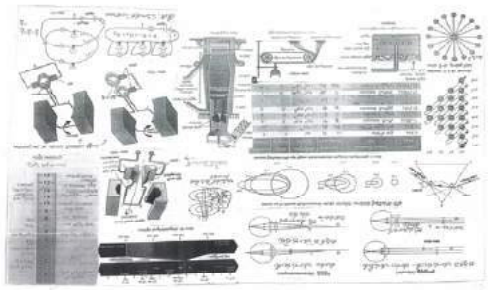
గురుత్వ కేంద్రం-ఒక్క మేకుపై 10 మేకులు.

✦ ఈ విధంగా అత్యంత సులభ ప్రయోగాలతో విద్యాబోధన చేయడమే కాకుండా విజ్ఞానశాస్త్రంపై అదనపు అవగాహనను, ఆసక్తిని పెంచుటకై చేపట్టిన మరికొన్ని అంశాలు:-

13. సైన్సు న్యూస్ స్క్రాప్ బుక్:- కేవలం పాఠ్యపుస్తకంలోని సమాచారమే కాకుండా అదనపు సైన్సు సమాచారం పై అవగాహన కల్పించుటకై వార్తాపత్రికలలో వచ్చిన పేపర్ కట్టింగ్స్‌తో తయారు చేసిన ఎందుకు? ఏమిటి?ఎలా? అనే ఒక స్క్రాప్ బుక్ తయారు చేసి పాఠశాల ప్రార్థన సమయంలో రోజుకొక విషయం చదివించి వివరింపచేయడం ద్వారా సైన్సు విషయాలపై అదనపు జ్ఞానాన్ని పెంపొందింపచేస్తున్నాము.

14. NGC, NCSC, INSPIRE, SCIENCE PROJECTS మరియు SCIENCE FAIRS లలో కూడా పాఠశాల స్థాయి జిల్లా స్థాయి, రాష్ట్ర స్థాయి లలో జరిగే పోటీలలో విద్యార్థులను ఎక్కువ సంఖ్యలో పాల్గొనేటట్లు చేయడమే కాకుండా ప్రథమ బహుమతులు సాధించే విధంగా సంసిద్ధులను చేయడం జరుగుతుంది.


15. ప్రత్యేకంగా 10వ తరగతి విద్యార్థుల 100% ఉత్తీర్ణతా సాధనకై పటనైపుణ్యం పెంపొందించుట కొరకు సులభంగా నేర్చుకొనుట కొరకు పాఠ్య పుస్తకంలోని ముఖ్యమైన పటంలన్ని ఒక దగ్గర చేర్చిన జిరాక్స్ పత్రాలు సొంత ఖర్చులతో ప్రతి విద్యార్థికి ప్రతీ సం॥ అందిస్తున్నాము

16. విజ్ఞాన శాస్త్రానికి సంబంధించిన ప్రముఖ దినాలు :- ఉదా:- అంతర్జాతీయ ఓజోన్ పరిరక్షణ దినోత్సవం, కాలుష్య వ్యతిరేక దినం, డెంగ్యూ నిర్మూలనా దినం, సి.వి.రామన్ జయంతి, డా॥ ఏ.పి.జే అబ్దుల్ కలాం గారి వర్ధంతి, జాతీయ వైజ్ఞానిక దినోత్సవం, ఇంధన పొదుపు వారోత్సవాలు మొదలైన వాటి ప్రాముఖ్యతల సమాచారాన్ని ఆయా దినాలలో పోస్టర్ను తయారు చేసి సమావేశంలో చెప్పించడం, వివరాలను నోటీసు బోర్డులో ప్రదర్శించడం జరుగుతుంది.

17. విద్యార్థులలో సైన్సు పై ఇంకా ఉత్సాహాన్ని కలుగచేయడానికి సెల్ఫ్ గవర్నమెంట్ డే (నవంబర్ 14) లో విద్యార్థులను పాల్గొనే విధంగా ప్రోత్సహించి ప్రయోగాల ద్వారా బోధించేటట్లుగా తర్ఫీదునివ్వడం జరిగింది.



18. SAVE WATER, SAVE ENERGY పై చిత్రలేఖన పోటీలు మరియు SRF వారి MATHS & SCIENCE OLYMPIADS మరియు JVV వారి చెకుముకి టాలెంట్‌టెస్ట్ కూడా నిర్వహించడం జరుగుతుంది.

X. అత్యంత సులభ బోధనాభ్యాసనా సామాగ్రి తయారీకి ఉపయోగించిన పరికరాలు:-

మన పరిసరాలలో అందుబాటులో ఉన్న గోధుమపిండి, Laser light, Plastic boxes, Bottles, Paper Cups, Pipes, క్రొవ్వత్తి, అగ్గిపెట్టె, White Paper, Acrylic Mirror, Aluminium Foil (Paper) సమతల పుటాకార, కుంభాకార దర్పణాలు, కటకాలు, Optical Fibres స్లింకీ, స్ట్రాలు, అట్ట గొట్టం, దారం,Head Massager, అయస్కాంతం, ఇనుప రజను, సిరంజీలు, చాక్‌పీసుపొడి, నీరు, Clay, Bowl, Surf, బ్యాటరీ, రాగితీగలు, దిక్సూచి, మేకులు.

XI. <u>Out-Comes:-</u>

1) Science Club (ప్రయోగశాల)ను ప్రత్యేకంగా ఏర్పాటు చేయడం ద్వారా విద్యార్థులు ముఖ్యంగా భౌతికశాస్త్రంపై భయాన్ని వీడి ఆసక్తితో ఉత్సాహంగా ప్రయోగాలు చేస్తూ అభ్యసిస్తున్నారు.

2) విద్యార్థులు స్వయంగా నమూనాలు తయారుచేస్తున్నారు.
3) కీలక పదాల విర్వచనాలు సులభంగా చెప్పగలుగుతున్నారు.
4) విద్యార్థుల అభ్యసనా స్థాయి పెరిగి మంచి ప్రతిభను కనపరుస్తున్నారు.
5) అన్నింటికన్నా ముఖ్యంగా సైన్సు సబ్జక్టులో 10వ తరగతి విద్యార్థులు 100% ఉత్తీర్ణత సాధిస్తున్నారు.
6) వ్యాసరచన, వక్తృత్వ, INSPIRE, NCSC, SCIENCE FAIRలలో పాల్గొని అనేక ప్రథమ బహుమతులు పొందారు.

7) సైన్సు ఉపాధ్యాయురాలిగా నేను కూడా 2017-18 సం॥లో సైన్స్‌ఫేర్‌లో TEACHERS TLM EXHIBIT నందు పాల్గొనడమే కాకుండా జిల్లా స్థాయి, రాష్ట్ర స్థాయి, సదరన్ ఇండియా స్థాయి వరకు కూడా అనేక మంది ఉన్నత అధికారుల, ఉపాధ్యాయుల ప్రశంసలు పొంది HINDUSTAN AERONATICS SPECIAL PRIZE ను SCERT DIRECTOR, శ్రీమతి శేషుకుమారి మేడంగారు మరియు హైదరాబాద్ DEO. శ్రీ సత్యనారాయణ రెడ్డి గార్ల చేతుల మీదుగా అందుకోవడం జరిగింది.

8) ఇటువంటి అత్యంత సులభతర బోధన ద్వారా విద్యార్థులను ఉత్తములుగా తీర్చిదిద్దుతూ వారిలో 100% ఉత్తీర్ణతను, మంచి ప్రతిభను, ఆసక్తిని కలిగిస్తున్నందుకు ఈ విద్యా సంవత్సరం మన తెలంగాణ రాష్ట్ర ప్రభుత్వముచే సెప్టెంబర్ 5 గురుపూజోత్సవం రోజున రాష్ట్ర ఉపముఖ్యమంత్రులు గౌరవనీయులు శ్రీ॥ మహమూద్ ఆలీగారు శ్రీ॥ కడియం శ్రీహరి గారి చేతుల మీదుగా **రాష్ట్ర ఉత్తమ ఉపాధ్యాయ అవార్డు** అందుకోవడం జరిగింది.

XII. IMPLICATIONS:-

1. భౌతికశాస్త్రం పట్ల భయాలు తొలగి ఉత్సాహంగా అభ్యసిస్తున్నారు.
2. పరిసరాలలో అందుబాటులో ఉండే వస్తువులతో అనేక నమూనాలు తయారుచేస్తున్నారు.
3. ప్రయోగాలు సులభంగా స్వయంగా చేయుటకు చొరవ చూపిస్తున్నారు.
4. నూతన ఆలోచనా విధానాలను పెంపొందించుకుంటున్నారు.
5. భౌతికశాస్త్ర పదజాలంను ఎక్కువగా ఉపయోగిస్తూ తామే ప్రశ్నించేతత్వాన్ని మరియు నిర్వచించేతత్వాన్ని పెంపొందించుకుంటున్నారు.
6. సైన్సు పోటీలలో పాల్గొనుటకు ఉత్సాహం కనపరుస్తున్నారు.

XIII. REFERENCES:-

1) Science Orientation & Training Classes
2) Science Video Conferences
3) Self Teaching Experiences.

STATE COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING
TELANGANA-HYDERABAD

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-: THEME :-

SCHOOL SCIENCE CURRICULUM-NEEDS AND CHALLENGES

-: SUB-THEME :-

INNOVATIVE SCIENCE TEACHING FOR CREATIVE MINDS

-: TITLE OF THE TOPIC :-

SCIENCE TEACHING OUT SIDE THE CLASS ROOM

(తరగత గది వెలుపల విజ్ఞానశాస్త్ర బోధన)

లక్ష్యాలు (Objectives) :-

- సైన్స్ నేర్చుకోవడం పట్ల కుతూహలం పెంచడం
- ప్రత్యక్ష అవగాహనలతో అభ్యసన ప్రక్రియలు పటిష్టత
- క్షేత్ర సందర్శన, స్వీయ కృత్యాల ద్వారా విషయ పరిజ్ఞానం విస్తృత పర్చుకోవడం
- పరిసరాలతో అనుబంధం అవసరాలను గుర్తించి కాపాడుకోవడం వృద్ధి చేయడం
- నూతన పోకడలు తెలుసుకోవడం ఆచరింపజేయడం
- సమస్యలు ప్రత్యక్షంగా పరిశీలించి పరిష్కార దిశలపై ఆలోచన సాగించడం
- నిజ జీవిత సన్నివేశాలలో వారు అవగాహన పొందిన శాస్త్రీయ భావనలను అనువర్తింప చేసేలా ప్రోత్సహించడం

Design of the Innovation

Introduction :

పిల్లలది ఓ సృజనాత్మక ప్రపంచం. ప్రతీది తెలుసుకోవాలని తరచి చూడాలని తీపించే మనస్సువారిది. ఇదే విజ్ఞాన శాస్త్రాన్ని అధ్యయనం చేయడానికి ఉపయోగపడే అత్యంత అవసరమైన పునాదిగా గుర్తించాలి. విజ్ఞాన శాస్త్ర పాఠ్య పుస్తకాలలోని అనేక కృత్యాలు అభ్యసన ప్రక్రియలు పిల్లలు తమ సృజనాత్మక ప్రపంచాన్ని విస్తృతం చేసుకునేలా ఉన్నాయి. విజ్ఞానశాస్త్ర తరగతి నిర్వహణ అంటే నేర్చుకోవడాన్ని నేర్పడమే అనే విధంగా ఉండాలి. ఆటపాటలతో సాగే ఆనందకర బాల్యాన్ని విజ్ఞాన లోకంలో విహరింప చేసేలా బోధన జరిగేలా చూడటంతో పాటు చురుకైన మేధస్సులకు మరింత పదును పెట్టేలా బోధనా పద్ధతులుండాలి. ఇందుకోసం అవసరమైన ప్రయోగాలు కృత్యాలు నిర్వహించడానికి కావలసిన పరికరాలు సందర్శించాల్సిన క్షేత్రాల గూర్చి ప్రణాళికలు ముందుగానే సిద్ధం చేసుకోవాలి. ఇవన్ని అభ్యసనలో భాగమే కాబట్టి పనిలో కూడ పిల్లలు భాగస్వాములయ్యేలా చూడాలి.

1	⇒	2	⇒	3	⇒	4
పాఠ్యాంశ వివరణ విషయావగాహన (తరగతి గది)		**ప్రయోగాలు-చర్చ** డిజిటల్ వీడియోలు ప్రణాళికలు (ప్రయోగశాల)		**సందర్శన పరిశీలన** ప్రత్యక్ష అవగాహన (తరగతి గది వెలుపల) క్షేత్ర స్థాయిలో		**కార్యాచరణ అమలు** (నిత్య జీవితంలో)

1. తరగతి గది (విషయావగాహన):-

నిర్దేశించిన పాఠ్యాంశములోని విషయాలను వివరించడం. విద్యార్థులచే చర్చించి విషయావగాహన కల్పించడం ద్వారా విషయ పరిజ్ఞానం మరింత విస్తృత పర్చడం. 6 నుండి 10వ తరగతి వరకు గల జీవశాస్త్ర పాఠ్యపుస్తకాలలోని ఆయా అంశాలకు సంబంధించి తరగతి గదుల్లో విషయ పరిజ్ఞానం బోధించడం.

2. ప్రయోగాలు, ప్రణాళికలు (ప్రయోగశాల):-

అభ్యసన ప్రక్రియల నిర్వహణకు సంబంధించి ప్రణాళికలు రూపొందించడం. జట్ల వారిగా కృత్యాల బాధ్యతలు అప్పగించడం ప్రయోగాలకు చెందిని స్పెసిమెన్స్, స్లైడ్స్, మాడ్యుల్స్ పరిశీలించడం. గ్రూపుల వారీగా సంబంధిత అంశాలను విభజించుకొని చర్చించడం. సమస్యల తొలగింపుకు చర్యలు. కారణాలు, అవసరాలు సంరక్షణ నివారణలను గుర్తించడం మరియు అభిప్రాయాలను షేర్ చేసుకోవడం. డిజిటల్ వీడియోల ద్వారా అవగాహన పొందడం. ఉదా॥ సందర్శన ప్రాంతాలను గుర్తిచడం. అందుబాటులో లేని విషయాలను వీడియోల ద్వారా చూడటం (ఎడారి, సముద్ర, ధృవ ప్రాంత వాతావరణ పరిస్థితులు-అంతరిస్తున్న జంతు, వృక్ష సంపద)

3. సందర్శన-పరిశీలన (ప్రత్యక్ష అవగాహన) (తరగతి గది వెలుపల క్షేత్రస్థాయిలో) -

పాఠ్యాంశాలలో కృత్యాలుగా ఇచ్చిన అంశాలకు సంబంధించి తరగతి గది వెలుపల అదనంగా అవగాహన కల్పించడం. కృత్యాలకు సంబంధించి క్షేత్ర స్థాయి సందర్శన. పరిశీలన, సమాచారం సేకరించడం, బేరీజు వేసుకోవడం, సమస్యలు గుర్తించడం, పరిష్కార మార్గాలు ఆలోచించడం.



ఉదా॥ పాడి పరిశ్రమ మొక్కలు, జంతువుల వ్యాధులు, ఆహారోత్పత్తి, మిశ్రమ పంటలసాగు, నీటి పారుదల (బిందు, తుంపర) సౌకర్యాలు, కలుపు మొక్కలు, రైతులు, అధికారులతో ఇంటర్వ్యూలు చేయడం.




4. కార్యాచరణ అమలు (నిత్య జీవితంలో):-

తరగతి గది వెలుప ఉపాధ్యాయుడి సహాయంతో క్షేత స్థాయిలో పరిశీలనలు. ప్రత్యక్ష అవగాహనల వల్ల గుర్తించిన సమస్యల పరిష్కారం కోసం కార్యాచరణ రూపొందించడం. తన వంతు బాధ్యతను తెలుసుకొని అమలు చేయడం అవసరమైతే బృందాలుగా అవగాహన కార్యక్రమాలు నిర్వహించడం. భవిష్యత్తు మేలు కోరే విధంగా కార్యాచరణ రూపొందించడం.

DESCRIPTION OF THE INNOVATION

పాఠ్య భాగాలలోని విషయాలు సులభంగా అర్థం చేసుకోవడానికి విద్యార్థులను గ్రూపులుగా విభజించి క్షేత్రస్థాయిలో పరిశీలన ప్రత్యక్ష అవగాహన పొందేలా మార్గదర్శకత్వం వహించడం.

OUT COMES

- మొక్కలు, జంతువుల ద్వారా లభిస్తున్న అహారోత్పత్తుల పరిశీలన. రైతులు పడుతున్న కష్టాలను ప్రత్యక్షంగా చూసిన నేపథ్యంలో ఆహారం వృధా చేయరాదని నిర్ణయాలు తీసుకోవడం.
- మిశ్రమ పంటల సాగు ద్వారా లాభాలు పొందవచ్చునని గుర్తించడం
- పర్యావరణ కాలుష్య నివారణకై పంటల సాగులో వ్యాధుల నివారణతో సహజ క్రిమి సంహారకాలు ఎరువులు వినియోగిస్తాడు.
- సహజ వనరులు కాపాడడం బాధ్యతగా గుర్తిస్తాడు.
- నేర్చుకున్న అంశాలు దైనందిన జీవితంలో ఎదురయ్యే సమస్యల పరిష్కారానికి సమర్థవంతంగా ఉపయోగపడతాయి.
- విద్యార్థులందరి భాగస్వామ్యం ఉంటుంది.
- నేర్చుకోవడంలో విద్యార్థులు కుతూహలం ప్రదర్శిస్తారు.
- ఒకరి ద్వారా మరొకరు ప్రేరణ పొందుతారు.

IMPLICATIONS

అవసరం మేర ప్రయోగాలు ప్రత్యక్ష పరిశీలనల ద్వారా విషయం త్వరగా అర్థం చేసుకోగల్గుతున్నాం. చర్చకు అవకాశం లభించడంతో పాటు అందుబాటులో లేని అంశాలు డిజిటల్ టివిలో చూడగల్గుతున్నాం.

కె. లక్ష్మి-8వ తరగతి

కేటాయించిన బాధ్యతలను ఆసక్తిగా నిర్వహిస్తూ పరస్పరం అభిప్రాయాలను షేర్ చేసుకునేలా వీలు కలుగుతుంది. విషయ పరిజ్ఞానం విస్తృత పర్చుకోగల్గుతున్నాం.

రమేష్-9వ తరగతి

తరగతి గదికే పరిమితం కాకుండా క్షేత్ర సందర్శనలు, పరిశీలనలు ప్రత్యక్ష అవగాహనలు ప్రయోగ కృత్యాలు ప్రకృతిపై ప్రేమను పెంచడంతో పాటు ఆసక్తిగా నేర్చుకుంటున్నాం.

మౌనిక-8వ తరగతి

తరగతి గది వెలుపల విజ్ఞానశాస్త్ర బోధన సహకారంతో రూపొందించిన అనేక నివేదికలు ప్రాజెక్ట్ పనులు దినపత్రికలలో కథనాలుగా రావడం గర్వకారణంగా ఉంది.

కృష్ణ-9వ తరగతి

-: ముగింపు :-

విజ్ఞాన శాస్త్ర బోధన తరగతికే పరిమితం చేయకుండా ప్రయోగాలు పరిశీలనలు, ప్రత్యక్ష అవగాహనలు, డిజిటల్ వీడియోల వీక్షణ వంటి వాటిని ఉపయోగించడం వల్ల మెరుగైన ఫలితాలు వస్తున్నాయి. 6 నుండి 10వ తరగతి వరకు గల జీవశాస్త్ర పాఠ్య పుస్తకాలలోని అన్ని కృత్యాలు విద్యార్థులచే నిర్వహింప గల్గుతున్నాయి. ఆవరణ వ్యవస్థలు నీరు, నేల, వాయు కాలుష్యాలు సహజ ఎరువుల వ్యవసాయ ఉత్పత్తులు మిశ్రమ పంటల సాగు జంతువులలో చలనాలు ప్రవర్తనలు వర్గీకరణ వంటి విషయాలు మరింత సులువుగా అర్థమయ్యేందుకు ఉపయోగపడుతున్నాయి.

OUR SCHOOL SCIENCE INNOVATIONS

-: *References* :-

1) 6 to 10 Bio Science text books

2) 9 &10 Environmental Education

3) Self Experiences

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Sub Theme	:	Development of Values- Through Science Teaching.

OBJECTIVES (లక్ష్యాలు)

– విద్యార్థులకు సైన్స్ ద్వారా నిజమైన జ్ఞానాన్ని, విలువలను అందించడం ద్వారా సమాజంలో, వ్యక్తిగతం గాను అత్యున్నత భాద్యతాయుత పౌరులుగా తీర్చిదిద్దడం.

– ప్రయోగ నిర్వహణలు, ప్రాజెక్టు, కృత్యనిర్వహణల ద్వారా, ఇతరులతో కలిసి మెలిసి ఉండడం, ఇతరులను గౌరవించడం, తోటి వారికి సహాయపడే లక్షణం, చేసే పనిపట్ల విశ్వాసాన్ని కలిగివుండి, పనిని ప్రేమించడం వంటి విలువలను పెంపొందించడం.

– మానవ జీవితాలలో వెలుగులు నింపుతున్న శాస్త్ర, సాంకేతికతలను గౌరవిస్తూ, అభినందించేలా వాటిని సరియైన విధానంలో ఉపయోగించుకొనేలా తీర్చిదిద్దడం.

– సైన్స్‌ఫేర్స్, సైన్స్ డ్రామా ఫెస్టివల్స్,రోల్‌ప్లే,క్షేత్ర పర్యటనల ద్వారా విద్యార్థిలో ఖచ్చితత్వం, నిజాయితి, మానవత్వం, ప్రకృతిని ప్రేమించగలగడం, జీవ, జంతువుల పట్ల దయ, సానుభూతి, అహింస, తోటి వారిపై, పెద్దలపై గౌరవాన్ని కలిగి వుండడం వంటి ఉన్నత విలువలను ఏర్పరచగలగడం.

– సైంటిఫిక్ టెంపర్‌ను పెంచుట ద్వారా వారిలో దాగి వున్న సృజనాత్మకత, పరిశీలనా శక్తి, స్వయం నిర్ణయాలు, తీసుకోగలగడం, ఆలోచనా శక్తిని పెంపొందించుకోగలుగుతూ జీవితం పై సరైన అవగాహనను కలిగి ఉంటూ భవిష్యత్తులో ఉత్తమ పౌరుడుగా,దేశాన్ని ప్రేమించేలా చేయగలగడం.

Design of the Innovation (ఆవిష్కరణ యొక్క ఉద్దేశ్యం)

విజ్ఞాన శాస్త్ర భోదన అనగానే పరిసరాలపై నిశిత పరిశీలన, అన్వేషణ, వస్తుసేకరణ, ఊహించే జ్ఞానం,ఆశించిన ఫలితం వచ్చే వరకు ఓపికగా మరల, మరల ప్రయోగాన్ని చేస్తూ ఎదురుచూడడం వంటి లక్షణాలు పెంపొందించడం అని మనకు తెలుసు వీటితో పాటు జ్ఞానవిలువలు, విషయ విలువలు, చారిత్రకమ విలవలు పర్యావరణ విలువల, ప్రక్రియా విలువలు, నైతిక విలువలు, సామాజిక విలువలు విద్యార్థిలో ఏర్పరుచుటకు, పెంపొందించుటకు, నిరంతర జ్ఞాన సముపార్జన చేసేటప్పుడు సంబందిత అంశాలపై విద్యార్థుల దృష్టి కేంద్రీకరించుటకు నేను కొన్ని ప్రక్రియలను పాటించాను వాటిలో కొన్ని

– ప్రయోగ, కృత్య నిర్వహణ ద్వారా విజ్ఞాన శాస్త్రబోధన ద్వారా అందులో దాగి వున్న విలువలను వివరించడం.
– బోధనాభ్యసన ప్రక్రియలో విద్యార్థుల భాగస్వామ్యం ఎక్కువగా ఉంచడం.
– డిజిటల్ క్లాసులు క్రమం తప్పకుండా నిర్వహించడం, చూసిన వెంటనే దానిపై చర్చించడం.
– రోల్ ప్లే, డ్రామా ఫెస్టివల్ వంటి సైన్స్ నాటకాలు, బాలసభ వంటి కార్యక్రమాల్లో పిల్లలను పాల్గొనేలా ప్రోత్సహించి వీటి ద్వారా విలువలను పెంపొందించడం.
– చెకుముఖి వంటి టాలెంట్ టెస్టులో పిల్లలు పాల్గొనేలా చేయడం,దినపత్రికలు చదివేలా ప్రోత్సహించడం ద్వారా అన్ని విషయాలపై అవగాహన కలిగి వుండేలా చేయగలగడం.

DESCRIPTION OF THE INNOVATION (ఆవిష్కరణ యొక్క వివరణ)

ప్రయోగాలు, కృత్యాలు నిర్వహిస్తూ విజ్ఞాన శాస్త్రాన్ని బోధించుట ద్వారా వారిలో తోటి వారితో కలిసి మెలిసి ఉండేలా, కావలసిన వస్తువులను సేకరించుటలో వాటిస్థానంలో (ఆవి లభ్యం కాని పక్షంలో) వేరే వస్తువులను ఉపయోగించే జ్ఞానాన్ని పెంపొందించవచ్చు. తద్వారా వారిలో అన్ని అవసరమైనవే సృష్టిలో ఏది నిరూపయోగం కాదు అనే భావనను ఏర్పరచవచ్చు. ఉదాహరణకు 8వ తరగతిలో ద్రవాల విద్యుద్వాహకత అనే పాఠంలో ఎలక్ట్రో ప్లేటింగ్ అనే ప్రయోగంలో రాగి ఫలకను ఉపయోగించవలసి వచ్చినపుడు విద్యార్థులు వారే స్వయంగా, తాయత్తులో ఉపయోగించే రాగిని, మరికొందరు ఇంటిలోని పాత రాగివస్తువులని తీసుకొని దానిని స్తరణీయత ద్వారా వెడల్పాటి ఫలకగా మార్చుకొని ఉపయోగించడం జరిగింది. అదే విధంగా జింక్ కొరకు పాత ఆయింట్‌మెంట్ ట్యూబ్‌లను ఉపయోగించారు. దీని ద్వారా వారికి ప్రతి వస్తువు. విలువైనదే, నిరుపయోగ మైనదంటూ ఏది ఉండదు. కాబట్టి అన్ని వస్తువులను సేకరించాలి దేనిని వ్యర్థం చేయకూడదు. అని తెలపడం జరిగింది. ఫలితం వచ్చే వరకు ఎదురుచూడడం, ఊహించగలగడం, కాలాన్ని సద్వినియోగం చేసకోవడం వంటి జీవన నైపుణ్యాలను తెలియజేయడం జరిగింది. 9వ తరగతి విద్యార్థులకు సజాతీయ, విజాతీయ మిశ్రమాల కృత్య నిర్వహణలో బురద నీటితో కలిసిపోవడం, ఇసుక,నీరు కలవక పోవడం

వంటివి పరిశీలించేటప్పుడు విద్యార్థులు స్థిరమైన ముఖ్యమైన నిర్ణయాలు తీసుకొనేటప్పుడు ప్రశాంత వాతావరణం వుండాలని తెలుసుకోగలిగారు.

తరగతి గది కృత్య నిర్వహణ ద్వారా విద్యార్థి అలవాట్లను,అభిరుచిలను గుర్తించగలమ. వారికి కావలసిన అభ్యసన అవసరాలను గుర్తించి, పాజిటివ్ దృక్పథాన్ని పెంపొందించవచ్చు. బోధనాభ్యసన ప్రక్రియలో విద్యార్థి భాగస్వామ్యాన్ని ఎక్కువగా ఉండేలా చేయడం ద్వారా విద్యార్థికి ఆసక్తిని పెంపొందించవచ్చు. అంటే మద్యమధ్యలో పాఠాన్ని చదివించడం ద్వారా భాషపై, పదాలపై మంచి పట్టు వస్తుంది. ప్రతి పదాన్ని అర్థం తెలుసుకోవాలనే జిజ్ఞాస పెంపొందిచవచ్చు. శాస్త్రవేత్తల చరిత్రలను కథల రూపంలో చెప్పడం ద్వారా ఆసక్తిని రేకెత్తించి, వారిని అభినందించడం, వారిపై గౌరవ భావాన్ని పెంపొందించవచ్చు. తద్వారా జీవితంలో ఎలాంటి మంచి విషయానైనా అభినందించగలగడం, పెద్దవారి పట్ల గౌరవభావాన్ని కలిగి వుండే విలువలను నేర్పవచ్చు.

8వ తరగతిలోని నీడ పొడవులను, దిశలను గుర్తించే కృత్యనిర్వహణ ద్వారా విద్యార్థులలో ఆసక్తిని

రేకత్తించుట, పరిసరాలపై పరిశీలనను పెంచుట, ప్రకృతిలోని అందాలను, అద్భుతాలను గుర్తించి ప్రకృతిని ఇష్టపడే తత్వాన్ని పెంచగలిగాను. 10వ తరగతిలోని దృష్టి లోపాలకు సంబంధించిన ప్రాజెక్టు ద్వారా సమాజంలో క్రొత్త వ్యక్తులను కలవడం, పెద్ద వారిపై గౌరవభావాన్ని కలిగి వుండేలా చేయవచ్చు మృత్తికా స్వభావాన్ని గుర్తించే ఆమ్ల క్షార ప్రయోగ నిర్వహణ ద్వారా మట్టి స్వభావాన్ని గుర్తించడం,దానిలో ఏరకమైన పంటలు పండించగలము, తద్వారా పనిని ప్రేమించగలిగే లక్షణాలను పెంపొందించవచ్చు.

క్షేత్రపర్యటనలో భాగంగా ప్లానిటోరియం వంటి ప్రదేశాలకు తీసుకపోవడం ద్వారా అంతరిక్ష విశేషాలను తెలుసుకొనుటలో చాలా ఆసక్తిని, పెంపొందించుకోగలిగారు. జంతుప్రదర్శనశాలకు తీసుకువెళ్ళడం ద్వారా జీవ, జంతువుల పట్ల దయ,ప్రేమ విలువలను పెంపొందించ వచ్చు. మ్యూజియం లాంటి ప్రదేశాలకు తీసుక వెళ్ళినపుడు పురాతన వస్తువులను, చరిత్రలను తెలుసుకోవడం, వారు ఉపయోగించిన వస్తువులను మొదలగు వాటిని గుర్తించి వారిపట్ల గౌరవాన్ని ఏర్పరచుకొని అభినందించగలరు.

డిజిటల్ క్లాస్‌లను చూపడం ద్వారా తర్వాత దానిపై చర్చ, అక్కడ ఇచ్చిన ఇంటి పని, ప్రాజెక్టు నిర్వహణ చేయించడం ద్వారా క్రమం తప్పకుండా సమయపాలన పాటించేలా నేర్పవచ్చు. అప్పగించిన పనిని వెంటనే పూర్తిచేసేలా తద్వారా వారికి సెల్ఫ్ కాన్ఫిడెన్స్‌ను డెవలప్ చేయించవచ్చు.

ఇంకా అతిముఖ్యమైన అంశం పిల్లలకు ఆసక్తిని రేకెత్తించి, దృష్టి పక్కకు మరలకుండా ఉండేటట్లు చేయడానికి NCERT వారిచే నిర్వహించబడే రోల్‌ప్లే, డ్రామా ఫెస్టివల్‌లో పాల్గొనేలా ప్రోత్సహించాను. ఈ

సంవత్సరము మా పాఠశాల విద్యార్థులు డ్రామా ఫెస్టివల్‌లో మరుగుదొడ్ల – ప్రాముఖ్యత అనే అంశంపై నాటకం ప్రదర్శించి జిల్లాస్థాయిలో బహుమతిని పొందడం జరిగింది. అదే విధంగా రోల్ ప్లే విభాగంలో **"కౌమార దశ– సవాళ్ళు"** అనే అంశంపై జాతీయ స్థాయికి సెలెక్టు అయి NCERT- NEW DELHI లో ప్రదర్శన ఇవ్వడం జరిగింది. ఇటువంటి వాటిలో పిల్లలు ఎంతో ఆసక్తిని కనబరుస్తారు. కాబట్టి వారికి ఏదైనా నేర్పదలచుకొంటే ఈ మార్గం సరియైనదిగా నేను భావిస్తున్నాను. ఇలాంటి ప్రదర్శనలలో పాల్గొనేటప్పుడు తోటి విద్యార్థులతో స్నేహపూర్వకంగా మెలగడం క్రొత్త ప్రాంతాలకు వెళ్ళినపుడు అక్కడి సంస్కృతి, సాంప్రదాయాలను తెలుసుకోవడం, క్రొత్త వారితో కలిసిపోయి వారి వేషధారణ; భాషలను వారి అలవాట్లను గుర్తించడం, పెద్ద వేదికలపై ప్రదర్శనలు ఇవ్వడం ద్వారా వారిలో భయాన్ని పోగొట్టడం, వారిపై వారికి నమ్మకం కలిగేలా చేయవచ్చు. ఇది వారికి జీవితంలో ఉన్నత స్థాయికి వెళ్ళేలా, ఎక్కడైనా నియమ, నిబంధనలు అతిక్రమించకుండా సరైన పద్ధతిని అవలంబించే లక్షణాలను పెంపొందిస్తుంది. సమాజం పట్ల గౌరవం, క్రొత్త ప్రదేశాల గురించి తెలుసుకోనేలా చేయవచ్చు.

దినపత్రికలు చదివించడం వాటిలో సైన్స్‌కు సంబంధించిన అంశాలను చదివేటట్లు ప్రోత్సహించడం ద్వారా సమాజానికి సైన్స్ ఎంతగా ఉపయోగపడుతుంది,ఎంత సాంకేతిక అభివృద్ధిని సాంధించింది, మానవాళికి ఎంతలా సహాయం చేస్తుంది

వంటి అంశాలు తెలుస్తాయి. తద్వారా సైన్స్‌ను గౌరవిస్తూ సమాజానికి ఏదో చేయాలన్న తృష్ణ వారిలో పెంపొందించవచ్చు. అంతరిక్ష పరిశోధనల గురించి తెలియజేయడం ద్వారా ఎంతో ఉన్నత జ్ఞానాన్ని అందుకొని, వాతావరణ పరిస్థితులను గుర్తించి ప్రకృతిని ప్రేమిస్తూ,సహజ వనరులను వ్యర్థం కాకుండా కాపాడేలా తరిగిపోని శక్తి వనరులను పూర్తిగా ఉపయోగించుకొనేలా మార్చవచ్చు.

సైన్స్ ట్యాలెంట్ టెస్టులు చెకుముకి,జాతీయ శోధన పరీక్షలలో విద్యార్థులను పాల్గొనేలా చేయడం. ద్వారా వారిలో ఆత్మవిశ్వాసం కలిగి భవిష్యత్తులో ఉన్నత స్థాయికి వేళ్ళేందుకు సహకరిస్తుంది.

OUT COMES & IMPLICATIONS ఆవిష్కరణ యొక్క ఫలితములు

ప్రయోగ, కృత్య నిర్వహణల ద్వారా వారిలో ఆశించిన విలువలు ఇతరులతో కలిసి మెలసి ఉండడం, నిశిత పరిశీలన, ఊహాత్మకత, ఓపికతో వేచి వుండడం, సృజనాత్మకత, ఖచితత్వం వంటివి. ఆశించిన ఫలితం పొందినప్పుడు ఆత్మవిశ్వాసం ఏర్పడి, చేసే పనిపట్ల నమ్మకం, గౌరవం వంటి విలువలు పెంపొందాయి. బోధనాభ్యసనలో భాగస్వాములను చేయడం ద్వారా ఆసక్తి,క్రొత్త విషయాలను నేర్చుకోవాలి, తెలుసుకోవాలనే తపన, శాస్త్రవేత్తలను వారి ప్రయోగాలను అభినందించే తత్వం, పెద్దలను,గురువులను గౌరవించే లక్షణం. భాషా జ్ఞానాన్ని పెంపొందించుకొనే విలువలను ఏర్పరుచుకొన్నారు.

డిజిటల్ క్లాసుల ద్వారా సమయపాలన, క్రొత్త విషయాలను అంశాలను తెలుసుకొనుటువలన జీవితంలో ఏ పనినైనా సరైన సమయంలో పూర్తి చేయాలనే విషయాన్ని తెలుసుకోగలిగారు. రోల్ ప్లే, నాటకాల ద్వారా అందరితో కలిసిమెలసి ఉండటం,క్రొత్త విషయాలు,అంశాల పట్ల ఆసక్తిని కలిగి వుండడం, ఎవరితోనైనా కలిసి పోయి, మర్యాదగా ప్రవర్తించగలగడం, సమాజం పట్ల ఇష్ట పూర్వకంగా, సంఘంలో భాగంగా వుండగలగడం సరైన నైతిక విలువలు తోటి జీవజాతులపై ప్రేమతో ఉండడం వంటివి నేర్చుకోగలిగారు. ట్యాలెంట్ టెస్టులలో పాల్గొనడం, దినపత్రికలు చదవడం వల్ల సమాజంపై గౌరవాన్ని, ఆత్మవిశ్వాసాన్ని ఏర్పరచుకొని, ప్రకృతిని ప్రేమించగలిగి, సమాజానికి ఉపయోగపడే వ్యక్తిత్వాన్ని పెంపొందించుకొని భావి భారత ఉన్నత పౌరులుగా మారుతారు అనడంలో అతిశయోక్తిలేదు.

సంప్రదించిన గ్రంథాలు/వనరులు

SECRT Science Text books (6 to 10th)

Self Experience

రామకృష్ణ ప్రభ మాసపత్రిక

ONE DAY STATE LEVEL SCIENCE SEMINARON28-02-2019

S.C.E.R.T., TELANGANA.

Theme: School Science Curriculum-Needs and Challenges.

Sub Theme: *Development of values through science teaching*

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Title of the Topic :*Development of values through scienceteaching*

Objectives :

*విద్యార్థులలో నైతిక విలువలను పెంపొందించటం .

*ప్రతి జీవికి ఉన్న జీవించే హక్కును గుర్తించడం ద్వారా సమస్త జీవరాశి పట్ల సానుభూతితో ప్రవర్తించేటట్లు చూడటం.

*విద్యార్థులకు నేడు మనం అనుభవిస్తున్న వైజ్ఞానిక ఆవిష్కరణల వెనుక ఉన్న శాస్త్రవేత్తల శ్రమ, పట్టుదల, కృషి, అంకిత భావం తెలియజేయడం ద్వారా వారికి కృతజ్ఞులుగా ఉండేటట్లు చేయడం.

*ప్రకృతి పట్ల, జంతువుల పట్ల దయ, సున్నితత్వం గల వ్యక్తులుగా తీర్చిదిద్దటం .

*సమాజం లోని వివిధ వృత్తుల వారి కష్టాన్ని, శ్రమ విలువను గుర్తించి , గౌరవించే పౌరులుగా మలచటం .

*వాస్తవాలను అంగీకరిస్తూ, మంచిని అభినందించి, గెలుపు-ఓటములను సమానంగా స్వీకరించే మనస్తత్వాన్ని పెంపొందించటం .

*మానవ చర్యల వల్ల పర్యావరణానికి కలిగే హానిని గుర్తించి , బాధ్యతతో వ్యవహరించేలా చూడటం .

Description :

నేను సైన్స్ మరియు జీవశాస్త్ర బోధనలో ఈ క్రింద పేర్కొన్న అంశాలకు ప్రాధాన్యత ఇవ్వడం ద్వారా విద్యార్థులలో విలువలు పెంపొందించే ప్రయత్నం చేస్తున్నాను. ఈ సందర్భంగా 7వ తరగతి సామాన్యశాస్త్ర పాఠ్యపుస్తకంలో

S.C.E.R.T. డైరెక్టర్శ్రీమతి బి. శేషుకుమారి గారు చెప్పిన "ముందుమాట" లోని క్రింది వాక్యాలు నాకు ఎప్పుడూ స్ఫూర్తిదాయకంగా ఉంటాయి.

"తరగతి గదులలో రూపుదిద్దుకుంటున్న రేపటి తరానికి సైన్స్ నేర్పడమంటే సూత్రాలు, సిద్ధాంతాలు, ప్రయోగాలను పరిచయం చేయడం మాత్రమే కాదు.ప్రకృతిని చూసి స్పందించే మనసున్న మనుషులుగా తీర్చిదిద్దాలి.జీవ వైవిధ్యాన్ని కాపాడడం తమ కర్తవ్యంగా భావించే వ్యక్తులుగా రుపుదిద్దాలి. సైన్స్ నేర్చుకోవడమంటే సమాజ హితాన్ని కోరుకోవడమని,మానవ సంక్షేమాన్ని కాంక్షించడమనీ తెలుసుకొనేలా చేయాలి."

1. పాఠ్యపుస్తకాలకు సంబంధించి

* *అభ్యసనాన్ని మెరుగుపరచుకుందాం లోని అంశాలు*
* *ఆలోచించండి-చర్చించండి లోని అంశాలు*
* *సూక్తులు*

2. వివిధ సందర్భాలలో చర్చించే ఇతర అంశాలు

ముందుగా పాఠ్యపుస్తకాలను గురించి చూసినట్లయితే –

నూతన పాఠ్యపుస్తకాలు విద్యార్థుల్లో విలువలను పెంపొందించే విధంగా ఉండటం, విలువలు పాటించడాన్ని ఒక విద్యాప్రమాణంగా తీసుకోవడం

ఎంతయినా అభినందనీయం. ఆయా విషయాలకు తగినంత ప్రాధాన్యతను ఇవ్వడం ద్వారా విద్యార్థులలో విలువలను పెంపొందించవచ్చు.

పాఠ్యాంశాలలోను మరియు "అభ్యసనాన్ని మెరుగుపరచుకుందాం"లోను ఇవ్వబడ్డ " అభినందించండి, ప్రశంసించండి,నీవైతే ఏంచేస్తావు?" వంటి అంశాలను మొక్కుబడి విషయాలుగా కాకుండా విద్యార్థుల మనసుకు హత్తుకునేలా వివరించడం ద్వారా వారిలో సున్నితత్వాన్ని, విలువలను పెంపొందించవచ్చు. ఉదాహరణకు...

- విద్యార్థులకు ప్రయోగాలు,కృత్యాలలోభాగంగా ఇవ్వబడ్డసూచనలలో – అనవసరంగా మొక్కలను పీకవద్దు,పరిశీలనకోసం సేకరించిన జంతువులను వాటిని సేకరించిన ప్రదేశంలోనే వదిలివేయండి- వంటి సూచనలను పాటింపజేయడం ద్వారా జీవులపట్ల సరైన వైఖరి ఏర్పడి, జీవవైవిధ్యం కాపాడుతారు.
- 7వ తరగతి సైన్స్ పుస్తకం లోని " నీరు ఉన్నదే కొంచం- వృధా చేయకండి" పాఠం ద్వారా నీటి విలువను తెలియజెప్పడం ద్వారా దాన్ని దుర్వినియోగం చేయకుండా,ముందు తరాలకు అందించాలన్న ఆలోచన పెంపొందించవచ్చు.
- *8వ తరగతి జీవశాస్త్ర పుస్తకం లోని విలువల పెంపుదలకు దోహదపడే అంశాలు*.

- పోలియో వ్యాధికి టీకామందు కనుగొన్న జోనాస్ సాక్ , దానిపై పేటెంట్ తీసుకోకుండాటీకాను అందరికీ ఉచితంగా అందించాలనుకున్న అతని ఉన్నతమైన ఆలోచనను ప్రశంసించడం ద్వారా విద్యార్థుల్లో శాస్త్రవేత్తలపట్ల కృతజ్ఞతా భావాన్ని పెంపొందించవచ్చు.
- ఎడ్వర్డ్ జెన్నర్, లూయీ పాశ్చర్, రోనాల్డ్ రాస్, అలెగ్జాండర్ ఫ్లెమింగ్,ఎల్లాప్రగడ సుబ్బారావు వంటి ఎందరో శాస్త్రవేత్తల కృషి వల్లనే నేడు మనం ఎన్నో వ్యాధుల బారి నుండి రక్షించబడ్డాము.వారి శ్రమను, పట్టుదలను, అంకిత భావాన్ని విద్యార్థులచే గుర్తింప జేయాలి.
- జీవ వైవిధ్యం గురించి, మొక్కలను, జంతువులను కాపాడుకోవాల్సిన ఆవశ్యకతను తెలియజెప్పడం ద్వారా జీవులపట్ల సానుకూల వైఖరి ఏర్పడి, ప్రకృతిని కాపాడతారు.
- 8వ తరగతి జీవశాస్త్రం వెనుక అట్టపై ఇచ్చిన "ప్రకృతి ప్రార్థన" ను వారంలో ఒక రోజు ప్రార్థనా సమావేశంలో చెప్పటం వల్ల విద్యార్థుల ఆలోచనా విధానంలో మార్పును గమనిస్తాం.
- "మొదటి పంట మంచి మిత్రులకే" అనే విషయం చర్చించేటపుడు ప్రస్తుతం పిచ్చుకలకు రేడియేషన్ ప్రభావం వల్ల కలిగే హాని, వాటి సంఖ్య గణనీయంగా తగ్గిపోవటం వివరించడం వల్ల పిచ్చుకలపట్ల, పక్షులపట్ల ప్రేమానురాగాలు పెంపొందుతాయి.
- "రసాయనిక పరిశ్రమలో నీవు జనరల్ మేనేజర్ గా ఉంటే గాలి, నీరు కలుషితం కాకుండా ఏ చర్యలు తీసుకుంటావు?" వంటి

ప్రశ్నలుచర్చించడం ద్వారా విద్యార్థుల్లో సామాజిక బాధ్యత, అవగాహన పెంపొందుతాయి.

- *9వ తరగతి జీవశాస్త్రపాఠ్యపుస్తకంలోని అంశాలు.*

- రక్త వర్గాలు కనుగొనే సమయంలోనే రక్తదాన ఆవశ్యకతను తెలియజేయడంద్వారా అవసర సమయంలో చేసే రక్తదానం మరొకరి ప్రాణాలను కాపాడుతుందని గ్రహించి, భవిష్యత్తులో రక్త దానం చేయడానికి సానుకూలంగా ఆలోచిస్తారు.
- *10వ తరగతిలో* అవయవ దానం చేసిన వ్యక్తుల సమాచారం సేకరించదాన్నిప్రాజెక్ట్ పనిగా ఇవ్వడం ద్వారా అవయవాల కోసం ఎదురుచూస్తున్న వారిపట్ల జాలి, దయ కలిగి, మానవత్వపు విలువలు పెంపొందుతాయి.

- సూక్తులు :

- 6,7తరగతుల సామాన్యశాస్త్ర పాఠ్యపుస్తకాలలో ఇవ్వబడిన సలీంఆలీ, ఎం.ఎస్.స్వామినాధన్,రవీంద్రనాథ్ ఠాగూర్, అమర్త్యసేన్ వంటి మహనీయుల సూక్తులు వివరించడం ద్వారా విద్యార్థుల్లో మానవీయ కోణం ఆవిష్కరించబడుతుంది.

- *2.వివిధ సందర్భాలలో చర్చించే ఇతర అంశాలు*

- పాఠ్యపుస్తకాలలోని అంశాలతో పాటు సమకాలీన సామాజిక అంశాలను కూడా చర్చించడం అవసరం. మనం కేవలం విజ్ఞాన శాస్త్ర ఫలాలను

అనుభవించడమే కాదు, వాటి ఆవిష్కరణల వెనుక ఉన్న చరిత్రలను కూడా విద్యార్థులకు తెలియజెప్పాలి. దీనివల్ల శ్రమ విలువను గుర్తించే వ్యక్తులుగా రూపొందుతారు.

- సైన్స్ డే సందర్భంగా శాస్త్రవేత్తల జీవిత చరిత్రలపై డిబేట్

నిర్వహించి, విజేతలకు అవే పుస్తకాలను బహుమతులుగా ఇవ్వడం జరిగింది.

- <u>OUTCOMES</u> :
- పైన పేర్కొన్న అంశాలను నేను అనుసరించడం వల్ల విద్యార్థుల వైఖరిలో మార్పును గమనించాను.
- జీవుల పట్ల దయ, జాలి పెంపొందాయి. జీవ వైవిధ్యాన్ని కాపాడుతున్నారు. తరగతి గది మూలన ఉన్న గొంగళిపురుగు గూడును తీసివేయడానికి 7వ తరగతి పిల్లలు అంగీకరించలేదు. అది తుమ్మెదగా మారి, బయటకు రావడం చూసి చాలా ఆనందించారు. ఆ తర్వాత మాత్రమే వాటి గూళ్ళు తొలగించారు.

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- పాదం పరిశీలన కోసం తాము సేకరించిన నత్తను, చలనాన్ని పరిశీలించడం కోసం తెచ్చిన చేపలను వాటివాటి స్థానాలలో వదలి వచ్చారు.


- శాస్త్రవేత్తల జీవిత చరిత్రలు చదవడానికి ఆసక్తి చూపుతున్నారు. తెలుగులో పుస్తక సమీక్ష రాయడానికి వాటినే ఎంచుకుంటున్నారు.
- పర్యావరణం పట్ల బాధ్యతతో వ్యవహరిస్తున్నారు. మట్టి గణపతినే పూజిస్తున్నారు. హోళీకి, సంక్రాంతికి రంగులు వాడటానికి విముఖత చూపుతున్నారు.

- సున్నితత్వం పెరిగింది. తోటివారి పట్ల సంయమనంతో వ్యవహరిస్తున్నారు.
- గెలుపు, ఓటములను సమానంగా స్వీకరించగలుగుతున్నారు.
- చుట్టుప్రక్కల జరిగే విషయాలను విజ్ఞానశాస్త్ర కోణంలో ఆలోచించి, మూఢనమ్మకాలను తొలగించే ప్రయత్నం చేస్తున్నారు.

ఇప్పుడున్న సైన్స్ పాఠ్య పుస్తకాలను సమర్ధవంతంగా వినియోగించుకోగలిగితే విద్యార్థుల్లో చక్కని నైతిక విలువలను పెంపొందించవచ్చు.

SCHOOL SCIENCE CURRICULUM – NEEDS AND CHALLENGES

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Sub Theme : Development of values through science teaching

అంశం

పాఠశాల సైన్స్ పాఠ్యప్రణాళిక – అవసరాలు మరియు సవాళ్ళు

సైన్స్ బోధన ద్వారా విలువల అభివృద్ధి

పాఠశాల విద్యలో 6,7 తరగతులలో సామాన్యశాస్త్రం, 8,9,10 తరగతులలో జీవశాస్త్రం, భౌతిక రసాయనశాస్త్రంగా సైన్స్ బోధన నిర్వహణ జరుగుతున్నది. సైన్స్ బోధన ద్వారా విద్యార్థులలో ప్రధానంగా సాధించాల్సిన లక్ష్యాలు శాస్త్రీయ వైఖరి, శాస్త్రీయ దృక్పథం పెంపొందించుట, దృగ్విషయాల కార్యాచరణ సంబంధాలను గుర్తించుట, ప్రకృతి గురించి అవగాహన పొందడం, ప్రక్రియా నైపుణ్యాలను పెంపొందించడం, వీటితో పాటు విలువలు, శాస్త్రీయ విలువలు పెంపొందించడం

సైన్స్ బోధనలో ప్రధానంగా పెంపొందించాల్సిన విలువలు : నిష్పాక్షికత, నిజాయితీ, నిష్కపటం, జవాబుదారీతనం, న్యాయంగా ఉండడం, నాయకత్వం, ఉత్సుకత, ఆసక్తి, ఉపయోగిత, సహకారం, ధైర్యం, విధేయత, ప్రశంస, అభినందన, సౌందర్యాత్మక స్పృహ మొదలగునవి.

సైన్స్‌లో అభివృద్ధిపరచవలసిన విలువలన్నింటిని మొత్తంగా 6 రకాలుగా వర్గీకరించవచ్చును. అవి

1. ప్రాయోజిత విలువలు
2. సాంస్కృతిక విలువలు
3. క్రమశిక్షణ విలువలు
4. సౌందర్యాత్మక విలువలు
5. నైతిక విలువలు
6. మానసిక విలువలు

సైన్స్ బోధన ద్వారా విద్యార్థులకు వ్యక్తిగతంగా, దైనందిన జీవితంలో, సమాజంలో విలువలు పెంపొందించాల్సిన అవసరం ఉంది. పాఠ్యాంశాలు పరీక్షలు, మార్కులు, గ్రేడుల కొరకు కాకుండా అంశాలను అవగాహన చేసుకొని ఆచరించడానికే అని విద్యార్థులచే గుర్తింపజేయాలి.

ఈ విలువలు సమాజంలో ప్రతిఫలించినప్పుడు మాత్రమే ఆ సమాజం విద్యావంతమైన, ప్రజాస్వామిక, శాస్త్రీయ భావాలు కలిగిన సమాజంగా రూపుదిద్దుకుంటుంది. కాబట్టి అలాంటి ప్రవర్తన కలిగిన విద్యార్థులను సైన్స్ బోధన ద్వారా విలువలు అభివృద్ధిపరచడం ద్వారా సాధించగలం.

Science is a beautiful gift to humanity we should not distort it - Albert Einstein

అల్బర్ట్ ఐన్‌స్టీన్ 'సైన్స్ సమాజానికి కీడు కాకూడదు' అని తెలిపాడు. సైన్స్ ఫలాలు మానవాళి ప్రయోజనాలకు అనుగుణంగా విలువలతో వాడుకోవాలి అని అన్నారు. కాబట్టి 6–10 తరగతుల సామాన్యశాస్త్రం, జీవశాస్త్రం పాఠ్యపుస్తకాలలోని అన్ని పాఠ్యాంశాలలో విలువలకు సంబంధించిన అంశాలను చేర్చడం జరిగింది. అలాగే ప్రశంస, విలువలు, సౌందర్యాత్మక స్పృహ, జీవవైవిధ్యం, దైనందిన జీవిత వినియోగం అంశాన్ని సైన్స్‌లో నిర్ధారించుకున్న ఒక ప్రధాన విద్యా ప్రమాణంగా చేర్చడం జరిగింది. ఈ విద్యాప్రమాణం 'సైన్స్ బోధన ద్వారా విలువల అభివృద్ధి'కి దోహదం చేస్తుంది.

ఫలితాలు – సవాళ్లు

- ప్రతి పీరియడ్‌లో బోధించిన అంశం ఆధారంగా విలువలను గుర్తించడం.
- వాటిని నిజజీవిత సన్నివేశాలలో ఆచరించడం
- పాఠ్యాంశం పూర్తయ్యాక కూడా పాటించాల్సిన విలువలను గుర్తించడం, చర్చించడం, పాటించడం.
- మార్కులు / గ్రేడులు / పరీక్షల ప్రాధాన్యం కాకుండా 'విలువల' ఆధారంగా పాఠ్యాంశాల అవగాహన
- పాఠశాల ప్రతి కార్యక్రమంలో, సమాజంలో విద్యార్థుల ప్రతి ప్రవర్తనలో 'విలువలు' ప్రతిఫలించడం.
  - ✓ 'విలువల' పాటింపు దీర్ఘకాలం కొనసాగడం
  - ✓ సమాజం, తల్లిదండ్రుల నుండి వచ్చే ఆటంకాలను ఎదుర్కొని నిలబడడం పాఠ్యాంశ చర్చ సమయంలో 'విలువలు' పాటించడంలో అధిగమించవలసిన అంశాలను గుర్తించి అమలు చేయడం.

6 – 10 తరగతుల సైన్స్ పాఠ్యాంశాలు – సైన్స్ బోధన ద్వారా విలువల అభివృద్ధి

8వ తరగతిలోని పాఠ్యాంశాలు

సూక్ష్మజీవుల ప్రపంచం పాఠ్యాంశం ద్వారా అవి ఎలా ఉపయోగకారులు, అపాయకారులు విద్యార్థులు అవగాహన చేసుకుంటారు. మొక్కలలో, జంతువులలో, మానవులలో అవి కలిగించే వ్యాధుల గురించి తెలుసుకొని

నివారణ చర్యలు చేపడతారు. అలెగ్జాండర్ ఫ్లెమింగ్, ఎడ్వర్డ్ జెన్నర్, లూయిపాశ్చర్,ఎల్లాప్రగడ సుబ్బారావు వంటి శాస్త్రవేత్తల కృషిని అభినందిస్తారు.

జంతువులలో ప్రత్యుత్పత్తి పాఠ్యాంశం ద్వారా తమ లైంగిక అవయవాల గురించి అవగాహన పొందుతారు. భిన్నలింగ వారి పట్ల సరయిన ప్రవర్తనను ఏర్పరుచుకుంటారు.

కౌమార దశ పాఠ్యాంశం ద్వారా శారీరక, మానసిక, ఉద్వేగ, సామాజికాంశాలలో వారి వయస్సులో వచ్చే మార్పులను అవగాహన చేసుకుంటారు, నైతిక విలువలు ఏర్పరుచుకుంటారు.

జీవవైవిధ్యం పాఠ్యాంశం ద్వారా ప్రకృతిలోని ప్రతి జీవ, నిర్జీవ అంశాల ప్రాధాన్యతను గుర్తించి వ్యవహరిస్తారు.

మొక్కలు, జంతువుల నుండి ఆహారోత్పత్తి పాఠ్యాంశాల ద్వారా రైతుల కృషిని తెలుసుకోగలరు, అభినందించగలరు. భావి జీవితంలో వ్యవసాయం, అనుబంధ పరిశ్రమలను వృత్తిగా చేపట్టగలరు. ఆహారాన్ని, నీటిని వృధా చేయరు.

కాలుష్యం పాఠ్యాంశం ద్వారా గాలి, నీరు కాలుష్యం అయ్యే విధానాలను తెలుసుకొని తన వంతుగా కాలుష్య నివారణకు కృషిచేయగలరు.

మనకు అనారోగ్యం ఎందుకు కలుగుతుంది పాఠ్యాంశం ద్వారా వ్యాధుల వ్యాప్తి నివారణ, అందుకు చేయదగిన అంశాలపై అవగాహన పొంది దైనందిన జీవితంలో ఆచరించి ఆరోగ్యంగా ఉంటారు.

6వ తరగతి పాఠ్యాంశాలు

రక్తం – రక్తవర్గాలు, జీవవైవిధ్యం, ముఖ్యంగా జ్ఞానేంద్రియాలైన కన్ను, ముక్కు, చెవి, నాలుక, చర్మం యొక్క నిర్మాణంపై లోతయిన అవగాహన, వ్యాధులు నివారణ చర్యల వంటి అంశాలను దైనందిన జీవితంలో ఉపయోగించుకుంటారు. వ్యవసాయోత్పత్తులు – సవాళ్లు వ్యవసాయ దేశమయిన మన దేశంలోని రైతుల గురించి అవగాహన, వారి పట్ల గౌరవం పెంచుతుంది. నేల కాలుష్యం అందుకు కారణాలు, నివారణ చర్యలు తెలుసుకొని దైనందిన జీవితంలో నివారణకు చర్యలు తీసుకుంటారు. శాస్త్రజ్ఞుల కృషిని అభినందిస్తారు.

10వ తరగతి పాఠ్యాంశాలు

ఆహారపు అలవాట్లు, పోషకాహార లోప వ్యాధులు, విటమిన్లు, వివిధ వ్యవస్థలు శ్వాసక్రియ, విసర్జన, ప్రసరణ, నియంత్రణ – సమన్వయం వంటి వాటికి సంబంధించిన అవయవాల నిర్మాణం, వాటిని ఎలా జాగ్రత్తగా ఉంచుకోవాలి, వ్యాధులు రాకుండా ఎలా జాగ్రత్తలు తీసుకోవాలి వంటి అంశాలపై అవగాహన చేసుకొని తాను పాటించి, ఇతరులకు సూచనలు ఇవ్వగలరు. అలాగే సహజవనరులు గాలి, నీరు, నేల, ఇంధనాల వంటి వాటిని సంరక్షించుకోవడం, అందుకు దైనందిన జీవితంలో పాటించే విలువలపై అంగాహన పొంది ఆచరిస్తారు. ముఖ్యంగా కుటుంబ నియంత్రణ, భ్రూణహత్యలు, బాల్యవివాహాలు, అవయవదానంపై అవగాహన పొందుతారు. ఇవన్నీ

దైనందిన జీవితంలో పాటించాల్సిన విలువలు. ఇదే విధంగా 6,7 తరగతులలో పాఠ్యాంశాలన్నీ విద్యార్థులకు విలువలను అందించేవే.

పాఠ్యాంశాల బోధన – విలువల అభివృద్ధి

6–10 తరగతుల సైన్స్ బోధన ద్వారా ప్రతీ పీరియడ్‌లో ఆ పాఠ్యాంశానికి సంబంధించి విద్యార్థులు పాటించవలసిన విలువల గురించి చర్చ జరుగుతుంది. మా తరగతిలో ప్రతీ పాఠ్యాంశంలోని వివిధ అంశాలపై ప్రతీ పీరియడ్‌లో మరియు పాఠ్యాంశం పూర్తయ్యాక 'విలువల'పై చర్చ నిర్వహించి దైనందిన జీవితంలో ఏమి, ఎలా పాటించాలో ఇతరులకు ఆదర్శంగా ఉండే విధానం గురించి ఆచరించేలా చర్చ జరుగుతుంది. కిరణజన్యసంయోగక్రియ గురించి చర్చించాక 'ఆకులు' తెంపడం మానివేశారు. ఇష్టకరమైన ఆహారంతో పాటు అన్ని రకాల ఆహారపదార్థాలు తీసుకుంటున్నారు. రైతులతో హానికర రసాయనాల గురించి మాట్లాడుతున్నారు. మరుగుదొడ్ల నిర్మాణం కోసం తల్లిదండ్రులతో చర్చిస్తున్నారు. నీటిని వృధా చేయడంలేదు. శాస్త్రజ్ఞులు, శాస్త్రవిజ్ఞానం పట్ల ఉత్సుకత చూపుతున్నారు. తాము తెలుసుకున్న అంశాలను తోటివారితో చర్చిస్తున్నారు. ప్రాజెక్టు పనుల ద్వారా అభ్యసిస్తున్నప్పుడు సహకారం, జట్టులో మెలగడం, క్రమశిక్షణ వంటివి పాటిస్తున్నారు. ప్రయోగశాలలో ప్రయోగ నిర్వహణ సమయంలోను ఇది కనబడుతున్నది. తరగతిగది ప్రక్రియలతో పాటు సమాజంలో కూడా పాఠ్యాంశం ద్వారా అభ్యసించిన విలువలను పాటించే ప్రయత్నం చేస్తున్నారు.

విద్యార్థులలో పెంపొందిన విలువలు

- మధ్యాహ్న భోజన ఆహారపదార్థాలను వృధా చేయడంలేదు, అన్ని రకాల కూరగాయలు తింటున్నారు.
- ప్రయోగాలు, ప్రాజెక్టు పనుల నిర్వహణలో విద్యార్థులు ఒకరికొకరు సహకరించుకుంటున్నారు.
- చేతులు శుభ్రం చేసుకునే సమయంలో, తాగే సమయంలో ఇతర సందర్భాలలో నీటిని వృధా చేయడంలేదు.
- తమ ఇంట్లో, పొలాల్లో, చుట్టుపక్కలలో నివసించే జంతువుల పట్ల దయతో ఉంటున్నారు.
- విద్యుత్ ఉపకరణాలను అవసరం మేరకే వాడుతున్నారు.
- మొక్కలు పెంచుతున్నారు, వాటికి నీళ్లు పోసి జాగ్రత్తగా చూసుకుంటున్నారు. కొన్నింటి బాధ్యత తీసుకున్నారు.
- నిష్పాక్షికంగా, నిబద్ధతతో మెలుగుతున్నారు. ప్రవర్తనలో ధనాత్మక మార్పు వస్తున్నది.
- ఆరోగ్యంపై చాలా శ్రద్ధ చూపుతున్నారు. వ్యక్తిగత, పరిసరాల పరిశుభ్రతపై దృష్టిపెట్టారు. మరుగుదొడ్ల నిర్మాణం కొరకు తల్లిదండ్రులపై ఒత్తిడి తెస్తున్నారు.
- వ్యవసాయ కుటుంబాలకు చెందిన విద్యార్థులు తమ తల్లిదండ్రులతో రసాయన ఎరువులు, క్రిమిసంహారకాల వాడకంపై చర్చిస్తున్నారు. వారిని ఒప్పించే ప్రయత్నం చేస్తున్నారు.

STATE LEVEL SCIENCE SEMINAR – 2019

Theme : Schools Science Curriculum - Needs and Challenges

Sub-theme : Development of Values through Science teaching

Title of the Topic :

Games to teach life skills as a part of adolescent education

Presented by:

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Title of the Topic : Games to teach life skills as a part of adolescent education

Objectives 1. To imbibe the life skills to adolescents through joyful classroom games

2. To make adolescent education more effective

3. Making high school students more focused on studies in their adolescent period

4. Developing personal, social, emotional values among adolescents

Design of the Innovation : I have molded some of the simple and well known games to teach life skills among the adolescents who undergo lot of confusions and disturbances emotionally due to physiological changes in their age. These games will be no-cost games and can be played individual and group within the classroom

Description of the innovation :

As a high school teacher I have been observing changes in the mindset of students once they enter into adolescent age making them to be deviated from their academic goals as well as ruining their character there by their career and life. These games help them to sow a thought of being good for themselves

Some of the games are as follows

1. BLINDFOLD : The student will be tied with a blindfold at one side of a room who should walk and reach to an object kept at the other side in the room. Obstacles like benches, tables will be placed in the way of the player. A team of his friends will guide him by giving directions where as an opponent team will misguide him.

   Implications : The student will learn that there will be obstacles and misguiding persons in reaching his goals or a good life style. He should take a right decision at every step irrespective of the attracting bad things.

2. SNAKES AND LADDERS : It's a board game can be played on a table or by placing the big printed chart on the black board. The several boxes containing snakes are written with bad habit titles like Smoking, Drug addiction, Alcoholic, Rash bike driving, unnecessary sexual pleasures etc. The boxes containing Ladders are written with good habits like Self control, Focusing on studies, denying the bad proposals from others, good diet, physical; exercise, aiming higher studies, developing skills etc.

Implications : The students will come to know and sow a thought in mind that good habits like above make them to move forward in life with prosperity and the bad habits will ruin their life.

3. SAY ’NO’ : Saying ‘No’ plays a major role in adolescents life to escape from many attracting bad things at initial stages. In this game a special situation is given to each and every player where they will say ‘No’

   Implications : Students will habituate to say No when it is needed

4. CONSTRUCTION&DESTRUCTION : In this game players are given time to construct a pyramid or building shaped structures with cards. And the one who build the structure for about 15 to 20 min is asked to destruct it.

   Implications : The student first feel sorrow to destruct the building which he built with lot of patience, skills and time. And he comes to know the construction of anything takes much efforts where as destruction takes no time. So as the character , career and life of him.

   Conclusion : I have ideas of some other games which can inculcate life skills and values among adolescent children. I will demonstrate them with required material on the day of seminar presentation

   References: My personal ideas

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DEVELOPMENT OF VALUES THROUGH SCIENCE TEACHING

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ABSTRACT:

Values are the guiding principles of our lives. They are essential for positive human behaviour and actions in our daily lives. They are formed on the basis of interest, choices, need, desire and preferences. They have played important role in not only sociology, but also psychology, anthropology and related disciplines.

Development of values is pivotal which shape human personality. Which provide identify of an individual in the society and in the surroundings.

Core values are thoroughly imparted to the students through science teaching which shape students personality. It is equally important to ensure that the youth are equipped with core values needed to live as responsible citizens in complex democratic societies.

Under the lust of greediness, the people in the world became self-centered and exploited their associates causing flux in world fiscal and public order .To come out of this confusion and strengthen the social fabric, are following all types of values which are common world over and are basic and relevant for all times through science teaching.

The need for value education has been stressed by all the commissions set up for educational development viz., Radha Krishna commission (1948), Sri prakasa committee on religious and moral instructions , Kothari commission (1964-66),National policy on education(1986).The programme of Action (1992) emphasized, value education as an integral part of school curriculum.

According to Plato the outstanding eternal values are Truth, Goodness and Beauty. These values are three areas of education .All these three aspects if practiced would make students value conscious.

The parliamentary standing committee on human resource development in its 81st report on the value based education (1999) has highlighted that Truth, Righteous conduct,peace, love and non-violence as the core universal values ,which need to be identified as the foundation stone on which the value based education programme can be built up .so this paper discusses the need of value education, how science infuses the values in the students.

Various activities those help to inculcate each value in students are also discussed .Among the science lessons selected, emphasis was given to environment related topics , keeping in view, the position given to environmental values and sustainable development in human values education.

The main aim of the paper is to illustrate how development of values through science teaching.

INTRODUCTION:

Value education is an interdisciplinary field of study with rich content. Value education removes impurities in mind which is essential for character development with absence of pride and free from hypocrisy. The philosophy about value is that, value should help anyone to seek the real knowledge and goal of life in a righteous manner. It is equally important to ensure that the youth are equipped with core values needed to live as responsible citizens in complex democratic societies. The responsibility of making tomorrows citizens equip with core values is on the shoulders of architects of nation, the teachers and also educational institutions.

S. H. Schwartz, defined 'values' as "conceptions of the desirable that influence the way people select action and evaluate events"He hypothesized that universal values would relate to three different types of human need:

1. Biological needs,

2. Social co-ordination needs, and

3. Needs related to the welfare and survival of groups.

Schwartz's suggest fifty-six specific universal values and ten types of universal value. Schwartz's ten types of universal value are: power, achievement, hedonism, stimulation, self-direction, universalism, benevolence, tradition, conformity, and security. Below is each of the value types, with the specific related values alongside:

Teaching of science signifies progress, rational thinking and true knowledge. Similarly, a social sign is given to science teaching.

Few good qualities of science teacher is that the teacher has to engages students at a high level, understands students learning styles to remediate with the new knowledge, brings science lessons to life with real-world applications connected students initially to the immediate environment, also understand student sensitivities and differences, one of the professional who Is committed to continual professional improvement and adjusts science lesson plans based on students' assessment evaluations.

The true values the science teaching inculcates in the students are given bellow.

They are

1. The power and authority by giving empirical knowledge of the world world and also the world of values which bridges with the social values of leadership.

2. Through the science teaching the teacher can inculcate the values of achievement which is prerequisite for the further development. That is the success in the subject matter and the intelligence brings self-respect to him or her.
3. Hedonism: the sciences drives the pleasure factor as the students involve in the learning of science subject or experiment if it is successfully done student got pleasures where direct the students to enjoying life as he involves in it.
4. Stimulating : one concept of science learning has direct effect on learning of other concept which agreeable mode. One learning of science concepts works as stimulating agent to pursue other knowledge in the science. It displayed the varied life and do daring activities in the science experiments which exciting the life.
5. Self-direction: once the learning of science provides greater opportunity to interact with the real life situation in and around the surroundings through creativity it generate the curiosity of the student and got freedom to take decisions and manipulate on his / her own, which make them independent person in decision making and choose own goals in future.
6. Universalism : is another great quality through science teaching one can generate. The students develop to thing in a broadmindedness to acquire greater wisdom, understand the means of social justice by participate and conduct the experiment in the social set up. Knows the values of equality among the living being keep efforts for making the world at peace by making unity with nature. Take steps to protect the environment and make inner harmony.
7. Benevolence: Through science teaching teacher can inculcate the value of helpfulness, honesty, forgiveness, loyalty, responsibility and on the whole the friendship with the friends.

8. Tradition: it is the basic acquisition of knowledge where we accept one's portion in life, Humanity is basic element in it and respect for the tradition also one of the main factor with the hope of moderation in the tradition according to the acceptance of the society and present day technological advancement.

- Conformity: science teaching shows great value of conformity by acquiring self-discipline, obedience towards the nature.
- Security, cleanliness: science teaching advocates cleanliness is next to Godliness in a thorough manner by inculcate the knowledge to the pupils who to be secure in the day today world where human should live securely by not harming natures resources and to live healthily in harmony with the nature. It inculcate how to struggle for family security and importantly the national security, fight for the stability of social order, fight against the reciprocation of favors, have consciousness towards the health and generate sense of belongingness.

The values are needed as we encounter several circumstances every day which test our patience, our character and peace of mind. We have to make tough decisions each day. Whatguide us in these circumstances are our values. Our values serve as markers to tell if life is heading in the right direction.

Teaching of science generate the values to self-direct our self in right path, provides to learn the importance of certainty, goodness and beauty of life which provided by the nature, give direction to life and bring joy to the lives. Teaching of science will bring the knowledge of how to learn satisfaction towards life though practice. Science teaching development how to attain peace in life and how to develop character, one of the greater virtues of teaching of science is that it preserves our culture and heritage. Also provides greater opportunities to bring changes in behavior towards positive thoughts and promote the peace and harmony in the society.

The science teachers have to take interest in the development of personality of students as most of the students are indulged in activities which are not acceptable in a healthy society. The curriculum driven value education has given broad scope for the science teachers to teach the value education through the science. But in the present day scenario the educational institutions are engulfed by materialistic values ignoring the development of Childs personality. Under the desire of materialism, the people in the world became selfish and exploited their members causing imbalance in world economic and social edict .To come out of this disorder and support the social fabric, is following all types of values which are common world over and are basic and relevant for all times. Values which lead to plain living and high thinking are considered out dated (R.T.Deopurkar) but values can only put ceiling on desires which is a solution. John C. Maxwell the greatEducationistexpressed strongly in favour of values to strengthen the social fabric of the society by saying that "when values, thoughts, feelings and actions are in alignment, a person become focused and character is strengthened."National policy on education (1986): "The growing concern over the erosion of essential values and an increasing cynicism in society has brought to focus the Need for readjustments in the Curriculum in order to make education a forceful tool for the civilization of social and moral values." According to Plato the eternal values are Truth, Goodness and Beauty. They are exactly similar to the attributes of God as expressed by the sages and seers of ancient India in the words, Sathyam, Shivam and Sundaram. These values are three areas of education .All these three aspects if practiced would make students value conscious.

The parliamentary standing committee on human resource development in its 81st report on the value based education (1999) has highlighted that Truth, Righteous conduct , peace , love and non-violence as the core universal values ,which need to be identified as the foundation stone on which the value based education programme can be built up. Through teaching of science the teacher can inculcate the value of the truth in the children and said that how the

righteous conduct will beneficiary in the life in a student to progress in positive direction to make his life comfort and generate confidence in them.

In the

Let us take an example topic “matter around us.” Will give the information how the small and big particles are associated in harmony with one another and some particles which are very tiny and beyond imagination are intertwined with one another without confusion said about the value of hedonism that speaks about pleasure and enjoying life by being in various situations.

In another topic of 7^{th} class science topic “Food components” if the student explains the experiment through authority he got the confidence in him, and if he gathered the absentees students and teacher them he got special quality called as leadership quality which will inculcated by the science teacher.

The science teacher can inculcate the idea of self-respect by giving proper stimulus at the time of the proper response when teacher ask in the classroom situation so the student got the honour of achievement that is success in front of the his own classroom. Teacher will appreciate the capacity and intelligence of the students so he is not disappointed by his teacher’sbehaviors and encourage the students to provide various opportunities to do experimentation by making modification in the subject matter.

In the color changing observation experiment if the teacher properly encouraged the students he stimulates properly and dare to do many activates.

If the science teacher give freedom to the children to manipulate the experiment to by given proper feedback they got confidence and they have grown into self-directed, creative student.

If the teacher the lesson of 7^{th} class Physical science of “Animal Fibre” students can understand how many types of the animal fibres and developed a wisdom of not using the animal fibre for not effecting their extinction and they feel world at peace, a world of beauty

and unity with nature where every tiny part of the universe if important and should be protected.

Through the topic of physical science of class seventh third topic if one student does not know how to connect the wires and prepare the circuit to create own cell. The science teacher asks the student to help their classmates to get the result. That makes them how to cooperate with the students and how helpfulness help the students to generate honesty, forgiveness, loyalty, responsibility, friendship where in this experiment we can observe.

In the physical science lesson 16 “Forest our Life” the science teacher can instill the conformity of the forest with the human life and they are not separable and having thick relation. This development of conformity is very essential that one should have to show the obedience with other living being whether it is moveable or immovable.

Value of cleanliness is one of the great values where the physical science teacher specifically will generate in the students so it should reflect on the health of the nation.

RECOMMENDATIONS:

1. Students given freedom to take responsibility of showing accountability of the event conducted at the school level.
2. A special period will be engaged to the student assign the job and see the things are going to be finished up by the students with the guidance of the peer students on the basis of developing a concept of association of responses to the students.
3. Every teacher of the institution will shoulder the responsibility to modify unsocial behavior of the students and take the chance whenever it is possible.
4. Government will have to come with the project works like working in public private partnership in true sense of developing wellbeing in the students.

5. There is a need to understand what the means of values is first for that it is better if the education officials provide good integrated in-service program which infuses the true sense of values in the teachers through practical exposure.
6. Practice before preach is vital quote where it is needed for all human being so be like a model is an idle quote for every teacher who proclaimed true values through the deeds.

CONCLUSION:even if government come with the revolutionaryrevamp in the syllabus which encourages for the humans to be wellbeing we are not follow them properly in true sense of achievement even if we have seen that human values help to lead peaceful and value oriented life. Values to be inculcated may not be in school syllabus but it is the responsibility of the any subject teacher to inculcate values through the lessons taught by them. Especially a science teacher can use some of the time allocated for practicals in inculcating values. So Inculcation of values through curriculum may help tomorrow's citizens to lead value based lives in the society in better harmony of the world.

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STATE COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

HYDERABAD-TELANGANA

STATE LEVEL SCIENCE SEMINAR ON NATIONAL SCIENCE DAY ,2019

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Theme : SCHOOL SCIENCE CURRICULUM-NEEDS &CHALLENGES

Title of the topic : My experimentation to Develop Values through science teaching.

IF YOU TRULY BELIEVE IN THE VALUE OF LIFE, YOU CARE ABOUT ALL OF THE WEEKEST AND MOST VULNERABLE MEMBERS OF SOCIETY,FOR ME, THE VALUE OF LIFE ABSOLUTE,WITH NO CONCESSIONS.IT'S NOT NEGOTIABLE.

Introduction:

During my school days I usually observe my teachers, not only their class room teaching but also their behaviour towards their colleagues, In my school (Fatima Girls High school)along with Main subjects we had vocational and Ethics classes weekly twice, we usually await for those classes and even today I remember the Moral values which we learnt in Ethics class, they was that much effective, Now as a teacher I realized the need of value education but today's learner's needs are much more different from our time, Once a student teacher of B.Ed(who came to my school /work place for teaching practice) in her lesson plan (topic: Diffusion) at the values column she didn't wrote anything (kept blank), when I asked her reason, she said how could we explain values through diffusion, it is just a physical process, That's the starting point of my experimentation, decided to experiment with teaching values through the usual Science lessons since that time I worked to inculcate values in science teaching ,for that I spare 5 to 10 minutes of time and must explain the hidden values of the topic during my class room teaching.

Objectives

The objectives in teaching values through science are:

1) to provide a realistic and broad-based understanding of human values and to educate students to become responsible citizens in their personal and social lives;

2) to develop and promote among students, values such as truth, humility, honesty, perseverance, cooperation, love, compassion, peace, non-violence, courage, equality, duty, morality, kindness, piety and righteousness, dignity of labour, concern for others and a small family norm;

3) to enable students to understand, appreciate, uphold, protect and promote the sovereignty, unity and integrity of India and the national goals of egalitarianism, socialism secularism and democracy besides imbibing values enshrined in the Indian Constitution;

4) to protect, preserve and conserve the natural and cultural environment and to make judicious use of natural resources;

5) to develop scientific temper and spirit of scientific inquiry and capacity for independent and original thinking;

6) to understand, appreciate, promote and use knowledge of Science and Technology for enhancing productivity and human happiness;

7) to safeguard public property, remove social barriers and renounce the practice of violence, cheating, corruption and destructive tendencies;

8) to sharpen the intellect, build character and self-discipline essential for creative pursuits in science and technology;

9) to offer science education conducive to the development of physical, intellectual, moral, social, spiritual and economic aspects of life; and

10) to enable students to distinguish between good and bad, right and wrong and acquire intellectual wisdom and disposition to do what is ethically correct and good.

Design of innovation:

Two basic approaches followed to achieve my goal, which is development of values through science teaching, the revised text books supported me in my work, The importance of science clubs, exhibitions, museums, quiz programmes, field trips etc. are stressed. Commitment, availability of instructional materials, community involvement made me success. I Used multiple strategies through multimedia approaches. Whatever the topic ,I discover the hidden values in it and prepare a special taglines to explain hidden values of the topic.

Description of innovation:

Value education is taught frequently as a separate subject even today

“If every teacher is equipped with such a value system and can infuse values in every lesson, values-centric education will become integrated in their lives and not as a separate subject.”

Eg:1) Diffusion: Through this process we can explain the equality ,Broad mindedness, helping nature, kindness,

2)Photosynthesis: Sustainability, Cooperation, love,Concern for others, environmental protection etc.

3) During our schooling in all text book examples few repeated names we observed(Ramu,Raju), but in revised textbooks we can see girl names and the names reflect all religions , through these examples I explained the gender equality, Secularism and democratic values.

4) All the parts of our body teaches us Harmony , Coordination, Cooperation, discipline , selflessness, dedication.

5) Excretion topic teaches the relation between health and hygiene, Cleanliness of surroundings. Also explain us concern towards others like mother because of overburden kidneys may fail.

6) Ecosystem: Inter dependency, Biodiversity, Concern towards Environment.

7) Apiculture: Dignity of Labour, Harmony, Cooperation, Aesthetic sense, Concern towards others, Appreciation, Self discipline.

8) Silk: Appreciation, Aesthetic sense

9) Symbiosis: Unity, concern towards others, Self respect, Self reliance.

10) Each and every life process explain us cooperation, Discipline.

As per my experience students learn democratic values through observation of teacher’s behaviour but not through classroom teaching.

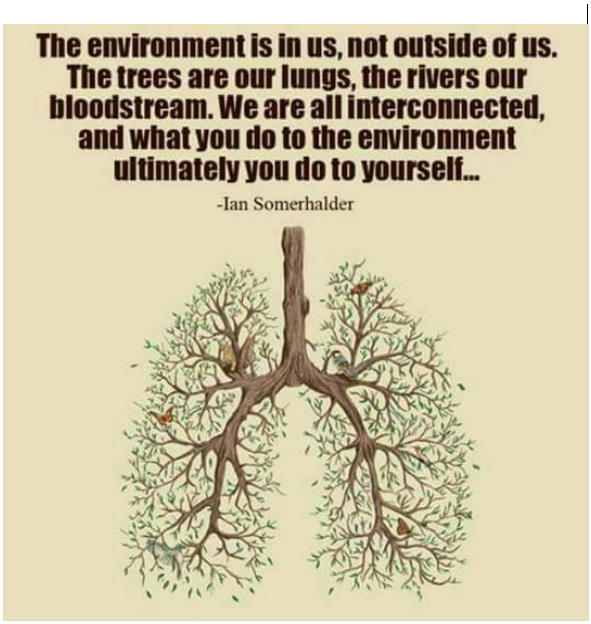
There is, however a growing trend to regard all teachers as teachers of Value Oriented Education and all school subjects and activities as lending themselves to the formation of values. The correlation of values with science teaching has been attempted to an appreciable extent. However, Value Oriented Science Education requires much more intensive efforts.

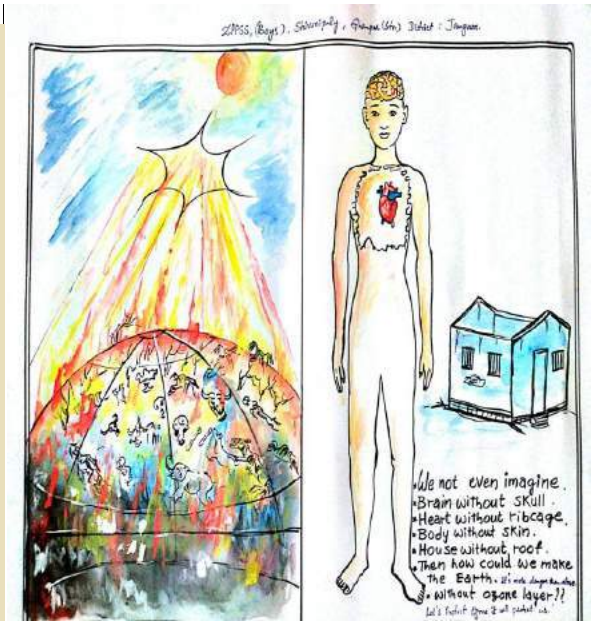
Outcomes of the innovation:

Evaluation has to be continuous, comprehensive and improvement oriented. Evaluation of cognitive components is easier than non-cognitive ones. The affective qualities are general and not content, class/grade or age specific. The use of teachers' ratings, developmental values profiles of pupils, recording of observations of pupil participation in science activities and maintenance of cumulative records, peer ratings, pupils' self-appraisal, parent reports etc. for evaluating values have been emphasised.

Conclusion:

Practical results are emphasized. The results of value teaching will be indicated by the behaviour of the students. Teachers always set some demands on the students' behaviour. The evaluation itself can cultivate good habits of action among the students.





STATE LEVEL SCEINCE SEMINAR

28th FEBRUARY, 2019

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THEME : SCHOOL SCIENCE CURRICULUM – NEEDS AND CHALLENGES

SUB THEME: DEVELOPMENT OF VALUES THROUGH SCIENCE TEACHING

TITLE OF THE TOPIC : INCULCATING VALUES THROUGH SCIENCE TEACHING LEARNING ACTIVITIES

I. INTRODUCTION:-

School is the place where the formal education is implemented through well-defined curriculum. Curriculum enlists subjects to be taught, practical to be conducted as well as co-curricular and extra-curricular activities. The National curriculum frame work for school education (2005) brought to focus the erosion of human values and suggested the integration of values in the curriculum. The philosophy about value is that value should help anyone to seek the real knowledge and goal of life in a righteous manner. The need for value education has been stressed by all the commissions set up for educational development from time to time especially Radha Krishnan commission (1948) and Kothari commission (1964-66). EINSTEIN The greatest scientist expressed in favour of values to strengthen the social fabric of the society. As educators we know how important it is to teach values in our schools.

Biology is one of the important subjects in the curriculum. It also reflects some values such as Love with nature, Environmental awareness, respect to biodiversity, animal protection, scientific attitude, non-violence, aesthetic view, integrity, sensation with nature, co-operation and Human Health. Values integration is carefully planned and woven in the subject without sacrificing the content of the subject prepared for the day's lesson. The aim of the present paper is to know how the biological science teaching learning activities are inculcating the values among the students.

II. OBJECTIVES:

1. To develop the habit of working hard and appreciate the contributions of science and scientists for human happiness.
2. To protect, preserve and conserve the natural environment and to make judicious use of natural resources.
3. To develop scientific temper and spirit of scientific inquiry and capacity for independent and original thinking.
4. To develop the habit of observing and reporting results of experiments and measurements honestly and truthfully.
5. To develop pupil's skills in solving everyday problems by means of scientific knowledge.
6. To inculcate eco-friendly behavior.
7. To provide a realistic and broad – based understanding of human values and to educate students to become responsible citizens in their personal and social lives.

III. DESIGN OF THE INNOVATION:

Values cannot be taught but they have to be caught. Various strategies and activities could be used for inculcating values in the content of biological science. Among the strategies are:-

1. Role plays
2. Discussions
3. Field trips and project works
4. Lab Activities (practical)
5. Poster Presentations (Scientists)
6. Nature Prayer
7. Haritha Haaram

IV. DESCRIPTION OF THE INNOVATION:

1) Role Plays:

a) After explaining the story "**The animals Law suit against Humanity**", which is related to Biodiversity lesson of class VIII. It could be converted into Role-play by giving characters to the students then they performed role-play. Student participated in it with immense enthusiasm besides they learnt the concept easily and sent a message.

Outcomes: - By performing this role-play, students understood the importance of biodiversity to survive in this world. They have learned that they ought not to rule the animals but to serve them Love, Kindness towards fellow creatures are inculcated among the young minds, which reflects Live and let live.

b) While teaching the lesson Reproduction for class-X two role-play were conducted on child marriages and female foeticide.

Outcomes: By performing the role-play on child marriages girl students come to know that the problems which are occurred with child marriages and they swore that they won't get marriage early and let not to be others get marriages early as well. Whereas boys realized that the importance of girl child in the society after performing the role-play on female foeticide" Boys strongly decided to carry forward the message which is given by Prime Minister Sri. Narendra Modiji that is Beti Bachao – Beti Padao.

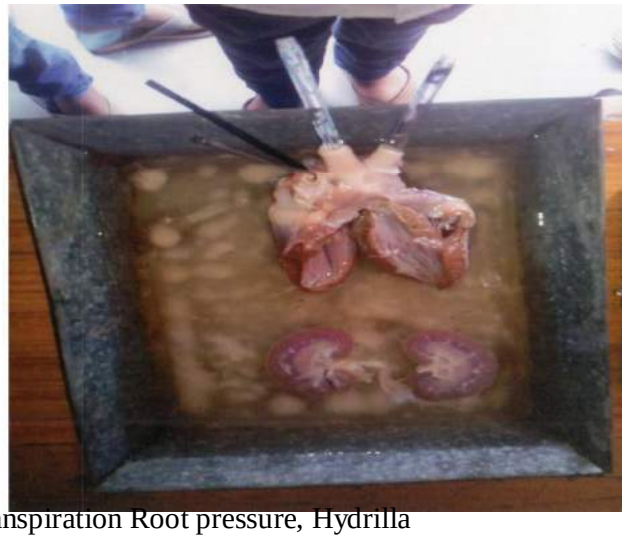
The achievement of our **ZPHS Rammandir, Armoor** students in this academic year is

- We got **2nd prize** in Nizamabad District Level Role Play competition which is on **Drug Abuse**.

II. Lab Activity (Practical):-

a) I did dissection of Goat's heart and kidney and explained about its internal structure and functions.

Outcomes: Students came to know that all animals and human body is also a complicated structure than it appears and it is a wonderful machine.



b) I have conducted several experiments like transpiration Root pressure, Hydrilla experiment and Black paper experiment etc.

Outcomes: Students observed above experiments keenly. Honesty and truthfulness are inculcated among the students while reporting the results of experiments and measurements.

III. Poster Presentation:

I prepared poster presentation activity on eminent scientists like **Dr. Yellapragada Subbarao, sir Ronald Ross, Louis Pasturem, Prof. J. Kurion and M.S. Swaminathan**etc. students came forward and explained about scientists and their contributions to the society by using the poster.

Outcomes: Students appreciated the scientists and their invaluable inventions to enhance productivity to human welfare and also they appreciated the scientists and their contributions for the human happiness.

IV. DISCUSSIONS:

1) While teaching the chapter "**Adaptations in different Eco- Systems**" of Class-IX conducted discussion on Aquatic Eco-system and Desert Eco-system with students.

Outcomes: Students understood that how organisms adjusting in diverse conditions of their environment for better survival by adaptations. They also came to know that adjusting in different conditions physically and psychologically is very important for better survival.

2) I conducted discussion on Renewable and Non-Renewable resources during the discussion students rose 2 vital points i.e. by indiscriminate usage of resources they may not be available to next generation and indiscriminate usage leads to pollution causing Global Warming.

Outcomes: Students realized how the resources are used judiciously for sustainable development. This helps the students to listen conscious and even suggests others towards righteous attitude.

V. PROJECT WORKS:

As project work is one of the tools of Formative Assessment in the CCE method. We are giving project works on different current issues which are related to our text books to the students to gather information in a group.

Outcomes: while collecting and gathering information (In a Group) in project work Co-ordination, Co-operation and convergence are inculcated among the students.

In this academic year (2018-19) we conducted a project on **CLEAN ARMOOR – ERADICATING OPEN DEFECATION** for National Children Science Congress (NCSC-2018) and it is selected as District Level Best project and we received award from our **DEO Sri. Durga Prasad Garu**. In this project students conducted a survey and we came to know that 46 families were not using Toilets though they have usable toilets. Students brought changes in behavior and attitude of the people towards open defecation and achieved ODF**.** We felt glad that we did our duty as a responsible citizens in the part of **SWACHH BHARAT ABHIYAAN.**

FIELD TRIPS:

We have visited a Handloom in our Armoor with 6th and 7th Class Students as a part of field trip.

Outcomes: By observing weavers and weaving process students realized that how the man power and skill is required to weave cloth and they recognized their hard work to prepare cloth.

OTHER ACTIVITIES:

We conducted the following activities to inculcate Eco-friendly behavior among the students.

1. Clay idols of Lord Ganesh which are prepared by the students.

2. **Haritha Haram Programme**: As a part of this programme in the name of **Swachh Patashala–Haritha Patashala** we planted plants in our school and conducted rallies. I have adopted plants to each students to look after it. With students involvement 100% survival rate is recorded and appreciated by the educational and forest officers.




3. **Nature Prayer**: On every Friday during morning assembly our students take nature prayer pledge we are inculcating Eco-friendly attitudes, Aesthetic sense and scientific attitude to protect the nature by conducting this Nature prayer pledge.

4. We are also conducting world environment day, population day, world ozone day and national science day to develop positive attitude and values towards science and nature.



IMPLICATIONS:

1. By conducting these activities Effective Domain of the pupils can be developed to lead value based life.
2. These teaching learning activities can be conducted in an integrated approach by not separating the content and values.
3. These strategies and activities are helpful in science teaching to foster values among the students.
4. Eco-friendly behavior can be nurtured through above activities among young minds.

CONCLUSION:

We have seen that human values help to lead peaceful and value oriented life. Values may not be included directly in the syllabus but embedded in the syllabus indirectly in all subjects. It is the responsibilities of the any teacher to inculcate values through the lessons taught by them. So inculcation of values through curriculum may help tomorrow's citizens to lead value based lives in the society. Hence it is the responsibility of all teachers to mould children into becoming good citizens

References:

1. Text Books of Biological Science 6^{th} to 10^{th}Classes of T. S Govt.
2. 9^{th} and 10^{th} Class Environmental Education Books.
3. My own experiences in class room, Science Lab and at field level
4. Various web articles about value education
5. Books on methods of Teaching Biological Science.

Children should realize that the food in his plate is the result of Hard Work and efforts of many.

-Giju Bhai Bhageka

Seminar Paper on "SCHOOL SCIENCE CURRICULUM – NEEDS AND CHALLENGES"

Sub-theme

"Development of values through science teaching"

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    - Profession – Director, Prajna Research wing , JIVA
- Title of the topic – " Promoting Value Based education through Hands-on Science Experiments"
- Objectives –
    - To allow students learn the physical science concepts in an unsurpassable way through "learning by doing" methodology.
    - To establish critical thinking as a precursor to scientific thinking.
    - To utilize the science curriculum in imbibing students with human values.
    - To utilize values as analogies for better understanding of complicated science concepts.
    - To promote value-centered education through all the school curriculum subjects.
- Design of innovation –

Imbibing moral values in students through dedicated "Moral/ethical education" courses have a tendency of creating least impact due to a couple of reasons. These courses lack the effectiveness as most of them are implemented as 'Extra-curricular'. The other reason is the lack of a controlled environment to apply as well as to review the values learned in the courses. Overcoming these two factors is crucial in successful implementation of a Moral education curriculum.

Teachers can play a key role in character building of students by following innovative methods for delivering moral values. These methods will make students think, apply and introspect the values for their personal as well as the growth of the society.

We are proposing a novel method of using science experiments as a tool to promote values. We will use values as analogies and so this method will in turn helps the students in understanding the science concepts with the aid of values. The methodology will make sure the value fits perfectly with the results of the experiment. Furthermore, to get the student completely involved in the process, we plan to discuss the values after the student

experience the science concept through Hands-on work rather than just a demonstration performed by their science teacher.
Finally a review will be taken from the students to access the effectiveness of this method.

- Description of the innovation –

While science is the study of nature, values build the character of a person and a society can thrive with the help of people with moral values. As nature/surroundings can be analyzed with science, the changes occurring in nature can be examined and linked with the changes in human behavior. Rectification of human behavior to cater the needs of society is crucial and the moral/ethical values are designed for the same purpose.

With a strong belief that moral values need to be delivered with the help of every subject teacher, we have prepared modules for science teachers in an uncompromising way so as to deliver the science concepts along with values. Upon successful implementation, a similar process would be used to add values to all other subjects content.

Our innovation is to promote human values by integrating the values with the results of science experiments performed by students through 'Hands-on' exposure to science equipment. We have worked on modules which include the regular content pertaining to any science experiment such as the procedure, analysis and Introduction. In the last section of the experiment document, we added a moral value that goes hand in hand with the concept of the experiment. We believe the students will find synergy between the experiment content and the derived moral value.

To find the effectiveness of this integration we plan to review the students understanding of the values and also the science concepts through either or all of the following strategies.

Strategy 1: Self realization

Students would be guided in detail with the science experiment procedure and after they perform the experiment by 'Learning by doing' methodology, detailed discussion of results will be undertaken. A moral value with synergetic link with the experiment will be explained.

For the next experiment that immediately follows the first and after the results are analyzed, the students will be asked to think about a value that fits with the science concept learnt by them in the second experiment.

In our opinion, this is a very powerful strategy as the student himself gives a human value and there will be no resistance within himself to implement his derived value in his everyday situations. On the other hand, a value given by a teacher or any other person often meets with resistance in terms of understanding and also with the implementation.

Strategy 2: Values helping understanding the science concepts.

Two sample groups of students will be selected. Both the groups will be utilizing the same apparatus and procedure for understanding the science concepts. The first group will be provided with a moral value and its link with the experiment will be explored in detail. The second group will not be given any moral values to accompany with the experiment.

A review set of same questions will be provided to both the control groups and the results will be analyzed to see if using a moral value as analogy for explain the science concept has made it more comprehensible.

This strategy will help us in obtaining good data to explore the possibility of using moral values as analogies to explain science.

- Outcome of the innovation –

This innovation was implemented at the following venues.

Venue 1: Dayanand Anglo Vedic School, Nagarjuna Sagar, Nalgonda District, Telangana.

Venue 2: Kriya children festival, JNTU Kakinada, East Godavari District, Andhra Pradesh.

During these workshops we have observed some of the following outcomes and the rest of the outcomes are expected after a long term involvement with the students implementing this concept.

a) We expect the individual to have increased affection towards his parents, his country, world and environment.
b) An increased empathy towards other humans and animals is expected.
c) Teachers will move from a theory centered approach to experiment based teaching approach.
d) Students will understand the concepts along with applications. They will not rely on rote learning. Additionally, the fear towards learning science can be substantially reduced by implementing experiments driven by value education.
e) Students will learn Science in a unique way and at the same time learn values. This integrated knowledge will help them to be more patriotic towards the country and would make them better human beings.

- Implication –

  The innovation explores the implementation of values into the main stream curriculum there by a possibility of reducing the constraints posed from finances and time.

  Interlinking science with values could make the students better human beings and a possibility of becoming an ethically sound science professional. With considerable research, the project can be implemented in every school and intermediate colleges to guide the students in constructing a happy and productive life.

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- Passport size photo –

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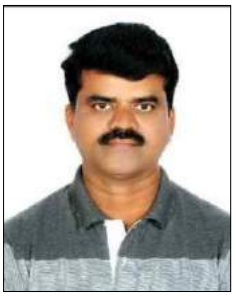

THEME: "SCHOOL SCIENCE CURRICULUM NEEDS AND CHALLENGES"

SUB THEME : ICT-SCIENCE TEACHING

White board projectors

Objectives :

1) To enable the Information &Communication Technology (ICT) which include both hardware and software's necessary for delivering of voice, audio, video, data.
2) ICT holds out the opportunity to revolutionaries pedagogical methods, expand access to quality education and improve the management of education in schools and colleges.
3) ICT, is regarded as a critical tool for preparing and educating students with the required skills for the global work place.
4) ICT is a diverse set of technological tools and resources used to communicate, and manage information.

Using ICT in SCIENCE TEACHING in schools

- The continuous development of Information and Communication Technologies (ICT) has created new opportunities for teachers.
- During classes, a modern science teacher should be able to integrate ICT with various teaching methods.

Using ICT by science teachers can be divided into three major areas

1) The general use of computers, operating system, office applications and Internet.
2) Use of the measuring equipment and its integration with a computer, applications for data collecting and processing.

3) Visualization of the lessons' content with the use of modern didactic tools, modelling, use of videos and animations, interactive presentations and assessment, virtual laboratories.

A great CHALLENGE for the Educators

- We should keep in mind that the use of ICT tools is **not an easy task for many teachers**.
- **Training is essential to the teachers** for using various ICT hardware and software tools.
- The extremely fast development of IT in the recent years can be seen as an additional difficulty.
- Therefore, it is a great challenge for the educators to create ICT courses that **prepare teachers for complex, reasonable and effective usage of modern didactic tools** in their courses.

Issues to be addressed

- The current level of **use of ICTs** at schools is not satisfactory.
- **Funding** constraints.
- The great challenge for educators is to prepare teachers for casual,conscious and **free use of the latest technology** in their classes.
- The need **to prepare science teachers** for general computer and Internet usage, especially in the aspect of lifelong learning.

Some progress in teachers

- ✓ A teacher tends to use ICT largely to support, enhances and complement existing classroom practice rather than re-shaping subject contents, goals and pedagogy.
- ✓ However, **teacher's motivation and commitment are high** and practice is gradually changing.
- ✓ Training teachers in using ICT in the classroom appears to have **more success in science** than in other subjects.
- ✓ **Teachers are now beginning to develop** and trial new strategies which successfully overcomes the distractions of the technology and focus attention instead of their intended learning objectives.

ICT Hardware Equipment for Science teaching

- PC / Laptop with Speakers, Mic
- iPads, Tablets, Smart Phones
- Multimedia Projector with USB, Wireless
- Flat LCD/LED Screen (32" / 42")
- Portable Sound Systems (Small , Medium, Large), Wireless Mic
- Visualizer / Document Projector
- Cameras (Video and Still)
- WEB Cameras, Scanners, Printers
- Interactive Pad

- Interactive Board
- Virtual Reality gadgets
- Slide presenter
- Overhead Projector
- Voice Recorders / MP3 players / DVD players / Head phones
- Portable storage devices (HDDs, Pen drives, card readers)

ICT Software tools

- MS Office suite / Open office Suite
- Adobe suite
- Animation (flash) players
- Java software
- Internet Browsers
- Audio / Video players, conversion packages
- Movie maker tools
- You-tube videos download

ICT Media types

- Documents (pdf / WORD etc.,)
- Power Point Presentations , Audio clips
- Images / Graphics , Videos / Movies
- Spread sheets (Work sheets / Tables)
- Flash animations.

2D & 3D Visualizations in Science Teaching

- ✶ The role of visualization in science education cannot be underestimated, especially in **chemistry education.**
- ✶ One of the most difficult problems in teaching introductory chemistry is conveying the **three dimensional structure and dynamic interactions of molecules** to students.
- ✶ That can be easily achieved with the **use of animations**, simple modelling applications and didactic movies.
- ✶ The only equipment necessary for such visualization is a PC and a **multimedia projector**.
- ✶ Such a setup can be connected to a **digital camera** or to a **web camera**, which gives the possibility of presenting experiments in both mini and micro-scale.
- ✶ The other improvement for the PC and the multimedia projector, which settled in classrooms, is the so-called **Interactive Learning Environment.**
- ✶ A standard equipment of such a classroom is usually an **Interactive Whiteboard, interactive screens, Tablets** and **Electronic Assessment Systems** (also called Personal Response Systems or PRS).

- ✶ The use of **PRS** is not only allows the teacher to control the progress of the students , but it also helps them to teach classes with the use of **problem based methods.**
- ✶ In the near future we can expect further development of ICT technologies and new solutions introduced to classrooms, i.e. 3D visualization systems combined with elements of a **virtual reality** .

What are the Steps to be followed ?

I. K-Yan projector :

. The **projector** is of the highest quality in terms of brightness (lumens) and it allows the students to view content even in an open and bright classrooms. K-Yan remains a compact teaching aid designed to enable a teacher to focus on teaching rather than technology. At the touch of a button the teacher can toggle between multiple media like PC, TV and Internet to bring about an immersive classroom experience to the students.

K-YAN projector

II.Basics of presentation

- ✓ Rules of the transfer of information aided by multimedia tools.
- ✓ Use various techniques of visualization;
- ✓ Design an arrangement of contents (colors, spacing, graphics etc.).

III.The use of the overhead projector

- Familiarize students with the techniques of visualization based on the overhead projector.
- Using a single layer and complex transparencies.
- Conducting experiment demonstrations on the overhead projector's plate.

IV. The use of the multimedia projector

Learn how to:

- ✓ Create attractive and eye-catching multimedia presentations,
- ✓ Operate graphics, sound and video files,
- ✓ Use the digital camera and multimedia projector setup for the presentation of experiments at the micro level.

V.Interactive learning environment

- ✓ Familiarize with the techniques of teaching with the use of the interactive whiteboard, electronic assessment systems and tablets.
- ✓ Specification, composition and advantages of various Learning Environments.
- ✓ Using PRS Personal Response System for assessment.

V. Mind and Concept maps

Application of the Mind Mapping and Conceptual Mapping techniques supported by chosen software. Teaching classes with the use of activation techniques.

Significance of Animations

- ✓ Animation teaches using the visual aids , It is a very strong proven way of learning , It brings a topic to life , It gains the attention of the viewer , It can be fun to watch.
- ✓ The educational games and quizzes allow the visitor to interact and learn and it helps to explain and illustrate more complex concepts and persons of any age can easily engross.
- ✓ Research says, children or adults are more tend to learn with the tools that are exciting or interactive. Animation has this magical quality to which learner's ability can be significantly enhanced.
- ✓ Animation helps explore and develop **ideas to implement them in reality.**
  The animation process fosters students' positive attitude and creative thinking.
- ✓ Creating virtual models of products and machines and showing their activities through animation has vast impact .
- ✓ In science for example, the computer animation might be used to show how our solar system works, and in math, a computer animation might show a student how one can algebraically manipulate specific equation.
- ✓ Other subjects such as English, foreign language, music, and art can also be thought by using animation.

Flash Animations

- ✶ **Why use animations?**
- ➢ Computer generated animations can illustrate concepts that would otherwise be difficult.
- ➢ **Processes occurring at the molecular level** e.g dissolving or melting
- ➢ **Processes that occur over very short or very long time periods** e.g. continental drift
- ➢ **The impact of a wide range of variables very quickly** e.g. effect on image of changing lens focal length
- ➢ **Processes that we cannot directly experience** e.g. nuclear fusion, star formation.
- ✓ They can also include 3-D concepts e.g. shapes of molecules, eclipses, retrograde motion.
- ✓ They can be used to visually compare and contrast e.g meiosis vs mitosis
- ✓ They can be used to introduce a concept or as revision or catch up of a topic already covered.
- ✓ They are better than movies because they do not have to be delivered in a linear fashion and can be interactive with the user changing variables etc.
- ✓ Students who have grown up used to special effects and flash technology can relate to them.

How to use animations

- Teachers most commonly use these animations by incorporating them into their teaching periods as **illustrations of concepts** etc.
- The animations can be displayed via a computer output onto **a large screen TV or monitor** or displayed on a screen via a data projector (for those fortunate enough to be able to access one).
- However, because of their ability to be used by most common **web browsers**, these animations can also be used by students directly using any internet capable browser.
- This can be set as **class or individual work**, at school or as **homework** and can be targeted towards students who missed some work or need some revision.

Recommendations:

Outline below are some recommendations on the way ICT can be used to enhance science education.

- ✓ ICT education should be made **compulsory** in all schools.
- ✓ Serving science education teachers should be given the opportunity to be ICT literate through in service education.
- ✓ Government should ensure provision of **ICT facilities** in schools.
- ✓ Every school should have an **ICT coordinator**
- ✓ Modern **computer laboratories** should be provided in schools.
- ✓ Government should ensure the provision of **Internet connectivity** to every school.

Conclusion: The role of ICT in education is not homogeneous ; ICT currently provides growing range of tools manipulate digital data as well as vast range and variety of content which underpins the information age , only some of which is designed to support learning.

Implication:-"**Education** prepares students for the use of **ICT in education**, future occupation and social life ….ICT as a medium for teaching and learning. This refers ICT as a tool for teaching and learning itself, the medium through which teacher can teach and learners can learn"

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- My class room practices

Thank you

Manchikatla Srinivas

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STATE LEVEL SCIENCE SEMINOR-2019

FOCAL THEME:- "SCHOOL SCIENCE CURRICULAM- NEEDS AND CHALLENGES"

SUB THEME:- ICT- SCIENCE TEACHING

TITLE/COVER PAGE: EFFECTIVE SCIENCE LEARNING WITH FIRST e SCHOOL

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OBJECTIVES

Many research studies on Indian Education and performance of the children in schools present days clearly indicated that children learning levels are not good that means according to their age and class they are not having proper knowledge levels .In school they are not having teaching learning materials ,lack of laboratories especially in science subject . They are very poor in science learning even the school administration and management and teachers are also not providing such environment of science learning classroom for that reason recently government has decided to improve learning levels of the children with introducing digital class room with ICT technology in class room

First object technologies LTD, is a software company provided first e school is an education initiative and it approached the topics with an optimum mix of technology ,quality content ,pedagogy ,educational psychology ,mnemonics and guide for better performance in examinations. The content is prepared under the guidance of eminent academicians. It covers pre primary to higher secondary education under CBSE/ICSE and state boards in English and all leading languages under the banner of “First e school”.

In our school nearly 600 students are studying in that nearly 350 students are residing in government BC, SC,ST hostels .Government supplied first e school software to the hostels and provided CPU and Digital screen. The children will see daily digital content of science subject of class 6^{th} to 10^{th} as tutor for the hostels I am showing digital content to all the students they are understanding subject very well. Experiments and activities are provided with animations compare to non hostel students their performance is increased rapidly. I am also learning very well in subject and explaining in school as well. So first e school software is giving very good subject and skills for our students.

In this paper I am clearly indicating the difference of hostel students and non hostel students in their examinations performance.

DESIGN OF THE INNOVATION

In our school nearly 600 students are studying from 6th to 10th class .They are very poor family back ground and parents are uneducated coming from very remote areas. Nearly350 students are living in BC, SC,ST welfare hostels. I am teaching 8th class to 10th class science. In our school no lab facilities, no teaching learning material available. Recently our new school building completed and we shifted there from old building. Last few years onwards our children are very poor in learning and very much absenteeism among the students and they are not able to understanding the scientific concepts .I am also working as tutor for the hostel children every day evening I will take classes in the hostel, but I am not able to show experiments and activities .The learning levels are the children's are not good .As much as I tried to teach for the children but not able to transfer complete concepts to their minds mainly lack of experiments ,lab works, projects ,no TLM . I was very sad from last 4 years. But from this academic year government provided digital software "first e school" by first object Technologies Company they supplied CPU and digital screen with software installation.

DESIGN OF THE INNOVATION
FEATURES OF FIRST e SCHOOL

A) EASY INSTALATION: First e school is very easy to install it happens in flip of second.

B) CONTENT COVERAGE: The content of the courses are prepared strictly as per the syllabus.

C) LESSON PLANS: The detailed lesson plans help the teachers in delivering the sessions in an organized way.

D) ONE STOPS SOLUTION: The course is designed the content is developed in such a way that entire student community is benefitted irrespective of their performance level.

E) INTERACTIVE: The e white board is an interactive tool.

F) SUPERIOR CLARITY: Best quality images and animations are used to provide easy understanding of the content.

G) EASY TO UNDERSTAND: 2D and3D animation with detailed step by step explanations.

H) EXPERIMENTS AND ACTIVITIES: Pure theory without practical knowledge is mere waste .Lab experiments and activities are provides as video and animated clippings.

I) EXAM FOCUS: Equal importance and emphasis is given to develop conceptual understanding the students for the exams.

J) MOCK TESTS: Content covers interactive mock tests.

K) ILLUSTRATIONS AND SOLVED EXAMPLES: It covers all numerous illustrations covering all the model questions at end of each chapter are solved.

L) ADDITIONAL CONTENT COVERAGE: Solved questions and concepts from CBSE, ICSE and state boards which are not available in the current curriculum.

M) BENEFITS: The benefits of using first e school solutions are multifold and offers equal benefits to all the stake holders i.e. students and teachers and educational institutions

METHODOLOGY

DISCRIPTION OF THE INNOVATION

I decided that with the help of first e school digital software to teach hostel students of class 8^{th} to 10^{th} .From June first onwards I am using this digital content everyday in hostel I am explaining all science concepts according to our syllabus.

In the morning I am teaching without digital content in the school like this nearly three months I completed my teaching .I am observing the performance of the hostel and non hostel students .Hostel students are learning more and understanding capacity with the help of digital content very much increased than non hostel students. To do this project I selected 46 students of 10^{th} class in which 29 students of hostel as experimental group and 17 students of non hostel students are controlled group.

OUT COME OF THE INNOVATION

I conducted two formative assessment tests to all the students' hostel students' marks are more compared to non hostel students.

DISCUSSION/ANALYSIS

The help of digital content the students of hostel performance is more compared to the non hostel students who are not having digital class

The average marks in FA1+FA2 of hostel students are 8.42

The average marks in FA1+FA2 of non hostel students are 6.11

As above results clearly indicating that digital classroom will increase children's understanding and performance levels.

IMPLICATIONS:-

This type of digital class will give very good results for the students and teachers also. I will try to continue in all classes with digital classroom try to bring non hostel students to the hostel to learn more and I will improve my teaching ability.

REFERENCES:-

1. First Object Technologies Ltd

ACKNOWLEDGEMENTS:-

I am very thankful to hostel wardens to give opportunity to work as tutor and I thankful to my school headmaster to conduct this study and I thankful to 10th class students to participate in this project.

ANNEXURE:-

10th class students FA1 AND FA2 marks lists of hostels and non hostel students

HOSTEL STUDENTS MARKS LIST

SLNO	Name of the student	FA1 Marks	FA2 Marks
1	D Akash	8	8
2	M Akhil	6	9
3	Syed Ameer	10	10
4	MD Arfath	9	8
5	CH Bhanuprasad	8	7
6	V Chakinder	8	6
7	V Dattatri	9	8
8	A Gnaneshwar	10	9
9	Y Hariprasd	9	10
10	B Henanth	8	7
11	P Joginath	7	9
12	N Kanikesh	9	8
13	K Krishna	8	7
14	J Laxman	7	8
15	K Laxminarayana	6	9
16	K Mahesh	8	7
17	G Prasad	7	8
18	B Nandulal	10	9
19	S Pavankalyan	9	10
20	M Rajesh	9	9
21	CH Ramesh	8	9
22	B Sai kumar	9	8
23	S Saketh	9	7
24	T Sangameshwar	9	8
25	J Santhosh	10	10
26	V Sardhar	9	8
27	K Sathish	8	10
28	K Raju	9	8
29	K Satwik	10	9
	TOTAL	246	243
	AVERAGE	8.48	8.37

TOTAL AVERAGE =8.48+8.37 =16.82/2 =**8.42**

NON HOSTEL STUDENTS MARKS LIST

SLNO	Name of the student	FA1 Marks	FA2 Marks
1	M Shadulla	7	6
2	A Shanker	4	7
3	G Shivakumar	6	7
4	CH Sreeman	7	5
5	B Teja	4	4
6	B Uday	6	3
7	N Venkat	9	7
8	P Venugopal	6	7
9	D Achyutkumar	5	5
10	M Vishnu	8	4
11	M Anil	7	7
12	MD Ajmeer	6	6
13	K Dasharath	5	5
14	S Karunakar	8	8
15	M Laxman	7	6
16	D Mahesh	8	6
17	N Murali	7	5
	TOTAL	110	98
	AVERAGE	6.47	5.76

TOTAL AVERAGE =6.47+5.76 =12.23/2 =**6.11**

THANK YOU

Personal Details:

Name of the teacher : Mitti Bala chandar

Qualification : M.Sc (organic chemistry), B.Ed

Designation : School Assistant (physical science)

Name of the school : Government Boys High School,Sultan Bazar, koti,Hyderabad.

Mobile number : 9959 067 656

E-mail ID : mbaluu143@gmail.com

Residential address : H.No:-1-8-E.W.S/52,Bagh Lingampally, Hyderabad.500044.

Theme: School science curriculum Needs and challenges.

Sub-theme : ICT - Science teaching.

Objectives:

- To develop Scientific temper among the students i.e scientific attitude / aptitude .
- To attract the students by attractive teaching learning material to learn science by joyful
- Building the scientific concept among the students
- Encourage the student to apply the scientific concepts in real life situations and concerned to the environmental issues
- To reduce dropouts and irregular students
- Help the students to understand the concrete and abstract concept by the ICT
- To improve Conceptual mapping By ICT
- To motivate the students To choose Science as career
- To construct the game based teaching and learning
- To develop experimental skill By ICT and online Labs
- To achieve the academic standards which are decided in Science subject

Such as

1. Conceptual understanding
2. Asking questions and making hypothesis
3. Experimentation and field investigation
4. Information skills and projects
5. Communication through drawing and model making
6. Appreciation and aesthetic sense, values
7. Application to daily life concern to biodiversity

- To make the teachers to teach science effectively using ICT and digital technology.

Design of the innovation:

Introduction

The world is changing rapidly towards Digital technology and the present generation students still more interested in digital technology and ICT. Not only students but also everyone aware of technology and using of this technology from cell phone to Notepad or laptop. Even remote village people also aware of usage of cell phone. They also using many Apps for their utilization. For them Google became "Grandma" (అమ్మమ్మ Everyone asking their problem and question For Google only. In olden days we use to ask Grandparents).

In teaching and learning process to reach this generation student the old methods of teaching and learning process on blackboard will not be fruitful as much as they required. We have to think for them latest technology upgraded methods to teach and include them in our teaching learning process to get our learning outcomes.

Our Physical science textbook has been designed with more number of activities in each lesson the teacher had a challenging task. To overcome all the activities in the specific time table experience and observations help the students to understand a phenomena and make a prediction about the world.

Description of the innovation:

I selected the following method to teach some topics science.

Conducting experiment with the students by their own hands and making it as video and it is uploaded in YouTube channel. When I said the student they are very enthusiasm in video preparing and they are very happy to see them in YouTube. First I give topic to them and ask to prepare and come who ever explain very well “I am going to take the video of them”.

Surprisingly, Even slow learner also came with well prepared and explained well manner. Here I prepared activity video which is performed by two to three students. I prepared some videos Such as,

- Newton's law of motions for 9th class



Activity done by mallesh, kranthi kumar and yashwanth

Youtube id in English:https://www.youtube.com/watch?v=cx8EDwjgbqQ

Youtube id in Telugu: https://www.youtube.com/watch?v=wa_nYW0J8TI&t=1s

Activity done by Bhanu prakash

- Mass effect on surface area for 8th class

Youtube link:https://www.youtube.com/watch?v=R6PuGA5N5zw

- Removing water of crystallization for 10th class

Youtube link:https://www.youtube.com/watch?v=-r5nPPOrnSE

With the help of students, for next academic year I am planning to give a project on video-based that means student has to prepare their own video about the project topic.

I am also using Kyan to show some of experiment and topics which we cannot perform in Labs. Such as our solar system in 8th class. Here I used "Stellarium" to show the universe and our solar system.

WATCHING THE VIDEO

DISCUSSING WITH OTHER STUDENTS

Stellarium is a wonderful application to know more about Universe. In it we can travel in time that means we can observe Celestial objects of fast ,Present and future Like, previous year solar eclipse and lunar eclipses,and also future Eclipses. Not only eclipses but also the positions of planets at different times. Student enjoyed much with the help of its.

I took them to past that is February 16th, 1980. before my birthday to show full solar eclipse. Here I made two videos, step by step how to use stellarium in Telugu and it is the first video of Telugu explanation in world.(No other videos are available for stellarium in Telugu).

https://www.youtube.com/watch?v=nAfFBRk3v8c

"Google Earth" is also an application to show the surface of moon in 3D. And I am also using VR and AR boxes to show the planets. I purchased AR (Augmented reality) periodic table which is help to visualize the atoms and its electronic configuration.With it student can able see the atom and how the electrons are revolving around the nucleus with in their own orbits. Some more apps like physics lite, periodic table, phet simulations ect.

Problem faced by the teachers

If you want to show any video about science topic we usually search in YouTube. But we get a plenty number of videos among them we have to choose the best and suitable to our topic. And it is time taking process. If we start searching in our classroom it is time consuming process.For this I came with two solutions,

One is selecting best videos and Place them at one place. I did it. I searched some of videos and place them in "4guru.weebly.com".

Second one is I am also able to link my videos with some QR codes with the help of these QR Codes need to enter any link address or website address in search box. We have to just scan the QR code with our mobile to get that video which saves lot of time. (not to wast time in front of students)

Removing water of crystallization

Here I am submitting one activity prepared and linked with a QR code. Just we have to scan the code we get the video. And also I am running a YouTube channel so that it helps to Teacher and as well as Students too.

Formation of chlorine

<u>Outcome Of the Innovation:</u>

- Students so much interest to attend the class.
- The confidence level of the students are very remarkable. Student understanding level increased.
- Below average student is also interest in learning and expressing the activity in their own hands.
- Student can understand and easily they never forget the content.

- Their level of understanding will be increased.
- The scientific temper of the student and teacher will be increased.
- If we create this type of quality videos in teaching learning process students will definitely attracts towards the government schools and government schools will be strengthened.
- It is a heavy work to create this type of teaching learning videos.
- Government also already making videos with the help of Teacher. If we Include students It will be Easy to understand Peer group learning.

Here I am very thankful to SCERT for they given me training about UBUNTU software and how to make videos with the help of kdenlive(for Bhumaiah sir), open shot video editor, screen recording tools, Which are more help full to me in making videos. Once again I am heart full thanks to all.

ICT – students in Computer class

(GHS,Kavadiguda, Hyderabad)

GROUP ACTIVITY

GROUP ACTIVITY

With out Science exhibition there is no science teaching and learning process

Attended various science training

(A lightning candle can light more candle)

Implications:

Here I would like to say something,

That every School must and should have their own youtube channel and they have to upload all the activities like Jan 26, June 2, Aug 15 programs etc, and also other activities performed by all subject teachers. It will not only help to future generations but also channel provides revenue to school (if it has 1000 subscribes and 4000 watch hours).

References:

1.8,9,10 physical science text books

2.ICT training module

3.Internet/troer site

4.Self experiences

Activity which is linked with QR code

Learning Outcomes/Aim

To know about the relation between force, mass and acceleration. Newton's Second Law of Motion.

Materials Required:

Wooden block and spring balance of 5 N.

Precautions:

1. A suitable spring balance to pull the block must be used.
2. The spring balance should be brought in elastic mode before doing the experiment.
3. The reading of the spring balance should be taken without any parallax error.
4. A smooth table or surface must be used.

Procedure in a real lab:

1. A wooden block with a hook is placed on a table.
2. Note down the least count of the spring balance.
3. The spring balance is attached to the hook.
4. Hold the spring in such a way that the reading displayed in the spring balance can be noted down without any parallax error.
5. The applied force on the spring balance is gradually increased until it just starts to move.
6. The reading of the spring balance is noted.

Procedure using simulator:

1. From the combo box, select Environment, where the experiment to be carried out.
2. Note down the least count of the spring balance.
3. The user can increase the mass of the block by changing the slider 'mass of the block'.

4. The user can also change the roughness of the table by changing the 'Roughness of the table' slider.

5. Apply force on the spring balance by changing the 'Apply force in Newton' slider.

6. The 'Reset' button can be used to reset the experiment to its initial state.

Observation:

Least count of the spring balance = value of 1 small division = …….g.wt

Trial No;	Mass of the block, M (kg)	Force required, F (N)

As the mass of the block increases the force required to move the block is also increases.

Result:

Force applied to just move the block is directly proportional to the mass of the block.

ie, F ∝ M

https://youtu.be/1srdDxmWe34
https://youtu.be/XmNQ2iMcB_U

Personal details for Science Day Seminar Article.

1. **Name of the Applicant : PESARA PRABHAKAR REDDY**
2. **Gender : MALE**
3. **Father Name : PICHI REDDY**
4. **Educational Qualifications:**

Academic: 1. B. Sc (BZC) Osmania University, I Class.

2. M.Sc (Bot) Osmania University, I Class.

Professional: 1. B. Ed (Bio-Sc) Osmania University, I Class.

2. M.Ed (Edn) S.V.University, I Class.

3. M.Phil (Edn) Osmania University, I Class.

5. **Date of Birth : 01-06-1968.**
6. **Age (in years) : 50 Years.**
7. **Present Profession:**

a) Professional Experience: 23 years.

b) Office Address: S.A (Bio-Sc)

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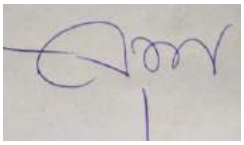
ZPSS M. J. PALLY.

Kamepally (M), Khammam (Dt).PIN: 507182.

17. Signature of the applicant:

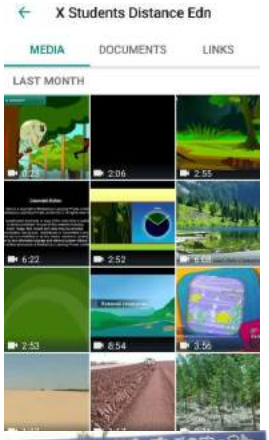


Theme: School Science curriculum – Needs and challenges.
Sub-theme: ICT – Science Teaching
Title of the Paper: MOOC model Pedagogy in School Education.

Objectives:

- **To create awareness on the positive use of social media.**
- **Utilize the Attraction of the social media on the students.**
- **Utilize ICT.**
- **Enhance the result percentage of X class students.**

Introduction: Under various articles of the Indian Constitution free and compulsory education is provided as a fundamental right to children between the ages of 6 and 14. As per those articles and Acts all the school aged children must be in the school and they must achieve their age level and class level competencies. My School Zilla Parishad High School Mucherla Jastipally is located in the agency area of Khammam District of Telangana state. As we know that Education in India is provided by the public sector with control of funding from three levels: Central, State and Local. My school comes under Local bodies. Class level, age level and subject specified competencies are fixed by the TS SCERT and according to that new text books are also prepared as per the guidelines of the NCERT from time to time. According to this class and subject wise Academic standards and Learning Outcomes are prepared. According to the RTE-2009 the Learning outcomes are to be developed. National Curriculum Framework-2005 and State Curriculum Frame work-2011 stated that Learning is a continuous process. And the National Achievement Survey results showed that the majority of students are not in a position to achieve the prescribed academic standards or Learning out comes.

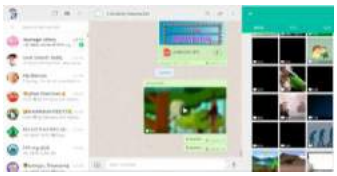


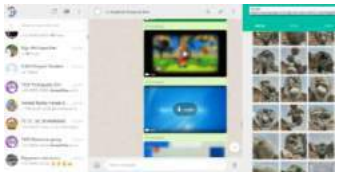
What are the existing solutions: we are in progress for Access to Education, 100% Enrolment, Retention and Transition to higher classes. Appointment of subject teachers, in-service trainings for the teachers, and infrastructural facilities are not only the solutions to achieve the students in their academic subjects.

What are the alternative solutions: change in the pedagogy, change in the mind set of the teachers, parents and change in the mindset of students are some solutions and more over capturing the digital opportunities in the field of Education is the one of the solution. Use of ICT in the field of Science is enhances the grasping power of the students and finally it increases the result percentage also.

My solution: Use of digital technology and social media in teaching learning process is my alternative solution for the proper achievement of the learning outcomes by the students.

Title of The Topic: **MOOC model Pedagogy in School Education.**





Importance of the Topic: Nowadays the role of Information and Communication Technology (ICT), in the education sector plays an important role, especially in the process of empowering the technology into the educational activities. ... "ICT plays a catalytic role in enhancing learning in classroom and beyond. Social media helps to enhance student academic performance and increase their knowledge through data and information gathering. When students are been given an assignment in school, they go through various online platforms to gather information so as to find solutions to their assignment. In a small observation I found that most of the students are using social media for their academic excellence with the permission of their parents. It leads me a conclusion that why don't I use the social media and internet for enhancement of Science learning in the students.

Design of the innovation: Now a day's using the social media is very common in the college students and gradually started in school age children also. To capture the attraction of social media I introduced the MOOC model pedagogy in my school. MOOC (Massive Open Online Courses) are free online courses available for anyone to enroll. MOOC provides an affordable and flexible way to learn new skills, advance our career and deliver quality educational experiences at scale.

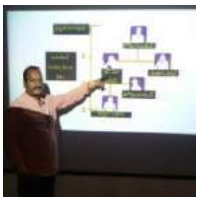
In addition to traditional course materials such as filmed lectures, readings, and problem sets, many MOOCs provide interactive courses with user forums to support community interactions among students, professors, and teaching assistants as well as immediate feedback to quick quizzes and assignments. MOOCs are a recent and widely researched development in Distance Education. Which were first introduced in 2006 and emerged as a popular mode of learning in 2012.

Early MOOCs often emphasized open-access features, such as open licensing of content, structure and learning goals, to promote the reuse and remixing of resources. It is a type of Online-based or Web-based distance learning, does not have limitation in terms of participants there is creativity and openness, Allows the participant to share readings, videos and activities.

As a teacher, I am trying to implement MOOC model pedagogy in my school, by creating whats app broadcast group for X class students, and running a broadcast channel by whats app. Subject related matters are posted in this group and the students are advised to make use of them with the co-operation of their parents. I advised the parents to install the Telegram app to for easy access to the science videos from me. I am also doing one more thing that I am running my channel through you tube.
https://www.youtube.com/channel/UCk2nvH_Qja0Pe_9RvC5vrug?view_as=subscriber .

By this I am uploading some videos related to science, awareness programmes and student related posts which are created by me. I felt that, this is also web based distance learning and does not have limitations in terms of participants and there is a chance to creative and openness also. My Goal is to reach all the Students who are studying in the Government schools by this type of pedagogy and enhance their science learning and results percentage. For this I adopted a Method that preparing the videos according to the needs of the students of their level/standard/class.

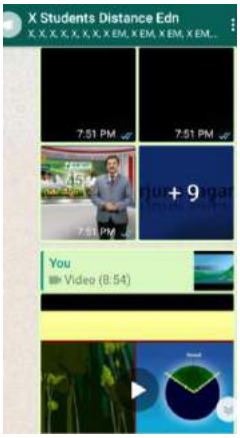
Description of the Innovation (Methodology): we knew that ICT and the internet are powerful resources and play a key role when we apply within education. As such, creating a safe and Secure ICT environment is provided in our school. When we show the digital videos and even though we explained in detailed manner, students having some doubts and they want to see the video once again. This leads to a conclusion that is it possible to give the video to the student's home. Then we think about the solutions and we thought that why don't we take the help of social media. As a Biological Science teacher dealing 10th class English medium, I started my work with the permission of my Head of the Institution (Headmaster). In the part of the Parent Teacher Association (PTA) meetings I collected the mobile number of the parents who attended to the PTA meeting. From the both the media parents I collected only the parents of EM students as my sample. I requested and instructed the parents to allow their children to use their mobile phones for educational purpose for their learning enhancement. Some of the parents suspected that the use of mobile phone usage by the students leads to some other complications, and with the help of my colleagues I explained the purpose in detail. After a long discussion finally all the parents agreed to give their mobile phones to their children and allow using them strictly for academic purpose.



By the gathered mobile numbers I created a whats app broadcast group named as X students Distance Education. I started sending science related material which is useful to the students and which will enhance the science learning. Students are receiving the same by the co operation of the parents. In the similar manner my you tube channel address is also given to the students to access the videos or the content easily. Kidney dissection, heart dissection, vriksha raksha bhandan, Haritha haram videos and some other science related videos are uploaded in to you tube and disseminated to the students through this platform. "They are writing something even though they are engaged with mobile phones," comments from the parents. I am doing this process every year for the 10th class English medium students. 10th class student's data was collected and analyzed.

Analysis:

Sl. No	Year	appeared No. in TM	Passed No. in TM	appeared No. in EM	Passed No. in EM	Remarks
1	2016-17	72	68	38	38	EM % high
2	2017-18	61	45	54	49	EM % high



Outcomes (Results and Findings) of the Innovation:
When we analyzed and compared the our school TM students results with the EM students there is a lot of variation in the pass percentage and huge variation is also seen in the Grades also. EM students getting good results when compared with the results of TM students.

What is the main limitation: Of course there is a limitation. In government schools, most of the student parents are below poverty line and in particularly rural and agency areas economically weaker sections prefer the Government schools. Access of mobile/smart phones to the students with the co operation of parents is the main limitation.

What is my hope to achieve: A digital culture is developing rural areas to purchase the mobile phones and particularly smart phones, and for the operating purpose they are depending on their children. So automatically students got the access for the mobile phones.

I achieved what I had set: Awareness on Education is also increased in the society. So they are accepting their children to use the phones for the educational purpose. With the co-operation of the parents students are able to access the mobile phones and following the instructions, guidelines and video lectures of the teachers and they are learning at their respective homes easily. I hope and observed that their Science learning and results percentage are enhancing year by year. But the number of students in the group is less than the number of students in the class room. This is a barrier for me.

Conclusion: The role of ICT in education currently provides a growing range of tools to manipulate digital data, as well as access to the vast range and variety of content only some of which is designed to support learning particularly in Science teaching. In order to harness the power of these technologies to serve science education it is necessary first to identify the precise objectives of that education and then to match appropriate use of the technologies to the achievement of those objectives. I am using the ICT tools like computer and projector based video lessons, TV based T-Sat vidya live digital lessons and self made videos for the better understanding of the students. As a digital lesson presenter I am learning day by day that how to implement the ICT in the field of Science Education. For this I appeared an orientation on ICT in education in Mysore also. By the utilization of the ICT tools and using the social media as a tool for my MOOC model pedagogy was giving me the fruitful results.

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Theme

SCHOOL SCIENCE CURRICULUM- NEEDS AND CHALLENGES

Sub-Theme

ICT-SCIENCE TEACHING

Title of the Topic

A Comparitive Study on Impact of ICT in Teaching Learning Process among 8th Class Students of ZPHS Addagudur, Addagudur Mandal, Yadadri-Bhongir District.

Objectives

- ✓ To study whether ICT based learning improves students learning or not.
- ✓ To study whether ICT based learning applicable to Science subjects like Physical sciences.

Design of the innovation

I wish to know the impact of ICT in Teaching learning process, specially in Science Subjects like Physical Sciences.

So, I selected 8th Class Students in my school (ZPHS Addagudur). the strength of 8th class Students in my school is 38. From them, I have selected 32 students in stratified sampling method and divided the students into two groups, viz Group A, and Group B. in both groups A grade, B grade and C-grade D grade and E Grade Students are present. And same number of Girls and Boys (Boys -16 and Girls - 16)

Here **Group A is Control group and Group B is Experimental Group.**

Means Group B students are exposed to ICT Based Learning along with Regular Classes where as Group A Students are Exposed to only regular classes. In the time of Group B ICT classes, Group A is instructed to learning/ revise their Topics separately.

Description of groups

Group Name	Type	Quantity of students	A grade Students	B Grade students	C Grade students	D & E Grade Students	Boys	Girls
Group A	**Control group**	16	03	05	05	03	08	08
Group B	**Experimental Group**	16	03	05	05	03	08	08

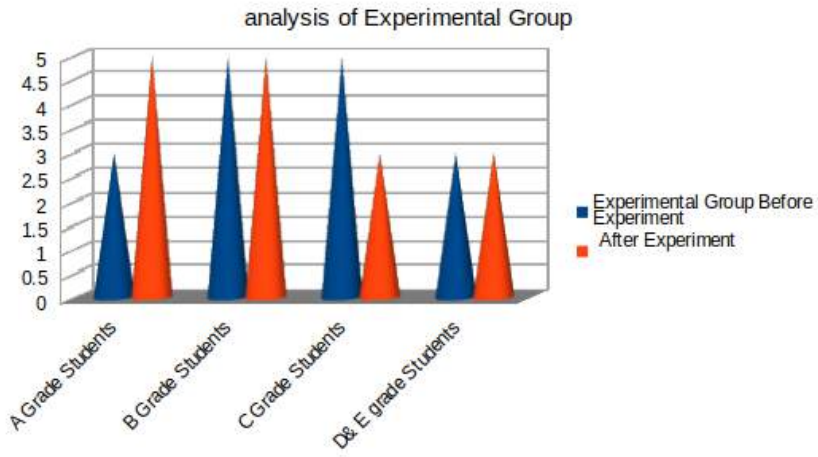
Outcome of the innovation

the formative assessment- 4 of the groups are came as followed.

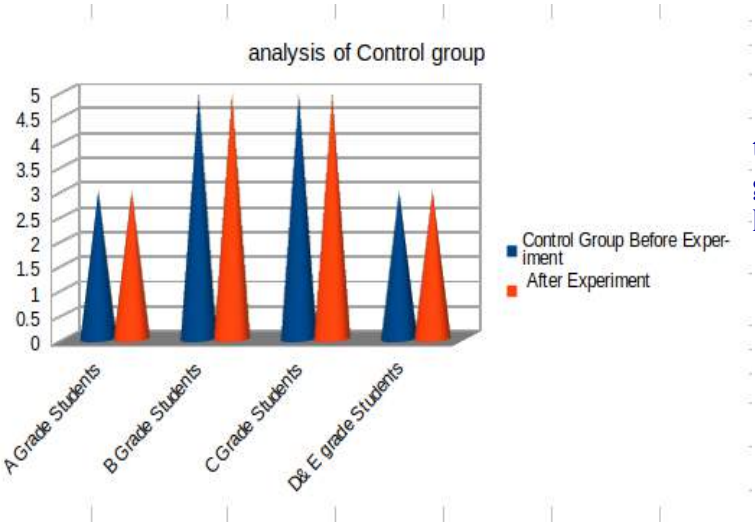
Group	Type of group	A Grade Students	B Grade Students	C Grade Students	D & E Grade Students	Boys	Girls
Group A	Control	03	05	05	03	08	08
Group B	Experimental	05	05	03	03	08	08

Results in Formative Assessment :

The analysis of Formative Assessments 3 & 4 of 8th Class Students in Physical Science Students.



From the Chart we can Conclude that ICT enabled (Experimental group) shows increase in their learnings.



From the Chart we can Conclude that Non ICT enabled (Control) group shows no increase in their learnings.

Implications

Students at all grade levels (A,B,C,D & E) need Individual differences in learning science. And It can be possible with ICT Learning. While it is important for **conceptual understanding** to be based in concrete experiences, school students will learn it by ICT based Teaching learning process.

Experimental group students are good in Formative assessment because they are exposed to ICT bases Learning than Control group students(Non ICT Bases learning).

Some Implications are..

- Students With ICT based Learning showed Good Performance than Non-ICT based learning.
- Because ICT based Learning uses Audio-Visual content, Simulation and Virtual Laboratories.
- ICT based leaning group shows much impact on B and C grade students. They are improved their learning.
- ICT based Learning is shown less impact on A grade and E grade students.
- In experimental group, C grade students increased their learning and got B grade and Some B grade students increased to A grade.
- ICT based learning is Very useful to Rural Area Students.
- Motivates Backlog (C Grade) Students in Science.
- Information Technology skills also Increases.

References :

- SCERT, UNICEF and SIET Digital Content.
- UBUNTU software, Internet and Youtube
- ZPHS Addagudur, Addagudur (Mdl) Yadadri-Bhongir District.
- ICT Work Shops For Teachers Conducted by RMSA-Telangana Sate.

Passport size photo

A Study on Knowledge of Computers and Attitudes of Science Teachers

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Abstract

The central and state governments are taking tremendous efforts to implement the computer application in the process of teaching and learning and Govt. has introduced computer course in high schools by providing and establishing computer labs in high schools with suitable software. In the present study, an attempt has been made to study the knowledge of computers and attitude of teachers towards computers.

The present study aims at finding the levels of use of computers, its knowledge and attitude towards computers among high school teachers. 100 teachers were randomly selected from high schools as sample. A test was conducted to measure the knowledge and attitude towards computers among teachers.

Majority of the teachers working in the high schools, have low level of computer knowledge and also they have a relatively favorable attitude towards computer. This reveals that the computer knowledge of the teachers needs to be improved and the Education department should take necessary steps to train and use the computers in teaching learning process.

Keywords: Knowledge, attitude, teaching, learning computers.

Introduction

The teaching and learning process has been altered by the convergence of a variety of technological, instructional, and pedagogical developments in recent times. Technology is challenging the boundaries of the educational structures that have traditionally facilitated learning. The development in various aspects of computer technology has reached beyond our imagination and expectations. It is very useful and helpful in the teaching and learning process. Therefore, computer literacy is very much needed for teachers as well as learners. The computers have created a revolution in the content of education and in the nature of learning process.

Main function of secondary education is to prepare the young to live effectively and properly as adults in the society. It will also help to develop intellectual powers of the young and transmit the knowledge and wisdom of the society to the new generation. Now a days the world is changing rapidly with the technological advancement. So students must cater with the needs of the society.

Computers have a great impact upon our educational system. Computer knowledge may be stated as "knowing about the various fundamental aspects of computers and the basic skills involved in the operations of computers". It also includes the applications of computer in teaching and learning process. E-Learning helps the learner to know about the subject he/she wants to learn with the help of the latest technology, the computer. Favourable attitude towards computer plays a very important role in making one really interested in it. Unless the teachers possess a favourable attitude towards computer, they may not be interested in it, which in turn will affect their knowledge of computer and also they will find teaching with help of computer difficult, which in turn will affect students learning. Therefore, if the teachers have favorable attitude towards computer, then there may be a chance for them to be motivated in acquiring knowledge of computer, as it is clear that the computer knowledge is very much needed for teachers.

The central and state governments are taking tremendous efforts to implement the computer application in the process of teaching and learning. The state government has introduced computer course in the high schools and in other classes also. The government has started supplying computers with suitable software and has started providing facilities to develop computer laboratory. At this juncture, we felt that there is a need to know the knowledge of the computers and the attitudes of teachers and an attempt has been made to study the teachers' computer knowledge and their attitude towards computer.

The computer knowledge possessed by the teachers will be very useful to them for their future development, effective teaching and for their academic growth.

Objectives of the study

1) To find out the level of computer knowledge of teachers

2) To study the teachers' attitude towards computer

3) To study the significance of the difference between the sub-samples of the teachers in respect of their computer knowledge and their attitude towards it.

4) To study the nature of the relationship existing between the teachers' computer knowledge and their attitude towards computer.

HYPOTHESES

1. Teachers working in government schools have a significant difference in the computer knowledge between: Male and female teachers; urban and rural school teachers
2. There is significant difference in the attitude towards computer between the Male and female teachers; Teachers working in urban and rural schools
3. There is significant relationship between the computer knowledge of teachers and their attitude towards computer.

PROCEDURE

Tools used were:

Constructed and validated the Attitude towards Computer Scales.

A Questionnaire to Test the Computer Knowledge was prepared containing 20 multiple choice questions for 20 marks and the person one who scores above 15 is said to have high level, score 14 and below is said to have low level of computer knowledge.

Sample: The present study was conducted in Warangal district of Telangana, India. 100 teachers were randomly selected from 10 Government High Schools. Out of these 5 schools from urban and remaining 5 were from rural areas. This sample of 100 teachers working in the High Schools is found to have the following sub-samples:

(i) Male (N=70), (ii) Female (N=30),

(iii) Teachers' working in urban schools (N=60),

(iv) Teachers' working in rural schools (N=40).

Statistical Treatment of the Data

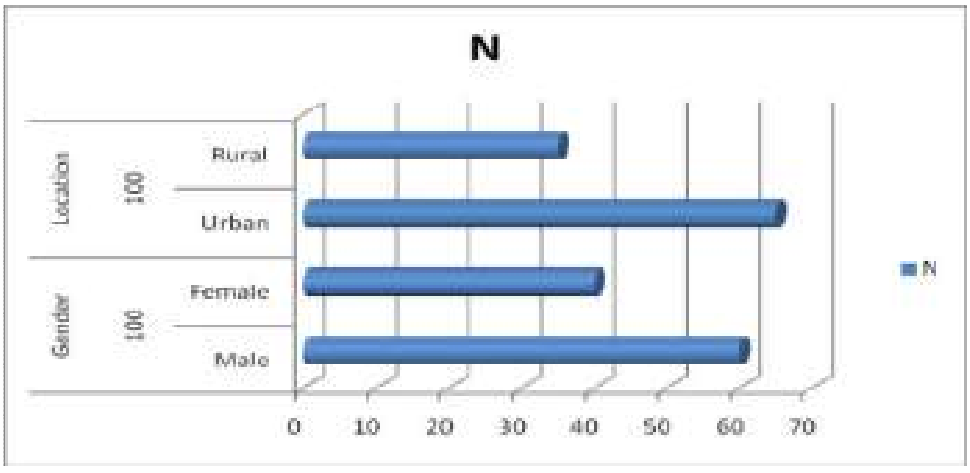
The means and standard deviations of the computer knowledge scores and Attitude towards computer scores were computed.

The test of significance was used ('t' test) in order to study if there was any significant difference between each selected pair of sub-samples in respect of their computer knowledge and their attitude towards computer.

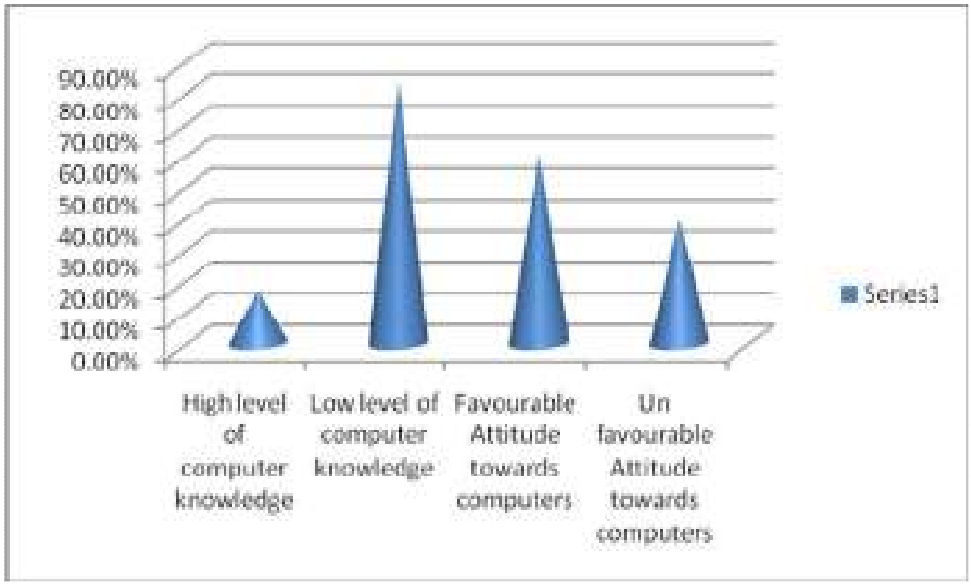
Statistical Treatment of the Data

The percentages of computer knowledge of Male and Female, Rural and Urban teachers and also the attitude towards computers also were computed directly.

Variable	**Total**	**Category**	**N**
Gender	100	Male	60
		Female	40
Location	100	Urban	65
		Rural	35



High level of computer knowledge	16.70%
Low level of computer knowledge	83.3%
Favourable Attitude towards computers	60.40%
Un favourable Attitude towards computers	39.60%



Computer knowledge	Female is better than males
	Urban is better than rural
Attitude towards computer	No significant difference in males and females
	Urban is more positive attitude than rural

FINDINGS

The results showed that there was;

In respect of the entire sample of teachers, only 16.70% of them belonged to the high level of computer knowledge and as much as 83.30% of them belonged to the low level of computer knowledge. This trend is seen in respect of the sub- samples, too. These findings reveal that the teachers are weak in their computer knowledge.

As much as 60.40% of the teachers had relatively a favourable attitude towards computer and only 39.60% of them had relatively an unfavourable attitude towards computer. This trend is seen in respect of the sub samples, too.

There was a significant difference in computer knowledge between the male teachers and female teachers. Moreover, the female teachers were better than their male counterparts in their computer knowledge.

There was significant difference in computer knowledge between the teachers working in the urban and rural schools. Moreover, the teachers working in urban schools were better than their rural counterparts in respect of their computer knowledge.

There was no significant difference in attitude towards computer between male and female teachers.

There was significant difference in attitude towards computer between the teachers working in the urban and rural schools. Urban teachers have more positive attitude towards computers.

There is a significant and positive relationship between the computer knowledge and the attitude towards computer of the high school teachers.

CONCLUSION

The study served as an eye opener regarding the use of computer knowledge and their attitude towards computer of high school teachers. It is a very unique study conducted to study the high school teachers' on computer knowledge and their attitude towards computer. People are living in a society with numerous applications of computer technology; hence, achieving the goal of computer literacy is currently implemented in schools at various levels. In general, computer literacy includes basic knowledge and skills of computer technology (computer achievement), computer attitudes. This study viewed teachers' computer knowledge and their attitude towards computer s.

The present study has revealed many interesting findings. The majority of teachers working in the high schools belong to the low level of computer knowledge and majority of teachers have a relatively favorable attitude towards computer. This reveals that the computer knowledge of the teachers needs to be improved.

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పేరు: టి.రాజశేఖర్ రావు,
స్కూల్ అసిస్టెంట్ – జీవశాస్త్ర భోధకులు.

చిరునామా: జిల్లా పరిషత్ ఉన్నత పాఠశాల
గ్రామం:వెన్నచెర్ల, మండలం: పెద్దకొత్తపల్లి, జిల్లా: నాగర్‌కర్నూల్.
సెల్: **9494885340**

శీర్షిక:

పాఠశాల స్థాయి విజ్ఞానశాస్త్ర ప్రణాళికల అమలు మరియు ఎదుర్కొంటున్న సవాళ్ళు.

ఉపశీర్షిక:

వినూత్నమైన విజ్ఞానశాస్త్ర భోధన ద్వారా విద్యార్థులల్లో సృజనాత్మకత పెంపొందించుట.

అధ్యయన శీర్షిక:

సృజనాత్మకత ఆలోచనలను పెంపొందించడానికి వినూత్న పద్ధతిలో సైన్సు బోధనను కేయాన్ ద్వారా నిర్వహించుట.

లక్ష్యాలు:

- విద్యార్థులలో ఆధునిక కాలంలో సంతరించుకుంటున్న నూతన సాంకేతిక సమాచార రంగంలో వస్తున్న మార్పులకు అనుగుణంగా విద్యా ప్రమాణాలను సాధించడం.
- సైన్సు బోధనలో ఆమూర్త భావన లోని అంశాలను విద్యార్థుల మనసులలో సహేతుకమైన ఆలోచన లను పెంపొందించే విధంగా చేయండం.
- సమస్యను గుర్తించడం, పరిష్కార మార్గాలను అన్వేషించడంలో సాంకేతిక పరిజ్ఞానాన్ని పెంపొందించకోవడం.
- చదవడం, రాయడం, అవగాహన చేసుకోవడం వాటికోసం స్వీయ అభ్యసనా ప్రక్రియలను పెంపొందించుకోవడంలో సహాయ పడడం.
- బృందచర్చ, నాయకత్వ లక్షణాలను అలవర్చుకోవడంలో సహాయపడడం.
- సమాచారము వంటి భావవక్తీకరణ ప్రక్రియలను సాంకేతిక అంశాలను ఉపయోగించి సృజనాత్మకత ఆలోచనలను పెంపొందించడం.
- సాంప్రదాయ పద్ధతిలో భాగంగా ఉపన్యాస పద్ధతి, ఉపన్యాస ప్రదర్శనల ద్వారా జరిగే భోదనలో ఆధునిక సాంకేతిక సాధనమైన కేయాన్ ను ఉపయోగించి విద్యార్థులలో సృజనాత్మకత ఆలోచనలతో పాటు విద్యా ప్రమాణాలను పెంపొందించేలా చేయడం.

అధ్యయనం యొక్క రూపకల్పన:

- విజ్ఞాన శాస్త్ర బోధనా ప్రక్రియలో భాగంగా విద్యార్థులలో విజ్ఞాన శాస్త్రం పట్ల ఆసక్తిని పెంపొందించడంలో భాగంగా 10వ తరగతి పాఠ్య ప్రణాళికలోని కొన్ని అంశాలను కేయాన్ ద్వారా బోధించుట.
- సాంప్రదాయక విజ్ఞానశాస్త్ర బోధనలో కొన్ని పద్ధతులను ఆధునిక సాంకేతిక సాధనమైన కేయాన్ లో మేళవింపు చేస్తూ విద్యాబోధన కొనసాగించాను.
- తీసుకున్న అంశాలు విద్యార్థులలో ఆసక్తిని రేపడంతో పాటు సాంకేతిక పరిజ్ఞానం నేర్పడం ఒక లక్ష్యంగా నిర్ధారించుకున్నాను.

కేయాన్:

ఇది ఆధునిక సాంకేతికతో కూడిన ఉన్నత స్థాయి సాఫ్ట్‌వేర్‌ను కలిగిన దృశ్య శ్రవణ సాధనాలతో కూడిన యంత్రం. సాధారణంగా బోధన్యాభ్యాస ప్రక్రియలో ఉపాధ్యాయుడు తరుచుగా నల్లబల్ల ఉపయోగిస్తాడు.

- అదే కేయాన్‌లో వైట్ స్క్రీన్‌పై డిజిటల్ పెన్ సహాయంతో భోదనాంశాలను రాయవచ్చు, ప్రదర్శించవచ్చు.
- కావలసిన రంగులలో, కావలసినంత పెద్ద అక్షరాలతో అక్షరాలను డిజిటల్ స్క్రీన్‌పై రాస్తూ

పాఠ్యాంశాలలో అవసరమైన చోట అంశానికి సంబంధించిన వీడియో మరియు ఆడియో లింకును కూడా ఉపయోగించుకోవచ్చు.

- పాఠ్య ప్రణాళికకు సహాయపడే లైబ్రరీలోని చిత్రాలను, ఫ్లో చార్ట్ మరియు అంతర్జాలంలో వున్న విజ్ఞానశాస్త్ర సంబంధ అంశాల సమాచారాన్ని బోధించవచ్చు.

అధ్యయన వివరణ:

- సాంప్రదాయ బోదన పద్ధతుల ఆధారంగా చేసుకొని విద్యార్థులలో విద్యా ప్రమాణాలను సాధించడంలో భాగంగా కేయాన్‌ను ఉపయోగించాలి.

విద్యాప్రమాణాలు వరుసగా

విషయఅవగాహన, ప్రశ్నించడం పరికల్పనచేయడం, ప్రయోగాలు – క్షేత్ర పరిశీలనలు, సమాచార నైపుణ్యాలు – ప్రాజెక్ట్ పనులు, బొమ్మలు గీయడం, నమూనాలు తయారు చేయడం ద్వారా భావ ప్రసారం, అభినందించడం, సౌందర్యాత్మకత కలిగివుండడం, నిత్యజీవితంలో వినియోగం. వంటి అంశాలతో కూడిన పాఠ్యప్రణాళికను నేను కేయాన్‌లో రూపొందించుకున్నాను.

- **పదవతరగతి జీవశాస్త్రం లోని పోషణ–ఆహార సరఫరా వ్యవస్థ** పాఠానికి సంబంధించి పాఠ్యప్రణాళిక రూపకల్పనలో కొన్ని అంశాలను కేయాన్‌లో బోధించాను.
- ఈ పాఠంలోని విద్యా ప్రమాణాలను సాధించడం కొరకు 10 పిరియడ్స్ కేటాయించుకోవడం జరిగింది. దీనిలో 5పిరియడ్స్‌ను కేయాన్ ద్వారా బోదించాను.

మొదటి పిరియడ్ తీసుకున్న అంశం:

- స్వయం పోషకాలు, పరపోషకాలు మరియు కిరణజన్యసంయోగక్రియ.

ఉపాధ్యాయుని కృత్యం:

- చర్చ – ప్రదర్శన పద్ధతి ద్వారా పాఠ్యాంశాలలోని కీలక పదాలను గుర్తించి వాటి అర్థాలను చర్చ రూపంలో విద్యార్థులు తెలుసుకుంటారు.
- డిజిటల్ స్క్రీన్‌పై విద్యార్థులు చర్చించిన అంశాలను రాయడం జరిగింది.

ఆశించిన ఫలితం:

- విద్యార్థులు చర్చల ద్వారా తెలుసుకున్న అంశాలను ఆకర్షనీయమైన రంగులతో కూడిన అక్షరాలను చూసి తమ నోట్‌బుక్‌లో రాసుకున్నారు.

రెండవ పిరియడ్: – అంశము: మోల్స్ అర్ధపత్ర ప్రయోగము:

- **ఉపాధ్యాయుని కృత్యము:** ప్రయోగాన్ని సిమ్యులేటర్ అప్లికేషన్ ద్వారా విద్యార్థులకు వివరించడం.
- **విద్యార్థి కృత్యము:–** ప్రయోగ నిర్వాహణకు కావలసిన పరికరాలను, ప్రయోగ విధానాన్ని నేర్చుకుంటాడు.

- **బోధనోపకరణము**:- సిమ్యులేటర్ అప్లికేషన్:
- **ఆశించన ఫలితము:**- ఎక్కువ సమయాన్ని తీసుకునే ప్రయోగాలను, కొన్ని వీలుకాని ప్రయోగాలను సిమ్యులేటర్ అప్లికేషన్ ద్వారా నేర్చుకున్నారు.

మూడవ పిరియడ్:- అంశము: కిరణజన్య సంయోగక్రియ విధానము:

- విడియో ప్రదర్శన ద్వారా కిరణజన్య సంయోగ క్రియ లోని ప్రక్రియలను అంతర్జాలంలో వున్న విడియోల ద్వారా తెలుసుకొని విద్యార్థులు ఆయా అంశాలను తమ నోటుబుక్‌లో రాసుకున్నారు. విద్యార్థులలో ఆశించిన ఫలితము: కిరణజన్య సంయోగ క్రియ అనే ఆమూర్త భావనను సాధ్యమైనంత వరకు సులభంగా విద్యార్థులు నేర్చుకున్నారు.

నాల్గవ పిరియడ్: అంశము: జీర్ణవ్యవస్థ:

- విద్యార్థులలో ఈ అంశాన్ని అర్థం చేయించడం కోసం నేను రోల్ ప్లే విధానాన్ని అనుసరించాను.
- జీర్ణ వ్యవస్థలోని అవయవ భాగాలను డిజిటల్ స్మార్ట్ బోర్డుపై గుర్తించి ఒక్కొక్క విద్యార్థి తనకు కేటాయించిన అవయవ బాగం యొక్క పని విధానాన్ని గురించి ఇచ్చే అర్థ వివరణను విడియోల రూపంలో తీసి డిజిటల్ స్మార్ట్ బోర్డుపై గీసిన చిత్ర భాగాల పేర్ల ప్రక్కన విడియో లింకులను అనుసంధానించడం వల్ల విద్యార్థులు చాలా సులభంగా అర్థం చేసుకున్నారు.

ఐదవ పిరియడ్: అంశము – ప్రాజెక్ట్ నిర్వాహణ:

పోషకాహార లోప వ్యాధులు, విటమన్ల లోపం వల్ల కలిగే వ్యాధుల సంబంధించిన అంశాన్ని 5 మంది విద్యార్థులతో కూడిన ఒక బృందానికి ప్రాజెక్ట్ ఇవ్వడం జరిగింది. దీనికోసం విద్యార్థులు అంగన్‌వాడీ బడిలోని, ప్రాథమిక పాఠశాలలోని విద్యార్థులను ఆధారంగా చేసుకొని వారిలో ఈ అంశాలను గుర్తించి వారి సమాచారాన్ని సేకరించారు. దీనిలో ప్రధానంగా కాషియోర్కర్, మారస్మాస్, స్థూలకాయత్వం బారిన పడిన బాలబాలికలను గుర్తించి ఆ లోపాన్ని సరిదిద్దు కోవడానకి తీసుకోవలసిన ఆహారపు అంశాలపై అవగాహన కలిగించాను.

- ఈ సమాచారాన్ని విడియోల రూపంలోను, గ్రాఫ్ రూపంలోను భద్రపరిచారు. ఈ విధంగా ప్రతి పాఠ్యప్రణాళికకు సంబంధించిన బోధనాంశాలలో కొన్నింటిని నాకు అనుగుణంగా కేయాన్ ద్వారా బోధించడం జరిగింది. ఈ అంశాలన్నింటిని ఎప్పటికప్పుడు డిజిటల్ రూపంలో నిక్షిప్తం చేసుకొని తదుపరి పునరుద్ధరణ తరగతులలో తిరిగి వాడుకోవడం జరిగింది.

అధ్యయన ఫలితాలు:

- పదవతరగతి పాఠ్యప్రణాళిక లోని కొన్ని అంశాలను కేయాన్ ద్వారా బోధించినప్పుడు విద్యార్థులు చాలా సులభంగా అర్థం చేసుకున్నారు. అంతేకాకుండా నిర్మాణాత్మక మూల్యంకనములో మంచి

ప్రగతిని సాధించారు.

కేయాన్ ద్వారా జరుపుతున్న బోధనలో వున్న అవరోధాలు:

- బోధనలో ఐ.సి.టి. ఉపయోగించుకోవడం ఆధునికత అయినప్పటికీ బోధనాభ్యాస ప్రక్రియలన్నింటిని కేయాన్ ద్వారా బోధించడం సాధ్యం కాని పని.
- ఇది సాంప్రదాయ విజ్ఞాన శాస్త్ర పద్ధతులకు పూర్తి ప్రత్యామ్నాయం కాదు.

విద్యార్థులు ఎదుర్కొనే సమస్యలు:

- కేయాన్ ద్వారా అన్ని తరగతుల విద్యార్థులకు బోధన సాధ్యం కాదు.
  ఎందుకనగా ఈ పరికరం చాలా ఖరీదైనది. (దాదాపు రూ॥ 1,20,000/-లు) దీని ద్వారా జరిగే బోధనలలో తరగతి గది విశాలము గాను కొంత చీకటిగాను వుండాలి.
  దీనివల్ల కొంత తక్కువ కంటి చూపు వున్న విద్యార్థులకు ఇది అంత ఉపయోగకరం కాదు.
- డిజిటల్ స్మార్ట్ బోర్డుపై అంశాలను వ్రాసే క్రమంలో తెరపై పడే కాంతికి అవరోధంగా వస్తే వ్రాత అంశాలను వ్రాయడం ఇబ్బంది కరంగా వుంటుంది.
- పాఠ్యంశాలన్నింటిని దీనిద్వారా బోధిస్తే విద్యార్థులలో క్రమంగా అనాసక్తి ఏర్పడుతుంది.

సాంకేతిక సమస్యలు:

సాంకేతిక నైపుణ్యంపై కొంత ఆసక్తి కలిగిన విద్యార్థులు మాత్రమే దీనిని ఇష్టపడుతారు.

- కేయాన్ సాఫ్ట్‌వేర్‌లో స్థానిక భాషలకు పెద్దగా అవకాశం లేదు. అంతేగాక మైక్రోసాఫ్ట్ ఆఫీస్ లోని యం.స్.వర్డ్, యం.యస్ పవర్ పాయింట్ వంటి కీలకమైన అప్లికేషన్లు లేకపోవడం వల్ల కొన్ని పాఠ్యంశాలను బోధించుట కష్టతరం.

నిర్వహణా సమస్యలు:

- కేయాన్ ధర సుమారు రూ॥ 1,20,000/-లు కాబట్టి దీని నిర్వాహణ వ్యయభరితం.
- దీని నిర్వహణకు గాను పాఠశాల గ్రాంట్స్‌లో నిధులు కేటాయించడం లేదు.
- విద్యుత్ సమస్య కూడా బోధనకు అవరోధకంగా మారుతుంది.

రెఫరెన్స్:

1) కేయాన్‌కు సంబంధించిన బుక్‌లెట్
2) జీవశాస్త్ర బోధనాపద్ధతుల పాఠ్యపుస్తకం.
3) అంతర్జాలసమాచారము.

PROMISING ACHIEVERS

In INSPIRE Awards – MANAK, 7th NLEPC, 5 projects from Telangana were found place among top 60 projects at National Level. The top 60 projects are selected for National Awards and will be showcased at the Annual Festival of Innovation at Rashtrapathi Bhavan, New Delhi.

1. M. Abhishek, ZPHS Hanmajipet, Rajannasiricilla
2. Md. Zaki Ahmed, Sri Chaitanya School, Jagityal
3. K. Srija, Krinaveni Talent School Ramagundam
4. K. Sravani, ZPHS Bibinagar, Yadadri Bongiri
5. Keesari Naveen Kumar, ZPSS Nennel, Mancherial

PROMISING ACHIEVERS

3 students from Telangana visited Japan during 20-26 May, 2018 under SAKURA Japan Exchange Programme implemented by Government of Japan.

1. M. Lavanya, MPUPS Chandippa, Shankarpalli, R.R. Dist.
2. Z. Ramgopal, Triveni High School, Alwal, R.R. Dist.
3. B. Sreeyanshu, Alphores High School, Karimnagar.

In **7th NLEPC INSPIRE Awards – MANAK**

M. Abhishek, ZPHS HANMAJIPET, Rajanna Siricilla bagged 3rd National prize and received Rs.10,000/- Cash prize, one Laptop and Memento.

STATE COUNCIL OF EDUCATIONAL RESEARCH & TRAINING
TELANGANA, HYDERABAD