STATE LEVEL SCIENCE SEMINAR 2021

SCIENCE EDUCATION FOR DEVELOPING INDIA

28th February, 2021

Virtual Mode

State Council of Educational Research and Training,
Telangana, Hyderabad

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28th February, 2021

“SCIENCE EDUCATION FOR DEVELOPING INDIA”

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DEPARTMENT OF MATHEMATICS AND SCIENCE

STATE COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING,

TELANGANA, HYDERABAD

Smt. M. Radha Reddy
Director, SCERT

State Council of Educational
Research and Training,
Opp. L.B. Stadium 'E' Gate,
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FOREWORD

The State Council of Educational Research and Training, is an academic wing of Department of School Education in the State. It continuously strives to achieve Academic Excellence in the School Education and also Teacher Education in the State. To facilitate constant professional growth of teachers as well as teacher educators, the SCERT organizes various academic activities which include teacher trainings, workshops, conferences, symposia, seminars, exhibitions, etc., in different subjects and Pedagogical practices.

Every year on 28th February "National Science Day" is celebrated all over the country in commemoration of historic discovery made by Sir. C.V. Raman for which he was awarded Nobel Prize in Physics in the year 1930. All the schools, colleges and other science organizations celebrate this day by arranging, Lectures, Seminars and various competitions such as Essay Writing, Elocution, Science Quiz etc.

On this occasion, the Department of Mathematics and Sciences of SCERT is organizing a State Level Science Seminar on the Theme **"SCIENCE EDUCATION FOR DEVELOPING INDIA".**

In view of Pandemic Situation the seminar is being organized in virtual mode on zoom platform.

In response to our notification an overwhelming number of 160 papers have been received. I appreciate all these science lovers who have sent their papers with lot of enthusiasm.

The papers were scrutinized by senior professors and 30 papers have been selected for presentation. I congratulate all the participants whose papers are selected and who are going to present their papers in this seminar on 28th February, 2021.

I strongly believe that this seminar will inspire all the presenters and audience, to prepare themselves to make science education more effective and purposeful in the light of National Educational Policy 2020.

My hearty greetings to all the teachers, teacher educators and students on the occasion of "National Science Day 2021".

Director, SCERT, TS.

सीसीएमबी CSIR CCMB

कोशिकीय एवं आणविक जीवविज्ञान केन्द्र
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Director

MESSAGE

Science and society in the context of current pandemic: Role of academic institutions

The COVID-19 pandemic has become the worst public-health crisis in a century with over 2.5 million people having died globally. A clear understanding of the drivers of the pandemic, and the intervention and therapeutic measures and policies that work have become the need of the hour. Policy-makers and the general public require evidence-based inputs and clear scientific communication to shape society and medical research and this pandemic is an urgent example of the role that academic institutions have to play. CCMB is tackling multiple aspects of our country's pandemic response which includes testing, training healthcare workers for testing and developing more economical and efficient methods of COVID-19 testing. New research on the SARS-CoV2 virus also carried out at CCMB, addresses its biology and its means of transmission and spread. Academics play a key role at the interphase of scientific discovery and its implementation and propagation for societal benefit. These serve as examples of the importance of investing in scientific advances and R&D as well as communication of scientific developments beyond the academic circle.

23.02.2021

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State Level Science Seminar - 2021

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Sub theme: Games and toys as pedagogical tools for teaching science.

A Study on the role of gaming tools and different types of videos in teaching science during covid time.

Introduction: Science games and activities provide exciting ways to learn about how the world works. Thousands of science games and simulations are available in internet. We can blend those activities, simulations and games in our teaching learning process. These games support learners by engaging them in learning and comprehension. Interactive tests and gaming tools are useful to test their learning. I used various ICT tools to reach out my students during this pandemic time, they are PhEt and net logo simulations, Interactive videos made by Edupuzzle and playposit.com ,aravind gupta toys videos ,experimental videos of mine, interactive cross word puzzles and gaming assessment tools etc. I used to interact with my students through whatsapp, zoom meeting and through DCEB suryapet, DEO khammam and pavithra's VTLM youtube channels. Students participated very actively in teaching learning process through synchronous and asynchronous modes.

Objectives:

To know that how far toy making, experimental videos and simulations helped students in understanding concepts.

To know that the gaming assessment tools like kahoot, quizziz and interactive cross word puzzles were created interest in students.

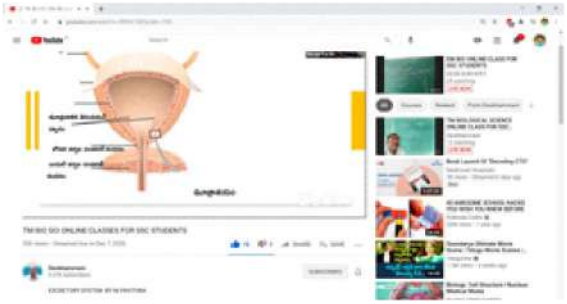
To know that interactive videos are useful for teaching learning as well as assessment.

Presentation:

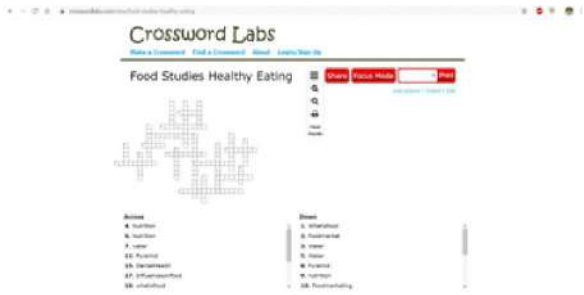
When covid lockdown started I learnt different ICT tools through my friends and through the online training programs and courses. I started using these tools in the month of June in teaching science.I started interacting with my students through whatsapp, my youtube channels and through zoom classes. I used to teach them most of the times through you tube channels and later I sent various types of videos through whatsapp group to involve my students in teaching learning process. Interactive videos, simulations, 3d videos helped me a lot to grab the attention of my students. They asked different questions based on the videos I sent, it leads to discussion in the group. This interaction created more interest in me to continue my classes for months.

I intimate time to my students through whatsapp for conducting online gaming quiz. For this beforehand I prepared various types of questions in kahoot and quizizz on the topics completed at that time. Most of the students participated in online quiz. In this gaming competition results will be declared on the screen immediately after each submission and appreciating words and images are displayed on their screen to motivate them. Very few students not participated in interactive videos, online quizzes etc. because they don't have smart phones and internet connection. I asked them to pair with your friends who have smart phone.

Some of the example of tools I used given here



Youtube channels of mine and official youtube channel of suryapet and khammam. Classes I took through these channels in this pandemic time.



I conducted digital gaming mode quiz in the month of February, 2019, in my school.

I interacted with my students regularly through synchronous and asynchronous modes. After six months of continuous teching learning process I collected the opinions of 50 students from 9th and 10th classes through Google forms about the tools I used in teaching. Their opinions as follows…

Name of the tool	Percentage of students showed interest and said they useful in understanding the concept.	Percentage of students not interested	Percentage of students not participated regularly due to phone and network issues
Interactive crossword puzzle	80	10	10
Interactive videos , simulations, 3D videos	82	8	10
Gaming Tools like kahoot ,quizizz	90	-	10
Toy making ,experimental videos	90	-	10

By these results I came to know that students are very much interested in various ICT tools I used in teaching science.

Outcomes:

Students actively involved in teaching learning process. They prepared some science toys by observing the videos I sent like aravind gupta and my own experimental videos and they showed their toys through zoom meetings. Games and Toy making grabbed the attention of students because they involve the head, hands and heart of the students. Hence games and toys are very useful in teaching learning process.

Pupil showed lot of interest in participating gaming tools. For this they prepared beforehand well by observing the simulations, 3D videos and interactive videos and you tube lessons sent by me.

We can use these online gaming tools and interactive videos, toy making videos in face to face classes also. These will break the monotonous way of teaching. Actually I conducted science quiz to my students in the month of February, 2019 in gaming mode. I divided interested students into 5 groups and they were given with the smart phone (collected from teachers in my school).Quiz conducted through kahoot. They enjoyed a lot in participating quiz .asked other subject teachers to conduct these type of gaming mode quizzes regularly. we encouraged our children by conducting other subject quizzes in gaming mode.

References:

ZPHS gaddipally students and staff

Gaming tools like Kahoot, Quizizz

Playposit, Edupuzzle – Interactive videos

Crossword labs – Cross word puzzles

Arious app

PhEt simulations, cells alive,starlogonova,netlogonova etc.

Aravind Gupta videos – For science toys making

DCEB suryapet youtube channel

DEO khammam youtube channel

Pavithra's VTLM – my youtube channel

State Level Science Seminar - 2021

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Sub-Theme : Games and Toys as Pedagogical Tools for Teaching Science

Title of the Topic : Science in Games and Toys

Introduction:

"Children create their own understanding about the world" – Jean Piaget Science education plays a very important and crucial role in developing and country. Science should be taught to the children from their pre-primary level but as Jean piaget said children create their own understanding, we should not teach the science but we should create environment and they should build their knowledge.

Children love to play games and with toys.So, it is very easy to build their scientific knowledge through games and toys.

Objective:

To make teachers and children to identify the educational values and scientific principles involved in games and toys and use them in teaching and learning those principles.

Presentation:

"Education does not mean teaching people to know that what they do not know, it means teaching them to behave as they do not behave".

The aim of teaching science education is not to teach only the concepts but to develop educational values like character,morality, honesty, scientific attitudeand also to promote democracy, secularism, equality and national integration.

These all educational values can be developed in the students through games and when they play with toys with their peer group.

For example:

Through every game - We can promote equality, secularism, democracy and national integration.

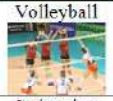
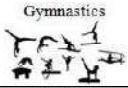
Through Kabaddi and Cricket etc - They can learn about collaborative learning.

Through Chess -Critical thinking

Through Snake Ladder - Patience

Not only the educational values but easily the concepts also can be taught or built through games and toys.

For Example :

Name of the Game of Toy	Concept can be build
Every game or playing with toy 	Muscular force, Newton's laws of motion
Spinning top, Spinner 	Rotatory motion
Kites fight 	Strength of the fibre, Wind speed, Bernoulli's principle
Kabaddi 	Net force, Force
Yoga 	Body parts or Organs
Archery and Shooting 	Accuracy and Precision
Tug of War 	Friction and Tension
Chess 	Distance and Displacement
Football 	Friction Effect of force and Net force
Badminton 	Effect of force and Net force
Volleyball 	Effect of force and Net force
Swimming 	Archimedes principle and Fluid friction
Weight lifting 	Mass and Weight
Cycling 	Types of Motion
Gymnastics 	Centre of Mass and Centre of Gravity
Skating 	Friction, Speed
Windmill Toy 	Wind speed
Doctor Set Toy 	Functions of the organs and The instruments used by doctor
Animals Set 	Domestic and Wild animals and their shape

Outcomes:

These are the just some of the examples if we go on to the ground work may be we get more thoughts which we can't get right now. With this play way method they can easily build their knowledge**.**

Implications:

I will highly recommend this unique idea to implement in education. It is a very highly effective way to learn. In our **TSWREI SOCIETY** we have already implemented this play way method in V class. We found very excellent results with this. Our main aim is to the keep child in centre means we should use the method or strategy according to the child. Even if possible we should change the strategy. In this play way method we can change the game or the toy. We can use more games or toys for a particular topic as said in the above table.

References:

I have collected this information from the psychology books by Jean Piaget etc.

Referred different books about the games online and offline.

State Level Science Seminar - 2021

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Sub theme:

Games and toys as pedagogical tools for teaching science.

Title of the topic:

Cartesian diver and Newton's cradle

Introduction:

Sometime teachers face trouble to make understand the children some basic laws of physics. Children also feel difficult to understand certain laws in physics. To overcome this some toys can be used in teaching science in the real classroom practices. Hence children feel easy about physics.

Objectives:

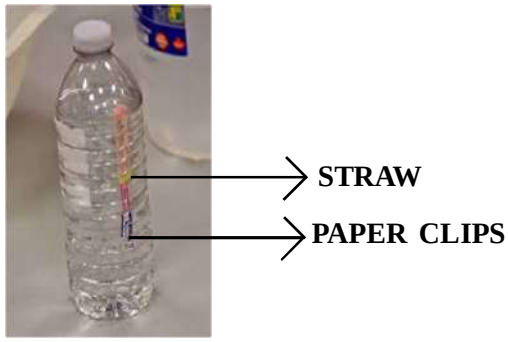
By using these two toys we can create joyful learning for secondary school children.

Teacher can demonstrate some basic laws of physics i.e. Pascal law, law of flotation conservation of energy, conservation of momentum and Newton's laws of motion so easily and elegantly.

Children will understand the above laws in play way method and can explain in their own words.

Presentation:

Cartesian Diver



I made Cartesian diver by bending the one-third of plastic straw in half .Secure both ends with paper clips and rubber band. By adding exact number of paper clips we have to make sure that the straw should float vertically just below the surface of water. This driver is put in transparent plastic water bottle. When we squeeze the bottle gently the diver will dive into the bottom of the bottle. It will rise up when squeezing is released.

When the diver is floating the air inside the straw will produce enough buoyant force and on squeezing the bottle the air inside the straw get compressed and volume of straw decreases. Hence density increases and displace less liquid] less buoyant force will act and diver will sink in water.

According to Archimedes principle

Weight of the floating body = buoyant force.

Buoyant force = weight of liquid displaced by the floating body

When pressure is acted on the air inside the straw get compressed and volume decreases. So less volume of water is displaced so that less buoyant force will act .Hence the diver will sink in water and on releasing the pressure the volume of straw increases. So volume of liquid displaced also increases .So more buoyant force will act. Hence the straw will float.

The pressure applied on the outer surface of bottle will transmit through the entire liquid and act on straw. Then the star will get compress. Hence Pascal law is proved.

NEWTONS CRADLE

This is made by two or more metal balls which are ideal, exactly the same size, weight, mass and density. We have to hang 5 balls in a perfectly straight line by thin threads that attach them to two parallel horizontal bars which are in turn attached to a base. Ii we pull a ball up and out and then release it .It falls back and collides with the others with loud click instead of all four remaining ball swinging out only the ball on opposite end jumps forward leaving its comrades behind hanging. Still that was lost to a stop and then falls back and all five are briefly reunited before the first ball is pushed away from the group again.

When the first ball of Newton's cradle collides with the second the first ball stops but its momentum is not lost, just transferred to the second ball then the third then the forth until it reaches the very last ball. We witness this conservation of momentum as the last ball swings into the air with nearly the same momentum as the first ball does. If two balls are lifted into the air on one end of the device and released then the two balls on the opposite end will swing in response Newton's cradle demonstrate the conservation of energy also. When the ball is pulled to certain height it gains potential energy .On releasing changes into kinetic energy and transfers through the line of balls and ultimately results in the upward swinging of the ball and appear in the form of potential energy. Hence the energy is conserved.

Newton's cradle is also used to explain laws of motion.

If no force is applied the ball stays at rest because of inertia of rest.

If we conduct this experiment where there is no air resistance and gravity the balls will oscillate continuously. This is because of inertia of motion.

Hence first law of motion is proved.

If 1or 2 balls are pulled to less height at left side and released will collide the other balls with less momentum.

If balls are pulled to more height and released it will collide the other balls with great momentum.

Rate of change of momentum is directly proportional to applied force. This is called second law of motion.

When we lift one ball on the left it comes back down with a force and the energy is transmitted through the three balls in the centre to the ball on the far right the ball on the far right then moves with a motion that is equal and opposite to the motion of the ball that we lifted. Hence third law is proved.

Outcomes:

Cartesian diver helps to understand the concepts of Pascal law and law of flotation.

Newton's cradle helps to understand the conservation of momentum, conservation of energy, and Newton's laws of motion

Children will explain the basic laws of physics in their own words after playing with these toys.

Implications:

The material of ball must be highly elastic for better result and low cost.

In Cartesian diver the diver may be made by balloons, pen cap , eye dropper, plastic doll

References:

Dr krishnam Rajulu Naidu retired professor O.U has motivated me to work on Cartesian diver.

I have demonstrated these two toys in my school in the real classroom practices.

State Level Science Seminar - 2021

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Sub theme : Games and toys as pedagogical tools for teaching science

Topic : Analyzingstudents learning with games and toys as pedagogical tools for teaching science.

Introduction

Toys and games are the best companions of children no matter whether they are toddlers or teens. Even the grownups are also attracted towards certain games and toys. If such companions can be used to transfer knowledge of science, then it will have a greater impact on the holistic development of the children. Rural children have more naturalscience knowledge as compared to the children in urban areas as they are more exposed to the outdoor games. This exposure can be used as a tool to develop scientific temper among the children.

Literature review

Based upon the different formulations provided in the literature, creative scientific thinking can be defined as the ability to generate numerous original ideas in multiple fields for the solution of a problem that requires a solution, using a multidisciplinary and innovative approach to science, technology, and art (aesthetics).

Definitions

1. Gravity: It is the force by which a planet or other body draws objects towards its center. The force of gravity keeps all the planets in orbit around the sun.

2. Angular momentum: A vector quantity describing an object in circular motion; its magnitude is equal to the momentum of the particle, and the direction is perpendicular to the plane of its circular motion

Objectives

1. Analyzing the learning of scientific topics of IX grade children with the toys and game as pedagogical tools.

2. Analyzing the skills that has been developed with the toys and games as pedagogical tools.

3. Identify the constraints for using toys and games as pedagogical tools and steps to reduce them.

Hypothesis

1. If toys and games are used as pedagogical tools for teaching science, then the critical thinking and problem solving skills of students will develop.

2. Toys and games provide the hands on experience for students which enable student to develop innovative ideas for the applying of the scientific topics they have learned in their day to day life.

3. The child may not be able to learn the terminology and the conceptual definitions as they are more interested in applying the skills so eventually missing out the basics.

Methodology:

This activity can be carried out in IX class which has 25 students with the top as a pedagogical tool for teaching the concept of factors that affect the angular momentum.

Sample:

Studentsof grade IX and the size is 25 studentswith both boys and girls. All the 25 students are divided into 4 groups.

Tool: Creating model of top

Assessment factors:

- The top should spin
- Students should identify that mass, radiusand spinning speed of the top is considered.
- At the end of the activity,an assessment for learning is conducted to check the learning of students. The questions that include in the assessment are

1. What factors affect the angular momentum? (close ended question).

2. What happens to the angular momentum if we increase the mass of the object? (Open ended question)

Activity conducted:

1. The top is not able to stand erect when it is at rest, as it is attracted by gravitational force but it's able to spin around its axis due to angular momentum. The angular momentum decreases gradually due to friction. The top continues to spin if the angular momentum is greater than the gravitational force but as soon as the gravitational force becomes more than the angular momentum the top stops.

2. At the beginning the students were given a top to rotate then the students are divided into 4 groups in a class and asked to make a top using thick chart, pencil, and tape. The students can rotate the tops and note down the factors they observed that have affected the spinning of the top.

Outcomes

1. Out of the 4 groups, only 1 group was able to spin their top in the first go whereas the other 2 groups were able to spin their top after some modifications. But 1 group was not able to spin their top at all.

2. The students where the top has been used as a pedagogical tool for teaching science was very active. They were enthusiastic to present their work. The students in the class were engaged throughout the class.

3. At the end of the activity during the discussion all the students were eager to give reasons why the top was not able to spin or why it was able to spin. The group whose top was not able to spin tried to make changes in their model to make the top spin.

4. The class was enthusiastic but it was also chaotic. It was difficult to handle the class as they were too active. During this transition some students who are supposed to be introvert did not indulge in the discussion or activity among the group members.

In the beginning of the class, girls were a little bit reluctant to play with the top but later when some of the boys demonstrated the activity, some girls came forward to try and later almost all the girls were very active to show their model of the top.

Implications

1. The creative and problem solving skills of the children were developed during the activity. They were able to find the factors that would have affected the working of their model and fix them to suit their needs.

2.. All the students were attracted towards the tops hence increasing their interest towards the topic.

3. The class where the top was used was very chaotic because I think they would have found it very exciting as toys and games were used as pedagogical tools in their class for the first time and teacher has given them chance to play in the class and show their skills in the game.

4. There were disciplinary issues in the class and students were doing their task without following the norms which is a disturbance for other classes. This issue can be tackled by regular practice and setting the norms beforehand. It can also be suggested to the children that only one member of the group can speak at a time.

5. The students who have used the top were not able to put their ideas clearly during their assessment even though they gave clear ideas during the discussion.

Conclusion

Students were able to create their own tops and create a design so that their tops were able to spin. Students were able to apply the knowledge which they have acquired and were able to make their own model. They were also being able to deduce implications as what could be the reason for the failure of their model. This is the highest level of cognitive development in the child according to the Blooms taxonomy.

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State Level Science Seminar - 2021

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Sub Theme: Games and toys as pedagogical tools for teaching science.

Title of the topic : Scientific play

Introduction:

Now a days every human being seems to be participated in a race where one treats the other person as opponent and tries to win the race at any cost. We can also find this kind of tendencyat international level. Today, various countries of the world are seemed to be in race, in which they try to prove themselves superior to others in the level of development. The countries where science and technology have developed to considerable extent are generally known as developed countries, while the countries where still these areas are not satisfactory are considered as developing or underdeveloped countries.

Science plays an important role in national development as well as in our everyday lives. Almost each and everything we use from the fan, light and even for making food we need electronic devices. So, we can say the things we use is directly or indirectly scientifically developed. We can surely say that a nation without science would become dark with different varieties of problems.

Objective: To identify the importance of games and toys in science education.

Presentation:

Children love playing with toys. During play, they grasp the science behind the toy.

Creative learning can be achieved through team work and it needs to be open ended and child centered. Science teaching includes in-class and out-of-class activities.

Everyone knows that children love moving but not sitting in one place for a long time, but their activities and motions are not tolerable for teachers. Children with calm mannersand just pay attention to the teacherare more accepted by the teachers.

There are countless skills that students can develop through game playing.

- For example, just by conducting a running race of 100m, we can explain the children that the person pushing the ground is action force, ground also pushes his feet is reaction force according to Newton's third law of motion. By measuring time and distance covered we can calculate the speed, acceleration, relation between mass and acceleration.
- If the same race is conducted in circular path the race time will be longer. This is because the person experiences centrifugal force as he goes around the turn. We can also explain how the center of gravity of the person changes during run.
- In a long jump, an athlete runs before jumping because it helps him to jump longer. Here we can explain it is because of inertia of motion and momentum. If a person jumps from standing point, he will cover shorter distance.
- Force, balanced force and net force can be explained through Tug of war.
- To explain image characteristics in case of spherical mirrors children can play a game where pole, focus and center of curvature points are marked on the floor. One student should stand at object position, the other student acting as image should change her position according to the object position.
- While playing carroms also we can explain inertia of rest where we see the bottom coin moves and other remain stationary.

The role of toys in early childhood science education is to teach general concepts of science and their usage in daily life. whereas in secondary education, students can design some advanced science toys.Imagination is very important in designing toys. There are many people making Science interesting and fun through Science toys. One such person isArvind Gupta,India's 'science magician', preparing toys from trash.

Our children don't need any expensive equipment to learn. They need one adult who can share the idea and simple toys as tools to engage them. Toys are helpful to explore concepts of motion, force, energy, heat, sound, light, magnetism, electricity and other basic scientific principles that exist in our day to day activities. We can prepare rocket using balloon, straw, thread to experience forward motion of balloon and backward motion of air inside it.

Kaleidoscope, is one of the oldest science toys which creates a beautiful and mesmerizing display of images by the reflection of light, using multiple mirrors.slinky to demonstrate standing waves.

Now a day's students are interested playing games on computer. Computer simulations are a useful tool for student learning and understanding. Individuals who require more information on a topic can be directed to a simulation to help further complete their knowledge building.

Computer simulations can repeat trials quickly, change variables to understand the effects of change. Creating games using computer simulations can be an effective way to get students interested in learning more about a topic.For example, we can build an atom of any element by just changing number of protons, neutrons and electrons. It tells us whether the atom is neutral or ion depending on number of protons and electrons.

We can also construct electric circuit, series and parallel connection of resistors virtually

using wires, switch, bulb, battery, ammeter and voltmeter.

Quizizz is a Gamification Technique of assessment, it is using the way of creating games into learning and teaching areas.Teachers can use Quizizz in class for creating occasional tests and it increases interest and student's participation.

Outcomes:Games and toys in Teaching learning process improves

- Communication and Social Interaction
- Problem solving and learning cause and effect
- Learning how to play with others through compromise, conflict resolution and sharing
- Development of fine and gross motor skills
- Develop their creativity and imagination
- Discovering their independence and positive self-esteem

Implications of Games and toys as pedagogical tools for teaching science:

- Assist with Eye-Hand Coordination
- Encourage Imagination and Creativity.
- Simulations allow for more lab experiences and make it easy for every student to participate
- Simulations are interactive, so students retain what they've learned
- Digital games can provide immediate feedback
- Digital games are readily available, safe and cost-effective.
- Teachers who allow children to play and work by themselves through small difficulties, support and encourage them to "fix it" will build self confidence and problem-solving ability.
- Digital games involve animated graphics and audio effects as well as stimulation.
- Teachers who use toys in their lesson plans will definitely improve creative mental skills of their students.

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State Level Science Seminar - 2021

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SUB THEME : - "Games and toys as pedagogical tools for teaching science".

TITLE OF THE TOPIC:- 'Joyful learning".

INTRODUCTION

Childhood is naturally devoted to sports. Activities of students depend on their environment and interest.This is the reason why they find bookish knowledge uninteresting. Every time lessons are taught by teachers, homework and examinations become cumbersome for the students. It is possible that in such cases students get bored with books and school. It is well known that subjects like mathematics and science seem monotonous for the students. As soon as the school education starts, students are seen to be ordered to read all the time by their parents. They often get to hear, 'your mind is always occupied by games and you don't even touch books.' There are also some parents who do not show interest or care about the education of their children due to their livelihood. This results in students beginning to flee from books or carry their books in their hand, but their mind remains distracted. To get rid of these problems and educate students innovative ideas in education are required. One such innovative ideas in education is sports games, that is education through games and toys in which students have a natural interest though it leads to a joyful atmosphere in the teaching learning process.

OBJECTIVES

- Making teaching learning process of science inclusive, interesting, interactive and child friendly.
- Linking learning of science inside and outside the classroom.
- Facilitating development of various domains of a child (cognitive, psychomotor, socio-emotional, communicative, adaptive etc) through learning science.
- Striving towards preservation of cultural heritage by using traditional games.
- Integrating science with arts.

PRESENTATION

Due to change in the academic system from time to time, the present education

system sometimes induces dislike in students. It is often seen that the students are apathetic towards a difficult subject. Students begin to fear subjects like mathematics and science. If these subject are

taught through games and toys, they will be able to assimilate the topics better through this medium, the concentration of the students also increases therefore, teaching through games is the need of today's era. Game laws make learning interesting and simple and create positivity in students attitude.

EXAMPLE OF SPORTS GRID GAME

Necessary materials - chalk, floor etc

Time taken to prepare the game: 5-10 minutes

Construction of game:- Construct a grid by drawing vertical and horizontal lines on the floor using chalk. Create objective questions related to the subject to be taught to the students and then write the answer to these object questions in the groves of the grid. This game can be played individually and in a group. If played individually, the students will be questioned one by one and they will stand on the correct answer. For example; if the question is "which is the biggest artery?", then the student will stand on the groove in which aorta is written. The student or group who gives the maximum correct answer will be declared winners. If the game is played in a group, then teams of students will be formed and each team will be questioned.

SNAKES AND LADDER GAME

Necessary materials - Chart paper, tokens, dice etc

Time: 30 minutes

Construction of the game:-

1. Create 1-100 squares on a chart paper.
2. Sort the correct and incorrect answer to small question related to the case for example, factorial numbers, prime numbers, ascending order, even numbers, odd numbers etc in mathematics.

Rules of the game:-

1. This game can be played by minimum two students and a maximum of eight students.
2. The game opens only after there is 1 to 6 number in the dice.
3. Examples to play, if the student is on square number 41 and on throwing the dice gets 4, then he will move to square number 45. Now if he answers the question asked correctly, he will stay on 45 and if his answer is wrong, he will go back to 41. If the student finds a ladder on 45, he will ascend it and if a snake is found on this issue, he will come down following the snake bite, according to the rules of the game.
4. This game can also be played in other forms in the school premises, where a solid box of cardboard is used as a dice. To play the game in the above form, the students stand in place of token and move accordingly. This game can be played by four students at a time in which two students throw the dice and two students move in place of tokens.

This game can teach the following:-

1. Identification of numbers.
2. Local values of digits.
3. Knowledge of new numbers attained by changing local values of numbers.

4. Ascending and descending order of numbers.

5. Divisible and indivisible numbers.

NOTE: This game can be played with all the subjects.

WHEEL GAME

Necessary materials - cardboard, chart papers, sketch pen, one nail, fevicoletc

Time: 25-30 minutes

Construction of the game:-

1. First of all, three wheels are made from the carton. The first wheel should be the smallest, the second wheel larger than that, and third should be the largest.

2. Paste chart paper on all three wheels and cut them spherically.

3. Put the nail in the middle of the three wheels and hang it on the wall.

4. First, fix the smallest wheel in the nail, then the larger one and finally, the largest one.

5. On the largest wheel write down different and small questions within the lines.

6. On the second wheel write the answer to these questions in different squares. Similarly, write the answers related to the same questions on the first wheel.

Rules of the game:-

After the wheel is fixed on the wall, the teacher will raise those questions above, which she wants to ask the students and the latter will place the correct answer below the question by turning the second wheel and will place the answers of the first wheel too in a similar manner. In this way, the correct answer will be placed under the right question. This game can be played by every student alternately.

Note: This game can be played with all the subjects.

LEARNING WITH TOYS

Example: AMAZING BALANCE

Number of participants - Entire class in the groups of 4 to 5 students.

Time Required - 20 minutes

Material required - 1 ceramic cup (height 6-7cm), folding kitchen knife(7cm), tripod stand, match box (with wooden matches)

How to proceed?

- Push the pointed end of the knife into a match stick. The knife must be bent in such manner that the angel between its blade and the handle is 90 degree or slightly more.
- Now place the match stick on the rim of the cup. Adjust the position of the match stick so that it is balanced. Make sure that the tip of the match stick so that it is balanced. Make sure that the tip of the match stick is inside the periphery of the cup.
- Light the match stick. What do you observe?
- The unburnt part of the match stick rests on the rim of the cup. The knife and the match stick together remains in equilibrium.

Science behind the toy: - This toy works because the centre of gravity of the whole arrangement of knife and match stick

lies just below the point in support of match stick.

Example: IS THE 'SMILEY' MOVING?

Number of participants: Entire class in the groups of 4-5 students each.

Time Required: 10 minutes

Material Required: 1. 60cm of stiff electrical wire.

2. A small plastic ball (nearly the size of table tennis ball)

3. Plastic bead through which the wire can be inserted and a

small piece of pvc pipe about 2.5 cm in diameter.

How to proceed?

- Paint a 'smiley' on the ball.
- Wind the wire on pvc pipe to make a spiral with about 10 turn
- Remove it from the pipe and pull it slightly.
- Insert 'smiley' in between the two loops so that is somewhere in the middle of the spiral. Tie a small thread on one end of the spiral. Attach the bead on the other end.
- Hang the spiral vertically by the thread with one hand with the other hand twist the thread.

The smiley appears to be going up or down depending on the direction of winding or unwinding of the thread. It is an amazing optical illusion, very simple to make.

Science behind the toy:- An optical illusion is a visually perceived image that differs from the objective reality. The information gathered by the eye is processed in the brain to give a perception that does not tally with the physical reality.

NOTE: Teachers need to utilize various resources along with their own ideas to conduct teaching and learning process through games and toys in school.

How does children's nature support learning through games and toys?

- Children want to do and see
- Children seek freedom
- Children do not like to sit in one place for long
- Children like to work with peers
- Children interested in games, songs and stories.
- Children love what it means to make toys.
- Children imaginative power is amazing and corrects their mistakes themselves.
- Children seek self respect and do not like to be punished, criticized or insulted
- Children games played in groups develop a passion for activities.
- Children realize that need to be disciplined.
- The given work is done very diligently by children.
- Children are very active and energetic.

OUTCOMES

→ Education is imparted joyfully.

o Joyful learning of tough or boring topics.

- Improvement in the on-roll students and their attendance and an environment of learning class and school.
- → It leads to a sense of equality and leadership ability.
- → It fasters holistic development of student.
- Students develop regularity, understanding, the ability to make decisions and the efficiency to solve problems.
- → It develops the ability to work in group.
- Students stay active and learn through play-way.
- → The weak students find support through this method.
- A strong bond is created between student-teacher-parents.
- → Development of creativity and comprehension in students.
- The level of education and discipline increases amongst the students. Moral values and mutual cooperation to increase amongst the students.

IMPLICATIONS:- Implications according to students point of view.

There is a lot of irregularity in students going to school in the rural areas, which is due to lack of enthusiasm and interest. Often it has been observed that due to their social and economic status, depression symptoms are found in students and there is a lack of self-confidence and concentration.

Implication according to teacher's point of view.

Some teachers…….

- → Follow traditional teaching methods.
- → Do not follow the nature of science and the nature of children in teaching learning process.
- → Have a lack of patience and dedication.
- → In the name of discipline fail to promote students freedom of expression.
- → Have lack of implementation in school of things learned which in the teachers orientation programmers.
- → Have great faith in punishments.

CONCLUSION

The National Curriculum Framework (NCF), 2005 and New Education Policy, 2020 recommended that children learning at school be linked to their life outside the school. It further advocated for adopting a constructivist approach of teaching where students and teachers are viewed as partners in the teaching learning process. The teachers plays the role of a facilitator and help children to express themselves, handle objects and explore their natural and social milieu. In the context of teaching of science is important to introduce new methods of teaching to make learning more interesting. Time has come-change the quantitative approach to a qualitative.

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State Level Science Seminar - 2021

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Sub Theme: Games and Toys as Pedagogical Tools for Teaching Science.

Title of the Topic: Teaching Faraday's laws of Electromagnetic Induction using Toys.

Abstract:

Many students feel difficult to understand physics concepts at school level. Electromagnetic Induction is an important concept, yet complex physics topic that is a part of curriculum.

Learning is most effective when students build their own understanding. But due to lack of expertise or due to limited budget many classrooms cannot afford equipment for demonstrations.

The purpose of this paper is to integrate teaching physics with toys and to bring conceptual understanding among students. This toy could help teachers to teach Electromagnetic Induction through an active learning process.

Introduction:

There is a need to reorganise classroom practices which provide opportunities to children for interaction with the environment. The young learners would love to play and participate in the activities which will eventually make the learning physics interesting and enjoyable which also helps in their physical, social and emotional development.

Many students possess knowledge but they don't have imagination power which is more important to understand the abstract physics concepts.

"If we listen we forget, If we see we can remember and If we are involved in a particular activity we can remember for long time." By this we can understand the importance of using toys in teaching learning process and we can make students understand concepts clearly without any confusion and they feel interesting and self -motivated and more interactive.

Electromagnetic Induction is a complex physics topic which combines the knowledge of many laws and concepts from electromagnetism. When reasoning about Electromagnetic Induction students have to integrate and apply their knowledge about basic concepts such as magnetic field, magnetic flux, electric field, electric current and

electromagnetic force and so on. But we have seen students facing some difficulties in learning such concepts.

The main identified difficulties are the following-

i. Difficulty to recognise Electromagnetic Induction phenomena taught in curriculum.

ii. Difficulty to recognise Electromagnetic Induction when there is no induced current.

iii. Explaining Electromagnetic induction as being caused by the magnetic field.

iv. Applying Faraday's laws without proper understanding.

Students cannot retain concepts for longer time in lecture method. Electromagnetic concepts and phenomena are unlike those in mechanics, generally not a part of students everyday language and experience and students are therefore less likely to have strong pre formed concepts in Electromagnetism. So, we have integrated toys to teach this kind of complex topics and make teaching learning process more fruitful and successful.

Objectives:

i. Using toys makes students interested towards the subject and develops creativity and curiosity among them.

ii. Passive learners also become active in the classrooms.

iii. There is so much fun for the students when we use toys in teaching.

iv. Students actively participate in the activities.

v. Conceptual understanding takes place in the students.

vi. These experiences give them long time remembrance.

vii. Complex concepts are made simple.

viii. Difficult and abstract physics concepts are also understood easily when toys are used.

ix. Children would be able to ask questions to clarify their doubts.

x. Children would be able to appreciate the efforts of scientists and have aesthetic sense towards nature.

xi. Students apply the knowledge of the concepts they have learned and solve the problems faced in daily life situations.

Presentation:

At school level many students feel difficult to understand Faraday's laws of Electromagnetic Induction by chalk and talk method. To overcome this problem we have integrated teaching of Faraday's laws of Electromagnetic induction with the usage of toys. The toy works on the principle of Faraday's law, which says that a changing magnetic field induces an electromotive force(emf), producing a current in a coil.

In this paper we come to know how a toy is used to explain Faraday's laws.

We made a toy by taking copper wire of 24 gauge and made two hundred turns around an old syringe. We have removed the insulation at the two ends of the copper wire and connected an LED (Light Emitting Diode) to the ends. Then we placed a strong neodymium magnet inside the syringe and closed the end with a rubber cork.

Toy for explaining Faraday's laws of EMI.

While explaining the Faraday's laws we ask the students to shake the toy. When they shake the toy the magnet moves which causes a changing magnetic field (Magnetic flux) and induces current in the coil. They observe the LED glowing

Shake a toy and make light.

From that we can make the students understands that varying magnetic field develops emf in the coil and generates current which causes the LED to glow. This is the Faraday's first law of Electromagnetic Induction. We then instruct students to shake the toy with more speed, then they observe that the LED glows very brightly which tells that emf developed in a coil increases as rate of flux increases. Now we tell them that this is Faraday's second law of Electromagnetic Induction. This can be expressed mathematically as

$$€=-N\Delta\Phi/\Delta t.$$

Students feel difficult to understand this mathematical equation. But , by using this toy we can explain the beauty of physics concepts in a simple and clear manner which develops conceptual understanding and prediction among students.

When we use toys in our teaching many students become active learners and learn more effectively.

Outcomes:

i. Students develop interest towards physics.

ii. They enjoy learning even the difficult concepts.

iii. Conceptual understanding and prediction develops among the students.

iv. Develops scientific knowledge among the students.

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Designing Science Games and Science Toys from the perspective of Scientific creativity by Dr. Sibel DEMIR KACAN

State Level Science Seminar - 2021

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Sub Theme : Games and Toys as Pedagogical tools for teaching science.

Title : Fun with Flash cards

Objectives :

1) To create self learning among the students
2) For student centered learning
3) Interest created to slow learners
4) To make easy in hard concepts and rote memory concepts.

Presentation :

Give children wing but leave them alone, so that they can learn to fly on their own. Scientific temper can be in calculated in children when they learn science through cooperative collective activity and not through a competitive process. We must encourage activity and discuss among children. These activities make children to collect information, do the things themselves, observe pictures and understand different issues. To extend the knowledge of certain things additional information is given under the caption. Instead of providing direct knowledge to the children we provide self learning material. Teaching does not means transferring information from the textbook in lecture method. Tuning mind mapping as one of the initial whole class activity and developed debate and discussion on the given concepts.

I am frequently using models, experiments, charts, Dissection and Section cutting. Without Teaching Learning Material I cannot go through the lesson. One of the my favorite teaching learning material is " Flash cards" I am using these Flash cards in motivation, in content explanation and also in Evaluation.

Flash cards :

We can prepare Flash cards in low cost, no cost materials. Mostly with wedding cards, cut wedding cards in square are rectangle shape and write words what we want and also pictures. We can use these Flash cards in many ways. We can use these Flash cards from 6th class to 10th class. Mostly slow learners, show interest in learning with Flash cards.

Here are some examples :

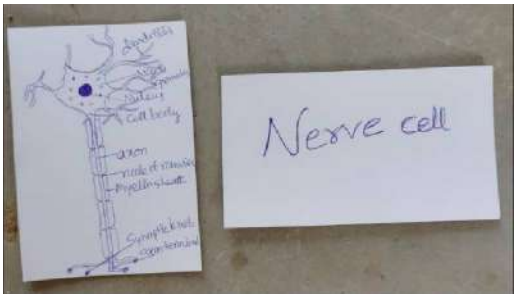
For classification : Like Plant tissues, Animals tissues, Classification of Plant Kingdom, Animal Kingdom like that many classification learned in Play way method. I divided students into groups and put a leader to the group. I give Flash cards to each group. Group leader engage slow learners with Flash cards in leisure time. So that student familiar with the words.

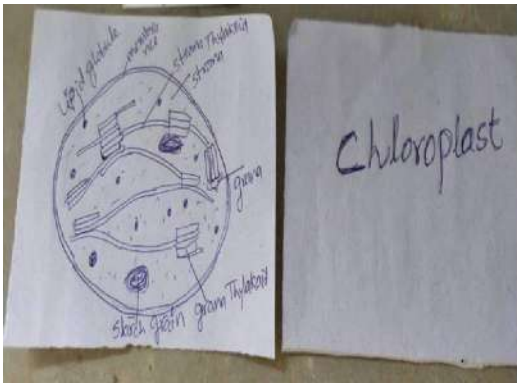
Flowcharts :

Flowchart of respiratory track, digestive tract, food chain, wool to fiber, pyramids, the hierarchy of classification etc.,

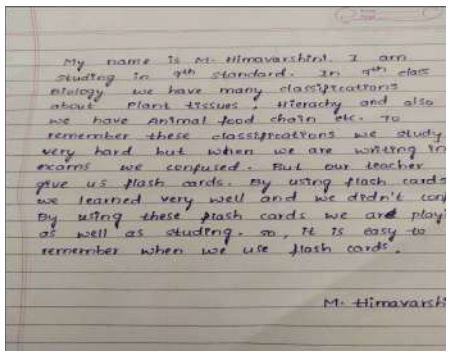
To Identify the Pictures :

I given a pictures in one Flash cards and names of the pictures in another Flash cards and ask the students to identify the name of the picture from the cards.

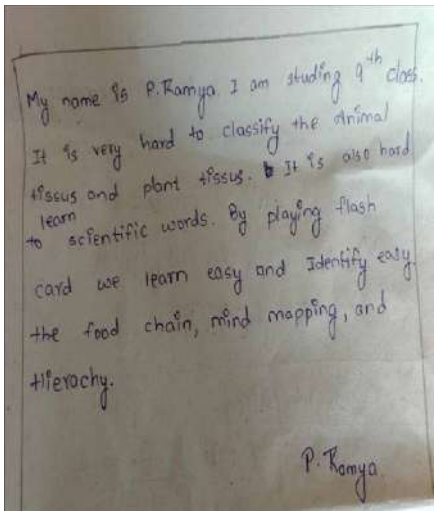




In this we must use Flash cards in many ways. Students also gave their opinions happily about Flash cards.


My name is M. Himavarshini. I am studing in 9th standard. In 9th class biology we have many classifications about Plant tissues, Hierachy and also we have Animal food chain etc. To remember these classifications we study very hard but when we are writing in exams we confused. But our teacher give us flash cards. By using flash cards we learned very well and we didn't co By using these flash cards we are play as well as studing. so, It is easy to remember when we use flash cards.

M. Himavarsh


My name is P. Ramya. I am studing 9th class. It is very hard to classify the animal tissus and plant tissus. It is also hard to learn scientific words. By playing flash card we learn easy and identify easy the food chain, mind mapping, and Hierachy.

P. Ramya

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Sub Theme :Games and Toys as pedagogical tools for Teaching Science

Title of the Paper : Let's learn Physical science through toys

Introduction:

Children are not learning science through practical methods, but only through books. They are not testing each scientific theory they learn and understand the concepts behind them. Can we enjoy food without actually tasting it? Then how a student enjoys the concept and beauty of science without actually doing it practically? Even lack of small amount of salt can destroy the taste of food then how a child enjoys the science without actually performing the activities. The famous saying fits exactly this situation.

I hear and I forgot

I see and I remember

I do and I understand.

Teaching science is not really a tough job if we, the science teachers started teaching in out-of-the-box methods. If we change the method of teaching science, it would increase the problem solving skill, analyzing ability and understanding ability of the student.

Present day, the teacher's task goes beyond teaching a topic in the classroom. There is a need to innovate and evaluate student learning outcomes. As a teacher, we should encourage the students learning from observing the surroundings. Ask them to experiment and learn from their observations. Innovative methods of teaching science and creating toys in science concepts increase the interest among the pupil.

Objectives:

In this paper, I present efforts to discuss innovations in teaching physical science at the school level by the means of **Playing with toys.**

Method :

LAZY PENDULUM (Target Children: Class X, XII)

Materials Required:

A Thread, Stand, Magnet, Thick piece of Aluminium

Procedure:

Tie a thread to the stand and attach a pendulum. Now, oscillate the pendulum. It oscillates. Place an aluminium sheet just below the magnet of the pendulum; remember that it should not touch the pendulum. The pendulum comes to rest faster. It cannot oscillate freely.

Reason:

When the magnet is moving on the aluminium piece (which acts as a conductor). Due to the change in magnetic flux, it creates current in the aluminium piece. When the current is produced, it sets up a magnetic field around it. That magnetic field of the aluminum piece opposes the motion of the magnetic pendulum.

Outcome:

Students can understand the concept of Lenz's Law and Faraday's Law. By this toy, we can make the learning interesting and joyful.

SSDE - HAVE FUN (Target children: class VIII, IX, X)

Materials Required: Iron spokes (straws), Cello Tape

Procedure: Collect 100 or more Iron spokes or straws for the experiment

Step 1: Place the cello tape on the floor. Now place the iron spokes on the cello tape by spacing them at a distance of 1 cm.

Step 2: Now seal them with another tape. SSDE model is ready!

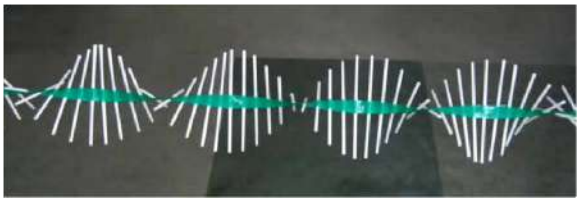
If we strike one spoke, all the spokes vibrate in wave (sound wave).

If we strike a spoke a little harder, then the wave will come back (stationary wave).

If we twist it on one end a little, it is structure of DNA.

If we twist it further, it is structure of Electromagnetic wave.

Outcome: Students enjoy this toy and understand the concept of waves



ANTI GRAVITY MACHINE (Target children: Class X, XII)

Materials required: A copper or aluminum hollow pipe, a magnet and a small piece of iron

Procedure: Take a copper pipe and hold it vertically. Now drop a piece of iron into the pipe, within no time it falls due to gravity. Now take a piece of magnet and drop it into the pipe. Now observe the magnet. It falls extremely slow and this is anti gravity machine.

Reason: Many students think that the magnet attracts towards copper but in fact copper repelled by a strong magnet. The moving

magnet produces induced current in the copper rod and the motion of the magnet is opposed by the magnetic field produced in the copper rod that makes the magnet falls slowly on the ground.

Out comes: Students can clearly understand the concepts of Faraday's law, Lenz's law and Eddy current.

I AM LIQUID – YOU CANT COMPRESS ME

(Target children: Class IX)

Materials required: 2 syringes, a balloon and water

Procedure: Take a small balloon and fill it with water and insert it into a syringe and piston is closed. Now close the syringe with thumb and try to compress it. Now take another small balloon and fill air in to it. Now close the syringe with thumb and try to compress.

Reason: In the first case the syringe can't be compressed because liquids are incompressible. In the second case while we are compressing the piston the volume of the air in the balloon is going to decrease because the gases are compressible.

Outcome: The students understand the concept of Boyle's law and compressibility by these toys.

SHAKE ME TO GLOW ME

(Target Children: Class X, XII)

Materials required: A syringe, 28 gauge enameled copper wire, Strong magnet, LED bulb

Procedure: Wind the winding wire to the syringe about 250 turns both ends are connected to a LED bulb. Now remove its piston and insert a strong magnet into it. Now shake it. We can clearly understand that the LED bulb glows.

Reason: According to Faraday's law of electromagnetic induction, change in the magnetic field will produce induced current in the coil.

Outcome: By this toy students can understand the concept of self induction and working of ynamo.

Implications: *Teaching concepts in innovative way and teaching science in the form of toys really helps the students understanding ability.* Student-centered methods of teaching makes it possible for students to design and participate in science experiments with dialogic approaches, so they can explain, discuss, and reflect upon their own ideas. Our NEP mainly focusing on student centered education system. With NEP 2020, teachers will have an opportunity to nurture these very same values of adaptability and innovation in their classrooms. A key focus area of NEP is transforming the 'quality of teaching,' where teachers will be empowered to lead change.

Conclusions: The above mentioned are some examples of making children involve in conceptual learning. There are many toys we can make and present in front of the students. The main advantage of this method of teaching science with toys is that the student actually doesn't know that he is learning but he will learn all the concepts by toys and do it and learn it method. An effective teacher is who always learn, passionate towards innovation, experimentation and keen on student development.

State Level Science Seminar - 2021

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Games and toys as pedagogical tools for teaching science

Young children don't need highly specialized or expensive equipment to learn how to explore the natural world scientifically. They do need, as Rachel Carson mused in The Sense of Wonder, "the companionship of at least one adult who can share it."

Simple toys and tools can engage children as they explore natural phenomena in ways that will support their later science learning. Adults who allow children to play and work through small difficulties by themselves support children as they build an understanding of how the world works. Resist the temptation to "fix it" or "make it go faster" or "use it the right way," and you will build your child's self-confidence and problem-solving ability.

1. Spinning Tops

Concept: Use these toys as tools to explore motion.

How to support exploration: Ask your child open-ended questions (questions with more than a yes or no answer). How hard do you have to push each type of top before it begins to spin? Are light or heavy tops easier to spin? Are tall or short tops easier to spin? Can a top with a penny taped to it maintain a spin?

Where to purchase: Look for tops in party stores or in catalogues that sell small plastic party favors.

Concept: Tools can extend our senses, allowing us to obtain more information than we would be able to on our own. Magnifiers extend our sight by making objects look bigger.

How to support exploration: This tool is fun to use to make the world look blurry and our eyes look huge, and to look closely at everything! Magnifiers reveal aspects of nature that are too small to see with just our eyes. Examine skin, coins, flower structures, and insects—all objects with small parts that make up the whole.

Variation: Fill a round, clear plastic jar with water and have your children look at their hands or a picture through the jar. Children often notice the change in apparent size. Ask them, "Did your hand look bigger?" Then let them examine it and ask, "Did my hand really get bigger, or did it just look bigger?" Take another look so children can be certain of their answer. Have your children pinch the lens of a

magnifying glass between two fingers and gently run their fingers across it to notice that the magnifier is not flat but has a curved surface, just like the jar!

Where to purchase: Drug stores and discount stores sell inexpensive plastic magnifiers, or you can order them from a scientific supply company.

2. Eye Droppers or Pipettes

Concept: As children use eyedroppers and pipettes to move liquids, they learn a lot about how liquids behave. For example, they learn that when they squeeze the bulb the dropper pushes air out, and when they release the bulb it pulls water in. Children this age can also observe that water forms drops.

How to support exploration: Show your child how to squeeze the dropper to force the air out of the bulb and how to release it to allow it to pop back into shape, drawing in air or liquid as it reforms. Your child can feel the air as it leaves the dropper by holding the dropper up to her cheek (away from her eyes) as she squeezes the bulb. Use the dropper to suck up small amounts of rain from a puddle or to mix colored water from one dish with water of a different color in another. Turn the dropper upside down to create a fountain. All of these activities have the added benefit of helping your child develop small motor control.

Where to purchase: Buy just a few at a pharmacy or dollar store or order many from a scientific education supply company.

3. Bubbles and Bubble Wands

Concept: Bubbles teach children about geometry (shapes) and give them an awareness of air movement. How long will the bubble last, and where will it float?

How to support exploration: Bend a pipe cleaner into a square-shaped bubble wand and ask your child to predict what shape the bubbles will take. Introduce less common words like "sphere" as you blow bubbles to give your child the ability to describe a three dimensional shape and to expand his vocabulary.

Where to purchase: Look for bubble solution in party stores year-round or, during the warm months, in drug stores and discount stores.

4. Balls

Concept: Playing with mirrors to reflect light and wondering how our image is reflected teaches children a beginning understanding about the properties of light.

How to support exploration: Bounce light off of different surfaces. A large plastic "baby" mirror, held freely, is especially good for this. Have your children use mirrors to look behind themselves. "Catch" some sunshine and reflect it to another surface outside or inside.

Children can use a mirror to examine their face to draw a self-portrait. Children are more likely to draw from the observations they see in the mirror and not from memory if they are encouraged to focus on parts of their face they don't usually begin with, such as their nostrils. Ask, "Do you see the holes in your nose? How many are there?"

Where to purchase: Buy mirrors at a pharmacy or dollar store. "Baby" or designed-for-preschool plastic mirrors can be ordered from preschool, or scientific, education supply companies.

6. Magnets

Concept: Children can play with magnetic force and explore this property of materials. By using the phrase, "attracted to the magnet," instead of "sticking to the magnet," you reinforce that there is no "stickiness" involved—magnetism is a force that pulls or pushes. How it does this involves understanding that all materials are made of tiny pieces too small to see (atoms), a concept that children will build toward understanding around age 10. There is no need to rush this understanding. In early childhood, children can understand that being attracted by a magnet, or not, is the nature of a material.

How to support exploration: Ask questions such as, "What objects in my house can be attracted to a magnet?" and "Can magnetic force work through fabric?" Put the magnet in a sock and see if it can still attract objects.

Where to purchase: Be sure to buy magnets that are too large for a child to swallow. These can be found in hardware stores or toy stores, or they can be ordered from preschool, or scientific, education supply companies.

The most important science learning comes from experiencing the natural world. Without the natural world we could not manufacture any of the human-made materials that make our lives easier and more comfortable. The natural world is the most important science tool of all, so go outside with your child, breathe, look around, and explore

State Level Science Seminar - 2021

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SUB THEME:

GAMES AND TOYS AS PEDAGOGICAL TOOLS FOR TEACHING SCIENCE

TITLE OF THE TOPIC:

GAMES,TOYS AND LEARNING MATERIALS I USED

OBJECTIVES

- To construct the game based teaching and learning process.
- To develop Scientific temper among the students by games and toys related to science.
- To attract the students by attractive teaching learning material to learn science by joyful.
- The games, toys and activities pave way for the students to observe, brainstorm, think, question, explore and finally discover the concepts involved.
- Building the scientific concept among the students.
- By doing group activities students develops leadership capabilities.
- Encourage the student to apply the scientific concepts in real life situations and concerned to the environmental issues.
- Help the students to understand the concrete and abstract concept by the ICT
- To reduce dropouts and irregular students
- Experimental skill by ICT and online Labs too.
- To motivate the students to choose Science as career

INTRODUCTION

Science containing lot of abstract concepts. If we teach them in old method, it will be concrete (abstract) only and make students run away from the science. If we make the science concepts by activity-based it is more helpful to understand the science concepts. If we use student favourite activities and objects like games and toys for teaching science it helps to draw the attention of students towards science. We can make toys and games by low cost no cost material involving the students help.

I am not saying to not to use lab. But so many schools well equipped labs are not available so with the help of alternative tools and material which are available surrounding us can be used to teach science equivalent to lab.

DESCRIPTION OF THE PRESENTATION

Some of games, toys, tools and alternative materials are given to learn the science.

For 10th class

1. Using spoon or **acrylic sheet** for explaining curved mirrors.
2. Using **graph paper** for drawing Ray diagrams easily.
3. **Physicslite**mobile app to see the position of the image according to the position of object.
4. **Solar cooker with silver paper** but not by acrylic sheets. (Acrylic sheets may injure the students while preparing solar cooker.)
5. A video prepared by me as object.
6. Using **simple balance and atoms, molecules ball set** for **balancing the chemical equations.**
7. we can take help of **Phet simulation app.**
8. Red cabbage, beetroot solutions, turmeric powder and hibiscus flower are used as indicators.
9. **CBI activity**: To Catch the corrupted person using **phenolphthalein indicators and base.**
10. **Acid base strength testing toy:**With the help of LED and small batteries we can test the strength of acid and base (But not used by using AC voltage which is given in textbook.)
11. **Rainbow water or magic water:** Take dilute hydrochloric acid in a conical flask and add a drop of universal indicator the colour of solution will be in red colour. Now add dilute sodium hydroxide solution drop by drop then the colour of solution changes red colour to orange then green, blue green finally reaches to blue colour.
12. Using graph paper for ray diagram of lenses.
13. We can prepare ray box by using 3 laser light to show converging and diverging lenses.
14. We can find the **refractive index** of a prism by using laser light. (Traditional method using all pins.)
15. Making artificial rainbow with the help of plate and water mirror.
16. I Made **electronic configuration chart** we can learn by playing.
17. I purchased a periodic table, which is augmented reality that means the elements coming to true.
18. Bond formation videos by students.
19. Bond angle formation with the help of balloons.
20. Group activity and projects to calculate house and school current bill.
21. **Oersted experiment**to show that wire having electricity also has magnetic field.
22. **Flying magnet:** Lenz law by copper pipe and neodymium magnet. When we drop neodymium magnet through copper pipe it won't fall immediately it takes some time to reach the other end. It creates enthusiasm among the students to learn Lenz law.
23. Levitation with magnets.
24. Magnetic separation.

Action of soap by pepper powder and soap.(Take a bow of water and sprinkle the pepper powder now apply soap to your finger touch the water the pepper powder will move away from the finger.)

For 9th class

1. Diffusion of solids in liquids. By taking potassium dichromate, potassium permanganate, copper sulphate we can create colourful water which creates interest among the students.
2. Arrangement of molecules in different states is shown by jelly balls in water.
3. Balloon rocket to explain Newton's third law.
4. Refraction of light it can demonstrate with the help of laser light and smoke on water in a jar.
5. Total internal reflection by laser light.
6. Making colloid solution.
7. **Truth telling chalk:** Paper chromatography can demonstrate with the help of chalk.
8. Types of reactions by playing a game with the students.
9. To demonstrate density, we can use floating egg.
10. Barometer. Real barometer to students instead of textbook picture.
11. Bramah press model.
12. Atomic configuration with buttons.
13. Biomass. We digged biomass PIT in our school which helps to students to understand about biomass and encourage them to you using of waste material (waste management.)
14. Telephone with paper tea cups. (To demonstrate,zsound travels through solids.)
15. Dancing laser light on talk. To show sound has energy.

For 8th class

1. Balloon, papers, plastic straw, bottle for static electricity.
2. Keychain for identifying electric conductivity of a material.
3. Jaltarang
4. To show the Fermat principle I made a chat with the help of nails and thread.
5. Air is essential for burning

6. **Burning sand:**Calcium carbide is used for making sand to born.
7. Straw balloons for demonstrating electricity.
8. VR box using to show the augmented reality solar system in mobile. Stellarium and sky view apps to locate the planets.
9. Hot air weight measuring balance.
10. **Magic paper:**Deep a paper in phenolphthalein solution and let it dry. Write something on that paper with the help of a stick by dipping it in a base solution.
11. Magnetic lines with the help of magnets and iron filing.
12. **Magic arrow**: Draw an arrow showing left to right on your paper then keep it behind the empty transparent glass now pour some water by observing in front of glass magic.
13. **Repulsing balloons**
14. **Magic water**. We can test is water attracts or repulse.

Not only these tools but also we can take help of ICT to make the students to learn science.

some apps are given below

Physics lite, Phet, Kahoot, Mentimeter, H5P, Stellarium etc.

CODUCTING SCIENCE FAIR IN SCHOOL

Every year 28th Feb we are celebrating National Science day and Science fair too.

- USING ICT IN SCIENCE TEACHING LEARNING PROCESS

  I created the H5P interactive video https://balachandra.h5p.com/content/1290924598011946978
- ELECTRONIC CONFIGURATION LEARNED BY PLAY WAY METHOD (I MADE A CHART)

  https://www.youtube.com watch?v=3EFmhb_eqOw
- ELEMENT SONG IN TELUGU

  https://www.youtube.com/watch?v=JAxDvj4UNGY

CONCLUSION AND IMPLICATIONS

Now a days Central Govt. helping to establish of Atal tinkering labs and providing NCERT, SCIENCE kits. to selected schools which helps a lot in sciences teaching.

Science is everywhere.

So we can learn science from anywhere with the help of any objects.

And special thanks to SCERT Telangana and Janyaa foundation.

REFERENCES

- 10th, 9th , 8thclass Telangana physical science text book
- SCERT manuals

Experience of my own and other Science teachers.

State Level Science Seminar - 2021

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Sub theme : Games and Toys as pedagogical tools for teaching Science

Introduction:

Science has pioneered us to new ways of opinions and interpretation. Science helps to sharpen intellect and promotes intellectual honesty of the learner. Science can develop the positive attitudes of a learner to understand, evaluate and solve many problems. Science is essentially relating of the secrecy of environment and environment is a store house of all the gorgeous things. Science has played an important role in determining the culture and civilization of our country from time to time. It has pretentious our way of views and mode of living. Teaching of science is essential for developing scientific attitudes and scientific temper of the learner. The main idea of the teaching of science develops the instincts of curiosity, creativeness, self assertion, and self expression etc. of the learner. Science provides opportunities for students to acquire relevant functional knowledge and skills that are associated with scientific processes needed for advancement in science and technology. Students are encouraged to acquire and practice the scientific skills through science education. Science Teachers has to educate to inculcate self-discipline, scientific literacy and commitment in the minds of students. Teaching of Science should become enjoyable and exciting to the students rather than encumber and monotony. Science is the growth and progress of any society. It is not only conveys facts, proficiency and also instill values among the learners. Science is a subject that desires to be trained using very realistic and suitable instructional assets to the learners. Teachers should endow with opportunities for all learners to learn science. First of all, planning is profoundly reliant on the teacher's consciousness and understands the skills, benefits, and enriching environment of learners in the classroom. Teaching science necessitate efficient communication, cooperation and inventiveness. Ways of effective teaching techniques in the science curriculum can cultivate superior interpersonal skills and independent thoughts of the learner.

Objectives:

- Teachers have to develop the resilience of inquisitiveness, creativeness and critical thinking.
- Teachers has intend activities for discovering and pertaining scientific thoughts and ideas
- Employ students in using and concerning new science ideas in an assortment of ways and situations.
- Persistently mounting actually fascinating challenges and activities of the learner.
- Improve special skills, interpretation, and conceptual perceptive
- Allow students to visualize science content while developing domain specific, authentic interpretation skills, thereby sustaining deep conceptual understanding.
- Enable students to more easily make real world connections.
- Teachers have to develop students' basic scientific acquaintance as well as students' thoughts, incentive, and commitment.
- Inculcate playful thinking in science learners.
- Use emergent technologies creatively i.e., engage students in creative visual production and expression while learning science.
- Students need to explore, evaluate and apply ideas and not only to knowledge transmission.
- Teachers have to plan tools in an interactive way to engage students in thinking and learning.
- Promote critical thinking and freedom from fear and prejudice in learning Science.

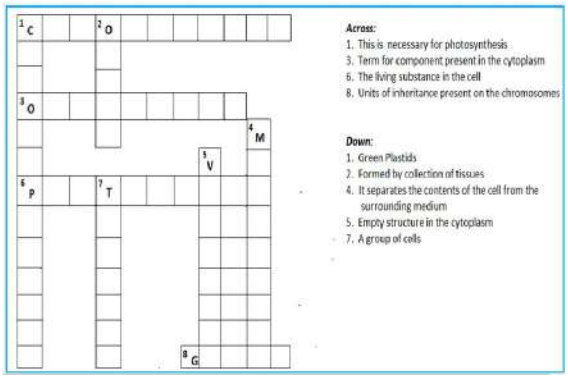
Presentation:

Games:

I) Crossword Puzzle

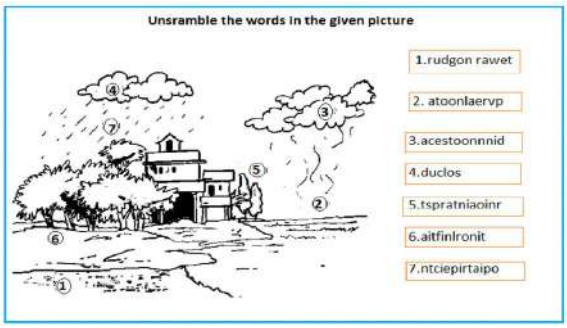
Class VIII –Interactive Science – Jhara Roy – Ch 8: Cell: Structure and Functions

A **crossword** is a word puzzle and word search game that typically takes the form of a square or a rectangular grid of white- and black-shaded squares. The game's objective is to fill up the white squares with letters, figuring words or phrases, by resolving clues, which escort to the answers.



II) Word Scramble – Grade VII - Science

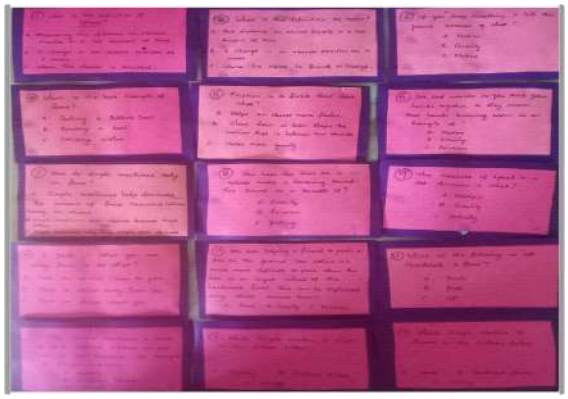
Word Scramble is a word game, most commonly known as Jumble. It's a word puzzle game based on the idea of anagram, where you have to re-arrange its letters to rebuild the original word, through the help of given clue for each set.

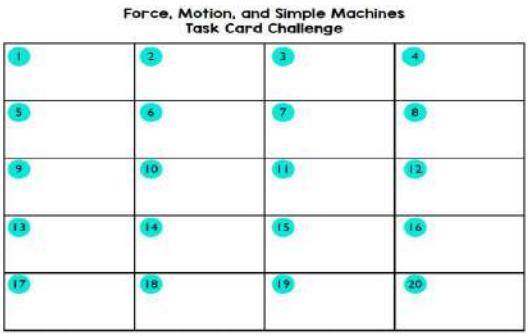


III) Task Cards Game:

Grade V – Begin with science – Wonder Kids Chapter 11 – Force and Energy

A task card is precisely what it sounds like: a card with a task on it. Task cards come in sets so that the teacher can give a objective on a particular skill, standard, or subject area. This can make them easier to complete by the students with a emotion of achievement. It can also perform as a motivator for students to see how many tasks they can effectively achieve in the time they are allotted.

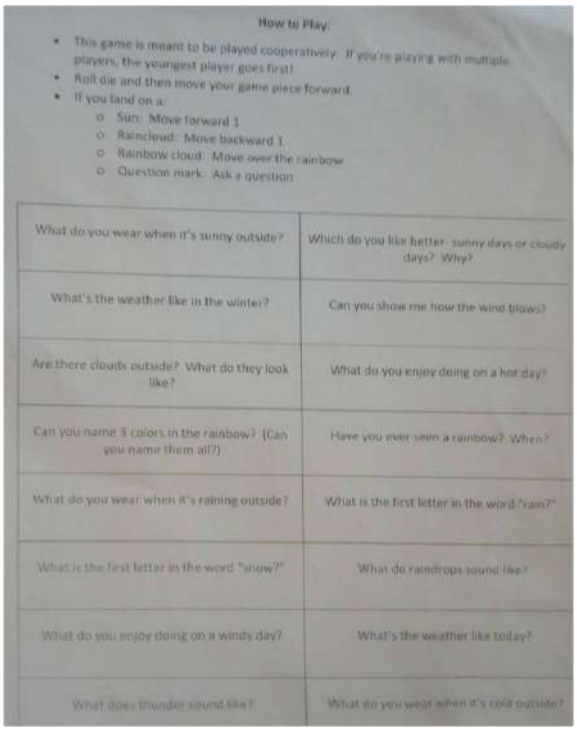




IV) Board Game – Weather – Grade III – Interactive Science – Jhara Roy

Board games are usually a rift of tabletop games that engage counters or sections enthused or positioned on a surface or board, according to a set of rules.

Rules for playing the game:



Toys:

Phases of the Moon: For Grade III to V

This toy was developed by using two plastic water glasses, a black and a yellow chart paper, Black Marker Pen.

Brain Hat: Grade VI to IX

This toy was designed using a plastic bowl and colours.

Using this toy, Teacher can explain the different parts of the brain in an easy way and student can able to understand about the Brain in an easy manner.

Outcomes:

- Enhances student self-esteem
- Students can develop self-concepts in science subject
- Improves rendezvous, ecstasy, and inspiration in the learner
- Students are to be encouraged to be practical and try innovative ways to develop games and toys
- Increase Intrinsic and Extrinsic Motivation among the learner.
- Draw's the learner attention
- Learners can endorse their social and cognitive skills
- Helps students to investigate and strengthen their knowledge,
- Promote students learning performance and engagement
- Creates an pleasant learning environment
- Promotes team work among the learners

Implications:

Games and toys in science can confidently impact students' academic results , pleasurable for students , encourage students' extrinsic motivation , definitely influence students' performance and amplify their inherent inspiration even in concepts that learner have trouble in understanding. Teachers have to be used more pedagogical learning strategies as games and toys to teach the students different concepts in science. The learning conclusion of games and toys in teaching science were motivation and commitment, learning achievement, and social communication. In Conclusion Games and toys has to develop Students' positive attitudes , scientific thinking and support of their independence can also support meaningful learning experiences and has to sustain their skills.

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Internet:

https://www.mdpi.com/2227-7102/11/1/22/htm

Books:

Class VIII –Interactive Science – Jhara Roy – Ch 8: Cell: Structure and Functions

Grade V – Begin with science –Wonder Kids Chapter 11 – Force and Energy

Grade III – Interactive Science – Jhara Roy

This toy can be used by teachers to describe the Phases of Moon in a clear and easy way so that the student can understand easily about the Phases of the Moon.

State Level Science Seminar - 2021

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SUB THEME – Ways to make science education more effective in light of NEP 2020 .

TITLE OF THE TOPIC – SCIENCE WITHIN AND AROUND US

INTRODUCTION –

Meaning - it blasts many doubts, foresees what is not obvious science is the eye of everyone, one who hasn't got it, is like blind

1) Science education is like a divine nectar which resuscitate the knowledge , truth in human to endure life lustuorously .
2) Science education can be more effective when we endeavor to involve our own routes along with nature.
3) Today's necessitate is not only to achieve livelihood but to aim towards substantial lifestyle .

OBJECTIVES –

1) To lead life both quality and quantity wise with science education .
2) To achieve personal passion with professional aspects in application to science education.
3) To enjoy science education in interesting and joyful way .
4) To break monotonous science learning .
5) To achieve the targets of National Educational Policy 2020 .
6) To reduce superstition and believe in scientific facts .
7) To increase quench of scientific attitude and scientific temperament .

PRESENTATION :

<u>Involve Nature</u>

Nature has created us. Thus , science education must inculcate the natural love towards nature. This will enhance empathy , sensitivity and balance .

Eg – Study beyond classroom under the tree (OLD GURUKUL MODE) , Class in the school garden , frequent visits to nearby forests , nearby botanical garden , Planting and taking care of trees as a compulsory syllabus .

INVOLVE OUR OLD TRADITIONS

India has a deep root of tradition where each event symbolizes scientific representation .

Eg – Harvest festival – Cropping Patterns , Holi – Eco friendly colours , hinders miroorganisms and purifies air . Mahashivratri Fasting – Intoxifiaction of body system , Folk songs,dance,stories-represents geographical behaviour .

Thus , Science eduaction must involve our traditions .

INVOLVE FAMILY AND FRIENDS

Family and Friends are great motivators , with their help science education can be more simplified and defintely can bring a positive behavioural and social change among students .

Eg – Learning cooking procedures from ancestors with the knowledge of nutritional value.

To develop moral science , kindness and affection , family and friends can be a great help .

Vocational training can be learned from ancestors with scientific awareness – for eg – Practicing farming , practicing handloom .

INVOLVE PERSONAL PASSION IN SCIENCE EDUCATION

Science is actual combination of all subjects inculcating scientific facts in personal passion like singing , dancing , painting and crafting , reducing the pressure of boredom and difficulties . Science learning can be more joyful and fun field by collabarating personal hobbies and positive habits . GAMES TO BE USED IN SCIENCE EDUCATION .

Eg- Learn the perioidic table , reactivity series etc through songs , water cycle by role play or acting , poster making and slogans for scientific awareness , crafting with best out of waste and ecouragement towards reduce , reuse and recycle policy etc .

OUTCOMES

1) The reciever of science education can lead life with serene beauty of nature .
2) Science education of collaboration withpersonal passion , new technology , Elearning / teaching **which will add flavour to NEP 2020** .
3) Will break the montomy and help the learner to achieve educational target in fascinatingpath .
4) Superstitions and myths will be obstructed and scientific tendency will expand .

IMPLICATIONS :

The above pictures are the examples of applied science to make science education more effective and beautiful.Activities are done by students of Ocimum International School with guidance of Mrs Shephali Panda TGT Science. Families of students were involved actively in science teaching and learning process resulting in traumaless way of aquiring knowledge in Science education .

I am providig few pictures which I have practically applied on school children from grade 4 to 10 .

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1)Science syllabus of CBSE .

2)Sanskrit sloka – Internet (https://blog.practicalsanskrit.com/2009/07/science-is-only-eye.html)

3)NEP 2020

State Level Science Seminar - 2021

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SUB THEME: WAYS TO MAKE SCIENCE EDUCATION MORE EFFECTIVE IN THE LIGHT OF NEP 2020

TITLE OF THE TOPIC: WAYS AND MEANS OF DOING SCIENCE TEACHING MORE EFFECTIVE"

INTRODUCTION:

Science plays a major role in making India a better place to live. Scientific inventions have helped in the growth of almost every sector in the country. With the help of these inventions people today have become better equipped to handle various tasks – be it the small household tasks or the big corporate projects.

Science has helped in the growth and development of India to a great extent. There are many institutes in the country that train the students in this subject. Many of these students come up with newer scientific inventions while others work on the already available ones to improve their way of working. We, as a country, have benefitted a great deal by these inventions. Scientific inventions made in other parts of the world have also been implemented for carrying out various tasks in India. These inventions have played a vital role in making India.

Education is a key to progress and development of a country. Science education plays a major role in it. Our life has become very comfortable due to the gifts the science has provided to us. India has made much progress in the education sector since Independence including the progress in science education. A large number of institutes of higher learning have been opened including Engineering colleges, Medical colleges and exclusive institutes of science.

Science education improves the education of future scientists and fosters a greater and more relevant understanding of nature and the findings of science among the population as a whole. Science education gives children an

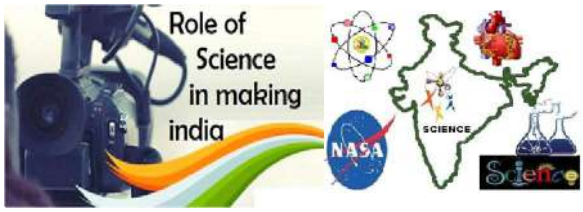
awareness of technology and develops their personal experiences. Practical skills, encouraged in technological activities, help children to acquire resources of knowledge and intellectual and physical skills. Science Education requires financial support, professionals, effecting planning, and resources for effective implementation, scientific literacy, and development of intellectual skills and sequencing of material.

OBJECTIVES:

- To explore the ways and means of doing science teaching more effective in the light of NEP 2020.
- To identify the different ways and means in teaching science more effective.
- To adopt the ways and means of doing science teaching more effective in the context of NEP 2020.
- To motivate the teachers in implementing the different methods and strategies for teaching science more effective.
- To motivate the students to realize and appreciate the importance of science for developing India.

DESCRIPTION OF PRESENTATION:

The Importance of Science Education:



Science Education is one of the most important areas of the curriculum. It is an essential vehicle to provide human resource development, modernization and overall development of countries. Science education is related to some important aspects of development. These essential aspects are Health, Food, Agriculture, Energy resources, Industry and Technology, The Environment, Information transfer, Ethics and Social responsibility.

The general aims of science education are- to promote agricultural development, industrial production, scientific research and social development, to provide pupils with a scientific spirit of curiosity and inquiry, to understand and change the natural world, to encourage people to question and search for data.

The objectives of science education as- The development of a spirit of inquiry, Understanding of valid views of the nature of science, The teaching of problem solving, using scientific techniques such as observation, measurement, formulating or testing hypotheses,experimentation, drawing validconclusions,Impartation of science literacy,Development of manipulative skills and scientific attitudes,Understanding the interaction between science and the society,The transformation of the environment,The production of individuals who are capable of participating in socially useful and productive activities,The production of citizens who are better consumers of scientific products,

Accelerating the development of potential scientific and technological manpower.

NEP 2020: Transformational Reforms in Education System

NEP 2020 deals with many aspects of school education that had already been addressed by the National Curriculum Framework of 2005. These include the need to move away from rote learning, flexibility in examinations, discouraging an overdependence on textbooks and providing for overall development of children.

- The New Education Policy will give importance to students' practical knowledge instead of just pushing them towards rote learning.
- It will help students to develop scientific temper from a young age.
- The NEP aims to make it easier to set up new quality of higher educational institutes which will be at par with the global standards.
- Since NEP will make it easier for foreign colleges to set up their campuses here many students who are unable to go abroad due to multiple reasons will be able to experience it and get global exposure.
- This will promote value-based education.

NEP 2020: Technology in Education

This Policy aims at appropriately integrating technology into all levels of education to improve classroom processes, support teacher professional development, enhance educational access for disadvantaged groups and streamline educational planning, administration and management.

An autonomous body, the National Educational Technology Forum (NETF), will be created to provide a platform for the free exchange of ideas on the use of technology to enhance learning, assessment, planning, administration. Appropriate integration of technology into all levels of education will be done to improve classroom processes, support teacher professionaldevelopment, enhance educational access for disadvantaged groups and streamline educational planning, administration and management. Technology-based education platforms, such as DIKSHA/ SWAYAM, will be better integrated across school and higher education. Higher Education Institutions(HEIs) will play an active role in conducting research on disruptive technologies and in creating instructional materials and courses including online courses in cutting-edge domains.

With the National Education Policy 2020 recognizing the need for flexibility in choosing the subjects that a student wants to study, implementation of this policy will boost science, technology, engineering and mathematics (STEM) education in India. The New Education Policy also recognized that skills like reasoning, scientific temper and evidence based thinking should be learnt by all students to become good, successful, innovative, adaptable and productive human beings in today's rapidly changing world. Technology integration into educational processes (e.g. support translation, act as a pedagogical aid, facilitate continuing professional development, online courses, etc.) will be optimized through digital repositories, teacher preparation to use technology, qualified support and research. Centres of Excellence in Educational Technology will be set up to undertake research and support use of technology.

Teaching Approaches and Strategies for Science:

The biggest challenge before a teacher is how to teach Science lessons. If this teaching – learning activities are effective, students can reach the goals of life by acquisition of knowledge, skills and values in Science.

As defined by Dr. Rosalyn Yalon, a Nobel Laureate in Medicine, science is not simply a collection of facts. It is a discipline of thinking about rational solutions to problems after establishing the basic facts derived from observations. It is hypothesizing from what is known to what might be and then attempting to test the hypothesis, logical thinking must come first; the facts can come later.

The teachers' mindset and their feedback are crucial to instruction in the science classroom. Here are five teaching techniques for the science classroom and explanations of them.

- Real-life scenarios that involve case studies and ways of analyzing current problems.
- Peer-to-peer teaching, which involves students in their own education.
- Hands-on activities that engage students beyond the lecture and teach useful scientific concepts.
- Science projects, which teach the scientific methods of inquiry and experiment.
- Field research journals, which are notes and other documentation of trusted science experiments or from the students in your classroom.

An Example: 5-E Model of Instruction

"The 5E Model of Instruction includes five phases: Engage, Explore, Explain, Elaborate, and Evaluate. It provides a carefully planned sequence of instruction that places students at the center of learning. It encourages all students to explore, construct understanding of scientific concepts, and relate those understandings to phenomena or engineering problems." –Rodger Bybee

The 5-E Learning Cycle is a model that promotes scientific inquiry. Each "E" represents part of the process of helping students sequence their learning experiences to develop a connection between prior knowledge and new concepts. The teacher serves as a facilitator as students construct new knowledge based on thoughtful inquiry and decision making.

The 5-E's are as follows: 1. Engage 2. Explain 3. Explore 4. Elaborate 5. Evaluate.

Engage: The students engage in a task to make connections between the past and present learning experiences. Example: Recall the following: 1. Compounds are classified into acids, bases, and compounds. 2. Some acids and bases are strong; some are weak 3. Indicators such as litmus paper and phenolphthalein can be used to identify acids and bases. Present the situation below to your students. Suppose you want to find out which among the substances in your home are acids and bases. You don't have any litmus paper or phenolphthalein. What will you do?

Explore: The students perform a task to get directly involved with key concepts through guided exploration of scientific, geographic, economic, and other data set. Example: Pupils will do an activity.

Explain: The students give details about the science concepts being developed in the task. Through readings and discussions, the students develop understanding of the major science concepts and verify answers to questions or problems posed in the engage stage. Example: Which of the household substances are acidic? Which substances are basic? You can answer the questions by comparing the color change of the extract in solutions found in the second table with the color change of extract in hydrochloric acid solution/sodium hydroxide solution. From these two tables you can deduce that milk, tea, coffee and bleaching agent are acids. Shampoo, detergent, baking soda and toothpaste are bases.

Elaborate: The students simplify the science concept/s in the lesson, e.g. stating the concepts in their own words, and applying new found knowledge to a different situation. Example: Present the situation below to the students. Some of us suffer from indigestion or stomach problem in the morning. Our parents would tell us to drink milk, coffee, or tea. Is this a good advice or practice? One cause of indigestion or stomach problem in the morning is hyperacidity. At first coffee, milk or tea may help. In the long run, the problem will worsen. Why? Tea, milk and coffee are acidic.

Evaluate: The students take a test, quiz, or any authentic assessment instrument to determine how much they benefited from the lesson or activity.

CONCLUSION:

One cannot underestimate the scope of science in today's world. Science is the backbone of human existence. The practical effects of science can be seen in motion everywhere. From path breaking discoveries in atomic science to discovery of newer vaccines in life science, to technological advancements in the field of communication, transportation and even weather prediction, science has left no aspect of humans untouched.

Science Education provides good standards for people and leads to cultural development. It is a truism that teachers must know the content that they are to teach. While no teacher could adequately support student learning without first mastering the content of the curriculum herself, effective teaching requires more than simple mastery. Quality instruction entails strategically designing student encounters with science that take place in real time and over a period of months and years. Teachers draw on their knowledge of science, of their students, and of pedagogy to plan and enact instruction. Thus, in addition to understanding the science content itself, effective teachers need to understand learners and pedagogy design and need to monitor students' science learning experiences.

National Education Policy 2020envisages-**teachers as the 'most important members of our society and the Torch bearers of change.'** The success of any effort to foster quality education is dependent upon the quality of the teacher.

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State Level Science Seminar - 2021

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Sub theme : Ways to make Science Education more effective in the light of NEP-2020

Intoduction:

Developments in science and technology have enabled human beings to deal with their problems and to improve their living standards. Many developing countries including India have embarked on achieving economic progress by investing in these disciplines. A multipronged strategy to use science for national development was worked out and implemented over a span of about half a century in India. In addition to making available science education to a larger population by establishing adequate number of educational institutions, it made efforts in teacher preparation and development of instructional material. Systematic attempts were also undertaken to conduct research in science education and make the findings available to the system. Apart from improving teaching of science in schools and colleges, India attempted to achieve progress through a variety of supporting activities like nurture of science talent, spread of scientific literacy and establishment of R&D institutions. These efforts resulted in the development of trained manpower that facilitated the industrial growth within the country. A case of India is presented in the chapter by highlighting the strategy used to achieve social and economic development by improving the status of science education and by undertaking supporting activities

Different ways to make Science Education more effective:—

Student engagement and understanding of materials is given more emphasis in today's education over spoon feeding the facts. Therefore, using black-boards or the typical lecture methods are not adequate to teach science and other related subjects.

Many scholars and researchers have proposed advanced ideas and they claim that virtual teaching scenarios or simulations can help to build a better understanding of subjects amongst students.

More than just conveying facts or findings in science, students will love to explore the world of science. These innovative teaching methods in science can substitute the typical teaching techniques to achieve the goal.

1. Hands on Learning:

This is the best teaching method invented so far that involves the active participation of students to experience scientific concepts than to just have an audience view.

Schools are promoting the use of low cost apparatus in classrooms to helps students to have hands on learning experience. It can be a string telephone to teach about sound and communication, matchstick mecanno to teach 3D structures, notched pencil to teach rotation motion or anything similar.

2. Story Telling

Students love to hear stories and therefore, storytelling is one of the best ways to get their attention in class.

Teacher can explain the facts of biology or the laws of physics in the form of stories. This is a mental organizer as human brains can remember stories than just plain facts. Some teachers present the whole concept as a story while some others use a story to open and end the session.

3. Role Play

This innovative method is becoming an integral part of science education as students can intellectually and physically involve through activities while learning a new concept.

Activities can be organized in classroom sessions where a group of students can take the role of atoms or molecules to study a chemical reaction or they can represent a scientist group to demonstrate the particular scientist's laws.

4. Sports Based Learning

This is an interesting approach to learn problem-solving in physics or a stepwise method to study complex chemical reactions. A game of football or cricket helps them to learn about the percentage, average or probability which can find its use in physics problems. Sports are mostly played in teams which also promote the importance of teamwork that helps them to synchronize better in group projects.

5. Visual clues

Using visual clues easily supplements auditory information and students can easily connect better with ideas.

The multi-sensory experiences improve their understanding and memorization. This includes drawings, diagrams, and pictures to assist theory and setting up examples to show its application side.

The sequence of lab procedures can be better taught using pictures with words approach.

6. Instructional Conversations

Building instructional conversations is a key method to teach science vocabulary. Let them talk in between the lectures about the experience they had with an application related to the topic of discussion.

This promotes their dialogue construction in science as they communicate using scientific and technical terms. Make this a classroom strategy to help students to easily learn science vocabulary.

7. Science Text Cards

This is an innovative teaching method to convey the science facts in an easy and

organized way. In this activity, statements related to science concepts are written on index cards.

Students can work individually, pairs or in groups to sort the cards based on the given format. The formats include true/false,agree/ disagree, matching pairs, classification, sequencing and more.

8. Word Gam This is a creative strategy to help elementary students to experience the language of science. Hangman, Pictionary, Dingbats, Bingo, Scrabble, Odd One Out, Charades, Trivial Pursuit etc. are the common games.

Playing these games using scientific terms helps the students to work closely with different hard to understand words and use them fluently in their subject.

9. Graphic Organizers

This teaching approach is helpful for students to interact with science in a more organized and structured way. Teachers can use different types of templates to represent the data according to the topic that is being handled.

A typical format for graphic organizer contains a central point from which different branches are formed and there may be sub-branches in certain cases. Arrows are used to point the direction or sequence of a process.

10. Word Parts

This teaching strategy is followed by teachers to educate the basics of science to elementary students. While introducing new scientific terms, they can reinforce the structure of words.

Students are asked to identify and understand prefix, suffix, and base word, and to relate their meanings. For example, metamorphosis — meta (large), morph (change), osis (process); photosynthesis — photo (light), synth (make), isis (process).

11. Social media

The different social media platforms can be used wisely to teach science to make the science classrooms more interesting and engaging. For instance, students can be asked to follow scientists in Twitter and share his/ her new thoughts and findings in class or to use Feedly for improving the content of their research projects.

Students can also use Vine to document and to share science videos, Pinterest account for sharing images for research projects or writing prompts or WordPress class account for peer-to-peer learning.

12. Virtual science labs

There are many virtual science labs available online for free and therefore, this approach almost gives hands on experience of learning the subject without much expense.

Detailed diagrams, illustrations or close up pictures allow students to virtually get inside a plant or animal part without actually doing it. Dissections in biology can be studied thoughtfully with a virtual hands-on sensation without the problem of odour and similarly, experiment a chemical reaction without burns.

13. Word walls

Science word walls in classrooms can stimulate the interest of students in the subject and an opportunity for them to illustrate different concepts. In an advanced technique, a more in-depth understanding of different scientific terms can be made possible with pictures that accompany the words.

This is also an option to help them better understand words with multiple meanings. Teachers can design creative word walls or ask students to contribute to the idea weekly or monthly.

14. Thinking Maps

This is an ideal way to visually represent different thought processes which help to organize the science education with a better flow. There are different types of thinking maps available which can be chosen wisely to represent the particular topic.

This includes bridge maps to teach relation between ideas, brace maps to break larger objects into smaller parts, flow maps to show sequence of events, multi-flow maps to show effects or causes of an event, tree maps to classify objects or ideas and more.

15. Mini anchor charts

These interesting charts are a great idea to give a detailed overview or explanation of a science topic. Teachers use it to interactively teach areas such as scientific methods, types of energy, plant life cycle, states of matter, mixtures and solutions, force & motion and more.

To make the whole idea interesting, the teacher brings variations such as black and white charts, colored ones; fill in the blank models, and full-page anchor charts for large classrooms.

16. Crossover Learning

In this teaching method, students are given opportunity to learn in multiple settings such as inside the classroom, museums, field trips or clubs.

Teachers can use this method effectively by proposing a question in class, taking students to informal settings to find answers and then, going back to classrooms to discuss and share the findings. This way, learners can record, link, recall and share their diverse learning events to explore the topic and get a deeper level understanding.

17. Argue with Science

Learning through argumentation gives students a widened thinking to contrasting ideas which in turn deepen their understanding. They can refine ideas with others and engage with open-ended questions, and re-state observations or remarks in a more scientific language. Teachers can also guide them in their approach and share the intellectual expertise with them.

18. Context-Based Learning

In this method, students are given the opportunity to create context and explore ideas from them. They interact with surroundings, hold conversations with subject experts, make relevant notes and attempt to modify the nearby objects.

The context can be understood in detail by exploring the world around. This gradually helps them to interpret new information from the context and relate to what they already know.

19. Computational thinking

This is an advanced technique to improve thinking and problem-solving skills. The method comprises decomposition i.e. breaking large problems into small units and pattern recognition-related problems to the ones which were already solved successfully in the past.

Computational thinking skills also cover algorithms-step by step approach to

reach a solution; abstraction-neglecting unimportant details and debugging-refining these steps.

20. Remote labs

Learning by doing is an unparalleled approach to teach science and this is made a reality with remote labs. Students are given access to authentic scientific tools and opportunities to control remote lab experiments.

This would enhance their inquiry skills and conceptual understanding and also, the students can learn and explore with motivation.

21. Embodied Learning

In this approach, mind and body of the students work together to explore science. The physical feedback, as well as the resultant actions, will reinforce their learning process.

This idea is well supported by today's technology such as visual systems that track movement or wearable sensors to collect physical and biological data.

22. Science museums

Give opportunity to students to visit a science museum as part of the learning process. This gives them access to innovative resources and they can visualize data they learned in class.

They can have a look at the real work of scientists which improves their urge to learn about it further. Regular visits to museums make learning science more engaging and interesting.

23. Projects

This can be an individual activity or group activity which helps students to showcase the application side of what they learnt through theory.

This method involves choosing the idea, building a plan, executing the plan and finally evaluating it. When students pass through these stages, they can improve their skills to express ideas, problem solving, overcoming the challenges, team work and self assessment.

24. Multimedia Approach

This method is a blend of text, audio, animation, video, still images or interactivity content forms to teach diverse difficult to understand concepts in science.

The educator can convey vast information using advanced media, devices and techniques, and involve a wide range of activities to provide a meaningful learning experience.

25. ICT Enabled Learning

ICT refers to the use of Information and Communications Technology to teach the scientific ideas that promotes open source learning.

In order to make the accessing, storing, transmitting, and manipulation of information more easy, this approach integrates telecommunications, computers and relevant enterprise software, storage, middleware, and audio-visual systems required to handle the topic.

26. Video clips

This teaching technique makes use of instructional video clips available online or in libraries to show and teach a new concept.

The evolution of a process can be conveyed better with animation videos. It can also be videos of demonstration of an idea or an application side of a theory or an interview with a scientist, tutorial by a subject expert and more.

27. Power Points

Instead of the conventional talk and chalk methods, teachers now include power point presentations in their classroom sessions to make it more interesting.

They connect the computers to projectors to address a larger classroom and include interesting slides with diagrams and flow charts to make the teaching more interactive.

28. Mini-labs

Mini-labs allow students to take part in hands-on activities inside the classrooms to illustrate a concept. This makes classroom sessions more fun, engaging and memorable.

Students can attempt to mock-up day/ night with a globe and flashlight, build circuits, test for conductivity and magnetism, produce mixtures and solutions or model the formation of sedimentary rock and more.

29. Science Fair

Schools should conduct science fairs as part of their teaching strategy to promote students interest in the subject as well as to evaluate their level of understanding.

In this competition, students are given a time frame to answer a question or perform a task through a range of experiments and research. They showcase the output in the form of reports, display board, or as models.

30. Research books

The teacher can promote the use of research books in classrooms rather than just text books and lecture notes. Students are asked to do a research on whatever topic is covered in class by means of libraries, websites or by talking with experts.

This can include the extended information of their syllabus and their findings with diagrams and charts to emphasize it. They can share their research books with classmates too.

31. Documented Problem Solving

In this method, the teacher insists students record their thought process when solving a problem. They are asked to explain their reasoning for reaching the particular solution rather than simply presenting a solution.

This kind of documented problem solving helps them to have a deeper understanding of their process and gives an option for self-analysis.

32. Science kit

This is one of the innovative methods of teaching science to kids and adults alike. Let it be physical science, life science, or earth science, teachers are now making use of science kits to help students have an engaging educational experience.

They can conduct small experiments with guided instructions to identify rock specimens, to watch out for insect metamorphosis or demonstrate chemistry reactions.

33. Science stations

This is a fun, quick and engaging way to teach science that promotes student-led learning. Science stations support differentiated learning that lets students immerse themselves in topics, experience science to the fullest and then reflect back on their learning.

There will be multiple stations built with different learning styles and students can

research, explore, watch, read, write, assess and illustrate the science concepts.

34. Observation stations

More than just the textbook assignments that have limitations in exploring the topic, these advanced observation stations help students to build up their research, observation, and creativity.

This includes activities that help them to have an understanding of a specific concept using 5 to 6 stations with varied options. The activities include determining mass using a triple beam balance or testing objects to find out their electrical conductivity and magnetism and a lot more.

35. Peer-to-Peer Teaching

Students take the role of teaching each other that promotes excitement learning science. In Peer-to-Peer Teaching approach, they are really engaged in the content by discussing scientific topics, generating questions and working in teams to explore new information. Some of the activities involved in this approach include buzz groups, solution groups, and critic groups.

36. Science movies

Teachers take initiatives to take them for science movies in theatres or in school halls that clearly showcase the application side of scientific concepts.

More than just entertaining them, many science movies captivate their attention and illustrate diverse science concepts in the real world. Science and nature-focused documentaries is one of the best ways to introduce science to kids than spoon feeding them with text book content.

37. Science games for kids

Kids always love to play and that is why smart teachers introduce science to them with interesting games. They can learn more about science and technology with fun.

A wide range of games are available online that showcase the concepts of animals, plants, space, forces, light, sounds, magnets, electricity, weather and gases. There are games with multiple levels and passing each level teaches a new concept and illustrates scientific experiments.

38. Science songs

This is another creative teaching method to help kids to learn about the science world with fun. Teachers can make use of the interesting science songs available online or create one to introduce the basics of astronomy, biology, botany, physical science and earth science with fun.

Science Is Real, Meet the Elements, The Star Song and Motion Song are a few among the popular science songs available online.

39. Science Exhibition

Encourage your students to take part in science exhibitions as part of school level or inter-school level competitions. This is a great opportunity to bring out their creativity in science and design an application based on a scientific concept.

Develop this inquisitiveness and creative mindset in students right from the elementary classes to help them to grow up as science enthusiasts.

40. Mobile apps for Science

A number of mobile apps are available online for elementary, middle school and high school students as well as for those undergoing

advanced studies. Today's kids are tech savvies and they love to learn science using their gadgets.

The advanced mobile apps built with innovative features in fact turn students into scientists. This lets them hold science in their hands and explore it with just a few taps. The popular apps in the category include Human Body, Cozmic Zoom, Earth Primer, Video Science, Science360, NASA GLOBE Observer and a lot more.

41. Field trips

In the middle of boring classroom sessions, take your students out for field trips to experience science while learning. Go to an aquarium, a nature center, a scientist's home or visit a pet store.

You can also spend some time with the students in the bird park or simply go on a nature walk to experience the science around while learning new concepts.

42. Science clubs

Set up science clubs in your schools or community, which is an ideal approach to STEM education that assimilates high quality hands-on instruction.

This is the right place for science enthusiasts to share and discuss new happenings in the science world and to connect innovative ideas to what they actually learned.

43. Reward discovery

Right from the elementary classes, teachers should support, guide and inspire students to discover the wonders of science. With an inquisitive mindset, there are a lot to discover from the science world we are living in. Also, reward them for the small discoveries they make and let them share and present it in class.

44. Interactive science journals

This is an advanced version of lecture notes in which students express the information they learnt into different templates and elicit their own responses.

Students can use this technique effectively to have a deeper connection to their learning and this activity promotes their higher level thinking. They can be creative with their notebooks using pictures, charts and comments, thus, building an encompassing resource for future reference.

45. Science at home

Like scientists say, science starts from home. Encourage your students to discover science at home from elementary classes itself. Ask them to find out a specific science concept application at home as assignments and let them discover science on the go.

There are fun science activities at home that involve parents and kids such as measuring Earth's circumference with a shadow, creating under water fireworks with chemistry, building a balloon powered toy car and a lot more.

46. Flipped Classroom

In this innovative teaching technique, students are asked to go through video instructions or tutorials in the initial stage, i.e. digital learning.

The second stage will be in classrooms where they involve in challenging tasks and assignments based on the information gathered through video assets. This flipped learning frees up class time for activities such as hands-on labs, guided practice or online simulations.

47. Guided Discovery Problems

Understanding science is more than just knowing some facts and the guided discovery problems method makes it possible. This technique can be integrated into the lecture, lab and field courses.

It refers to understanding science step-by-step through the discovery process and involves the collection and processing of data, debugging and explaining it through intriguing puzzles, structured hands-on activities and right presentation of information.

The conceptually difficult or counter-intuitive topics are better handled with this approach.

48. Fishbone

This is a visual tool for organizing critical thinking which is a good approach for problem solving in science. The fishbone diagram helps to teach students about the root causes leading to a problem and quantifying the relationship between the effect and cause. This is more effective when teaching a group. In this diagram approach, the head of the fish represents the change, the ribs show the reason and riblets have the supportive evidence.

49. Science Quiz

Include a quiz as a part of your classroom sessions when teaching science. This can be done as a whole class activity by splitting the group into 4 or more sets. The questions can include the application of the theory taught in class. Students can discuss and share ideas to find the solution within the stipulated time frame. This teaching approach helps students to think from different angles and sometimes, to think out of the box.

Conclusion: In this way we can teach science more effectively.

State Level Science Seminar - 2021

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Sub Theme :Ways to make Science Education more effective in the light of NEP - 2020.

Title of the paper : " Effective Science Teaching "

Organized by

State Council of Educational Research and Training, Department of Mathematics and Science, Telangana

I. Introduction

"Science does not simply sit down & pray for things to happen, but seeks to find out why things happen. It experiments and tries again and again and sometimes fails and sometimes succeeds & so bit by bit it adds to human knowledge. This modern world of ours is very different from ancient world or the middle ages. This great difference is largely due to Science." **- Pandit Jawaharlal Nehru**

As very rightly quoted above our every day is different from the earlier days & this is largely due to the contribution of science in our life. We can't live happy life without Science. The science has become integral part of our life. Science has also influenced educational enterprise & hence it is also the integral part of our educational system. Learning of science has become unavoidable part of general education. In this chapter we shall discuss the meaning importance & place of science in school curriculum and general and specific instructional objectives we shall also learn about organization of science curriculum using disciplinary approach & integrated approach.

II. Objectives

Understand the meaning & importance of general science. Describe the place of science in school curriculum. Explain the disciplinary approach of organization of science curriculum. Explain the integrated approach of organization of science curriculum.

III. Methodology

Science is an important subject in school curriculum because man's future depends to a large extent on scientific advances & development of productive activity. Hence there is a great need to teach science in school curriculum.

I think teaching is an art and there are born teachers. But there are majority of teachers, who can improve upon by experience of practice and utilization of various methods of teaching science. The basic aim of teaching any subject is to bring about desired change in behavior. The change in behavior of child will be indicated through children's capacity to learn effectively. This is only possible by adopting various methods of teaching. The teacher cannot utilize any method to any type of students in any type of environment. He / She has to choose and adopt the right method of teaching keeping in mind the capability of the students and the curriculum. Thus, method in a way of presentation of the content in the classroom. But, it in however very important to keep in mind that a method is not an end in itself but is used to achieve the set aims of teaching. You should also keep in mind that, same method should not be used at all times but there should be flexibility in using it as for as situations circumstances, and condition in a particular case. You should use various methods depending upon demand of the situation. The method which in a particular class under a particular circumstance, may be a total failure for other teacher. However, some set criteria for selection of a method of teaching will be discussed further in the following paragraphs. Principles for selecting methods:- There are some guiding principles for determining teaching methods.

They are as follows:-

1. Principle of sense of achievement through interest and purpose.
2. Principle of active cooperation.
3. Principle of capability of students of particular class.
4. Principle of realization of meaning of education i.e., "I bring up", "I nourish", "Drawing art".
5. Psychological principle i.e., need, interest, of students.
6. Principle of individual difference i.e., different potentialities of students.

METHODS OF TEACHING GENERAL SCIENCE:-

All the methods of teaching science can be classified into two types:- (i) Teacher-Centered and (ii) Pupil-Centered

(i) Teacher-Centered Methods:- This type of teaching methods focus on telling, memorizing, recalling information. The students participation is very limited where in they only ask questions or answers questions. Most of the time the students are passive listeners and receive the knowledge. The teacher is centre of process that goes on in the classroom.

(ii) Pupil-Centered Methods:- This process emphasizes on need, requirement, interest and capability of students. The students are active participants where in their skills and abilities are developed. The climate in the classroom is conducive where in flexibility in there. Teacher and students jointly explore the different aspects of problem. The role of the teacher in to create a problematic situation, has materials and resources available to the students, and helps them identify issues, state hypotheses, clarify and test hypotheses and draw conclusions.

Conclusions and Implications

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. Teach differently and the approach of the students to the concepts will change to a great extent. These kinds 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. These innovative techniques improve a rigorous higher order and critical thinking skills. It enhances the ability to understand even a very difficult topic. 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.

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State Level Science Seminar - 2021

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Sub-theme: ways to make science education more effective in the Light of NEP-2020

Topic: NEP 2020 Science education makes students as future Scientists.

INTERDUCION

Students in India have historically focused on preparing for exams in a system involving years of learning by rote, copious note- taking and narrow adherence to the syllabus. The proposed new education policy(2020) which emphasizes problem-solving and critical thinking skills will help the next generation of Indians finally 'prepare for life' and navigate their uncertain features.

For teachers across India, the reality brought on by the Covid-19 crisis has tested their ability to adopt and innovate. It is a challenge our teachers have overcome with dedication moving with agility to remotely teach students online with NEP 2020, teachers will have an opportunity to nurture these very same values of adaptability and innovation in their classrooms. A key focus area of transforming the quality of teaching where teachers will be empowered to lead change.

Learning to think critically is a vital part of child development , helping them make sense of the world around then. And critical thinks can be developed through focused learning activities.

At the same time problem solving skills is a frequently with goal of science educations. The National Science Teachers association (NSTA) statements, advocated that science teachers help students learn and think logically specifying that not only high school laboratory and field knowledge, but also problem solving and decision making.

We should encourage children science learning through Heritage science. Heritage science is over interdisciplinary domain of scientific study of integrating heritage science focus on enhancing the understanding care and sustainable use of heritage so it can enrich people's lives both today and in the future.

Objectives

1. To develop scientific temper and spirit of scientific enquiry and capacity for independent and original thinking.

2 To develop argumentation ability speaking skills
3 To develop effective communication and problem solving abilities in real world
4 To develop critical thinking ability
5 To encourage and enable students to develop inquiring minds and curiosity about science and nature
6 To develop experimental skill
7 To develop science learning through heritage science
8 To acquire knowledge conceptual understanding and ski8lls to solve problems and make informed decisions in scientific contexts

DESCRIPTION OF PRESENTATION

As students enter high school, the majority are mentally capable of dealing with the abstract. They clean manipulate multiple variables with multiple hypotheses simultaneously. They are using adult- like reasoning skills of induction and deduction. The high school students is capable complex thinking tasks. If a student has been challenged to think in the lower grades, he/ she will be mentally adopt at these complex skills in high school. However if the lower grades have tended toward factual knowledge and limited thinking skills, the high school students wills begin with a deficiency.

Critical thinking / problem solving can be taught to high school students (and in similar ways to heddle school) during the following exercises (ways)

1 Make them feel like real scientist
2 Use real date
3 Create opportunities for interactive feedback
4 Let students choose
5 Apply activities to real life
6 Allow for thinking practice
7 Teach scientific ways of thinking
8 Help students to develop a conceptual from work as well as to develop problems solving skills
9 Promote students discussion and group activities
10 Help students experiences science in varies interesting and enjoyable ways
11 Encourage science learning through heritage by visiting historical paves natural heritage

Implementing critical thinking and problem solving strategies in the class room

" A claver person solves a problem. A wise person avoid it "

-ALBERT EINSTEIN

OBSERVATION

COMMUNICATION

SORTING/CLASSIFYING

INFERRING

EXPERIMENTATION

DISSECTIONS

Conclusion:

Young Children are capable of understanding and activity building knowledge, and they are highly inclined to do So, While there are developmental constrictions on children competence, those constrictions secure as a sealing below which there is amorous room for variation in growth, skill acquisition and understanding.

When Teacher Implement critical thinking, problem solving skill developing strategies and intergrading heritage science education in the classroom, definitely our students (as a future scientist) will be give solution for many problems which are being faced by world, and new inventions are possible with their ideas. So that our developing India become sustainable.

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- My own experiences in class room in field level
- Various article about critical thinking , problem solving and integrating heritage science

State Level Science Seminar - 2021

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SUB THEME: "WAYS TO MAKE SCIENCE EDUCATION MORE EFFECTIVE IN THE LIGHT OF NEP 2020"

TITLE OF THE TOPIC: **"IMPACT OF SCIENCE EXHIBITIONS ON STUDENT LEARNING ATTITUDE TOWARDS STEM EDUCATION"**

The study is related to students learning attitudes toward science, technology, engineering, and mathematics (STEM) education and the study is limited to students of those are participated in Science Exhibitions like Science fairs, Inspire Awards MANAK, National Children's Science Congress, Science Melas and other Science activities. For this study, 120 science exhibition contestants from different schools are selected in random sampling technique to assess their interest in STEM education and their understanding of science inquiry. Science exhibition participation increased student understanding of science inquiry, and positively influenced the attitudes of the majority of students attracted toward STEM education. The strengths of the science exhibition programs were a focus on science inquiry as well as student choice in choosing technology, engineering, and mathematics (STEM) education to carrying out projects for their carrier. The study, revels that 97% of the students have chosen science, technology, engineering, and mathematics as their carrier. Hence, the study concluded as the students participated in the Science Exhibitions are inculcating to study towards STEM education.

***Keyword**: Science Exhibitions, STEM Education, Attitude.*

1.1 INTRODUCTION:

In the wake of globalization and the need for the India to remain technologically and economically competitive, increasing the number of students entering science, technology, engineering, and mathematics (STEM) fields has been a focus of much research and study in recent years (STEM Education Coalition, 2012). However, STEM careers require formal and rigorous academic preparation beginning in high school. One metaphor for this preparation has been of a STEM Education, where students trickle out based on their course choices in high school (Simpson, Koballa, Oliver, & Crawley, 1994).

In turn, high school course choices play a role in the student interest in STEM careers (Sadler, Sonnert, Hazari, & Tai, 2014). However, interest alone is not enough to ensure that students persevere in pursuing a STEM career. They also need science inquiry skills and understandings (National Research Council, 2000), and they need to lay the foundation of these skills and understandings in further studies. Science Exhibition participation may play a role in increasing both interests in understanding of STEM fields.

1.2 WHAT IS STEM EDUCATION?

STEM is a curriculum based on the idea of educating students in four specific disciplines i.e. science, technology, engineering and mathematics in an interdisciplinary and applied approach. Rather than teach the four disciplines as separate and discrete subjects, STEM integrates them into a cohesive learning paradigm based on real-world applications. STEM Education doesn't simply mean choosing one or all of the 4 mentioned fields. STEM Education means using real-life latest tools & technologies to build things & learn while doing so. Some of the common sub-fields of STEM are 3D Printing, 3D Designing, Robotics, Electronics, IoT, Programming, VR, etc. For school students, all such STEM Education programs can be introduced at a very young age. As the students begin to practically experience STEM starting from the basics, year by year, STEM education programs for them keep upgrading. For example, under STEM Education, lower grade students are taught to make wired robot cars using DC motors. At higher grade, they would be making a wireless robot car as a part of their STEM Course. STEM also is a major contributor to the modernization of education in developed countries. Even NASA provides STEM education to high school students. ISRO also has announced workshops of similar concepts, although initially, a limited number of students are to be selected.

STEM is important because it pervades every part of our lives. Science is everywhere in the world around us. Technology is continuously expanding into every aspect of our lives. Engineering is the basic designs of roads and bridges, but also tackles the challenges of changing global weather and environmentally-friendly changes to our home. Mathematics is in every occupation, every activity we do in our lives. By exposing students to STEM and giving them opportunities to explore STEM-related concepts, they will develop a passion for it and hopefully pursue a job in a STEM field. A curriculum that is STEM-based has real-life situations to help the student learn. Programs like Engineering for Kids integrates multiple classes to provide opportunities to see how concepts relate to life in order to hopefully spark a passion for a future career in a STEM field. STEM activities provide hands-on and minds-on lessons for the student. Making math and science both fun and interesting helps the student to do much more than just learn.

We believe, as we always had, that STEM is going to be integral in every child's development and life. Technology has always been proved to be helpful, earlier using audiovisual classrooms, then smart classes and now the classes over devices. Young children have high learning capabilities which are why they are taught discipline, etiquettes and other social skills at such an age for early childhood development. Thus, it is imperative to include STEM education during early

childhood education for it to grow and take shape with their age. Being a teacher, we've to promote learning by doing, making children active learners, helping them understand the latest tech to be at par with the developments of the world, and developing crucial 21st-century skills. We have partnered with schools and companies to implement STEM curriculum while also developing effective support systems to implement it.

1.3 THE ALLIANCE OF NEP 2020 AND STEM

NEP mentions that the report card of the child must include the skilled or vocational topics along with the subjective topics. Earlier rote memorization of the topics was the basis of assessing a child's learning. Now, it has shifted to competency-based which promotes more analysis and conceptual clarity in child's learning graphs. This purpose of assessment fulfils the desire to improve the whole schooling system and brings a continuous revision to the teaching-learning process for the development of a student. STEM education helps to improve your national assessment criteria carried by the centre PARAKH (Performance Assessment, Review, and Analysis of Knowledge for Holistic Development, as a standard-setting body under MHRD) as per NEP 2020 guidelines. STEM brings out the best in performance to assess on, helps to review your so far learning, and so analyze your knowledge and helps in the holistic development of a child. It signifies,

- Marks are going to be just a number.
- The child's future is all about the skills and techniques that he/she can retain. When we talk about skills, we mean the correlation of their theoretical knowledge into practical knowledge which can be applied in the real world.
- This kind of education, especially for subjects like science and maths, can be covered by STEM education. The aforesaid, high-quality education will do best for countries like us which have a maximum youth population to enrich their talent and do the best resource utility.
- The kind of quality and practical education that we used to get earlier in higher education as in college or other institutes will now provide at school level only.
- The young minds will be developed with all the experiential learning to utilise the knowledge in the real world.
- NEP has filled the gaps of Research and Development which includes all the key components for any country's success and development.
- Certain subjects, skills and capacities should be followed by all students to be productive, creative, innovative, adaptive, confident and successful.
- These will provide them with a scientific temper, help them to develop a sense of art, grasp problem solving and logical reasoning aptitude, be exposed to vocational education and become more digitally literate. These all skills and learning are included in STEM education.

So, we can say, STEM education provided by STEM for you is almost a complete package of all these key highlights mentioned in NEP 2020.

1.4 SCIENCE EXHIBITIONS:

There are different platforms for participation in science exhibitions foe the classes 6th to 10th. They, are, 1) Jawaharlal Nehru National Science, Maths, Environmental Exhibition(JNNSMEE), 2) Inspire Awards MANAK, 3) National Children's Science Congress, 4) School Innovation Challenge, 5) Science Mela at different levels, 6) Other Science Exhibitions.

1.4.1. JAWAHARLAL NEHRU NATIONAL SCIENCE, MATHEMATICS AND ENVIRONMENT EXHIBITION FOR CHILDREN

With a view to encourage, popularize and inculcate scientific temper among the children of the country, NCERT organizes national level science exhibition every year where children showcase their talents in science and mathematics and their applications in different areas related with our everyday life. The first Science Exhibition was jointly organized under the banner of the National Science Exhibition for Children in 1971, by the NCERT and the University Grants Commission (UGC) at Delhi. The subsequent National Science Exhibitions for Children have been organized by NCERT alone. From 1972 to 1978, the Jawaharlal Nehru Memorial Fund collaborated with the NCERT in its efforts to popularise Science Exhibitions by jointly sponsoring the National and State Level Science Exhibitions. In 1988 with the birth centenary celebration of Jawaharlal Nehru, the National Science Exhibition was renamed as the 'Jawaharlal Nehru National Science Exhibition for Children'. This year being celebrated as Year of Mathematics and to give more emphasis on environment-related issues, this exhibition is now renamed as Jawaharlal Nehru National Science, Mathematics and Environment Exhibition (JNNSMEE) for Children.

1.4.2. INSPIRE AWARDS-MANAK

'Innovation in Science Pursuit for Inspired Research' (INSPIRE) scheme is one of the flagship programmes of Department of Science & Technology (DST), Government of India. The INSPIRE Awards - MANAK (Million Minds Augmenting National Aspirations and Knowledge), being executed by DST with National Innovation Foundation – India (NIF), an autonomous body of DST, aims to motivate students in the age group of 10-15 years and studying in classes 6 to 10. The objective of the scheme is to target one million original ideas/innovations rooted in science and societal applications to foster a culture of creativity and innovative thinking among school children. Under this scheme, schools can nominate 5 best original ideas/ innovations of students through this website

1.4.3. NATIONAL CHILDREN'S SCIENCE CONGRESS

National Children's Science Congress, also referred to as Children's Science Congress at the district and state levels is the flagship programme of National Council for Science and Technology Communication (NCSTC), Department of Science & Technology (DST), Government of India. It is a platform for children to carry out small research activities at micro-level. The seeds of this programme were planted in Madhya Pradesh by an NGO called Gwalior Science Centre. It was later adopted by the NCSTC, DST for extending it to the national level.

Initially the programme was coordinated by the then NCSTC-Network (a network of non-government and government organisations working in the field of science popularisation) as national organiser. Since 2014, NCSTC, DST has been organising the Children's Science Congress with the guidance and support of the National Academic Committee, a core group of experienced academic team constituted by the NCSTC, DST, Government of India.

1.4.4. SCHOOL INNOVATION CHALLENGE

The purpose of the Innovation Challenge is to empower most disadvantaged young people to identify challenges in their communities and create entrepreneurial solutions to address them. Objectives of the programme are, A) To provide opportunity for school children in Telangana to i) Identify problems affecting them ii) Find the root cause for the problem and iii) Develop Innovative solutions. B) To introduce principles of up shift approaches to the teachers and students across the state. C) Provide interface and promote collaboration between the government, schools and the Industry. This Innovation Challenge is designed using a globally tested up shift approach which is anchored in human-centered design, putting young people at the centre of the process. This process will engage young people as co-creators of solutions, rather than just as beneficiaries. In this challenge, the children will be trained through an Interactive platform containing 4 levels of up shift approach-Understand, Design, Build & Test, Making it Real. The Interactive platform consists of 20 Instructional Videos and 12 Interactive assessments, followed by the submission of an Innovative Idea for 'Telangana School Innovation Challenge 2020'. Once they complete the course and submit an idea, they will receive a Certificate of Completion on "DESIGN THINKING FOR INNOVATION".

1.4.5. SCIENCE MELA AT DIFFERENT LEVELS

Science mela is also one of the exhibitions which up lifts the attitude of the students towards STEM. School Level, Mandal Level and District Level mela may conduct on the eve of National Science Day celebrations and on other national festivals.

1.4.6. OTHER SCIENCE EXHIBITIONS

Other exhibitions are there at national level, state level and at other levels like, competitions in MyGov.in app, National Innovation Foundation competitions (IGNITE Awards, Biennial Awards), Initiative for Research and Innovation in STEM (IRIS) National Fair, Dr.K.V.Rao Scientific Society Awards etc.

1.5 NEED AND SIGNIFICANCE OF THE STUDY

The study is related to student attitudes toward science, technology, engineering, and mathematics (STEM) education and the study is limited to students of those are participated in Science Exhibitions like Science fairs, Inspire Awards MANAK, National Children's Science Congress, Science Melas and other Science activities. In this study, 120 science exhibition contestants from different schools are selected in random sampling technique to assess their interest in STEM education and their understanding of science inquiry. Science exhibition participation increased

student understanding of science inquiry, and positively influenced the attitudes of the majority of students in the study toward STEM education. The strengths of the science exhibition programs were a focus on science inquiry as well as student choice in choosing technology, engineering, and mathematics (STEM) education to carrying out projects for their carrier.

2.1 OBJECTIVES

1. To study the Science Exhibition participant students learning attitude towards science, technology, engineering, and mathematics (STEM) education.
2. To elicit the relation between participation in Science Exhibitions and acquiring skills in STEM education.
3. To emphasis the importance of Science Exhibitions in achieving STEM education.
4. To find out the relation between Science Exhibition participant students learning attitude toward STEM education as per classification on the basis of (i) Gender, (ii) Medium of instruction, (iii) Management of the school.

2.2 HYPOTHESES FOR THE STUDY

1. There is no significant difference between boy and girl students (Science Exhibition participants) learning attitude towards STEM Education.

2. There is no significant difference between English Medium and Telugu Medium Students (Science Exhibition participants) learning attitude towards STEM Education.

3. There is no significant difference between Government and Private school students (Science Exhibition participants) learning attitude towards STEM Education.

3.1 METHODOLOGY

In this study, the primary aim of the investigator is to study the Science Exhibition participant students learning attitude towards science, technology, engineering, and mathematics (STEM) education. For this study, 120 science exhibition contestants from different schools are selected in random sampling technique as shown in the Table 1, to assess their interest in STEM education and their understanding of science inquiry.

3.2 SAMPLES FOR THE STUDY

Table 1

Total No of Sample	120 Students those are participated in Science Exhibitions							
Management wise	63 (Govt. School Students)				57 (Private School Students)			
Medium wise	28 (E/M)		35 (T/M)		49 (E/M)		8 (T/M)	
Gender wise	15 (B)	13 (G)	19 (B)	16 (G)	21 (B)	27 (B)	3 (B)	5 (G)

*E/M – English Medium and T/M – Telugu Medium, B – Boys and G – Girls.

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 15 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 10 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 multiple choice questions in the paper that is already prepared. There is no time limit for recording the respondents and the average time needed to give responses is around 20 minutes.

4.1 DATA ANALYSIS

1. There is no significant difference between boy and girl students (Science Exhibition participants) learning attitude towards STEM Education.
2. There is no significant difference between English Medium and Telugu Medium Students (Science Exhibition participants) learning attitude towards STEM Education.
3. There is no significant difference between Government and Private school students (Science Exhibition participants) learning attitude towards STEM Education.

4.2 RESULTS

1. There is no significant difference between boy and girl students (Science Exhibition participants) learning attitude towards STEM Education. Almost all the boys and girls equally opting STEM education for their carrier.
2. There is no significant difference between English medium and Telugu medium Students (Science Exhibition participants) learning attitude towards STEM Education. Almost all the students studying in English medium and Telugu medium are equally opting STEM education for their carrier.
3. There is no significant difference between Government and Private school students (Science Exhibition participants) learning attitude towards STEM Education**.** Almost all the students studying in Government schools and Private schools are equally opting STEM education for their carrier.

4.3 DISCUSSION

Increasing student interest in STEM careers and improving student science inquiry skills and understandings are stated goals of science fairs. Hazari (2010) and Kanter (2010) have shown that the key ingredients in student interest in STEM careers are the opportunity to engage in relevant, handson, real-world experiences. In addition to skills and interest, combination of skills and preparation are keys to success in STEM careers. Many of the students indicated that they did increase their science content knowledge, and could show their understanding of the science inquiry process through the use of appropriate terminology and detailed descriptions of the design and execution of their projects through participation in the science exhibitions. Some of the students found science fair participation to be affirming and inspiring in their aspirations for a STEM career.

4.4 CONCLUSION

Data shows that being required to participate in science Exhibitions can have the practical consequence of decreasing the positive impact on students. We found that about 97% of the students surveyed said that participating in science fair increased their interest in the sciences or engineering. Increasing student interest in science will represents one of the most important potential positive outcomes of science exhibitions.

4.5 SCOPE OF FUTURE WORK

Much of research work can be done in this field of study and improving the resources to encourage in choosing the STEM education as carrier of the students. Further research is needed to determine the effect of science exhibition participation on student career choice. This research could be conducted as a longitudinal study of a cohort of science exhibition participants engaged in STEM careers.

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State Level Science Seminar - 2021

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Sub theme : నూతన విద్యా విధానం 2020 – సైన్స్ విద్యను ప్రభావితం చేసే మార్గాలు శాస్త్ర సాంకేతిక రంగాలలో వెలుగొందే భారత్ – సైన్స్ ఉపాధ్యాయుల పాత్ర

ఉపోద్ఘాతము : 1980 తర్వాత మరొక జాతీయ విద్యా విధానానికి 29 జూలై 2010లో భారత ప్రభుత్వం ఆమోద ముద్ర వేసింది. అందుబాటు, సమానత్వం, గుణాత్మకత, స్తోమత, జవాబుదారితనం అనే మూల స్తంభాలపై ఈ జాతీయ విద్యా విధానం నిర్మించబడి భారతదేశాన్ని ఒక శక్తివంతమైన విజ్ఞాన కేంద్రంగా తీర్చిదిద్దగలదన్న ఆశాభావాన్ని జాతీయ విద్యా విధానం రూపకర్తలు వ్యక్తం చేశారు.

పాఠ్యాంశాలు (కరికులం), బోధనా పద్ధతి (పెడగాజి) మరియు మూల్యాంకనం (ఎ వాల్యుయేషన్) అన్ని కూడా విద్యార్థుల యొక్క వ్యక్తిగత ఉపాధి కల్పన అవకాశాల పెంపు దిశగా ఉండాలనే మల్టీ డిసిప్లినరీ అప్రోచ్‌ను కేంద్ర ప్రభుత్వం సూచించింది.

నూతన జాతీయ విద్యా విధానంలో భాగంగా విద్యార్థులకు తక్కువ ఒత్తిడితో కూడుకున్న విద్యార్థి కేంద్రీకృత విద్య అందించడం, తద్వారా విద్యార్థులు సృజనాత్మక పరిశోధనలు కొనసాగించి, Made in India అనే ఆత్మ నిర్భర్ భారత్ లక్ష్యాలను సాకారం చేసే విధంగా ఉండాలని సూచించింది. దీనిలో భాగంగా 3, 5, 8, 10, 12 వ తరగతులలో పరీక్షలు ఉండాలని, అదేవిధంగా ఉపాధ్యాయుల కొరకు ప్రత్యేకంగా నేషనల్ ప్రొఫెషనల్ స్టాండర్డ్ ఫర్ టీచర్స్ (NPST) NCTE ఆధ్వర్యంలో 2022 వరకు ఏర్పాటు చేయాలని సూచించింది.

నూతన జాతీయ విద్యా విధానంలో భాగంగా గతంలో ఉన్న 10 + 2 + 3 విద్యావిధానాన్ని సమూలంగా మార్చి 5 + 3 + 3 + 4 గా ఏర్పాటు చేసింది, ఆరవ తరగతి నుండి వృత్తి విద్యా కోర్సులు ప్రారంభమవుతాయి. National Higher education qualification framework. National educational technology forum. National research forum

వంటివి ఏర్పాటు చేయబడాలని సూచించింది. దీనిలో భాగంగానే తక్కువ థియరీ మరియు ఎక్కువ ప్రాక్టికల్ నాలెడ్జ్‌కు ప్రాముఖ్యం ఉండాలని సూచించింది.

లక్ష్యాలు :

- పాఠశాలను శక్తివంతమైన విజ్ఞాన కేంద్రంగా తీర్చిదిద్దడంలో ఉపాధ్యాయుల పాత్రను గుర్తించగలరు.
- జాతీయ విద్యా విధానం 2020 సైన్స్ కరికులంపై ఉపాధ్యాయులు అవగాహన పెంచుకుంటారు.
- సైన్సు బోధనను బలోపేతం చేయడం ద్వారా విద్యార్థులలో మెరుగైన అభ్యసన ఫలితాల సాధనకు కృషి చేయగలరు.
- విద్యార్థులు సైన్సు పట్ల ఇష్టాన్ని పెంచుకోవడానికి, వారిలో శాస్త్రీయ వైఖరుల పెంపుకు కృషి చేస్తారు.
- శాస్త్రీయంగా ఆలోచించడం ద్వారా మూఢ నమ్మకాలు లేని సమాజాన్ని నిర్మించగలుగుతారు.

వివరణ :

- చేయడం ద్వారా నేర్చుకోవడం వల్లనే జ్ఞాన నిర్మాణాన్ని చేసుకోవడం.
- తాము పొందిన జ్ఞానాన్ని నిత్య జీవితంలో ఎదురయ్యే సమస్యలను పరిష్కారం చేయడంలో వినియోగించడం
- ప్రయోగాలు, క్షేత్ర పర్యటనల ద్వారా మాత్రమే నిజ నిర్ధారణకు రావడం.
- శాస్త్రీయ ఆవిష్కరణలను అభినందించడం.
- సైన్స్ మేళాల వంటి వాటిలో పాల్గొనడం వంటివి సైన్స్ విద్యార్థుల లక్షణాలు

అటువంటి శాస్త్రీయ దృక్పథం గల భావిభారత పౌరులను తయారు చేసే ఉపాధ్యాయులు ఎలా ఉండాలి

నిత్య విద్యార్థిగా ఉండాలి. ప్రయోగాల మాస్టర్ గా విద్యార్థులను ప్రయోగాలకు పురికొల్పే మోటివేటర్‌గా ఉండాలి. అన్ని సౌకర్యాలు కల్పించి వారిచే ప్రయోగాల ద్వారా జ్ఞాన నిర్మాణము చేయించే సౌకర్య కర్తగా ఉండాలి. అంటే సైన్స్ కరికులం, బోధనా పద్ధతులు, మూల్యాంకనం ప్రస్తుత సమాజంలో వస్తున్న నూతన ధోరణులు అన్నింటి పైనా అవగాహన ఉండాలి నూతన విద్యా విధానం 2020 లో సూచించిన విధంగా ఒక సైన్స్ ఉపాధ్యాయుడుగా ఎలాంటి మార్గాలను అనుసరించవచ్చో కొన్నింటిని పరిశీలిద్దాం.

బ్లెండెడ్ లెర్నింగ్ : (ప్రత్యక్ష బోధన మరియు ఆన్లైన్ బోధనల కలయిక) శాస్త్ర బోధనలో ICT వినియోగం ద్వారా విద్యార్థులకు సందేహాస్పదమైన అనేక అమూర్త భావనలను సులభంగా వివరించవచ్చు. తద్వారా మెరుగైన జ్ఞాన నిర్మాణం దిశగా వారిని ప్రోత్సహించవచ్చు. ప్రత్యక్ష బోధన మరియు ఆన్లైన్ బోధనల కలయికల వల్ల విద్యార్థులలో జ్ఞాన నిర్మాణం వేగంగా జరుగుతుందని అనేక పరిశోధనలు ఋజువు చేస్తున్నాయి. కోవిడ్ పాండెమిక్ సమయంలో ఆన్ లైన్ తరగతుల ఉపయోగం మనకు తెలియనిది కాదు.
ఉదా: మూత్ర పిండాల ద్వారా మూత్రం తయారీ, మెదడులోని భాగాలు వాటి విధులు. గుండె నిర్మాణం అది పనిచేసే విధానం. ఊపిరితిత్తుల నిర్మాణం – అది పనిచేయు విధానం. ఓజోన్ పొరపై అతినీలలోహిత కిరణాల ప్రభావం మొదలగునవి.

అభ్యసన ఫలితం : ప్రత్యక్ష బోధనలో భాగంగా చాలా అంశాలు సందేహాస్పదంగా ఉండి ముఖం ప్రశ్నార్థకంగా కనిపించే విద్యార్థులు వన్ మినిట్ టాక్ ద్వారా ఆ భావాలను సులభంగా వివరిస్తున్నారు.

STEP (ప్రయోగాలు ప్రాజెక్టుల ద్వారా సైన్సు బోధన) : సైన్స్ అంటేనే చేయడం ద్వారా నేర్చుకోవడం, ఎంత ఎండలోనైనా ఆటలు ఆడే పిల్లలను చూడండి. వారిలో గల ఆసక్తి. భాగస్వామ్యం వహిస్తున్న సంతృప్తి దానికి కారణం, హైడ్రిల్లా గరాటు ప్రయోగంలో వెలువడుతున్న ఆక్సిజన్

గమనిస్తున్నప్పుడు, రెయిన్ గేజ్ పరికరాన్ని ఉపయోగించి స్వయంగా వర్షపాతాన్ని, కొలుస్తున్నప్పుడు, నిత్యజీవితంలో వినియోగిస్తున్న పదార్థాల ఆమ్ల, క్షార తత్వాన్ని కనుగొన్నప్పుడు ద్విగుణీకృత ఉత్సాహంతో మెరిసిపోయే విద్యార్థుల కళ్ళలోని సంతృప్తి సైన్సు బోధన ఎలా ఉండాలో, మనం ఏం చేయాలో చెప్పకనే చెబుతుంది. అందుకనే ప్రయోగాలు మా పాఠశాల బోధనాభ్యసన ప్రక్రియలలో నిత్య కృత్యం.

అభ్యసన ఫలితం : నిమ్మకాయలను కోస్తే దాని నుండి రక్తం రాదని, అది మిథైల్ ఆరెంజ్ మరియు సిట్రిక్ ఆమ్లం అనే రసాయనాల, రసాయనిక చర్య ఫలితం అని వివరిస్తారు. కొబ్బరికాయ కొడితే రక్తం రాదని, పువ్వులు అంతకంటే రావని అది ముందే తయారు చేసిన విషయం అని మూఢనమ్మకాలకు వ్యతిరేకంగా ఉద్యమిస్తున్నారు. ప్రయోగాలు అనగానే పాఠ్యాంశాలపై మరింత శ్రద్ధ చూపుతున్నారు.

డిసెక్షన్స్ : గుండె, మూత్రపిండాలు, ఊపిరితిత్తులు వంటి అవయవాల అంతర నిర్మాణం పుస్తకాలలో 2D లో చూడటం కంటే వాటిని ప్రత్యక్షంగా పరిశీలించి, వాటిని స్పర్శించడం వాటి నిర్మాణాన్ని స్వయంగా తెలుసుకోవడం ద్వారా విద్యార్థులు పాఠ్య పుస్తకాలలో చదివిన అంశాలలో పునర్బలనం పొందుతారు. మరియు ప్రత్యక్ష జ్ఞాన నిర్మాణం జరగడం వల్ల ఆయా పాఠ్యాంశాలను మర్చిపోకుండా ఉంటారు.

అభ్యసన ఫలితం : అంతర్నిర్మాణం విధులు అనే పాఠ్యాంశాలను వన్ మినిట్ టాక్ ద్వారా వివరిస్తారు. మూల్యాంకనం లో మర్చిపోకుండా రాస్తారు. మెరుగైన ఫలితాలు సాధిస్తారు.

ప్రాజెక్టు పద్ధతి : 21st century skills (5C) కోఆపరేషన్, కొలాబరేషన్, కమ్యూనికేషన్, క్రిటికల్ థింకింగ్. క్రియేటివిటీ అనే సాధనాల ద్వారా బోధనాభ్యసన ప్రక్రియలలో విద్యార్థులను భాగస్వామ్యం చేయడానికి ప్రాజెక్టులు ఉత్తమ సోపానాలు, ఎత్తు. బరువు, పొడవు, వెడల్పు ఘనపరిమాణములు కొలవడంలో వారు పాల్గొన్నప్పుడు ప్రపంచాన్ని జయించిన ఆనందం, ఒక శాస్త్రవేత్త లాంటి భావన వారి కళ్ళల్లో కనిపిస్తుంది. విత్తనాలు మొలకెత్తడం, పురుగు మందుల వాడకం యొక్క చెడు ప్రభావాలు, వివిధ వయస్సుల వారికి వివిధ సమయాలలో వేసే టీకాలు, తరచూ ప్రబలే వ్యాధులు లాంటి ప్రాజెక్ట్లు ఇవ్వడం ద్వారా విద్యార్థులు సమాజంలోని ఇతరులతో సైతం మంచి సంబంధాలను కలిగి ఉంటారు.

అభ్యసన ఫలితం : విద్యుత్ వలయాలను తయారుచేసి వర్ణిస్తారు. సృజనాత్మకంగా వివిధ రకాల నూతన నమూనాలను తయారు చేస్తారు. పురుగు మందుల వాడకం యొక్క చెడు ప్రభావాలు తెలుసుకోవడం, వాటిని తమ తల్లిదండ్రులకు వివరించడం, ప్రత్యామ్నాయ మార్గాలను అన్వేషించడం ద్వారా సమాజాభివృద్ధికి తోడ్పడతారు.

క్షేత్ర పర్యటనలు : విద్యార్థులను వాస్తవ ప్రపంచానికి కలిపేవి క్షేత్ర పర్యటనలు. ఇవి విద్యార్థులకు వాస్తవ ప్రపంచ అనుభవాలను ఇవ్వడంతో పాటు తరగతి పట్ల వినుగును తొలగిస్తాయి. విభిన్న సాంస్కృతిక అనుభవాన్ని మరియు సామాజిక బంధాన్ని ఏర్పరుస్తుంది.

అభ్యసన ఫలితం : విద్యార్థులు క్షేత్ర పర్యటనల ద్వారా పంటలపై వచ్చే వ్యాధులు, వాటిని కలిగించే క్రిముల గురించి అవగాహన ఏర్పరుచుకొన్నారు. వరి పంట సాగులోని వివిధ దశలను రైతులను అడిగి తెలుసుకొన్నారు.

సామాజిక అంశాలు : Science is a Social Issue సమాజంలో నెలకొన్న వివిధ రకాల అపోహలు, మూఢ నమ్మకాలు తొలగించడానికి విజ్ఞాన శాస్త్రం దోహదపడాలి. Shoot the social evils by shooting aviddeo అనేది మా పాఠశాల విద్యార్థులు అనుసరిస్తున్న ఒక కొత్త నూతన అంశం. దోమలు ప్రబలకుండా నిల్వ నీరు లేకుండా చూడటం, మూఢ నమ్మకాల నిర్మూలన వంటి మంచి సామాజిక విలువలున్న అంశాలను వీడియో ద్వారా వివరించి, వాటిని యూట్యూబ్‌లో అప్ లోడ్ చేస్తున్నారు.

అభ్యసన ఫలితం : ఉదా : Eradication of Social Evils by Science అనే అంశాన్ని వీడియో ద్వారా వివరించి, దానిని యూట్యూబ్ లోకి అప్ లోడ్ చేశారు.

సైన్స్ రంగోళి : సాంప్రదాయ ముగ్గులు వేయడం అనే నైపుణ్యానికి సైన్స్‌ను జోడించడం. దీని ద్వారా అనేక సైన్స్ బొమ్మలు ముగ్గుల రూపంలో భూమిపై దర్శనమిచ్చేసరికి విద్యార్థులు అంతా సైన్స్ మయం అనే పాట పాడినంత పని చేశారు. వివిధ రకాల కణాలు, కణాంగాలు, ప్రయోగాలు, ప్రక్రియలు అన్నీ బొమ్మల రూపంలో విద్యార్థులు వేయడం జరిగింది బాలికలతో పాటు బాలురు కూడా ఉత్సాహంగా పాల్గొన్నారు.

అభ్యసన ఫలితం : సైన్స్ ప్రక్రియా నైపుణ్యాలలో ఒకటైన బొమ్మలు గీయడం అనే నైపుణ్యం, వాటి భాగాలు గుర్తించడం, వాటి గురించి వివరించడం అన్నీ విద్యార్థులు చేయగలుగుతున్నారు.

ముగింపు : నూతన విద్యా విధానం 2020 వెలుగులో సైన్స్ విద్యను ప్రభావితం చేసే మార్గాలపై ఉపాధ్యాయులకు పట్టు ఉండటం అవసరం. తద్వారా మాత్రమే వారు సౌకర్యకర్తలుగా ఉండి విద్యార్థులకు మెరుగైన బోధనాభ్యసన ప్రక్రియలు జరపగలరు. మంచి అభ్యసన ఫలితాలను సాధించగలరు.

State Level Science Seminar - 2021

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SUB THEME : WAYS TO MAKE SCIENCE EDUCATION MORE EFFECTIVE IN THE LIGHT OF NEP 2020.

TITLE OF THE TOPIC : lEARNING SHOULD BE HOLISTIC, INTEGRATED, ENJOYABLE AND ENGAGING.

AIM : ONE INDIA - ONE EDUCATION SYSTEM

అందరికీ విద్య ఒకటే 3–18 సం॥ వరకు నిర్బంధ ఉచిత విద్య అనగా ప్రతీ విద్యార్థి 18 సం॥ నిండే లోపు ఉచితంగా, ఖచ్చితంగా విద్య నందుకోవాలి.

INTRODUCTION :

నూతన జాతీయ విద్యా విధానం (NEP) 2020 ప్రకారం ముఖ్యంగా విద్యా వ్యవస్థలో జరిగిన భారీ మార్పులు చూసినట్లయితే

- అందరికీ విద్య ఒకటే.
- మావన వనరుల శాఖ పేరు విద్యాశాఖగా మార్పు.
- ప్రతీ రాష్ట్రంలో రాష్ట్ర స్థాయి స్కూల్ రెగ్యులేటరీ అథార్టీ
- 4 దశల్లో నూతన జాతీయ విద్యా విధానం 5+3+3+4 అమలు

1. First Five years Foundational Stage

   3 years of Anganwadi/ Pre School +2 years in Primary School in Grades 1,2 (Covering ages 3-8)

2. Three years preparatory Stage- Grades 3,4,5 (Covering ages 8-11)

3. Three years Middle Stage- Grades 6,7,8 (Covering ages 11-14)

4. Four years Secondary Stage- Grades 9,10,11,12 (Covering ages 14-18)

- గ్రేడ్ 8 వరకు మాతృభాషలోనే విద్యాబోధన
- 6వ తరతి నుండి ఒకేషనల్ విద్య
- మౌళిక పాఠ్యాంశాల వరకే సిలబస్ కుదింపు
- యోగా, ధ్యానం, ఆటలకు కూడా ప్రాధాన్యం.

- బోర్డు పరీక్షల ప్రాధాన్యత తగ్గింపు.
- అప్లికేషన్, తెలివి తేటలు ఆధారంగా మార్పులు
- టీచర్లకు నేషనల్ ప్రొఫెషనల్ స్టాండర్డ్స్
- Credit Bank System.
- Higher Education - Multiple Entry & Exit Mode.

  1st year - general Certificate

  2nd Year - Diploma Certificate

  3rd & 4th Year - Graduation Certificate

OBJECTIVES:

1. NEP 2020 వెలుగులో సైన్స్ విద్యను మరింత ప్రభావవంతం చేయుటకు విద్యార్థులను సైన్స్ దిశగా ప్రోత్సహించుట.
2. భారతదేశాన్ని అభివృద్ధి చెందుతున్న దేశంగా నడిపించే దిశలో సైన్స్ పాత్ర ముఖ్యమని విద్యార్థులు గ్రహించుట, అర్థం చేసుకోనుట, అభినందించుట.
3. ఉన్నతమైన భారతదేశాన్ని తయారు చేయడానికి విద్యార్థులే కాకుండా సామన్య ప్రజలు సైతం స్వంత సహకారం అందించుట.
4. సైన్స్ విద్యలో విద్యా విలువలు, శాస్త్రీయ సూత్రాలను విద్యార్థులు గుర్తించేలా చేయుట.
5. సైన్స్‌లో ముఖ్యంగా ప్రయోగ నైపుణ్యాలను పెంపొందింప చేయుట.
6. మూఢనమ్మకాలను పారద్రోలి భవిషత్తుకు పునాది సైన్స్ అని గుర్తింపచేయుట.
7. విద్యార్థులలో భయాన్ని పోగొట్టి ఆసక్తిని, ఉత్సాహాన్ని పెంపొందింప చేయుట.

DESIGN OF THE INNOVATION:

విద్య నేర్చుకోవాలి – విలువ పెంచుకోవాలి. ఈ ప్రపంచాన్ని మార్చగలిగే శక్తి "విద్య"కు మాత్రమే ఉంది.

HAPPY EDUCATION = HAPPY LIFE

5+3+3+4

DESCRIPTION:

NEP 2020 ప్రకారం అందరికీ విద్య అందాలి. అనగా ప్రతీ విద్యార్థికి పూర్తి స్థాయిలలో బోధన – అభ్యసనం ఆశించిన స్థాయిలో జరగాలి. అంటే ఉపాధ్యాయులకు బోధన అనేది అత్యంత సులభతరంగా ఉంటేనే విద్యార్థుల యొక్క అభ్యసనా స్థాయిలను, విద్యా ప్రమాణాలను మరియు వారి ప్రతిభను కూడా పెంచగలుగుతాము. ప్రభుత్వ పాఠశాలల్లో ముఖ్యంగా Slow leaners and Irregular Students మాత్రమే ఉంటున్నారు. వారి అభ్యసనా స్థాయిలను పెంచుటకు మరియు పై స్థాయిలో ఉన్నత చదువులలో కూడా సైన్సు కోర్సులపై ఆసక్తి కనపరచుటకై ప్రోత్సహించే విధంగా ఉండడం కోసం పాఠ్యాంశాల బోధనా అభ్యసనం కింది విధంగా 4 విధాలుగా ఉండాలి.

Learning Should be 1. Holistic 2. Integrated 3. Enjoyable 4. Engaging.

1. Learning should be Holistic

అభ్యసనం అనేది Holistic అనగా సంపూర్ణంగా ఉండాలి. ప్రసం విద్యార్థులకు చదువు ఒక్కటే ఉంటే సరిపోదు. వివిధ రకాల నైపుణ్యాలను కూడా కలిగి యుండాలి.

విద్యార్థులు ముఖ్యంగా ఈ కింది నైపుణ్యాలను పెంపొందించుకోవాలి.

2. Learning should be Integrated:

- Integrated learning means combining what students learn the classroom, with the solution of real world problems.
- Integrated learning encourages active participation in relavant real-life Experiences.
- It develops higher - level thinking skills.
- It enables children to Integrate ideas and experiences and apply them to formulate new learning situations.

3. Learning should be Enjoyable:

NEP 2020 వెలుగులో సైన్స్ విద్యను మరింత ప్రభావవంతం చేయడానికి సూచించే మార్గాలలో ముఖ్యమైనది. Enjoyable (joy of Learning). సైన్సు ప్రకారం ముఖ్యంగా మనం విద్యార్థులలో పెంపొందించాల్సిదేమిటంటే "చెప్పింది నమ్మకండి – చేసి చూడండి" అని మరియు సైన్సు అంటే కేవలం పాఠ్యపుస్తకంలోని పాఠమే కాదు. ప్రయోగం ద్వారా అంతసూత్రాన్ని అర్థం చేసుకోవడం అని joy of Learning లో భాగంగా ముఖ్యంగా మన పరిసరాల నుండి అతి తక్కువ ఖర్చుతో మరియు ఖర్చు లేకుండా అందుబాటులో ఉన్న పరికరాలతో అత్యంత సులభ బోధనాభ్యసనా సామాగ్రి తయారు చేసుకొని విద్యార్థులు కూడా చేయగలిగే చిన్న చిన్న ప్రయోగాల ద్వారా విద్యా బోధన చేస్తూ వారి ప్రతిభా నైపుణ్యాలను పెంపొందింపచేయాలి. మరియు Science News సేకరించడం, Science Albums తయారు చేయించడం ద్వారా కూడా సైన్స్‌పై ఆసక్తి కలుగ చేయవచ్చు. సైన్స్ ప్రాముఖ్యతను గుర్తించుటకు ప్రతీ సంవత్సరం Science Day Celebrations నిర్వహించాలి.

4. Learning should Engaging

Engaged students are more likely to perform well on standarized tests and are less likely to drop out of school.

6. Stategies to engage students to share their voice.

1. Polling: Polling provides a way for every students to share their voice.
2. Turn and talk: This method is a powerful way to get every student talking about and thinking about the content.
3. Wait time: This cues students to think deeply about their answers and not to just mindlessly volunteer a memorized low-level fact.
4. Annotations: Students can be directed toannotate questions, conclusions or notes while reading a text.

5. Reflection: Reflection helps students review what was truely learned. If can help them work more effectively.

6. Vote for your feet: This technique works best with moderate - level questions that have short answers and no exact correct answer.

OUT COMES AND IMPLICATIONS:

1. సైన్స్ పట్ల భయాలు తొలగి ఆసక్తిని పెంచుకొని ఉత్సాహంగా అభ్యసించగలుగుతారు.

2. ప్రయోగాలు సులభంగా స్వయంగా చేయుటకు చొరవ చూపిస్తారు.

3. నూతన ఆలోచనా విధానాలను పెంపొందించుకుంటారు.

4. విద్యార్థుల అభ్యసనా స్థాయి పెరిగి మంచి ప్రతిభ కనపరచగలుగుతారు.

5. అనేక సైన్సు పోటీలలో పాల్గొనుటకు ఉత్సాహం కనపరుస్తారు.

6. అభివృద్ధి చెందుతున్న శాస్త్ర – సాంకేతిక పరిశోధనా రంగాలపై ఆసక్తిని పెంచుకుంటారు.

CONCLUSTION:

ఈ విధంగా Learning అనేది Holistic, Integrated, Enjoyable and Engagingగా ఉన్నట్లయితే NEP 2020 వెలుగులో సైన్స్ విద్యను మరింత ప్రభావవంతం చేయవచ్చు.

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State Level Science Seminar - 2021

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ఉపథీమ్:

NEP 2020 వెలుగులో సైన్స్ విద్యను మరింత ప్రభావవంతం చేయడానికి మార్గాలు:

పరిచయం:

పిల్లలు సైన్స్ విషయంలో బోధన అంశాలు నేర్చుకోవడం కష్టంగా భావిస్తారు. అందువల్ల వారు భౌతిక రసాయన శాస్త్రంలో కృత్యాలు, ప్రయోగాలు చేయడం చూడడంలో చూపే ఆసక్తి, ఆ అంశాన్ని క్షుణ్ణంగా నేర్చుకోవడంలో చూపడం లేదు. అందుకే నేను ముఖ్యమైన అంశాలు గుర్తుంచుకోవలసిన అంశాలను డిజిటల్ కథల రూపంలో తయారు చేయాలనుకున్నాను.అప్పుడు పిల్లలు సులభంగా, ఆహ్లాదకరంగా, ఇష్టంగా నేర్చుకోగలరు. గుర్తుంచుకోగలరు.

లక్ష్యాలు:

- ఆహ్లాదకరమైన బోధన
- డిజిటల్ కథల ద్వారా ఆసక్తి పెంచడం
- భౌతిక రసాయన శాస్త్రం పట్ల భయాన్ని పోగొట్టడం
- సైన్స్ పట్ల ఇష్టాన్ని కలిగించటం

ప్రదర్శన:

కథల వంటి ఇష్టపడని పిల్లలు ఉండరు. కథల ద్వారా ఎటువంటి పిల్లలను ఐనా ఆకట్టుకోవచ్చు. విష్ణుశర్మ పంచతంత్రం గురించి మనకు తెలుసు.

భౌతిక రసాయన శాస్త్రంలో ముఖ్యమైన భావనలను డిజిటల్ కథల రూపంలో తయారు చేసి పిల్లలలో ఆసక్తి పెంచవచ్చు. నేను ఆమ్లాలు, క్షారాలు లిట్మస్ పేపర్ రంగులలో మార్పులు అనే అంశంపై కథ తయారు చేసాను.

ఆమ్లాలు, క్షారాలు కథ భాగం 1

అనగనగా ఒక ఊరిలో HCI ఆమ్లం ఉండేది. ఒక గాజు సీసా దాని ఇల్లు. ఒక రోజు ఆడుకుంటూ ఉండగా అది బయటకు ఒలికింది. అక్కడే ఉన్న నీలి లిట్మస్ పేపర్‌పై పడింది. నీలి లిట్మస్‌కు కోపం వచ్చింది.

అది ఎర్రగా మారిపోయింది. కాని ఆ కొత్త రంగు చూసి దానికి ఎంతో సంతోషం వేసింది. తరువాత ఏం జరిగింది? 2వ భాగంలో చెప్పుకుందాం.

ఈ విధంగా కథను భాగాలుగా ఆమ్లాలు క్షారాలు రంగు సూచికలలో మార్పులను తెలియచేస్తూ కథ వీడియో రూపంలో కొనసాగుతుంది. ఈ వీడియో youtubeలో అప్లోడ్ చేసాను link https://youtu.be/vtXCGr1eMpw

ఫలితం:

- పిల్లలు ఆసక్తిగా నేర్చుకుంటున్నారు.
- ఇష్టపడి నేర్చుకుంటున్నారు.
- నేర్చుకుంటున్నాం అనే భావన లేకుండా నేర్చుకుంటున్నారు.

సూచనలు:

- సైన్స్ భావనలను గుర్తుంచుకోవడానికి, అర్థం చేయించడానికి మాత్రమే ఉపయోగించాలి.
- వీడియో నిడివి తక్కువగా ఉండటం మంచిది.

State Level Science Seminar - 2021

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Sub – Theme: - Science for self reliant India (Atmanirbhar Bharat) Role of teachers, in and outside the class room, to achieve it.

Title of the Topic :- Role of science teachers for Self Reliant India

Introduction:

Atmanirbhar Bharat which translates to 'Self – Reliant India' or Self – Sufficient India,' is a policy for making India, "a bigger and more important part of the global economy".

Atmanirbhar Bharat doesn't mean "Self containment," isolating away from the world or being protectionist."

- ➔ Science teachers play an important role to achieve self reliant India.
- ➔ Science Teachers play a key role in and outside the classroom by performing many science activities, Experiments, Project works and conducting field trips.
- ➔ By doing these type of activities in and outside the classroom students can develop scientific skills and scientific attitude which are helpful for making Self Reliant India.
- ➔ Now our country needs the students which are having digital skills, scientific skills and manufacturing skills to build a self sufficient India (Digital India – Make – in – India).

Objectives :-

- ➔ To develop Digital skills
- ➔ To encourage skill development
- ➔ To improve global economy
- ➔ To build self confidence in the students
- ➔ To make the students as a part of the Digital India – make – in – India
- ➔ To develop scientific skills, Scientific temper and attitude
- ➔ To develop curiosity in science and on environment to improve the experimental skills
- ➔ To pursuit innovations in science

➔ To develop scientific values at the same time moral values

➔ To develop Easthetic sense towards the nature

➔ To develop the appreciation skills towards the scientist and self employers

Description of the presentation :-

Presenting some activities in my school by me to develop the scientific & Digital skills, Activities like :- celebration of important (Science relating) days, Quiz, Seminars, presentation of posters, Group discussions, Science dramas, science role – plays, Lab activities, field trips, Project works, and Model making

➔ We made soil idols of lord vinayaka and distributed them as the part of NGC

➔ We conducted swatch awareness programme under NGC

➔ We conducted many science activities

Celebration of Important Days (Science Relating)

1) World Environment Day 5th June
2) World Day to Combat Desertification and Drought 17th June
3) Van mahotsav – July
4) World population day – july
5) International ozone Day 16th September
6) Wild life week 2nd to 7th October
7) World Habital Day first Monday of October
8) World Heritage Day 25th November
9) National pollution control Day 2nd December
10) National Energy conservation Day 14th December
11) International biodiversity Day 29 December
12) World wetlands Day 2nd February
13) World forest Day 21 March
14) World water Day 22nd March
15) World Earth Day 22nd April.

Out comes:

By celebrating these important days, students develop appreciation skills and learn how to save the nature, which leads to sustainable development of our country.

Science Seminar: - by participating in science seminars students can improve their presentation skills as well as group discussion skills.

Science Quiz: - by participating in science quiz , students can learn current issues and develop scientific skills.

Science Exhibition: - on the occasion of science day, (on 28th February) we are conducting science fair at our schools. Students actively participated in science fair. By Participating in science fair students improve their model making skills and scientific skills.

Lab activities: - by conducting these lab activities students can develop their manipulative skills

Role play: - by participating in role play students can improve their explanation skills can which can helpful for their talking power.

Field trips and project works:- By participating in field trips and project works students realize how the natural resources are used judiciously for sustainable development. This helps the righteous attitude in the students.

Science Talent Test: By participating in science talent test students can develop their scientific knowledge towards the present situations.

Conclusion and Implications: - Conclusion conducting all these activities, students can improve their observation skills, classifying skills, application skills, experimentation skills, collecting data skills, analyzing data skills, problem solving skills, and manipulative skills – these can helpful for the students to develop their self confidence which leads to self reliant India

Implications: - I conducted all these activities in our school. So I got good achievements in every year

- ➔ In this pandemic situation also my students got 1st prize in poem writing about "time for nature on the occasion of world Environment Day (online – competition) conducted by TS NGC.
- ➔ Our student L. Sanjana participated in essay competition and got certificate on the occasion of world space week 2020 conducted by SHAR – ISRO.
- ➔ For these achievements I got mandal best teacher award, Teacher innovator mentor award – 2019(from OU and TS CELL, at OU university, Teaching Excellence Award – 2019 at Telugu University (TEA – 2019), Inspiring Teacher Award -2020 at Nizamabad, super women Excellence Award – 2020 (8/3/2020)at OU, on the occasion of world women's day.

References: - pedagogy of Biological Sciences & Upadhyaya Kara Deepika – Biology.

State Level Science Seminar - 2021

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Sub theme: "Science for self-reliant India (Atmanirbhar Bharat) – Role of Teachers, in and outside the classroom, to achieve it."

Title of the topic: Role of science teacher in achieving **'AtmanirbharBharat'.**

"Intelligence is not the ability to store information, but to know where to find it"

Introduction

We have lots of information about science in the form of books, science magazines, newspaper and on internet, etc. but most of us as teachers fail to reach correct resource, hence I think '**Information**' is also a key component in addition to the five pillars that our Honorable PM listed of AtmaNirbhar Bharat (Intent, Inclusion, Investment, Infrastructure, Innovation).In the inaugural function of 6th India International Science Festival (IISF-2020),Prime Minister Shri Narendra Modi gave a clarion call for a**self-reliant India,** our Vice President Shri M.Venkaiah Naidu underlined the need to promote Science education and inculcate the scientific temper from a young age. He emphasized that an important lesson taught by the pandemic is that we need to invest and sustain research and development, and strive to become self-reliant,because during Covid period, we struggled to generate face masks, PPE (Personal protective equipment) kits, diagnostics, medicines, ventilators, etc.So, there is no better time or opportunity than now, to emphasize on Atmanirbhar Bharat – Self-reliant India & Global Welfare. (IISF2020).

Objective

To understand the role of Science teachers in making ofself-reliant India.

Presentation

What is Atmanirbhar Bharat? Is it making India or made in India? Is it Consume only Indian goods? Or should we stop imports? No, Atmanirbhar Bharat is not about being self-contained or being closed to the world, it is about being **self-sustaining** and **self-generating.**It is also focusing on 5 pillars namely Economy, Infrastructure, System, Demography and Demand. The theme of IISF 2020 was – **'Science for self reliant India and Global Welfare'.** It was a thought which was conceived and initiated by the Minister

of Science and Technology Dr. Harsh Vardhan along with Vigyan Bharti, which is the largest organization spearheading the swadeshi science movement.

Per the KPMG and FICCI(Federation of Indian chambers of commerce and industry) 2018 report,India has a demographic advantage as the average age of its population is estimated to be below 29 years for the next 6 years. By 2022, India will have the largest working-age population in the world.

So, it is necessary to focus on skilled based education at school level and as a science teacher let us discuss, how we can inculcate skill based knowledge in our students.

With the vision to make the youth Atmanirbhar through skill-based education and thus make the country Atmanirbhar Bharat, the National Education Policy 2020 has been crafted accordingly. The NEP 2020 provides that even the students of middle level shall be exposed to hands-on training in vocational skills like carpentry, plumbing, electrical repairing, horticulture, pottery, embroidery, etc. The policy has set the target of providing vocational skills to at least 50% students by 2025 in such a way that the vocational skills acquired at school level may be further extended up to higher education level, depending upon the requirement of individual students.

Thus, equipping students with the skills that enable them to survive the modern day, requires teachers to be aware of the market needs, and thus incorporating within their teaching strategies modules, sometimes extracurricular, that nurture and develop such skills.

However, many teachers still focus on back-to-basics traditional education methods. Only few of them deliver education in a way that encourages critical thinking, effective communication, cooperation, negotiation and problem solving skills. Usually, the lack of these skills is associated with poor education that has failed to cope with the rapid technological advancement.

The NCF, SCF and RTE clearly envisaged the role of the school in achieving the expected academic standards which are subject specific and grade specific.Learning of science does not include learning of information alone, but it includes doing projects to understand the science concepts, undertaking observations and experiments, collection of information, analysis of information and finally arriving at conclusions and generalizations.

In doing this

- Teachers of science should plan an inquiry-based science program for their students.
- Teacher should develop attributes in children like passion to explore, experiment, find reasons and understand it by doing.
- Develop a framework of long-term and short-term goals for students.

- Select science content, adapt and design curriculum to meet the interests, knowledge, understanding, abilities and experiences of students.
- Select teaching and assessment strategies that support the development of student's understanding and nurture a community of science learners.
- Focus and support inquires while interacting with students.
- Recognize and respond to student diversity and encourage all students to participate fully in science learning.
- Teachers of science should design and manage learning environments that provide students with the time, space and resources needed for learning science.
- **Structure the time available so that students are able to engage in extended investigations.**
- **Make the available science tools, materials, media and technological resources accessible to students.**

Suggestions

- As stipulated in the new National Education Policy 2020 that school education, especially grade 6 onwards, must have a skill component, key emerging areas must be integrated with such skill based curriculum. Areas like robotics, artificial intelligence, cloud computing, data analytics, internet,etc, are projected to create a number of new jobs.
- The training/practical component as per skill requirements from the unorganized sector should be integrated in school curriculum so that students who are desirous of seeking jobs right after schooling are trained accordingly.
- Following NEP 2020, the education system could be made more practical and job-oriented; thus the employability is automatically taken care of as it enables to have more job-givers than just job-seekers.
- Skill-based education should be part of higher education and it should not be restricted to ITIs and polytechnics.
- Teaching should include more practical/ research-based training i.e. 50% theory and 50% practical. Theory and practical should be linked.
- To inculcate the scientific temper and spirit of inquiry in children and general public, NISCAIR (National Institute of Science Communication and Information Resources) has a program named JIGYASA which means curiosity in Hindi, wherein students form Government and private schools are invited to visit CSIR laboratories and NISCAIR and interact with scientists and visit the entire campus.
- NISCAIR also publishes three magazines **(Science Reporter, Vigyan Pragati and Science kiDuniya)** for children in English, Hindi and Urdu at a very nominal cost.

Conclusion

It's been our endeavor to inculcate the spirit of enquiry in children. Even our Constitution talks about it. So we must encourage our children to ask questions. And whatever you do, if it does not serve the society, it's of no use. Mahatma Gandhi also emphasized this.

As a science teacher we should use different teaching methods like Innovative pedagogy, Synergogy, Paragogy, Heutagogy, Flipped classroom, Crossover learning, Geo-learning and Incidental learning to inculcate skill based education in children.

Students and society need new technology but there is no adequate awareness. NISTADS (National Institute of Science Technology and Development Studies) is basically a bridgethat takes forward the kind of technology developed in CSIR laboratories. It is also collaborating with **Unnat Bharat Abhiyan** and taking developments in science and technology to rural areas.

I want to end with some motivational words.

Why should we feel proud of being a teacher? Because, "A lawyer's income increases with increase in crime and litigation, a doctor's income increases with increase in diseases and illness, but a teacher's income increases with increase in knowledge, prosperity of people and nation". That is why we teachers should be proud.

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State Level Science Seminar - 2021

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SUB-THEME:

Science for Self Reliant India (Atma Nirbhar Bharat) – role of a teachers in and outside of the class room

Title of the topic:

Self sufficient India @ powerful economist country

Aim:

- the aim of my writings on this topic is…
- make a self sufficient India
- made in India for the country's economy
- India's products for the world

VI. Introduction:

ATMA NIRBHAR BHARAT, Which translates to self reliant-India or Self Sufficient India, is a term used by the Prime Minister of India Shri. Narendara Modi garu in relation to economic development in country. The term has been used in relation to making India a bigger and more important part of the global economy. pursuing policies that are efficient,competitive and resilent and being self-sustaing and self generating Atma Nirbhar Bharat does not mean self-containment, isolating away from the world or being protecionist. The first mention of this came in the form of the Atma Nirbar Bharat Abhiyan or self-reliant india mission during the announcement of india's COVID-19 pandemic related economic package on 12 may 2020.

The state of the world today teaches us that (Atma Nirbhar Bharat), self-reliant India is the only path. It is said in our scriptures Eshahpanthah. That is self-sufficient India- Prime Minister shri. Narendra Modi garu.

OBJECTIVES:

- MAKING INDIA AS A SUFFICIENT INDIA

- MAKE A BRAND "MADE IN INDIA"
- WE WANT TO SEE THE PRODUCTS WHICH ARE USING IN OUR COUNTRY AS MUCH AS INDIA'S PRODUCT.
- ESTABLISHMENT AT EVERYWHERE –LOCAL INNOVATIONS
- BRINGING OUR LOCAL TALENTS WHICH ARE PRODUCT MAKING IDEAS.
- SPREAD OUT THE VOICE OF LOCAL PRODUCTS
- STRENGTHENING THE QUALITY IN LOCAL PRODUCTS
- GIVING AWARENESS TO THE PEOPLE ON MADE IN INDIA BRANDS AND MAKE A PART THEM IN NATIONS ECONOMY
- SPREAD THE VOICE OF MAKE FOR INDIA AND MADE IN INDIA FOR MAKING THE POWERFUL ECONOMY INDIA
- INDIA FOR ITS'S PEOPLE AND FOR PEOPLE OF THE WORLD IS MAIN TARGETBY THE MAKING EVERY PRODUCT.
- STRENGTHENIZE THE TECHINICAL LEVEL'S IN INDIA.

DESIGN OF THE CONCEPT AND EXPLANATION:

1) Identify the country's efficiency in technology and point out the weak areas. Prepare a plan to strengthenize that weak areas.

2) Identify the natural resources availability areas and make a plan that resources are suing at now for which purpose and with that resources how many ways are there to prepare new things. How many number of products we can make from that other than present products.

   Present example: coal-for thermal electricity, coal thar, coal gas.

- But new way find out- Is there any other ideas on coal and its CHARACTERISTICS.

3) Identify the products which are using more in a day.

Ex: PETROL-DIESEL:

Petrol-Diesel mainly using in vehicles as a fuel, but the cost of it is going on, going on every day.

How can we stop that cost hikes?

#Can we stop to use fuel (petrol/ diesel)?

No, we can't stop to use. So we have to plan for better alternatives

#Shri Dr. APJ ABDUL KALAM AJAD sir also explained and noticed this in his many speeches about this fuel alternative methods.

In my words, we are purchasing and importing fuel from other countries, but we have to export the same from our country to the same country.

Why don't we think in that way, think for alrernatives and aware the students on this. Give a chance to the young talents to think and think until get the answer, give a chance to the scholars on this.

Just imagine if we export the fuel to the world, what will be the position of the india's economy in the world's economy.

Really it's an amazing imagination.

Why don't we prove?

Let us begin steps to that research

#i strongly believe that students minds are the nano-spaced laboratories to the research.

So plant such amazing questions in their mind and let them give a chance to think on that.

Definetly they can make INDIA PROUD.

#Petrol from Plastic:

Daily in India highest using objects are maximum made by plastic and also daily wastage product contains maximum plastic. So the solution is ready.

Petrol from wastage (plastic). We should concentrate on this.

If we concentrate on this definetly we may supply petrol to the world. why because

India has highest second population in the world. So usage of plastic and wastage of plastic more in our country than any other country. So we get Raw material very cheaply. If we made P from P, Petrol from Plastic, it becomes a great achievement.

4) Make India as a product manufacturer centre for the world.

If we look at China, China has no resources, no raw materials. But it is a big manufacture zone for the world. China imports the material (raw material) from various countries and it assemble and make the products and export the new items. we also need to improvise our export levels to increase the economy of our country

5) The ISRO has given a great contribution to the Indian Economy. It became a launching station for many countries like that ISRO gaining economy. ISRO is a inspirational boost to us.

6) Study the JAPAN technology, the country given a bullet train to the world. Japan has advanced technology.

INDIA FARMER VS JAPAN FARMER AT THEIR AGES ON THE FIELD…

In india the paddy farmers are attempting suicides for their loss in agriculture, but in japan the paddy farmers are growing paddy by paddy art on their fields. Look at that how sufficiently they are doing the cultivation and enjoying that work.

We have to identify the techniques and aware our farmers on that. Let them to do their work with happy and tell them to enjoy their work.

If the farmer is happy the country will happy.

We have the plenty of farmers and farming but why always those people are unhappy with their work? Solve it by technology. Add technology to their life and tell them to export their field products and feed the world.

7) The earth has very creative things in her soil. Various places contains various characteristics of soil. Read out such characteristics and establish the suitable product manufacturer zones at every where it gives the solution to the un-employment in all the areas and also give the economy to the country.

8) Now a days the most prestigious thing is a CELL-PHONE.

If we look at this concept, entire in india 80% of the people are using phones off INDIA(FROM OUT OF INDIA). MEANS, maximum people are more attractive on made in…….(other than india) cell phone.

Why don't we change this slogan to " WE USE ONLY MY MADE IN INDIA'S PHONE WITH INDIA'S TECHNOLOGY" and also let them to make ready the people of the world to use INDIA'S phone because the india's phones has outstanding features than any other country phone. Give a confident and prove this in early up coming days.

Identify where we are weak in making phones?

Identify the APPLE phone design, oppo, realme, mi characteristics and make steps towards to create a new phone with a excile features and add a mobile fever to the world. Make the people of the world to use only India's pone.

It will change the entire present stability and strength of the econoy of the INIDIA.

9) APPS:

Currently if we look at this, in a smart phone most of the apps are using of the other than india's apps- gaming, entertainments, news medical, health apps should come from india to change the trend in mobile apps. Shake the world with our genious minds. We have lot of the young people in such areas. Encourage them and give a chance to them to

prove their talents. We cannot imagine the economy if we success in this area.

IX.ROLE OF TEACHERS IN AND OUTSIDE OF THE CLASS ROOM:

The key role of teachers…

The nation can build inside of the four walls, the constructer is a TEACHER. He should play a major role in the class room.

He has to explain to the students about the India's position in the world regards education, health, technology and ECONOMY. If we look at the world, the world is under the control of the powerful economist countries. It means when the nation's economy becomes strong, it's automatically gives a strength to the nation in the world.

So, the main target is make india as a powerful economy country. It's possible by the only students and youth. Because their brain is more creative than any one. If we plant such ideas in their mind, they think in that way.

Dr. APJ ABDUL KALAM was choosen only the students to educate. If we deeply observe the 'kalam sir' , he knew that the students can make india powerful in all aspects. That is why he always walk into the brains of the students and he lectured many things. He said about technology, health, education, resosurces, researches, pharmacy, literacy, economy, history, polity, geographical situations, personality and many more. He touches everything. Until his last breath he was in lecturing only…

His life explained to us , if we want better country , make better students. That is why the role of teachers is more important. Explain them about technology and tell them to read your books for not getting certificates, for making certified ideas which should be unique and creative and should give economical support to your country.

Explain them about resources and teach them about renewable and non-renewable resources. Tell them to read out and make new ideas to create resources for the sake of country and world.

Tell them about coal and give a chance to readout its characteristics and let them to ask a free solution for few problems, which are very innovative than the world usage with that product. If we done on that, definetly the world look on to our nation.

Kalam sir, already explained in his speech about fuel, it'l become a big problem after years, that is why the teachers should insist the students to look at this situation and give a fuel free vechicles or find a new way of making fuel. Definetly the students can work on this.

Teachers should give a chance to the students to make little little products and ideas, because it leads one day to find a new product.

We should teach the students, how the world is moving on technology, we should

be more update than the world then only we give a better india and self-reliant india.

In geographically india has more resources and minerals, mines. Teach the students about that conditions and make them to give a solution about the manufacture zones. Teach them to use each and every condition and bend it to a manufacture purpose. That leads to prodcutivity and give economy to the country.

Teach the students more practically. Then only we will make products in made in india project.

X. VOCAL FOR LOCAL:

VOCAL FOR LOCAL… Give a voice to the local products. We should promote our products to the people and aware them on such product, then only we turn our people economy to use the strnegthenize of our nation.

Our people are working day and night and gaining money, with that money they are buying other countries product, what is the use with that, only our nation gets the tax amount in single percent but major amount of our peoples is going for other countries. It is not a good condition.

WE HAVE TO CHANGE IT BY MAKE PRODUCTS IN INDIA WITH OUR TALENTS, TURN THE WORLD ON TO US.

THIS IS POSSIBLE ONLY WITH "MADE IN INDIA AND MAKE FOR INDIA"

WHEN WE MADE INDIA WITH SUFFICIENT PRODUCTS, SUFFICIENT TECHNOLOGY, SUFFICIENT FOOD, SUFFICIENT HOSPITALITY, SUFFICIENT MEDICOS, SUFFICIENT PHARMA, SUFFICIENT MANUFACTURE ZONES, SUFFICIENT EDUCATION, THEN ONLY INDIA WILL BECOMES *"A SELF-RELIANT AND SELF-SUFFIENCY INDIA."*

State Level Science Seminar - 2021

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Sub-theme: Science for Self Reliant India (ATMANIRBHAR BHARAT)- Role of teacher ,in and outside the classroom, to achieve it.

INTRODUCTION:

ATMANIRBHAR BHARAT(COVID-19 PANDEMIC ECONOMIC PACKAGE.

An innovative programme was launched by the prime minister of India NARENDRA MODI to bring our country at the top position in the world in relation to ECONOMIC DEVELOPMENT and transforming India into a superpower. The economic package will cover all the major sectors in India. The main concept of Atmanirbhar Bharat is a domestic production and global supply by using science & Technology of our nation.

Budget allocations:

On May 12, 2020 – 20 lakh crore

On October 12, 2020- 73000 crore

On November 12,2020- 2.65 lakh crore

2021-22 budget-64180 crore for ATMANIRBHAR SWASTH BHARAT YOJANA.

SLOGANS: VOCAL FOR LOCAL

MAKE FOR THE WORLD

OBJECTIVES:

1. Aims to make economic india with scientific knowledge

2. Aims to develop healthy india and make the world as a global family through science.

PRESENTATION:

Science plays a major role in developing India at 360 degrees which includes improving life skills, technical literacy, new reforms in **agriculture (Atmanirbhar krishi)** production of modern agriculture equipments, drone technology, Artificial intelligence. Industry (T-HUB, Robots, Startups, Artificial Intelligence, Fertilizer Industry ,NTPC,GAIL),Means of transport (Metro Services, Driverless Vehicles), improve the quality of life , personal

health and hygiene. (Developing PPE kits, hand-sanitizers and hand-wash liquids and medicines like Chloroquine, Remdesivir Antiviral Drug. We need to have Infrastructural development through "MAKE IN INDIA " and MAKE FOR THE WORLD PROGRAMMES.

STIP: Science, Technology and Innovation Policy will strengthen India's STI ecosystem to achieve the goal of Atmanirbhar Bharat through **SCIENCE.** As part of this 5G network was announced.

Teachers are essential members of society.They will shape our next generation of citizens. A teacher should know the students inner curiosity,instrinsic skills, creative skills, coding skills (Future Science) , develop the engineering skills, artificial intelligence, mathematical operations, develop the cultural sensitivity, social justice, co-operative skills and constitutional values in and outside the classroom.hadno PPE kits at the time of the outbreak of COVID-19 . Now we are producing 450000 PPE kits per a day and we are able to export to other countries. Second achievement is that,we could produce vaccine at lower price for our Nation.In the name of "Operation Vaccine Mythri" ,Indian Government is socially responsible to supply vaccine to the countries of South Asia, South East Asia, Latin America for the welfare of whole world following the shloka **"VASUDHAIVA KUTUMBAKAM"** in the tagline of **SARVESANTHU NIVAMAYA.** This is possible due to the advancement in Indian Science (Bharat Biotech and Serum Institute of India).

Impementations: Government should take initiative steps to implement in co-ordination with state government and participation of people.

Reference: Prime Minister's speech, Union Budget.

State Level Science Seminar - 2021

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The role of Science teachers in making India self – reliant

What is Atma Nirbhar Bharat Abhiyan?

The world's biggest lockdown imposed to contain the spread of Covid – 19 has severely impacted the domestic and economic activities. All the business transactions came to a standstill. This would eventually bring down the GDP of our country to a negative single digit for the financial year 2021. So, to improve the turbulent economic environment and provide a boost to the ailing economy, the P.M. announced a package of 20 lakh crore in the name of 'AtmaNirbhar Bharat Abhiyan.This is equal to 10% of the nation's GDP. This clarion call was made on 12th May 2020. The outlined 5 pillars of this campaign are Economy, Infrastructure, System, Vibrant Demography and Demand. He wants India to pursue policies, which are efficient, competitive, resilient, self- sustaining and self - generating. This is not a call for isolation or protectionism. This does not advocate a self - centred system. In India's self-reliance, there is a concern for the whole world's happiness, peace and cooperation.

Importance of New Education Policy

The role of education cannot be undermined for the development of any society. Education plays a key role in converting any nation into a happy and prosperous one. Even New Education Policy was outlined and proposed on 29th July 2020 bringing forth, numerous reforms keeping in mind the changing scenario of the world. There is also a National Research Foundation to boost Research and Development so that the country can become innovative. NEP will open up the Education sector for facilitating greater global exposure for Indian students as foreign universities would get established.

The nation should be future ready and future fit. NEP would ease the burden of classroom teaching and examination on the students. Holistic knowledge blended with the understanding of Science is the answer to all the problems.

Role of Science teachers in making our country 'AtmaNirbhar Bharat'

A nation is built in a classroom and teachers are the architects of the nation.

Change is inevitable. It is the teachers who pass on the baton of 'change' on their students so that the students can keep themselves floating with the wave without much tussle and stand firmly in their lives. In short, the progress of a civilization is in the hands of a teacher.

Name anything - Technology, health and medicine, infrastructure, modern facilities, entertainment parks, launching of satellites, solar plants etc. are undoubtedly the marvels of Science. This shows how much important is the role of Science teachers in imparting knowledge and guiding students towards progress of the land as Science is an integral part of our life.. The standing example for this is the life of Dr. APJ Abdul Kalaam whose life was shaped by his primary Science teacher. Thus, we can say that the role of Science teachers is immense and indelible. Teaching was stopped during the lockdown but online education has become a way of life during the Covid 19 pandemic. There used to be an advertisement by 'Idea company' showing that education could reach the downtrodden and the remote areas through a mobile and probably people laughed at that but today this has become a norm. Absolutely, there is no replacement for the physical presence and role of a teacher but when situations arise like the one we experienced, like the prevalence of Corona virus, then the teaching learning process should go on and it went on The multimode access to digital education through DIKSHA scheme also helped both the students and the educators.

Tasks by Science teachers to make our country strong self - reliant

PM Modi has reiterated for being vocal for local. The tea prepared by Ayushman Bharat suggests that India has immense knowledge in the field of medicine. We know that 'Health is Wealth.' Teachers should teach students the importance of health and hygiene and importance of consumingbalanced food. They should ask the students to read a book called ' AshtangaHridaya.' This will help the students to become disciplined, concentrate on personal health, exercise and pranayama and yoga.

Headmasters and Principals should give freedom to teachers. They should not stress on discipline and marks. Science teachers should make their class into a fun place wherein the students can play with science. The students can learn the concepts on their own. One example - We know that metals are good conductors of electricity yet, wehear the news of death of many students during Sankranthi because they use metal rods to get kites which are found dangling from the electric lines. It means there is no implementation of the knowledge learnt. This proves that teachers should demonstrate and let the students learn the laws, rules and concepts by practical applications.They should give away the rote memory process. Society also should not measure the possession of knowledge among thestudents in terms of their marks. It is equally wrong on part of private institutions like Narayana and Chaitanya(sorry for becoming a little

personal) to showcase the marks. This is viewed in a wrong way by the society thus, misleading. Marks are not the indicators of a student's talent. Such culture should be stopped.

Reimaging industry – academia partnership

Teachers, educators, research institutions volunteers, think tanks, business people, entrepreneurs, government officials etc should form research teams. They can work on integrated research, gain knowledge and ideas and bring back to the classroom. Science teachers at local level can form small teams and have discussions with corporates, eminent personalities and know what would be the society like in the future and start giving that technical expertise to the students. Schools, institutions and teachers can help small entrepreneurs to establish their startups in their premises using their infrastructure so that they can grow. In the process they would also teach the students who learn in that premises. This can help in two ways. Entrepreneurs who cannot afford to pay rent can use school buildings by paying a small fee while in return they can train the students by exposing them to various things like etiquette, public speaking skills, computer literacy etc.

Balance the future of education with future of work

Future of work lies in artificial intelligence, automation and the gig work force all of which will shrink the shelf life skills of skills. It is quite evident that industries will reach out to students for hiring. Hence, our students should thrive in that work place and ensure that their lifelong learning continues. We should train our students towards this move. It is a known fact that around 12 million enter the workforce every year but more than 78% do not possess employmentskills.**Thus, teachers should integrate work experience deeply into their curriculum and syllabus and teach them the futuristic skills. If not our country would live in darkness.**

Leveraging alumni networks

The teachers can get in touch their ex-students. Alumni hardly get back to their schools but most of them are always ready to give back to the society. Teachers can take their help in getting the students trained in the skills as per their interest. Ex-students would bring with them their expertise, experience and opportunities. Teachers can tap their potential in building our communities.

Education is the only major agent which can bring the prosperity of the nation thus making it AtmaNirbhar. Accordingly, the students need to be trained for jobs that do not exist today but will be in demand in the future, So far, academic institutions have focused on training their students in the skills that are required in larger companies. But now AtmaNirbhar Bharat has brought country's focus on MSMEs.' They are one of the driving force towards self-sufficiency. In advanced nations MSME's have engaged with the academia by investing in research and innovation . South

Korea, Japan, Singapore have developed their economies due to their MSME's. Science teachers should also expand their roles by getting into research, trying to understand market and skills. Such teachers can motivate students to become hardworking by nature and learn to become not only scientists, army personnel or leaders but also to becomeentrepreneurs.

Role of Socially Useful Productive Work

This program should be implemented even in India. Here the students from 9th to 12th classes should be trained at least in one skill by practically working in any place after their study hours. This should consist of cumulative mentioned number of hours spanning from 9th class onwards. The society should be encouraged to give them small jobs so that they can get experience and money. This is almost like internship but at local level.

Starting of local magazines

Teachers in a particular locality can come together and form a forum. They can have general meetings with students of each other's schools. Their student's achievements, creativity and innovations can be made to publish in a local Science magazine. Teachers here can take the help of anybody or everybody. This will boost the morale of their students. Career planning, group discussions and debates should also be a part of this.

Other tasks

Science teachers should build confidence in the students irrespective of the students' background. They can also form teams with students and bringan awareness among the people about various things like cleanliness, protection of environment and girl child. They can help in plantation of trees, participate in Swatch Bharat programs. Teachers can themselves make few short films and educate even the masses on various issues. They can teach even about the ill effects of child marriages, female foeticideand child abuse. All these are the small steps which will make our country strong. Apart from these, Science teachers can help in building traditional skills like pottery, doll making too. Science teachers can encourage students to buy only local things. Also encourage them to make **local Apps**. Teachers can think of generating energy also with the help of students. Most importantly, teachers should nurture thinking and asking abilities among the students.

Teachers can motivate students to share the problems noticed by students. They can have brain storming sessions. Then can implement those solutions

Importance of online teaching

Though the nation was passing through tough times, teaching learning process did not stop. Even now, it is continuing. Online education has its own advantages too. A few are as follows. 1) Every child can get quality education because every school has a few mediocre teachers. Through online teaching, best teaching can reach every student. 2) Parents can invest on gadgets instead of making their children suffer from Corona by sending them to school. 3) Traffic will be less

on roads. 4) There will be no bullying by the peers 5) Students can become independent. For 'AtmaNirbhar Bharat, Atma Nirbharstuden't is needed. They can be motivated towards hard work and self-learning. After all, convention method is criticized for spoon feeding process. The emphasis on marks can be reduced which usually kills the creativity. Teachers can design their own digital content also. This will help the future citizens to get clarity about what is right and wrong for themselves, society and nation. Teachers can also get more time to do research and develop themselves.

Conclusion

Thus, we can say that teachers had been shaping the societies. Even the future of India is in the hands of teachers. They should justify their role properly otherwise our country will become again a slave in the hands of MNC's. We should protect our freedom which we received after innumerable people and unsung heroes sacrificed their lives so that we can breathe freely. There is huge unsaid responsibility on the shoulders of Science teachers.

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State Level Science Seminar - 2021

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శీర్షిక పేరు : ఆత్మ నిర్భర్ విద్యార్థి – ఆత్మ నిర్భర్ భారత్

సంగ్రహణం : ఆత్మ నిర్భర్ భారత్ లేదా స్వాలంబన అనేది

ఆత్మ విశ్వాసము

ఆత్మ చింతన

ఆత్మ సమ్మాన్ అనే మూడు సాంస్కృతిక స్తంభాలతో రూపొందించబడినది. ఆత్మ నిర్భర్ భారత్ యొక్క మూల సూత్రాలలో సమానత్వంతో కూడిన సాంకేతిక పరిజ్ఞాన ఆధారిత విద్య కూడ ఒకటి. ఆత్మ నిర్భర్ భారత్ ప్రవంచ నంక్షేమంపై దృష్టి సారించడంతోపాటుగా ఈ కలను సాకారం చేసుకొనుటకు ప్రవాస భారతీయుల మద్దతును కోరింది. భారతదేశాన్ని స్వాలంబన మరియు సంపన్న దేశంగా మార్చడంలో సైన్స్ బోధన కీలక పాత్ర పోషిస్తుంది. కావున ఈ లక్ష్యంతోనే ప్రస్తుత పోటీ ప్రపంచంలో పురోగతిని సాధించుటకు దేశంలో పరిశోధన మరియు ఆవిష్కరణలను మరియు బలోపేతం చేయడానికి నూతన జాతీయ విద్యా విధానం ప్రవేశపెట్టబడినది.

ఆత్మ నిర్భర్ భారత్ యొక్క సూక్ష్మ స్థాయి విజయం ఆత్మ నిర్భర్ విద్యార్థిపై ఆధారపడి ఉంటుంది. ఆత్మ నిర్భర్ భారత్ యొక్క మౌలిక సూత్రం అనేది విద్యా వ్యవస్థలోనే కాకుండా విద్యార్థులు, ఉపాధ్యాయులు మరియు తల్లిదండ్రుల మనస్తత్వంలో కూడా నిమగ్నమై ఉండాలి. భిన్న వైవిధ్యాల నుండి జాతీయ సమైక్యత మరియు స్వావలంబనను అభివృద్ధి చేసే సాధనంగా మారేలా విద్యార్థులకు, ఉపాధ్యాయులు అవగాహన కల్పించాలి.

ఉపోద్ఘాతము :

భారతదేశాన్ని గ్లోబల్ నాలెడ్జ్ సూపర్ పవర్‌గా మార్చడానికి పాఠశాల మరియు ఉన్నత విద్యా వ్యవస్థలో పరివర్తన సంస్కరణలకు మార్గం సుగమం చేయడమే ఆత్మ నిర్భర్ భారత్ ప్రధాన లక్ష్యం. విద్యా రంగానికి కోవిడ్-19 మహమ్మారి అందించిన అవకాశమే ఈ ఆన్‌లైన్ తరగతులు. ఆన్‌లైన్ తరగతులు ఇంత త్వరగా మన గ్రామాలకు చేరుతాయని ఎవరమూ ఊహించలేదు. కొన్ని సార్లు విపత్తుల సమయంలో కూడా ఒక అవకాశం కనిపిస్తుంది. కరోనా దెబ్బకు బడులు, కళాశాలకు తాళాలు పడినప్పటికి ఆన్‌లైన్‌లో స్మార్ట్ ఫోన్‌లు, ల్యాప్‌టాప్‌లు వంటి ఉపకరణాలతో బోధన జరగడమే ఇందుకు నిదర్శనం.

నేడు ఉపాధ్యాయుడు ఎదుర్కొంటున్న సవాళ్ళలో అతి ప్రధానమైనది ముఖాముఖి బోధనను ప్రత్యామ్నాయ బోధనాభ్యసన వ్యూహాలతో భర్తీ చేయడం. ఈ పరిస్థితి మొదట్లో కష్ట సాధ్యమే అనిపించినప్పటికి ఉపాధ్యాయులు అడ్డంకులను అధిగమించి చక్కని వ్యవస్థీకృత పద్ధతిలో చేసిన విద్యా విధానాలతో ముందుకు సాగుతున్నారు.

ఆత్మ నిర్భర్ విద్యార్థి ఇంటి పరిసరాలు :

కేవలం తరగతి గది బోధనతోనే 21వ శతాబ్దపు నైపుణ్యాలను బోధించడం సాధ్యపడదు. విద్యార్థులు స్వావలంభన కావడం చాలా అవసరం.

ఆత్మ నిర్భర్ మిషన్ మూలార్థం గ్లోబల్ ఇంటిగ్రేషన్ ఐనప్పటికిని జాతీయ అవసరాలకు ఏ దేశంపైన ఆధారపడరాదు.

- పిల్లలు ఎదుగుతున్న కొలది స్వావలంభన అనే లక్షణం కూడా అభివృద్ధి చెందుతుంది. కావున స్వావలంభన అనేది పిల్లలకు చిన్నతనంలోనే నేర్పించడం చాలా ముఖ్యం. స్వావలంభన అనేది పాఠశాలలో బోధించే విద్య యొక్క ఫలితం కాదు. ఇది ఇంట్లోనే ప్రారంభమవుతుంది.
- ఈ భావన ఇంటి వరినరాల నుండి, తల్లిదండ్రులు తమ పిల్లలకు ఇచ్చే సూచనల నుండే ఆరంభమవుతుందనే విషయాన్ని తల్లిదండ్రులు గ్రహించాలి. పిల్లలు తల్లిదండ్రులు చేసే ప్రతీ కదలికను జాగ్రత్తగా గమనిస్తూ ఉంటారు. కావున ఈ భావనకు తల్లిదండ్రులే పిల్లలలకు రోలన మోడలన అవుతారు. బాలల భావోద్వేగ, సౌందర్యాత్మక స్పృహ వంటి అంశాలలో సర్వతోముఖాభివృద్ధి సాధించుటకు ఇంటి పరిసరాలు అనుకూలంగా ఉంటాయి.

గురువు ఉజ్వల భవిష్యత్‌కు సంరక్షకుడు మరియు శిల్పి:

గు – శబ్దంధకారేస్యాత్ / రు – శబ్దంతి నిరోధకః / అంధకార నిరోదితః / గురురీత్యబిదియతే। అనే ఆర్యుల మాటలను పరికించి చూస్తే అజ్ఞానమనే అంధకారాన్ని పారద్రోలి జ్ఞానమనే కాంతులను వెలిగించే వారే నిజమైన గురువులు.

- ఉపాధ్యాయులు విద్యార్థులకు జాతీయ విధేయత మరియు బాధ్యతల భావాన్ని ఇవ్వాలి. నిరంతరం పిల్లల అభ్యసన స్థాయిని ప్రయోగశాలలో, తరగతి గదిలో క్షేత్ర పర్యటనలో నిశితంగా పరిశీలిస్తూ వారు ఒక క్రమ పద్ధతిలో పరిష్కారాలు కనుగొనే వారిగా తీర్చిదిద్దడంలో సరైన కార్యాచరణ చేపట్టినప్పుడు తప్పకుండా స్వావలంభనం కల సాకారమై భారతీయ సంస్కృతి, సంప్రదాయాలు పరిడవిల్లుతాయని చెప్పవచ్చు.

తరగతి బోధన స్వావలంభన :

తరగతి అభ్యసనం పిల్లల విస్తృత అభ్యాసన ప్రక్రియలో ఒక చిన్న అంశం. ఉపాధ్యాయుడు తరగతి గది ద్వారా విద్యార్థులలో పరస్పర సహకారం, చర్చలు, ఇచ్చిపుచ్చుకోవడం అనే భావనలను గ్రహించేలా చేస్తే పిల్లలలో స్వావలంభన ప్రక్రియ ప్రారంభమవుతుంది. విజ్ఞాన శాస్త్ర భావనలు, సిద్ధాంతాలను అధ్యయనం చేయుటకు తరగతి గది బోధన ఒక పునాది, కావున సరికొత్త సంబంధాలు నెలకొల్పడానికి అనుకూలంగా తరగతి గది నిర్వహణ కొనసాగాలి.

తరగతి ఆవల విజ్ఞానశాస్త్ర ఆవిష్కరణలు :

మంచి ఉపాధ్యాయుడు అంటే తన విద్యార్థులలో తనను తాను చూసుకునేవాడు. కావున పిల్లల్లో సహజంగా ఉండే జ్ఞానకాంక్షను పదునుపెట్టేలా

బోధన చేస్తూ, విద్యారంగంలో వచ్చే నూతన మార్పులను స్వాగతిస్తూ, కొత్త పోకడలను ప్రోత్షహించాలి. తన బోధన విధానంలో సరికొత్త విధానాలను దృష్టిలో ఉంచుకొని సమర్థవంతంగా బోధించుటకు ప్రయోగాలు చేయడానికి సిద్ధంగా ఉండాలి.

- రోజురోజుకు విస్తృతంగా రూపొందుతున్న సమాచారాన్ని పిల్లలకు కేవలం పాఠ్యపుస్తకం ద్వారా మాత్రమే అందించడం కష్టసాధ్యం. కావున వివిధ మాధ్యమాల ద్వారా అవసరమైన అంశాలను, అంశవరవైున వేరకు సేకరించుకుని నేర్పును పెంపొందించుకోవడం పిల్లలకు అలవాటు చేయాలి. తద్వారా వారు అవనరవైున జ్ఞానాన్ని న్వంతంగా నిర్మించుకోవడానికి వీలు కలుగుతుంది.
- నేను నా విద్యార్థులకు ఎప్పుడూ ఏ విషయాన్ని నేర్పడానికి ప్రయత్నించలేదు. నేర్చుకోవడం ఎలాగో అది మాత్రమే నేర్పాను. ..... ఐన్‌స్టీన్.
- పిల్లలు పాఠశాలకు వచ్చేసరికే వివిధ అంశాల పట్ల తమదైన భావనలను కలిగి ఉంటారు. కావున కొత్త సాంకేతిక పరిజ్ఞానాన్ని అర్థం చేసుకోవడానికి పిల్లలలను ఉత్సాహపరుస్తూ వారిలో దాగిఉన్న ఆవిష్కరించే సామర్థ్యాలను వారు గ్రహించేలా ప్రేరేపించాలి.

సృజనాత్మకత – స్వావలంభన :

- నృజనాత్మక సామర్థ్యాన్ని బోధించడానికి ప్రాథమిక పాఠశాల స్థాయి చాలా కీలకమైనది. ఆ స్థాయిలోనే సరైన ఉద్దీపనలు జరగాలి. పిల్లలను వివిధ అంశాలవట్ల తమ ఆలోచనలను, అభిప్రాయాలను స్వేచ్ఛగా వ్యక్తీకరించగలిగేలా తమదైన కోణంలో పరిష్కారాలు సూచించగలిగేలా ప్రోత్సహిస్తే, వారు వైజ్ఞానికంగా ఆలచించగలిగే స్వీయ పరిశోధకులుగా మారేందుకు తోడ్పడతాయి.
- ప్రస్తుతం పిల్లల ప్రగతిని మూల్యాంకనం చేయడానికి విద్యావిషయక సాధనకు ఎక్కువ ప్రాధాన్యతనిస్తూ, సృజనాత్మకత గల పిల్లలను విస్మరిస్తున్నారు. శాస్త్ర అధ్యయనం అంటే నూతన ఆవిషణలు మాత్రమే కాదు. ప్రకృతిలో ఇమిడిఉన్న అంతః నూత్రాలను అర్థం చేసుకుంటూ సహసంబంధానికి, పరస్పర ఆధారితత్వానికి అంతరాయం కలగకుండా అడుగువేయడం కావున సృజనాత్మకతతో కూడిన బోధన చాలా అవసరం.

బోధన మాత్రమే కాదు స్ఫూర్తినివ్వాలి :

- పిల్లల్లో స్పష్టవైున జాతీయ అవగాహన, ప్రజాస్వామ్యంవట్ల విధేయత మరియు స్వావలంభన లక్ష్యాలతో రూపొందించబడిన నూతన జాతీయ విద్యావిధానం అమలుకు మరియు కార్యాచరణకు ఉపాధ్యాయుడు సాధనంగా ఉంటూ నిత్యస్ఫూర్తిని ఇవ్వాలి. నిజాయితి, నిర్భీతి, విషయ నిష్ఠత, రాగద్వేషాలకు అతీతంగా ఉంటూ అధ్యయనం, ఆవిష్కరణలతో కూడిన బోధన చేయాలి.

గురు శిష్య పరంపర నిరంతరం కొనసాగాలి :

అంధకారంలో కృత్రిమ సూర్యున్ని (బల్బు) కనిపెట్టిన ఎడిసన్, ఆకాశవాణిని కనుగొన్న మార్కోని,

దూరవాణిని కనుగొన్న గ్రహంబెల్ వంటి మేధావులందరు వారి గురువుల మార్గదర్శకత్వంలో నడవడం ద్వారా ఆధునిక సమాజానికి పునాదులు వేసారు. ప్రాథమిక స్థాయిలోనే పిల్లలు ఉపాధ్యాయులను అనుసరించడం, అనుకరించడం ద్వారా ఎన్నో అంశాలను నేర్చుకుంటారు, కావున కృత్యాలను సృజనాత్మకతతో నిర్వహించే విద్యార్థులను ప్రోత్సహిస్తూ, వారి సందేహాలను నివృత్తి చేస్తూ పిల్లలతో సత్సంబంధాలు కొనసాగించాలి. తద్వారా వారికి మంచి భవిష్యత్‌ను అందించి స్వావలంభనంగా ఎదగడంలో గురువులు భాగస్వాములు కావాలి.

- మనుష్యులతో మానవీయ సంబంధాలు తగ్గిపోతున్న తరుణంలో ఉపాధ్యాయులే ఆచరణాత్మక ప్రణాళికలను రూపొందిస్తూ, పరిస్థితులను చక్కదిద్ది మానవీయ కోణాలను పిల్లలల్లో ఆవిష్కరించేలా కృషిచేయాలి.

అమ్మ భాషతోనే అభివృద్ధి స్వావలంభన :

- విజ్ఞాన శాస్త్రానికి మూలాధారమైన జ్ఞానమంత ఆంగ్లభాషలోనే ఉంది. రాబోయే కాలంలో అదంత మన భాషలోకి వచ్చేస్తుంది. అప్పుడు మనం జపనీయుల్లాగా పూర్తిస్థాయిలో మన భాషల్లోనే చదువుకోవచ్చు. ....అబ్దుల్ కలాం.
- విశ్వవిజ్ఞానమంత భారతీయ భాషల్లోకి రావాలి. అమ్మ భాషలో విద్యాబోధనే దేశప్రగతికి తొలిమెట్టు. శాస్త్ర సాంకేతిక రంగాల్లో భారతీయ ముద్ర కనిపించాలంటే, భారతీయులకు మాత్రమే సాధ్యమైన విజయాలు సాధించగలగాలంటే వైజ్ఞానిక శాస్త్రబోధన అంత భారతీయ భాషల్లో సాగాలి. మన పిల్లలు మనవైన అనుభవాల ద్వారా విజ్ఞానాన్ని ఒడిసి పట్టుకోవాలి. అప్పుడే భారతీయ ఆత్మ ప్రతిబింబించే కొత్త ఆలోచనలు చేయగలుగుతారు.

ముగింపు :

సైన్స్‌ను శాస్త్ర పరిశోధన రంగాన్ని ప్రోత్సహించడం. పరిపుష్టం చేయడం, యువకుల్లో సైన్స్ పట్ల ఆసక్తిని పెంచి భావిభారత పౌరుల్లో శాస్త్రీయ అవగాహనను పెంపొందిస్తూ, విద్యార్థులను స్వీయ పరిశోధకులుగా రూపొందించడమే లక్ష్యంగా ఉ పాధ్యాయుల బోధన కొనసాగాలి. దేశాభివృద్ధికి సైన్ ఒక బలీయమైన చోదకశక్తి అని అందరు విశ్వసించాలి. రాజ్యాంగంలో పేర్కొన్న శాస్త్రీయ అగాహనలను పిల్లల్లో పెంపొందించే పని ప్రాథమికి స్థాయి నుంచే విద్యాసంస్థలు చేపట్టవలసి ఉంది. ఉపాధ్యాయులు సమాజాన్ని పట్టిపీడిస్తున్న మూఢవిశ్వాసాలను రూపుమాపి, పిల్లల్లో పరిశోధనాభిలాషను పెంపొందిస్తూ, బోధన విధానంలో సరికొత్త మార్గాలను అన్వేషించినప్పుడే ఆత్మనిర్భర్ భారత్ లక్ష్యం నెరవేరుతుంది.

అధ్యయన గ్రంథాలు : 1) భౌతికభాస్త్ర బోధనాశాస్త్రం, 2) ఉపాధ్యాయుల కరదీపికలు, 3) 7, 8, 9 తరగతుల తరగతుల భౌతిక శాస్త్ర పుస్తకాలు.

State Level Science Seminar - 2021

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ప్రయోగ అంశం :

వేలాడే వెదురు బొంగుతో వంటింటి ఆయుర్వేద మొక్కల తోట (Medicinal Plants Kitchen garden with hanging Bamboo).

ఉప ఉద్దేశ్యం :

ఆత్మ నిర్భర్ భారత్ (స్వశక్తి భారతం) లో విజ్ఞాన శాస్త్ర పాత్ర – దీనిని సాధించుటకు తరగతి గదిలో మరియు తరగతి గది బయట ఉపాధ్యాయుని పాత్ర.

లక్ష్యాలు :

1. భారత దేశ అభివృద్ధిలో విజ్ఞాన శాస్త్ర ప్రాధన్యతను ఉపాధ్యాయులు గుర్తించాలి.
2. భారత దేశ స్వయం సమృద్ధిలో విజ్ఞాన శాస్త్రం యొక్క పాత్రను ఉపాధ్యాయులు సమగ్రంగా అవహగాహన చేసుకొవాలి.
3. భారత దేశ స్వయం సమృద్ధిలో భాగంగా విద్యార్థులు మరియు సాధారణ ప్రజానీకం ప్రాంతీయ పరిశోధనల ద్వారా నూతన అవిష్కరణలను సాధించుటకు ఉపాధ్యాయులు ప్రేరేపించాలి.

ప్రదర్శన అంశం :

వేలాడే వెదురు బొంగుతో వంటింటి ఆయుర్వేద మొక్కల తోట.

ఉప్రోద్ఘతం :

ఆత్మ నిర్భర్ భారత్ :

కరోనాతో విలవిల్లాడిన ఆర్థిక రంగానికి తక్షణ ఉపశమన కలిగించడం, దీర్ఘకాలిక సంస్కరణలను అమలు చేయడం, భారత్‌లో తయారీని ప్రోత్సహించడం అన్న లక్ష్యాల సమ్మిళతమే " **ఆత్మ నిర్భర్ పథకం**".

దీనిని ప్రధాన మంత్రి గౌ ॥ **శ్రీ నరేంద్ర మోడి** గారు 12 మే 2020 నాడు ప్రకంటించినారు.

ఆత్మ నిర్భర్ భారత్‌లోని ముఖ్యంశాలు :

1) ఆర్థిక సహాయం అందించడం
2) ప్రోత్సాహకాలు ఇవ్వడం
3) రుణాలు లభించేలా చూడడం
4) ప్రవేట్ పెట్టుబడులను ఆహ్వానించడం.

విలువ :

- నగదు విలువ రూ॥ 20,97,053 కోట్లు
- ఇదీ బీడిపిలో 10 శాతానికి సమానం.
- రూ॥ 20 లక్షల కోట్ల ప్యాకేజిగా వాడుకలోకి వచ్చింది.

కీలకాంశాలు :

1. మొదట ప్రభుత్వంలో సంస్కరణలు చేపట్టడం ద్వారా ఈ ప్యాక్‌జికి శ్రీకారం చుట్టారు. దీంట్లో భాగంగా రాష్ట్ర ప్రభుత్వాల రుణ పరిమితిని GDP లో 3% నుండి 5 శాతానికి పెంచారు. అయితే అదనపు రుణానికి సంస్కరణలు చేపట్టాలన్న షరతు పెట్టారు.
2. ప్రభుత్వం సంస్థలకు ప్రయివేటీకరణ చేయడం ఈ ప్యాకేజిలో మరో అంశం. కీలక రంగాల్లో ప్రభుత్వం రంగ సంస్థలను కొనసాగిస్తూనే ప్రయివేటు రుణాలను ఆహ్వానించాలని నిర్ణయించారు..
3. వ్యాపారం, సూక్ష్మ చిన్న మధ్య తరహా పరిశ్రమలకు దీర్ఘకాలిక ప్రయాజనం ఉండేలా కీలక మార్పులను ప్రకటించారు. వీటి నిర్వచనాలను మార్చడం, సులువుగా రుణాలు అందేలా చూడలి. వీధి వ్యాపారులకు రుణా పరిమితి కల్గించడం, ప్రయివేటు ఉద్యోగులకు పి.యఫ్ చెల్లించడం తదితర అంశాలు ఉన్నాయి. ఈరంగాల్లోని మొత్తం 15 అంశాల్లో సంస్కరణలు తీసుకొచ్చారు.
4. వివాదాస్పదమైన మూడు వ్యవసాయ చట్టాలు కూడా ఇందు భాగమే. ఇవి కాకుండా రూపాయల లక్ష కోట్లతో వ్యవసాయ మౌలిక వసతుల నిధి ఏర్పాటు చేశారు.
5. వలస కూలీలకు ఉచితంగా తిండి గింజలు అందిచడం ప్రధానమైనది. పట్టణాల్లో ప్రయివేటు సహకారంతో చౌక ధరలకు అద్దే ఇళ్ళను నిర్మించాలని ప్రతిపాదించారు.
6. విమానయానం, రక్షణ రంగాల్లో ప్రయివేటు పెట్టుబడులను ఆహ్వానించడం డిస్కంలకు ఆర్థిక సహాయం చేయడం, ఉపాధి హామి పథకం కింద పనిదినాలు పెంచడం మరికొన్ని ముఖ్యంశాలు.

ప్రయోగ లక్ష్యాలు :

1. పర్యావరణ పరిరక్షణ జరుగును.
2. పేదవాడి కలప / గ్రీన్ గోల్డ్ అయిన వెదురు విలువ పేరుగుతుంది.
3. తక్కువ ధర గల వస్తువుల ద్వారా నిర్వహణ.
4. సులభ పద్ధతి ద్వారా నిర్వహణ.
5. మన చుట్టు లభించే వస్తువుల ద్వారా విలువైన ఆయుర్వేద మొక్కల పెంపకం.

ప్రదర్శన :

కరోనాతో మహమ్మరి కారణంగా దెబ్బతిన్న ఆర్థిక వ్యవస్థను గాటిలో పెట్టుటకు " ఆత్మనిర్భర్ భారత్ పథకాన్ని ప్రారంభించారు. ఈ పథకం క్రింద అభివృద్ధి సాధనకు 6 మూల స్థంభాలను అనుసరించారు.

అందులో ముఖ్యమైనదే "**ప్రధాన మంత్రి ఆత్మ నిర్భర్ స్వాస్థ్య భారత్**". దీనికి కేటాయింపులు రూ॥ 64,180 కోట్లు.

దీంతో పాటు ఆర్థిక మంత్రి నిర్మలా సీతారామన్ 2021 - 2022 బడ్జెట్ ఆరోగ్యం, కుటుంబ సంక్షేమం, ఆరోగ్య రంగంలో పరిశోధన, ఆయుష్ విభాగానికి కలసి రూ॥ 76,901 కోట్లు కేటాంచారు. ఆయుష్ విభాగానికి రూ॥ 2970 కోట్ల కేటాయించారు.

ప్రజా ఆరోగ్యాన్ని కాపాడటానికి కరోనా లాంటి మహమ్మారిలను తట్టుకొనుటకు ఆయుష్ విభాగం, ఉద్యావన శాఖ మరియు వ్యవసాయ శాఖ సంయుక్త భాగ స్వామ్యంతో " అయుర్వేద మొక్కలు పెంపకం ". కార్యక్రమాన్ని చేపట్టారు.

దీనిని జాతీయ ఆయుర్వేద మొక్కల బోర్డు ద్వారా ముందుకు తీసుకొని వెళ్ళుచున్నారు.

ఇందులో భాగంగా రాబోవు రెండు సంత్సరంలో 10,00,000 Hectare లలో ఆయుర్వేదిక మొక్కల పెంవకం చేవట్టాలని లక్ష్యంగా నిర్ణయించారు.

దీనిని కొనసాగింపుగా ఉపాధ్యాయుడనైన నేను మా విద్యార్థులకు, వారి తల్లిదండ్రులకు మరియు సమాజానికి ఆయుర్వేద మొక్కల ప్రాముఖ్యతను, వాటి వల్ల కలుగు ప్రయోజనాలను, ఇంట్లోనే తక్కువ స్థలంలో ఏ విధంగా సాగు చేసుకొవాలి అనే ఇతి వృత్తంగా " **వేలాడే వెదురు బొంగుతో వంటింటి ఆయుర్వేద మొక్కల తోట"** కార్యక్రమాన్ని ప్రదర్శనాంశంగా రూపొందించాను.

ఈ ప్రదర్శనకు కావాల్సినవి.

1. స్థానికంగా దొరికే పేదవాడి కలప అయిన వెదురు సుమారు 2 Feet పొడవు, 3/4 inches వ్యాసం గల బొంగులు 3.
2. సారవంతమైన మట్టి.
3. వేలాడీయ దానికి సరియగు తాడు.
4. ఆయుర్వేద మొక్కల విత్తనాలు :
   - ఎ) పుదీన
   - బి) మెంతులు
   - సి) కొత్తిమీర.
5. **ఈ మొక్కల ఉపయోగాలు : -**

ఎ) **పుదీనా : -** పుదీనా ఆకుల్లో ఉండే ఖనిజ లవణాలు, కాల్షియం, మెగ్నీషియం, ఇనుము, విటమిన్ " **సి**" ఆరోగ్యానికి మేలు చేస్తాయి. మాంస కృత్తులను సులభంగా జీర్ణం చేస్తాయి.

దీంతో పాటు పొట్టనొప్పి తగ్గిస్తుంది. మలబద్ధకకం నివాస్తుంది. చర్మ సమస్యలను దూరం చేస్తుంది. నోటి సమస్యలను నివారిస్తుంది మొదలైనవి చేస్తుంది.

బి) **మెంతికూర : -** దీనిలో పీచు పదార్ధం సమృద్ధిగా ఉంటుంది. అంతెకాక ఇనుము, విటమిన్ - సి, బి1, బి2 , కాల్షియం ఉంటాయి.

ఇవి మధు మేహన్ని అదువు చేస్తాయి. కొలెస్ట్రాల్‌ను తగ్గిస్తుంది. గుండె పని తీరును మెరుగు పరుస్తుంది. కీళ్ళ నోప్పులకు చక్కని ఔషదం. క్యాన్సర్ ను నివారిస్తుంది. ఇలాంటి చాలా ఉపయోగాలు ఉన్నాయి.

సి) **కొత్తిమీర : -** కొత్తిమీరలో థయోమైన్ సహా విటమిన్ - సి, విటమిన్ - బి, భాస్వరం, కాల్షియం, ఇనుము, నియానన్, సోడియం, కెరోటిన్, పోటాషియం, కార్బొ హైడ్రెట్స్, ప్రోటిన్, ఫ్యాట్, ఫైబర్ మరియు నీరు ఉంటాయి.

ఉపయోగాలు : -

క్రొవ్వును నియంత్రిస్తుంది, చర్మాన్ని కాపాడుతుంది. జీర్ణ క్రయనం పెంచుతుంది. కంటి చూవు మెరుగు వరుస్తుంది. మధుమేహన్ని నియంత్రిస్తుంది. రక్త హీనతను తగ్గిస్తుంది. ఇటువంటి చాలా ప్రయోజనాలు ఉన్నాయి.

ప్రయోగవిధానం : -

1) మొదట సూమారు 2 Feet పొడవు, 3/4 inches వ్యాసంగా గల వెదురు బొంగులను తీసుకొని వేలాడదియడానికి అనుకులంగా ఉండేటట్లు రంధ్రాలు చేయించాలి.

2) పోడవుగా దానిలో మట్టి వేయడానికి అనుకులంగా కొలత వెదురు బద్దను తొలగించాలి.

3) అడుగున నీరు పోవడానికి రంధ్రం చేయాలి.

4) వెదురు బొంగులో మట్టిని పోయాలి .

5) ఎంపిక చేసుకొన్నా విత్తనాలను అందులొ వేసి మట్టి కప్పాలి.

6) ప్రతి రోజు నీరు పోయాలి.

7) సూర్యరర్మి బాగా సోకే చోట వేలాడదీయాలి.

8) వారం నుండి పది రోజుల్లో వాడుకోవడానికి అవసరమైన మొక్కలు వస్తాయి.

9) పై వాటిని ఉపయోగించుకొని ఆరోగ్యని కాపాడుకొవాలి.

<u>ప్రయోగ ఫలితాలు</u> :

1) ఈ వేలాడే ''వెదురు బొంగు వంటింటి ఆయుర్వేద మొక్కల తోట '' ద్వారా రాబొవు తరానికి ఉపయోగపడే పెదవాడి కలప అయిన వెదురు యొక్క విలువ పెరిగి, ఇతర కలప వాడకం తగ్గి వర్యావరణ వరిరక్షణ సాధ్యపడుతుంది.

2) ఆయుర్వేద మొక్కల పెంపకం అలవాటు విద్యార్థులకు విద్యార్థి దశ నుండి సులంభంగా అవగహన అవుతుంది.

3) విద్యార్థితో పాటు వారి చుట్టే వుండే సమాజం కూడా ఈ రంగంపై అవగాహన పెంచుకుంటారు.

4) అనారోగ్య సమస్యలకు అలోపతి మందులు వాడకం ద్వారా వచ్చే దుష్ పరిణామాలను ఆయుర్వేద మందుల ద్వారా నివారించుకొంటారు.

5) నగరాల్లోను పెంచుకొనుటకు చాల సులభమైన పద్దతి స్థల సమస్యను పూర్తిగా నివారిస్తుంది.

<u>అను వర్తనాలు</u> :

1) విద్యార్థి దశ నుండి వారికి మొక్కల పెంపకం, వనరుల నిర్వహణ, ఆయుర్వేద మొక్కల ద్వారా ఆరోగ్యాన్ని ఎలా కాపాడుకొవాలో అవగహన అవుతుంది.

2) రాబోవు 2 సం॥లలో 10,00,000 ఆయుర్వేద మొక్కల సాగు కార్యక్రమం విజయవంత మౌతుంది.

3) కరోనా వంటి వ్యాధులను భవిష్యత్తులో ఎదుర్కొనే సామార్థ్యం ప్రజల్లో పెరుగుతుంది.

4) ప్రభుత్వ పథకాల్లో ప్రజల భాగస్వామ్యం పెరిగి ఆత్మనిర్భర్ భారత్ కల సహకరం అవుతుంది.

5) ఆరోగ్యమే మహభాగ్యం అనే నినాదంనకు సంపూర్ణ సహకరం అందుతుంది.

<u>సూచనలు / సలహాలు</u> :

నేను తీసుకొన్న వంటింటి ఆయుర్వేద మొక్కలైన పుదీన, కొతిమీర మరియు మెంతికూర కేవలం సులభమైన ఉదాహరణలు మాత్రమే.

ఈ ప్రయోగానికి చాలా విస్తృతి కలదు. వీటితో పాటు ఆయుర్వేదిక మొక్కలైన

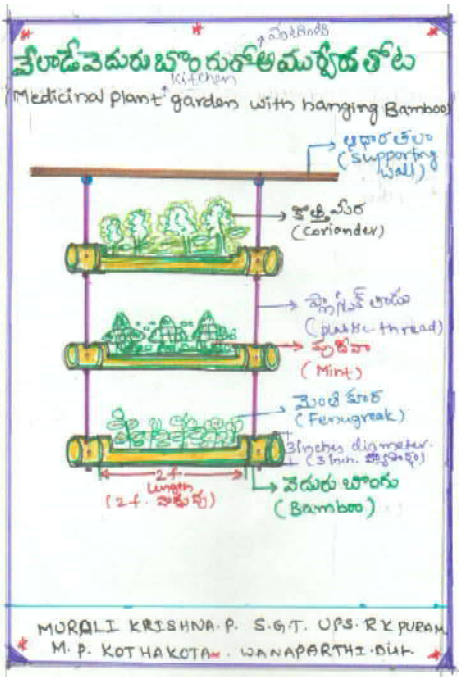
1. తిప్పతీగ 2. గోధుమ గడ్డి
3. నల్లేరు 4. కాకరకాయ.

వాటిని పెంచవచ్చు.

పై ఆయుర్వేద మొక్కల ద్వారా ఆరోగ్యాని పెంపొందించుకొవచ్చు.

ఇలాంటి ప్రయోగాల వల్ల భారతదేశం ఔషద రంగంలో స్వయం సమృద్ధి సాధించి అభివృద్ధి పతంలో ముందుకు సాగుతుంది.

"ఆరోగ్య భారతం అవిష్కృతం అవుతుంది ".



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State Level Science Seminar - 2021

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Title of the Topic : "ఆత్మనిర్భర భారత నిర్మాణంలో విజ్ఞాన శాస్త్ర ఉపాధ్యాయుల పాత్ర"

INTRODUCTION

మానవజాతి ప్రారంభమైనప్పటి నుండి తన పరిశీలనా శక్తి, మేధా సంపత్తితో అంచెలంచెలుగా ఎదుగుతూ, సౌకర్యవంతమైన జీవనం సాగిస్తూ అన్ని జీవులలో కెల్లా తనకంటూ ఒక ప్రత్యేకమైన స్థానాన్ని సంపాదించుకున్నాడు మానవుడు.

ఇతర అభివృద్ధి చెందిన దేశాలతో పోటీపడుతూ ఆకాశమే హద్దుగా సౌఖ్యవంత జీవనం కోసం, భవిష్యత్తు తరాల బాగు కోసం ఎన్నో ప్రయోగాలు చేస్తూ వ్యవసాయ, పారిశ్రామిక, విద్య, వైద్య, సాంస్కృతిక, శాస్త్ర సాంకేతిక వంటి అనేక రంగాలల్లో అభివృద్ధి చెందడానికి ప్రయత్నిస్తున్నాం.

ప్లేగు, మశూచి వంటి వ్యాదుల్ని అంతమొందించాం, పోలియో రహిత దేశంగా అవతరిస్తున్నాం. కోవిడ్ - 19 వ్యాప్తి ప్రారంభమైన రోజుల్లో సరియైన మాస్కులు, వెంటిలేటర్‌లు లేనటువంటి స్థితి నుండి ఎన్-95, ఎన్-99 మాస్కులు తయారు చేసుకుని నిరంతరం శానిటైజేషన్‌తో అవసరమైన వెంటిలేటర్‌లు సమకూర్చుకున్నాము. ఈ రోజు కోవిడ్-19 వ్యాక్సిన్‌ను తయారు చేసుకుని ప్రపంచానికే అందిస్తున్నాం.

ఇప్పటి వరకు సాధించిన ప్రగతిలో విజ్ఞానశాస్త్రం పాత్ర ఎంతో కీలకమైనది. అమూల్యమైనది.

ఇందే విధంగా విజ్ఞాన శాస్త్రాన్ని ఉపయోగించుకుంటూ ఇంకా అభివృద్ధి చెందుతూ, మన దేశంలో ఉన్న సమస్యలన్నింటిని పారద్రోలుతూ, రాబోవు తరాలకు అభివృద్ధి చెందిన ఆత్మ నిర్భర భారత్ లోకి అహ్వానిస్తూ మన దేశస్థాయి ప్రపంచాగ్రాన నిలబెట్టాలి. ఇటీవల కాలంలో దేశం అన్ని రంగాలలో సాధించిన ఫలితాలే పునాదులుగా స్వయం పూర్వకంగా ఎదుగుతూ, స్వయం సమృద్ధి సాధించుకుంటూ స్థానిక ఉత్పత్తులను ఆరోగ్యకర వాతావరణంలో వినియోగిస్తూ ప్రపంచ వ్యాప్తం చేస్తూ స్వయం ఆధారిత, ఆత్మ నిర్భర భారతాన్ని నిర్మించుకోవలసిన ఆవశ్యకత ఉంది. ఈ బాధ్యత దేశ పౌరులుగా ప్రజలందరి మీద ఉంది. ముఖ్యంగా నేటి బాలలే రేపటి పౌరులు", "యువత దేశానికి వెన్నెముక

అంటారు" కాబట్టి ఆత్మ నిర్భర భారత నిర్మాణానికి విద్యార్థులే పునాదులు, మరి వారిని మంచి పౌరులుగా తయారు చేసేది ఉపాధ్యాయులు, సమాజంలో కేంద్రబిందువు వంటి వారు ఉపాధ్యాయులు.

"మొక్కై వంగనిది మ్రానై వంగునా" అంటారు. మొక్కల వంటి పిల్లలు ఉపాధ్యాయుల చేతుల్లోనే మ్రానులు వంటి పౌరులుగా మార్చబడతారు. పాఠశాలలే నవ భారత నిర్మాణ కేంద్రాలు. ఆత్మ నిర్భర భారత నిర్మాణానికి విజ్ఞాన శాస్త్రం దిక్సూచి వంటిది. శాస్త్రీయ వైఖరులు, నైపుణ్యాలు, శాస్త్రీయ దృక్పథం అలవరచుకున్న జీవన విధానాల వలన నైతిక విలువలతో కూడిన మంచి జీవనం కొనసాగించడం, జీవ వైవిద్యం కాపాడబడి ప్రకృతి సమతుల్యత జరగడం, సహజ వనరుల సరియైన వినియోగం జరిగి జాతీయాభివృద్ధి చెందడం జరుగుతుంది.

OBJECTIVES

1) విద్యార్థులలో శాస్త్రీయ దృక్పథాన్ని పెంపొందించడం.

2) నిత్య జీవితంలో విజ్ఞాన శాస్త్ర ప్రాముఖ్యతను తెల్పుతూ, విద్యార్థులలో నైతిక విలువలు పెంపొందిస్తూ సర్వతోముఖాభివృద్ధి చెందించడం.

3) విద్యార్థి స్థాయి నుండే పిల్లల్ని ఆత్మ నిర్భరులుగా, మంచి పౌరులుగా తీర్చిదిద్దడం.

4) మారుతున్న కాలానుగుణంగా వచ్చే మార్పులపై, దేశాభివృద్ధిలో విజ్ఞాన శాస్త్రం యొక్క ప్రభావంపై, విద్యార్థుల ద్వారా వివిధ కార్యక్రమాల ద్వారా వారి కుటుంబ సభ్యులకు తద్వారా సమాజానికి అవగాహన కల్పించి ఆత్మనిర్భర భారత నిర్మాణంలో సామాన్య ప్రజలను భాగస్వాములను చేయడం.

PRESENTATION

- ఉపాధ్యాయులు శాస్త్రీయ విజ్ఞానాన్ని అందివ్వడం ద్వారా విద్యార్థుల్ని ఆత్మనిర్భరులుగా, మంచి పౌరులుగా తీర్చిదిద్దడంతో పాటు, మంచి జీవనానికి, దేశాభివృద్ధికి అవసరమైన వివిధ అంశాల పట్ల చుట్టూ ఉన్న సామాన్య ప్రజలకు, విద్యార్థుల ద్వారా వారి కుటుంబ సభ్యులకు అవగాహన కల్పించి తద్వారా దేశాభివృద్ధికి ప్రత్యక్షంగానూ, పరోక్షంగానూ విశేష కృషి చేయవచ్చు అని ధృడంగా నమ్ముతాను, దానికనుగుణంగా తరగతి గదిలో, పాఠశాలలో సమాజంలో సైన్స్ టీచర్‌గా బాధ్యతతో నడుచుకుంటాను.
- "A sound mind in a sound body" ఏది సాధించాలన్నా మంచి ఆరోగ్యాన్ని కలిగి ఉండాలి. కాబట్టి మంచి ఆహార పద్ధతులు, పరిశుభ్రత, వ్యాయామం, యోగా, ధ్యానం, సమతులాహారం యొక్క ప్రాముఖ్యతను విద్యార్థులకు ప్రయోగ పూర్వకంగా, ప్రాజెక్టులు నిర్వహించడం ద్వారా వివరిస్తూ ప్రతి రోజూ అమలయ్యేలా పర్యవేక్షిస్తాను.
- శాస్త్ర వేత్తల కృషి ఫలితంగా కనుగొనబడి పుస్తకాలల్లో నిక్షిప్తమైన అమూల్య విజ్ఞానాన్ని, వివిధ పాఠ్యాంశాలను విద్యార్థులు పూర్తిగా అవగాహన చేసుకుని దానిని కేవలం ర్యాంకుల కోసమే కాకుండా నిత్యజీవితంలో వినియోగిస్తూ, చుట్టూ ఉన్న వారికి అవగాహన కల్గించడం వలన మెరుగైన జీవనం సాగిస్తూ, తాము అభివృద్ధి చెందుతూ సమాజాభివృద్ధిలో పాల్గనేటట్లుగా విద్యార్థుల్ని ప్రేరేపిస్తాను.
- ఆత్మ గౌరవం, ఆత్మవిశ్వాసం, మనోనిబ్బరం,

సమయస్ఫూర్తి, సృజనాత్మకత, వ్యక్తిగత సామర్థ్యాలు, నైతిక విలువల పెంపుదల, స్వతంత్ర్య భావాలు, నాయకత్వ లక్షణాలు, విజ్ఞాన సముపార్జనలో ఆసక్తి వంటి లక్షణాలు పాఠశాల స్థాయి నుండే ప్రతి విద్యార్థిలో పెంపొందేలా వివిధ శాస్త్రీయ కార్యక్రమాలు చేపడతాను.

- పంటల అధిక దిగుబడికి జీవసాంకేతిక శాస్త్ర ఉపయోగాలు. అధిక రసాయన ఎరువుల వినియోగపు చెడు ప్రభావాలు, సేంద్రియ ఎరువుల యొక్క ప్రాముఖ్యత, నేడు ఆహార పదార్థాలు విష పదార్థాలుగా మారుతున్న విధానాలు, కంపోస్ట్ పిట్ ఆవశ్యకత, ప్రతి ఇంటి ఆవరణలో, పాఠశాలలో కిచెన్‌గార్డెన్ ప్రాముఖ్యత, పశుసంవర్ధక పద్ధతులను విద్యార్థులకు కూలంకషంగా వివరిస్తూ వారికి, వారి ద్వారా తల్లిదండ్రులకు పూర్తి అవగాహన కల్పించవచ్చు. ఆ విధంగా సేంద్రియ వ్యవసాయాన్ని ప్రోత్సహిస్తూ, సామాన్య ప్రజల ఆరోగ్యాన్ని కాపాడుతూ, వారి ఆర్థికాభివృద్ధికి, స్వయం సమృద్ధికి ఒక సైన్స్ టీచర్‌గా ఉపయోగపడవచ్చు.
- వివిధ రకాల కాలుష్యాల వలన జరిగే దుష్పరిణామాలు, ఎకోఫ్రెండ్లీ కార్యకలాపాల ప్రాముఖ్యత, రాబోవు తరాలను రక్షించుకోవలసిన బాధ్యతలను వివరిస్తూ నీటి పొదుపు, విద్యుత్ పొదుపు, ప్లాస్టిక్ నిర్మూలన, కాలుష్యరహిత సాధనాల వినియోగం వంటి వివిధ అంశాలపైన విద్యార్థుల ద్వారా ప్రాజెక్ట్ వర్క్ నిర్వహిస్తాను.
- పునరుద్దరింపబడే, పునరుద్దరింపబడు వనరుల గూర్చి మంచి అవగాహన కల్పిస్తూ అమూల్య సహజ సంపదలను కాపాడుకుని వాటిని శాస్త్రీయ విధానంలో ఉపయోగించుకోవడం వలన ఆత్మనిర్భర భారత్‌ను అవలీలగా నిర్మించుకోవచ్చు. ఇతర దేశాలకు ఆదర్శంగా నిలవచ్చు అని వివరిస్తూ విద్యార్థులను సామాన్య ప్రజలను దేశాభివృద్ధిలో భాగస్వాములను చేయవచ్చు.
- పాఠశాల మరియు ఇంటి ఆవరణలో ఉన్నటువంటి వివిధ ఔషధమొక్కల ప్రాముఖ్యత మన పూర్వపు తరాల వారు వివిధ మొక్కలను ఔషధాలుగా ఉపయోగించుకునే విధానాలు, మంచి ఆరోగ్యం కోసం సంప్రదాయ శాస్త్రీయ పద్ధతుల పట్ల విద్యార్థులకి, వారి కుటుంబ సభ్యులకి ప్రాజెక్ట్ వర్కుల ద్వారా అవగాహన కల్పిస్తాను.
- పాఠశాల ఆవరణలోనే ఉన్నటువంటి ఉత్తరేణి, నమిలినార మొక్కల పత్రాలను, బెరడును చర్మ ఎలర్జీలకు, జేష్ఠ వంటి చేతి వేళ్ళ ఎలర్జీలకు ఉపయోగించుకుని సమస్యలను పాఠశాలలోనే పరిష్కరించుకునే శాస్త్రీయ నైపుణ్యాలను విద్యార్థులలో పెంపొందింపజేయవచ్చు.
- బాలికలు, స్త్రీలలో ఓపిక, ఆత్మ విశ్వాసం, లోతుగా ఆలోచించడం, పరిస్థితుల్ని అంచనా వేయడం, సమయస్ఫూర్తి ఎక్కువగా ఉంటాయి. కాబట్టి ఆత్మ నిర్భర భారత నిర్మాణానికి ఆధారాలైన ఎకానమి, ఇన్‌ఫ్రాస్ట్రక్చర్, సిస్టమ్, డెమోగ్రఫీ, డిమాండ్ మరియు ఇతర రంగాల అభివృద్ధికి కూడా స్త్రీలు కృషి చేసేటట్లు ప్రోత్సహించాలి. కాబట్టి పాఠశాల స్థాయిలో బాలికలకు ఉన్న అవకాశాలు, బాల్య వివాహాల శారీరక మానసిక దుష్పరిణామాల శాస్త్రీయ వివరణ, డ్రాప్ అవుట్‌ల వలన నష్టాలపై అవగాహనలను స్కిట్, రోల్ ప్లే లు వారి చేత నిర్వహించడం ద్వారా తెలియజేస్తాను.

- "మొబైల్ ఫోన్, ఇంటర్‌నెట్ చెడు వినియోగం వలన జరిగే శారీరక, మానసిక నష్టాలు", "కౌమార దశ మార్పులు – సవాళ్ళు" "క్లీన్‌లినెస్, హెల్త్ అండ్ హైజిన్" వంటి విషయాలపై సైన్స్ స్కిట్స్, సైన్స్ డ్రామాలు వివిధ స్థాయిల్లో విద్యార్థుల ద్వారా ప్రదర్శింపజేసి బహుమతులు గెలవడమే గాక వాటి పట్ల విద్యార్థులకు అవగాహన కల్పిస్తాను.
- విద్యార్థులందరికి వివిధ సైన్స్ ఫేర్ లలో పార్టిసిపేట్ చేయించడం ద్వారా వారిలో శాస్త్రీయ ఆలోచనలు కల్గిస్తాను.
- అనేక రకాల ప్రజలలో ఇంకా మూఢనమ్మకాలు వెళ్ళూనుకుని ఉన్నాయి. వారు వీటి బారిన పడి శారీరకంగా, మానసికంగా, ఆర్థికంగా ఎంతో నష్ట పోతున్నారు. వారి పిల్లల భావి జీవితాల్ని వమ్ము చేస్తున్నారు. చాప క్రింద నీరులా ప్రవహిస్తూ దేశాభివృద్ధికి అడ్డుపడుతున్న మూఢాచారాలను కూకటి వేళ్ళతో సహా పెకిలించి వేయాలి. కాబట్టి చిన్నతనం నుండే విద్యార్థులకి బాణామతి, అంజనాలు వేయడం, పూనకాలు మొదలైనవి మనోవ్యాధి రుగ్మతలనీ, దొంగ బాబాలు వారి మంత్రాలు భూటకమనీ, విద్యార్థులలో, ప్రజలల్లో హేతుబద్ధ శాస్త్రీయ ఆలోచనలు రేకెత్తించడానికి వివిధ సైన్స్ ఎక్స్‌పెరిమెంట్స్ ద్వారా దొంగ బాబాలు చేసే మ్యాజిక్కుల ప్రదర్శనలు, వివిధ సాంస్కృతిక కార్యక్రమాలు పాఠశాల ఆవరణలో నిర్వహిస్తాను.
- కోవిడ్-19 వలన సంభవించిన వివిధ మార్పులను గుణపాఠాలుగా నేర్చుకుని ప్రతి ఒక్కరు సూక్ష్మజీవ వ్యాప్తి, హైజిన్ పట్ల అప్రమత్తంగా ఉంటూ మానవాళి మనుగడను నిరాటంకంగా కొనసాగించడానికి తమ వంతు కర్తవ్యాన్ని నిర్వహించాలని అవగాహన కార్యక్రమాలు చేపడతాను.
- సహజ శానిటైజర్‌లుగా పసుపు, వేప, నిమ్మ పత్రాలను ఉపయోగించుకునే విధానాలను ప్రయోగ పూర్వకంగా తెలియజేయడం ద్వారా విద్యార్థులలో శాస్త్రీయ నైపుణ్యాలు పెంపొందిస్తాను.
- వివిధ పండుగల నిర్వహణలో ఉన్న సైన్స్ దాని ఉపయోగం, వినాయక చవితి, హోళి వంటి పండుగలలో సహజ రంగులు ఉపయోగ ఆవశ్యకత, మొక్కల ద్వారా వాటి తయారీ వంటి అంశాల పట్ల విద్యార్థులకి, చుట్టూ ఉన్న ప్రజలకి అవగాహన కల్పించడం జరుగుతుంది.
- ప్రత్యక్ష అనుభవాలతో కూడిన బోధన విద్యార్థుల నిరంతర వృద్ధికి దోహదం చేస్తుంది. కాబట్టి సైన్స్‌లో ఏ అంశమైనా ప్రయోగం, ప్రాజెక్టు, ఫీల్డ్ వర్క్, మోడల్ మేకింగ్ ఆక్టివిటి, క్వశ్చనీయర్, హెర్బేరియమ్స్, పరిశీలన వంటి ఏదో ఒక రూపంలో బోధించడం జరుగుతుంది.
- చదువు కేవలం ఉద్యోగం సంపాదించే మార్గంగా మాత్రమే గాక విజ్ఞానాన్ని పెంచుకుని, వివిధ సమస్యలకి తామే పరిష్కార మార్గాలు కనిపెట్టేలా పాఠశాల స్థాయి నుండే పిల్లలలో శాస్త్రీయ ఆలోచనలు రేకెత్తించి భవిష్యత్తులో శాస్త్రవేత్తలుగా ఎదిగేటట్లుగా సైన్స్ అవేర్‌నెస్ ప్రోగ్రామ్స్ నిర్వహించడం జరుగుతుంది.
- సైన్స్ డే, వాటర్ డే, ఎయిడ్స్ డే, వంటి వివిధ దినోత్సవాలల్లో విద్యార్థులకు, గ్రామ ప్రజలకు అవగాహన కల్గేలా ర్యాలీలు, వివిధ కార్యక్రమాలు చేపట్టడం జరుగుతుంది.
- ఉపాధ్యాయులు నిరంతర పరిశోధక విద్యార్థులు

కాబట్టి కాలానుగుణ మార్పులపై అప్రమత్తతకు వివిధ అంశాల పట్ల విద్యార్థులకు, సామాన్య ప్రజలకు అవగాహన కల్పించవచ్చు.

- ఆత్మనిర్భర భారత్‌కై ప్రధాని మోదీ చేపట్టిన వివిధ చేపట్టిన వివిధ పథకాల పట్ల విద్యార్థులకు అవగాహన కల్పించి వారిని ఆత్మనిర్భరులుగా దేశాభివృద్ధిలో పాలుపంచుకునేలా మార్గ నిర్దేశనం చేయవచ్చు.
- విద్యార్థుల ద్వారా గ్రామ ప్రజలకు అవగాహన కల్పిస్తూ చేపల, కోళ్ళ, పశువుల పెంపకం మరియు వివిధ కుటీర పరిశ్రమలను గ్రామాలల్లో అభివృద్ధి చెందించడానికి, జీవ సాంకేతిక శాస్త్రాన్ని ఉపయోగించుకోవడానికి సైన్స్ టీచర్స్ సహాయ పడవచ్చు.

ఫలితము (Out comes)

- విద్యార్థులలో శాస్త్రీయ నైపుణ్యాలు, వైఖరులు, శాస్త్రీయ దృక్పథం అభివృద్ధి చెందాయి.
- విద్యార్థులు, కుటుంబ సభ్యులు మూఢాచారాలకు దూరంగా ఉంటూ, హేతు బద్దమైన ఆలోచనను అభివృద్ధి చేసుకుంటున్నారు.
- విద్యార్థుల తల్లిదండ్రులు సేంద్రియ వ్యవసాయ పద్ధతులను, అధిక పాల ఉత్పత్తి పశు సంవర్ధక విధానాలను, కూరగాయ మొక్కల పెంపకంను చేపడుతూ స్వయం సమృద్ధిని సాధిస్తున్నారు.
- ఎకో ఫ్రెండ్లీ విధానాలను అనుసరిస్తున్నారు.
- విద్యార్థులు వివిధ పాఠ్యాంశాలను నిత్య జీవితానికి అన్వయించుకుంటూ వారి కుటుంబ సభ్యులకు అవగాహన కల్పిస్తున్నారు. తద్వారా మంచి విలువలు కలిగిన పౌరులుగా ఎదుగుతూ ఆత్మ నిర్భర భారత నిర్మాణానికి తమ వంతు పాత్ర పోషిస్తూ, కుటుంబ సభ్యులను భాగస్వాములు చేస్తున్నారు.
- విజ్ఞాన శాస్త్రాన్ని, జీవ సాంకేతిక శాస్త్రాన్ని అనేక రంగాలల్లో ఉపయోగించడం ద్వారా పురోభివృద్ధి చెందుతూ ఆత్మ నిర్భర భారతాన్ని నిర్మించుకోవచ్చు.

సూచనలు (Implications)

- విజ్ఞాన శాస్త్రాన్ని కొన్ని సమూహాలకే కాకుండా ప్రతి ఒక్క విద్యార్థి నేర్చుకునేటట్లుగా ప్రోత్సహించాలి.
- ఉపాధ్యాయులు ఆత్మన్యూనతతో ఉన్న విద్యార్థులకు ఆత్మస్థైర్యాన్ని ఇచ్చి వారికి కనీస పరిజ్ఞానాన్ని అందిస్తూ ఇతర రంగాలల్లో వారి అభివృద్ధికి ప్రోత్సహించాలి.
- సైన్స్ విద్యావ్యాప్తికి సంబంధించిన వివిధ స్వచ్ఛంద సంస్థల కృషిని గుర్తించి వారికి ఆధారంగా నిలవాలి.
- ఉపాధ్యాయుడు నిత్య విద్యార్థి, కాలానుగుణ శాస్త్రీయ మార్పులను తెలుసుకోగలరు. కాబట్టి తమ పరిధిలో వివిధ వర్కర్స్, చిరు వీధి వ్యాపారులు, సామాజిక ప్రజలకు అవగాహన కల్పించాలి.
- రైతులు నష్టాల్లో ఉన్నపుడు వారికి అవగాహన కల్పించాలి.
- ఉపాధ్యాయులు దీక్ష వంటి వివిధ రకాల విద్యా యాప్ లను ప్రయోగ పూర్వక బోధనకు ఉపయోగిస్తూ డిజిటల్, ఆన్‌లైన్ విద్యావ్యాప్తికి, క్యూఆర్ – కోడెడ్ టెక్ట్ బుక్స్ ల పూర్తి మియోగానికి కృషి చేయాలి. తద్వారా "One Nation One Digital Platform" ని విజయవంతం చేయాలి.

- ప్రయోగ పూర్వక శాస్త్రీయ పరిజ్ఞాన వ్యాప్తికి కేటాయించబడిన టివి చానల్స్ ని ఉపయోగిస్తూ విద్యార్థులకి అవగాహన కల్పిస్తూ " One Class - One Channel" ని విజయవంతం చేయాలి.
- విద్యార్థుల తల్లిదండ్రులకు ఎక్కువ భారం కానటువంటి రేడియోలను విజ్ఞాన సముపార్జనకు వారు ఉపయోగించుకునేలా ప్రోత్సహించాలి.
- వినికిడి, దృష్టి లోపాలు ఉన్నటువంటి విద్యార్థులకు బోధించే సైన్స్ ఉపాధ్యాయులు ప్రత్యేక ఎలక్ట్రానిక్ మీడియాను పూర్తిగా మియోగిస్తూ వారిలో శాస్త్రీయ వైఖరులు పెంపొందింపజేయడానికి కృషి చేయాలి.
- ప్రతి సైన్స్ టీచర్ అన్ని రకాల వైయుక్తిక బేధాలు గల విద్యార్థినీ, విద్యార్థులందరికీ ప్రత్యక్ష అనుభవాలనందిస్తూ బోధించి, శాస్త్రీయ దృక్పథం పెంపొందించి తద్వారా ఆత్మనిర్భర భారత నిర్మాణంలో పాలుపంచుకునే మంచి విలువలు గల రేపటి పౌరులను తీర్చిదిద్దాలి.
- ప్రయోగ పూర్వక బోధనకు అవసరమైన వివిధ సైన్స్ ఎక్విప్‌మెంట్ ని ప్రభుత్వం ప్రతి పాఠశాలకు అందించాలి.
- ప్రభుత్వం శాస్త్రవేత్తల కృషికి తోడ్పాటునందిస్తూ నిరంతర పరిశోధనలకు ప్రోత్సహించాలి.

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అధ్యయన శీర్షిక :-

విద్యార్థులలో విజ్ఞాన శాస్త్రం పట్ల ఆసక్తిని పెంపొందించి, తరగతి గదిలోపల మరియు బయట జ్ఞాన సముపార్జన జరిగేల చేసి తద్వార వారు స్వయం శక్తితో (ఆత్మ నిర్భర భారత్) ఎదిగి, దేశాభివృద్ధిలో పాటుపడేలా చేయడం.

ఉపోద్ఘాతం :-

(ఆత్మనిర్భర భారత్) - ముఖ్య ఉద్దేశము

* ఆత్మనిర్భర భారత్ నినాదమును 12 మే, 2020 నాడు ప్రధానమంత్రి శ్రీ నరేంద్రమోడి గారు ప్రకటించాడు.
* ఈ కార్యకమము ముందుకు నడిపించేందుకు 20 లక్షల కోట్లు కేటాయించడం జరిగింది.
* భారతదేశము స్వయం సంవృద్ధి, స్వావలంబన, నిరంతర అభివృద్ధి మానవ వనరుల ఉపయోగం, విద్యార్థులు, యువతలో ఆత్మస్థైర్యము పెంపొందిస్తు - భారత దేశమును ఆత్మ నిర్భర భారతదేశముగా రూపొందిస్తూ, ప్రపంచ దేశాలకు దీటుగా, శాస్త్ర సాంకేతిక రంగాలలో అభివృద్ధి సాధిస్తూ, ప్రపంచ దేశాలకు మార్గదర్శకత్యము వహించుట.

ఆత్మనిర్భర భారత్ - మూల స్థంభాలు

1. Economy - ఆర్థిక వ్యవస్థను అభివృద్ధి చేయడం.
2. Infrastructure- అవస్థాపన సౌకర్యాలు కల్పించడం
3. System Devlopmewnt - దేశంలో రాజకీయ, సాంఘీక, ఆర్థిక, సామాజిక వ్యవస్థలకు బలపరుచట.
4. Vibrant Demography - శాస్త్రీయంగా జనాభాను అధ్యయనం చేయడం.
5. Demond and Supply - డిమాండ్‌కు అనుగుణంగా సప్లయ్‌ను పెంచుతూ ధరల స్థీరికరణ.

పై మూల స్థంబాలతో పాటు విద్యావ్యవస్థలో మార్పు తెచ్చి ఆత్మనిర్భర్ భారత్ కలను సాకారం చేసుకోనే లక్ష్యంను విద్యార్థులలో తీసుకురావలి.

లక్ష్యాలు :-

1. కృత్యాధార విదానంలో బోధనను విద్యార్థులకు తప్పనిసరి విదానుగా మారేలా చేయాలి.
2. సైన్సు బోధనలో అమూర్త భావనలోని అంశాలను విద్యార్థుల మనసులలో

సహేతుకమైన ఆలోచనలను పెంపొందించే విధంగా చేయడం.

3. పాఠ్యాంశములో ప్రతిభావనను నిత్యజీవితంలో విద్యార్థులు అన్వయించుకునేలా బోధనను కొనసాగించడం.

4. తరగతి గది లోపల విద్యార్థులకే కాకుండా బయట వారియొక్క తల్లిదండ్రులకు, యువకులకు - గ్రామస్థులకు శాస్త్రజ్ఞానం పట్ల అభిరుచిని పెంపొందించి వారిని స్వశక్తితో పైకి ఎదిగేలా ప్రోత్సహించడం.

5. సైన్సును నేర్చుకోవడం, నేర్పడం అనే ప్రతి సందర్భంలో Process మరియు Product అనే సూత్రాన్ని అమలుచేయాలి.

6. సమస్య పరిష్కారనైపుణ్యాన్ని విద్యార్థులు రెగ్యులర్‌గా, విధిగా అలవాటు చేసుకొనే విధంగా కృత్యాధార బోధనను గుణాత్మకంగా అందించాలి.

అధ్యయనం యొక్క రూపకల్పన :-

* విజ్ఞానశాస్త్ర బోధన ప్రక్రియలో భాగంగా విద్యార్థులలో విజ్ఞాన శాస్త్రాల పట్ల ఆసక్తిని పెంపొందిచాడంతో పాఠశాలలోని విద్యార్థులకు Activity Based విద్యను భోదించడం.

* నంద్రాయక విజ్ఞానశాస్త్ర బొధనకు కొనసాగిస్తునే, నిజజీవితంలో విద్యార్థులు Self Reliant గా మారి బోధన కృత్యాలను సమ్మిళితం చేశాను.

* విద్యార్థులలో ఆసక్తిని రేపడంతో పాటు, ఆత్మ నిర్భర భారత్ వైపు తీసుకెల్లడెంను ఒక లక్ష్యంగా నిర్ధారించుకున్నాను.

* దీని కోసం విద్యార్థులకు కృత్యాధార బోధన, తయారీ రంగం, ఎకనామి, ప్రాజెక్ట్ వర్క్‌లు, వర్క్‌షాప్స్, క్షేత్ర పర్యటనలు, ఇన్‌ఫ్రాస్ట్రక్చర్, శాస్త్రవేత్తల ఇంటర్‌వ్యూలు, మొ॥న అంశాలను బోధనలో ఖచ్చితంగా ఉండేలా చేశాను.

* విద్యార్థులు, తల్లిదండ్రులలో మూఢనమ్మకాలపై ఉన్న భావనలను దూరం చేసి, జ్ఞాన సముపార్జన జరిగేలా చూడాలని నిర్ధారించుకున్నాను.

* తల్లిదండ్రులు, యువకులు, గ్రామస్థుల వద్దకు స్వయంగా వెళ్ళి వారికి ఆత్మనిర్భర భారత్, బడిబయట ఎదుర్కొనే సమస్యలకు, విద్యార్థుల వాస్తవ స్థితిని అధ్యయనం చేసి, స్వశక్తితో వారు Vertical గా ఎదిగేలా చేయాలని లక్ష్యంగా పెట్టుకున్నాను.

* గొప్ప గొప్ప శాస్త్రవేత్తల మరియు దేశనాయకుల జీవిత చరిత్రలకు సంబంధించిన పుస్తకాలను ఇంటివద్ద విద్యార్థులు చదివేలా ఒక ప్రణాళిక రూపొందించుకున్నాను.

Title of the Topic :

ఆత్మనిర్భర భారత్ : తరగతి గది లోపల మరియు బయట ఉపాధ్యాయుల పాత్ర.

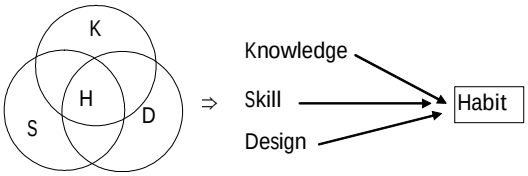
1. ఆత్మనిర్భర భారత్ అనగా స్వశక్తితో పైకి ఎదిగి దేశీయంగా ఉత్పత్తులను పెంచి ప్రపంచంలో మన దేశంను అగ్రస్థానంలో నిలపడం.

2. ఆత్మనిర్భర భారత్ వైపు విద్యార్థులను మళ్ళించేలా చేసే కృత్యాధార బోధనను మెరుగుపర్చడం.

3. విద్యార్థులలో శాస్త్రీయ ఆలోచన అలవాటుగా మారాలంటే Stephen. R. Kove

నూచించినట్లుగా, జ్ఞానాన్ని పొందుట, నైపుణ్యాలను అభివృద్ధి చేసుకొనుటతో పాటు వాటిని సాధించవలెననే బలమైన కోరిక ఉండవలెను.

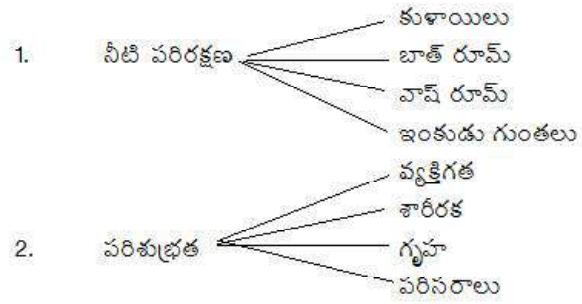
4. దీని కోసం టీచర్ పాఠ్యాంశానికి సంబంధించిన అదనపు సమాచారాన్ని ఇవ్వడం, తద్వారా వారిలో నైపుణ్యాలను పెంపొందిచే విధంగా కృత్యాలను చేయడంతో బలమైన కోరికను కలిగి ఉండవలెను. ఇది ఒక అలవాటుగా మారేలా చూడాలి.



5. నిరంతరం సమస్యలను సాధించే విధంగా ప్రాజెక్టులను ఇవ్వడం, Group Discussions చేయించడం, పరిష్కార మార్గాలను కనుగొనే విధముగా ప్రోత్సహించాలి.

6. కేవలం Class Room బోధననే కాకుండా, సమాజానికి ఉపయోగపడే, Self Reliant వంటి ఇంటి కృత్యాలను మరియు Project లను ఇవ్వాలి.

ఉదా :



7. పై అంశాలలో వనరుల సంరక్షణ చేయడం బాధ్యతగాను వైఖరిలో మార్పు వచ్చేవిధంగా, రేపటి భవిష్యత్ తరాలకు ఆర్థికవనరులను ఇస్తే సరిపోదు, ప్రకృతి వనరులను అందించినప్పుడే పౌరునిగా తన భాద్యత నెరవేరినట్లవుతుందని గ్రహించే విధంగా చేయాలి.

8. విద్యార్థులలో శాస్త్రీయ విలువలు, శాస్త్రీయ దృక్పదం పెంపొందించాలంటే తల్లిదండ్రులు అశాస్త్రీయంగా ఉంటే ఇది జరగదు. కావున తరచుగా తల్లిదండ్రులకు ఆరోగ్యం, పరిశుభ్రత, వనరుల సంరక్షణ, గృహ, సామాజిక సమస్యల పట్ల అవగాహన కలిగించే విధంగా వారిని పాఠశాలకు ఆహ్వానించి వివిధ కృత్యాల ద్వారా అవగాహన కల్గించినట్లయితే తద్వారా వారిలో వచ్చే మార్పు ద్వారా విద్యార్థులలో సులభంగా శాస్త్రీయ దృక్పథాన్ని పెంపొందించవచ్చు.

10. ఆధునిక కాలంలో శాస్త్రవేత్తల సంఖ్య క్రమంగా తగ్గిపోవడానికి కారణము ముఖ్యంగా విద్యార్థులలో సాధించాలనే

తపన, పట్టుదల నిబద్ధత లేకపోవడం. ఈ విద్యార్థులలో శాస్త్రజ్ఞానంను పెంపొందించి సాంకేతిక రంగంలోకి వీరిని పంపితే మన దేశం ఆత్మనిర్భర్ భారత్‌గా మారి స్వయం సమృద్ధి చెందుతుంది.

11. కేంద్ర, రాష్ట్ర ప్రభుత్వాలు కూడా బడ్జెట్‌లో సరైన విధులు Technologyకి కెటాయించక పోవడం, వలన యూనివర్సిటిలలో రిసర్చ్ ఫెల్లోస్ సంఖ్యక్రమంగా తగ్గిపోతుంది.

12. ప్రభుత్వాలు సరైన ప్రోత్సాహం అందిస్తే విద్యార్థులు కూడా సాంకేతిక రంగంవైపు పరుగులు పెడుతారు తద్వారా మనం అనుకున్న Self Reliant Indian ను చూడవచ్చును.

13. ప్రస్తుత కాలంలో తల్లిదండ్రులు పిల్లలను ఉద్యోగములో స్థిరవడే చదువులను చదివిస్తున్నారు తప్ప శాస్త్ర సాంకేతిక రంగాలవైపు మళ్ళించడం లేదు. ఉపాధ్యాయులుగా మనం తల్లిదండ్రులలో కౌన్సిలింగ్ ఇచ్చి మార్పు తేవాలి. ఉదా॥ గొప్పవ్యక్తులను, శాస్త్రవేత్తలను పరిచయం చేయాలి. వారి జీవిత చరిత్రలను చదివేలాచేయాలి.

14. మనదేశం Self Reliant గా మారాలంటే ప్రభుత్వాలు.

- విద్యారంగంపై ఎక్కువ పెట్టుబడులు పెట్టేలా.
- పాఠశాల స్థాయిలో సరైన Laboratory లను నెలకొల్పడం.
- జిల్లా స్థాయిలో, Division స్థాయిలో Science Centres ను Develop చేయడం.
- విద్యార్థులకు సరైన ప్రోత్సాహకాలు Ex: Scholorships అందించడం.
- ఉపాధ్యాయులకు సాంకేతిక శిక్షణను అందించడం చేయాలని నేను భావిస్తున్నాను.
- విద్యార్థులను తరచుగా Workshops, Factories, వ్యవసాయక్షేత్రలను సందర్శించేలా క్షేత్ర పర్యటనలను ఒక భాగముగా చేయాలి.

15. ఆధునిక కాలంలో కేంద్ర, రాష్ట్ర ప్రభుత్వాలు దీర్ఘకాలిక దృష్టితో ఆలోచించి, స్వార్థ ప్రయోజానాలను ప్రక్కన పెడితే మనం, మన విద్యావ్యవస్థను ఆత్మ నిర్భర్ భారత్ వైపునకు తీసికెళ్ళవచ్చును.

16. నేను నా పాఠశాలలో ఆత్మనిర్భర్ భారత్‌ను సాధించుటకు ఈ క్రింది విషయాలను అమలు చేయాలని అనుకుంటున్నారు.

ఎ) వున్తకాలలో లేని నూతన కృత్యాలపై విద్యార్థులను పరిశోధన చేసే విధంగా ప్రోత్సహించాలి.

బి) మూఢ నమ్మకాలపై అపోహలను తొలగించుటకు

విద్యార్థులు మరియు తల్లిదండ్రులలో అవగాహన కల్పించడం.

సి) స్థానికంగా ఉన్న Science Centres, Laboratory లను విద్యార్థుల సందర్శించేలా చేయాలి.

డి) అందుబాటులో ఉన్న శాస్త్రవేత్తలను పాఠశాలకు ఆహ్వానించి వారితో విద్యార్థులను మమేకం అమ్యేల చేయాలి.

ఇ) పాఠశాల స్థాయిలోనే పిల్లలను Technology వైపు మళ్లించేలా సరైన బోధనను చేయడం.

17. ప్రస్తుత కాలంలో మూఢనమ్మకాలు, సైన్సును ఎదుగకుండా చేస్తున్నాయి. మూఢనమ్మకాలపై పోరాటం చేస్తూ వీటిని సమాజం నుంచి తరిమివేయాలి. అప్పుడే నిజమైన సైన్సు ఫలాలు అందరికి అందుతాయి.

18. ఈ మధ్య చిత్తూరు జిల్లా, మదన పల్లెలో జరిగిన సంఘటన మూఢనమ్మకాలు సమాజంలో ఎలా నాటుకు పోయాయో అర్థం అవుతుంది. తల్లిదండ్రుల ఇద్దరు విద్యావంతులై ఉండి తమ ఇద్దరి పిల్లలను మూఢనమ్మకాలకు బలి చేశారు.

19. ప్రస్తుతం మనదేశం Covid టీకాను ఇతర దేశాలకు సరాఫరా చేస్తుంది మరియు రక్షణరంగ పరికారలను అభివృద్ధి చేసే Techology ని సాధించింది. ఇది అత్మనిర్భర్ భారత్ ద్వారా India సాధించిన ఒక గొప్ప విజయం.

CONCLUSION :

1 కృత్యాధార బోధన / Activity Based వల్ల విద్యార్థులను ఉపాధ్యాయుడు Self Reliant గా మార్చవచ్చును.

2. పుస్తకాలలో లేని, సమాజానికి ఉపయోగపడే కృత్యాలను Project Work గా ఇవ్వాలి.

3. స్థానికంగా ఉన్న Laboratory లు, Workshops, Factory లను విద్యార్థులు సందర్శించడం ద్వారా మన లక్ష్యాన్ని మనం చేరుకోవచ్చును.

4. ఒక ఉపాధ్యాయునిగా మనం తరగతి గది బయట అనగా గ్రామ పంచాయతి వద్ద, కూడళ్ళలో, పిల్లల తల్లిదండ్రులకు మూఢనమ్మకాలకు దూరంగా ఉండండి, సైన్సును ఆదరించండి, అని వారికి చెప్పడం ద్వారా విద్యార్థులు, ఆత్మ నిర్భర్‌గా మారుతారని మనం కోరుకొవాలి.

5. ఉపాధ్యాయులు ప్రతిరోజు బడిముగిసిన తర్వాత కనీసం ఒక వీరియడ్ 'జీవన నైపుణ్యాలు' మరియు టెక్నాలజికి సంబంధించిన విషయాలను బోధిస్తే విద్యార్థులలో ఆత్మస్థైర్యము పెరుగుతుంది.

6. విద్యార్థులు, ఉపాధ్యాయులు సైన్సును నేర్పడం, నేర్చుకోవడం ఒక అలవాటుగా మార్చుకోవాలి.

7. జన విజ్ఞాన వేదిక, ప్రజాసైన్స్ వేదిక, శాస్త్రజ్ఞులను పాఠశాలకు రప్పించి Science Activities ను వారితో చేయించి, Science ప్రాముఖ్యలను అందరు గుర్తెరిగేలా చేయడం వల్ల మనం కలలు గన్న , ఆత్మ నిర్భర్ భారత్‌ను చేరుకోవచ్చును.

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