RAYAPATI VENKATA RANGA RAO COLLEGE OF EDUCATION

GUNTUR - 522006.

ACHARYA NAGARJUNA UNIVERSITY

B.Ed COURSE : SEMESTER - I

ACADEMIC YEAR : 2021 - 2023

S I P - Course V : PEDAGOGY - II

subject :

Practicum : Activities / Project / Record

Name : S. Kajal Class No. M1

Group : Mathematics & Physical Regd. No. Y22ED03009

CERTIFICATE

This is to Certify that Mr./Mrs/Kum. SAHU. KAJAL

Class No. M1 Regd No. 192ED03009 of R.V.R.R. College of Education visited our institution and conducted the required activities / collected the required data regarding to Pedagogy of physical Sciences practicum as a part of B.Ed. Course work stipulated by the Government of Andhra Pradesh and approved by Acharya Nagarjuna University.

Signature of the Concerned Teacher

Name :

Signature of the Head of the Institution:

Name :

Seal :

This is to Certify that Mr./Mrs/Kum. SAHU. Kajal

Class No. M1 Regd No. 192ED03009 has completed the required activities regarding to Pedagogy of physical Sciences practicum towards the fulfillment of B.Ed. Course work stipulated by the Government of Andhra Pradesh and approved by Acharya Nagarjuna University.

This record is assessed.

Lecturer in-charge
R.V.R.R. College of Education
Guntur.

DECLARATION

I hereby declare that the Practicum / Project / Activity / Record work of Pedagogy of physical Sciences was done by me and the work is genuine.

Place : Guntur

Date :

S. Kajal

Signature of the Student-Teacher

Name : SAHU. KAJAL

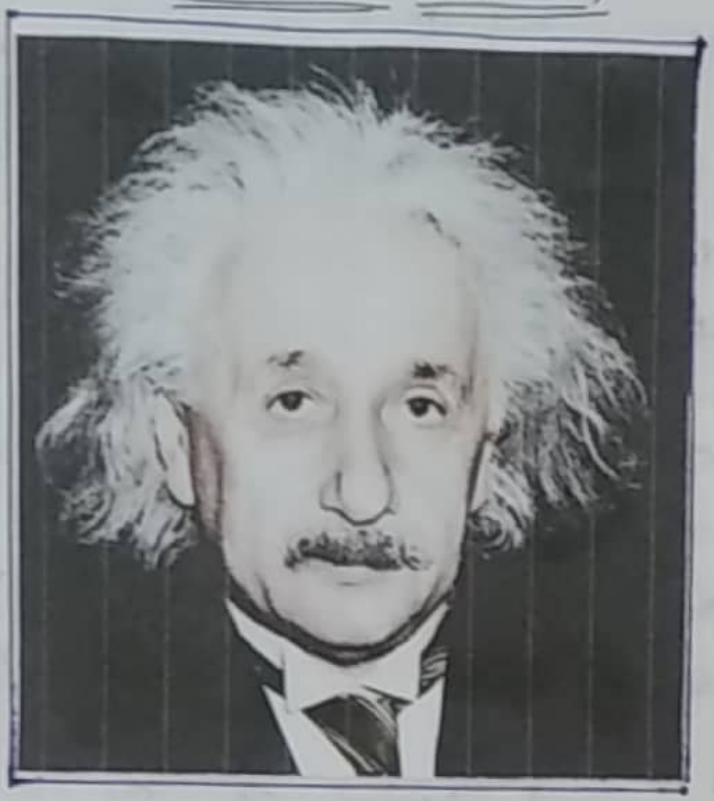
Regd. No. Y22ED03009

INDEX

Activity-1

Prepare Biographical Sketch of Scientists and his/her Contributions to Physics/Chemistry

Albert Einstein



History:

Albert Einstein was born on march 14, 1879 in Ulm, Germany. His parent moved from Ulm to Munich at his early childhood. After that they moved to milan, Italy in 1894. Einstein joined in Zurich polytechnic in 1896 and graduated as a Secondary School teacher of Mathematics and physics. Later he joined at Swiss patent office in Berlin. the patent office work required Einstein's careful attention. While employed in patent

office (1902-09), Einstein completed a range of publications in theoretical physics. Einstein wrote the papers in his leisure time, without any close contact with scientific literature or any scientist. Einstein submitted one of his scientific papers to the university of Zurich to obtain Ph.D, degree in 1905. In 1908, he sent second paper to the university of Bern and became the lecturer. The next year he received regular appointment as an associate professor of physics at University of Zurich. Till 1933, he worked as professor at university of Berlin from 1933 to till dealth (April 18, 1955) he held an analogus research position at Institute for Advanced study in Princeton, N.j.

After IInd world war, in association with Dr. Chaim weizmann, Einstein established Hebrew university of Jerusalem for relaxation music played a vital part in his life.

Contributions:

* Quantum theory of light:

Albert Einstein Quantum theory of light proposed that light is composed of

Small packets of energy called photons that have wave-like properties. In the energy, he also explained the emission of electron from some metal is struck by lightning- this was called the photo electric effect. This theory later lead to the invention of the tv, the mobile, which give technologists a vision to return up with a modern-day screen device (Smart phones, Computer, Laptops)

*$E=mc^2$:

He: Demonstrated the link between mass and energy that lead to Nuclear energy today.

*Brownian Movement:

This might far and away be the simplest einstein discoveries, where his observation of the zigzag movement of particles in suspension. It helps to prove the existence of atom and molecule and we all know how fundamental his discoveries to almost every branch of science today.

*The Special Theory of Relativity:

Albert Einstein theory helped to explain that time, and motion are relative to their observation as long as the speed of light remains constant and natural laws are the same throughout the universe.

*General Theory of Relativity:

Albert Einstein proposed that gravity is a curved field in the space-time continuous created by the existence of mass.

*Manhattan Project:

Albert Einstein created the Manhattan Project research supported by the U.S, which lead to the development of the atom bomb in 1945. However, during the second world war, this atom bomb was dropped in Japan (Hiroshima and Nagasaki). Einstein was known to be campaigning for a ban on nuclear weapons.

*Albert Einstein Refrigerator:

this may be one of the least known inventions that einstein is famous for today. Einstein developed a refrigerator design that used ammonia, water and

butane are required almost no energy to figure. Considering the energy demands of the planet, companies may realize the importance of cooling and refrigerator without energy and develop this idea further within the near future.

*The Sky is Blue:

Though this seems to be a simple explanation, Einstein help put this argument to the rest of the world.

In Conclusion, Einstein popular phrase "the Important thing is to not to stop questioning" reflected his never-ending questioning attitudes and curiosity. This attitude earn him a Nobel prize. He published quite 300 Scientific papers alongside over 150 non-Scientific works.

Einstein intellectual achievements and originality have made the word "Einstein synonymous with genius".

*His writings:

1. Special Theory of Relativity (1920)
2. Relativity (1920, 1950)
3. General Theory of Relativity (1916)
4. Investigation on Theory of Brownian movements (1926)
5. The evolution of physics (1938)

*Conclusion:

Albert Einstein received honorary doctorate degrees in science, medicine and philosophy from many European and American universities. During the 1920's he lectured in Europe, America and the far East and he was awarded fellowships or memberships of all the leading scientific academics throughout the world. He gained numerous awards in recognition of his work, the Copley medal of Royal Society of London in 1925, and the Franklin Medal of Franklin Institute in 1935.

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Activity-2

Prepare an assignment on any physical sciences and its application and implications with other branches of knowledge

Light:

Light is electromagnetic radiation within the portion of the electromagnetic spectrum that is perceived by the human eye. visible light is usually defined as having wavelengths in the range of 400-700 nanometers(nm), corresponding to frequencies of 750-420 tetrahertz, between the Infrared (with longer wavelengths) and the ultraviolet (with shorter wavelengths).

In physics, the term "light" may refer more broadly to electromagnetic radiation of any wavelength, whether visible or not. In this sense, gamma rays, x-rays, microwaves and radio waves are also light. The primary properties of light are intensity, Propagation direction, frequency or wavelength Spectrum and polarization.

It's speed in a vaccum, 299792458 metres a second (m/s), is one of the fundamental constants of nature. Like all types of electromagnetic radiation, visible light Propagates by massless elementary particles called photons that represents the quanta of electromagnetic field, and can be analyzed as both waves and particles. The study of light known as optics, is an important research area in modern physics.

the main source of light on earth is the Sun. Historically, another important source of light for humans has been fire, from ancient campfires to modern kerosene lamps. With the development of electric lights and power systems, electric lighting has effectively replaced fire light.

* Properties of Light:

⇒ Light travels in a straight line.

⇒ The speed of light is faster than sound. Light travels at a speed 3×10^8 m/s.

Reflection of Light:

Reflection is the phenomenon in which light travelling in one medium, incident on the surface of another medium returns to the first medium, obeying the laws of Reflection.

According to the laws of Reflection

1. The Incident ray, the reflected ray and normal to the surface at the point of Incidence all lie in the same plane.
2. The angle of Incidence is equal to the angle of Reflection

Refraction of light:

Refraction is a phenomenon in which there is a change in the speed of light as it travels from one medium to another and

there is a bending of the ray of light.

Dispersion of light:

-the Splitting of a ray of white light into its Constituent Colours is called dispersion.

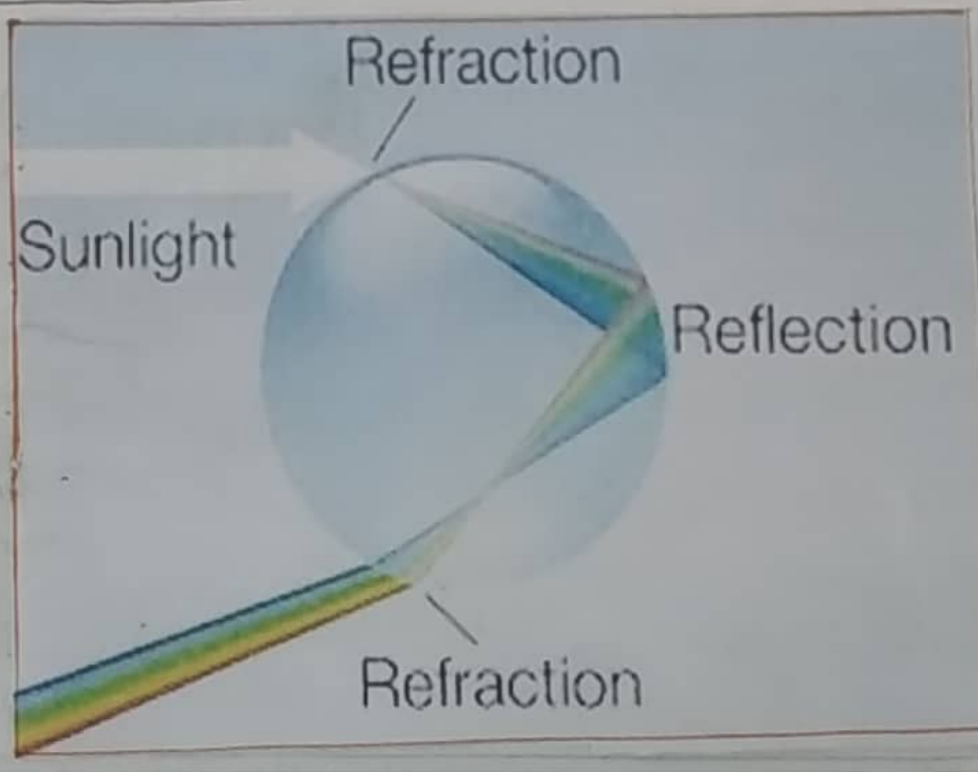
Diffraction of light:

The phenomenon of bending of light around Corners of Small obstacles and hence its encroachment into the region of geometrical Shadow is called Diffraction.

Interference of light:

The phenomena of multiple light waves interfering with one another under certain Circumstances, Causing the Combined amplitudes of the waves to either increase or decrease.

* Application of light (Reflection):



1.) meters like ammeters and voltmetres use a mirror to avoid parallax error. the reading is taken from a position such that the image of the pointer is directly under the pointer.

2.) The wing and Rear-view mirrors of a car are made of a convex and a plane mirror respectively. The wing mirrors enable the driver to see objects on both sides of the car. The rear-view mirror enables the driver to see things behind the car.

3.) A microscope uses a mirror to reflect light to the specimen under the microscope.

4.) An astronomical reflecting telescope uses a large parabolic mirror to gather dim light from distant stars. A plane mirror is used to reflect the image to the eye piece.

5.) Parabolic mirrors are used in torches and car headlamps as reflectors. A small lamp is placed at the focus point of the mirror to produce parallel rays.

6.) Concave mirrors with long focal length can be used as shaving mirrors as they form magnified and upright images.

7.) Concave mirrors are used by dentist to examine the teeth of a patient. the Concave

mirror forms a magnified image of the teeth.

8.) A Convex mirror has a wider view than a plane mirror. Therefore, Convex mirrors are used as driving mirrors and as shop Security mirrors.

9.) Convex Mirrors are also used as blind Corner mirrors on the road to help drivers view traffic around sharp Corners.

10.) An overhead Projector uses a Concave mirror to reflect light from the object to the Screen.

*Usage of light with Environment:

• Atmospheric observation by Laser beam:

A technology called light Detection and Ranging emits a laser beam into the atmosphere and utilizes photo sensors to detect material such as Suspended matter and atmospheric molecules from the returning and Scattering light to in this way measure Clouds, particles in the atmosphere, and the State of the Surface of the earth LIDAR is utilized in field including meteorology, geology, Seismology, atmospheric research and remote sensing.

*Usage of light with Medical field:

• Early detection of Cancer:

Cancer cells take in larger quantity of glucose as compared to normal cells, presence of Cancer is checked by injecting medicine with characteristics resembling glucose into the body and analyzing PET image of the accumulated glucose-like medicine.

* Usage of light with Industry:
⇒ Capturing flames
⇒ Investing the interior of objects without destruction.
⇒ Oil field investigation
⇒ Manufacturing, Inspecting & cutting SemiConductor ctors wafers
⇒ Eliminating electrostatic charges
⇒ Cleaning object surfaces
⇒ Lasers essential for product manufacturing.

* Usage of light with Academic Research:
⇒ Capturing the higgs boson
⇒ Exploring an asteroid
⇒ Capturing neutrinos.

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Activity-3

List out different Content aspects of a unit in physics/chemistry and write down the objectives and Specifications under Cognitive Domain associated with them

* Content Aspects of "Fun with Magnets".

⇒ Discovery of Magnets
⇒ Types of Magnets
⇒ Magnetic and Non-magnetic Materials
⇒ Finding materials attracted by Magnets
⇒ Properties of Magnets
⇒ Poles of a Bar magnet
⇒ Attraction and Repulsion between two magnets
⇒ finding directions with a bar magnet
⇒ Making Magnet
⇒ Make your own magnetic Compass
⇒ Magnetic Induction
⇒ finding out whether the given object is a magnet or not.
⇒ Do magnets lose their properties? when?
⇒ Usage of Magnets

Instructional objectives and Specifications under Cognitive Domain for the lesson "Properties of Magnets".

objective-1: knowledge

The pupil acquires knowledge of physical terms, facts, concepts, principles, formulae etc in Properties of Magnets.

Specification: The pupil

a) Recalls:

Physical terms: Attraction, Repulsion, like, Unlike, Poles, Directional, Magnetic, Non Magnetic.

Definition: Magnetic, Non-Magnetic, Attractional, Directional, Repulsion.

Symbols: N, S.

Concepts:

* Magnetic Material:
The materials that are attracted by magnets are called magnetic materials.

* Non-Magnetic Material:
The materials that are not attracted by magnets are called Non-Magnetic materials.

* Attraction:
Unlike Poles of a magnet attract each other. This property is called attraction.

* Repulsion:
like poles of a magnet repel each other. This property is called repulsion.

* Directional:
Magnets always comes to rest in the North South direction. In each case the marked end points towards north. This end is known as North pole of the Magnet. The other end,

which points towards the South is known as South pole of the Magnet. This property of Magnet is called directional property.

Process: processes of attractive and directional properties.

b) Recognizes:

The pupil Recognizes the above physical terms, definitions, Concepts, Symbols and processes.

objective-2: Understanding

The pupil understands the knowledge, terms, Concepts, definitions, Symbols in the lesson "Properties of Magnets".

Specifications: The pupil

a) Explains:

Explains the above Concepts in their own words

b) Translates:

Translates the Symbols to verbal form and vice versa.

Ex:- N - North
S - South

c) Gives examples (or) Illustrates:

Gives examples for Magnetic and Non-magnetic Materials.

d) Gives Differences:

Gives differences for attractive and directive Properties.

Gives differences for Magnetic and Non-Magnetic materials.

e) Detect errors and rectifies:

Eg: like poles attract each other.

The pupil detects the error and rectifies as "Like poles repel each other."

f) Interprets:

Interprets the above experimental processes.

g) Sees relationship (or) Identifies the relationships:

The pupil sees (or) Identifies the relationship between attraction between corner of the magnet and centre point of the magnet.

h) Verifies:

The pupil verifies the above Concepts and Processes.

Objective - 3: Application

The pupil applies his knowledge and understanding in the new and unfamiliar Situations.

Specifications: The pupil

i) Analyze:

Analyzes the above Concepts, processes.

ii) formulates:

formulates the hypothesis for the lesson 'Properties of Magnets'.

iii) Predicts:

Predicts different situations in the lesson 'properties of magnets'.

iv) Tests / Proves:

Tests (or) proves the hypothesis and Prediction.

v) Gives reasons:

Gives reasons for different phenomenon of the lesson 'Properties of Magnets'.

vi) Locates:

Locates the principles or concepts in daily life.

Ex:- The pupil locates the attractive property.

vii) Conclusions:

Draws Conclusions for the lesson 'Properties with magnets'.

viii) Generalizes:

Generalizes the above Concepts of the lesson 'Properties of Magnets'.

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Activity-4

Identify Concrete and Abstract Concepts in Physics and Chemistry of any class and Suggest the appropriate Teaching methods and approaches to teach them and report

Teaching Methods:

A method is a device/tool/implement with which one can perform his own work successfully and satisfactorily.

"A standard procedure in the presentation of instructional material and the content of activities, for example, the Herbartain Method, the Morrison method, etc." - Good C.V.

"A Rational ordering and balancing in the light of knowledge and purpose, of the several elements that enter into the educational process, the nature of the pupil, the materials of instruction, and the total learning situation." - Good C.V.

Approach:

Approach is used in the broader sense. It means a way of thinking and working in a set direction so as to accomplish certain goals.

Method:

It is related to the whole procedure or overall plan about teaching. It includes orderly arrangement of Ideas and topics.

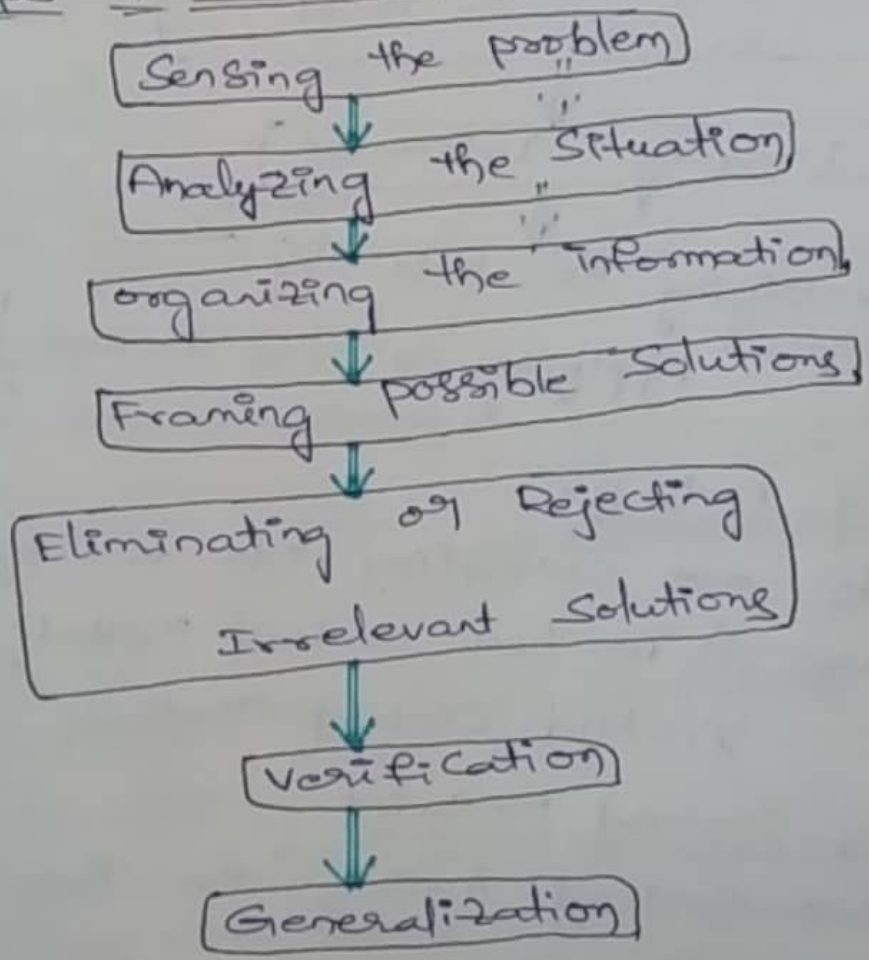
Teaching Science through problem solving is a method to present the subject. It requires systematic procedure.

Technique:

These are the tricks or the special attempts made to solve incidental problems that arise in the course of teaching while following a particular method.

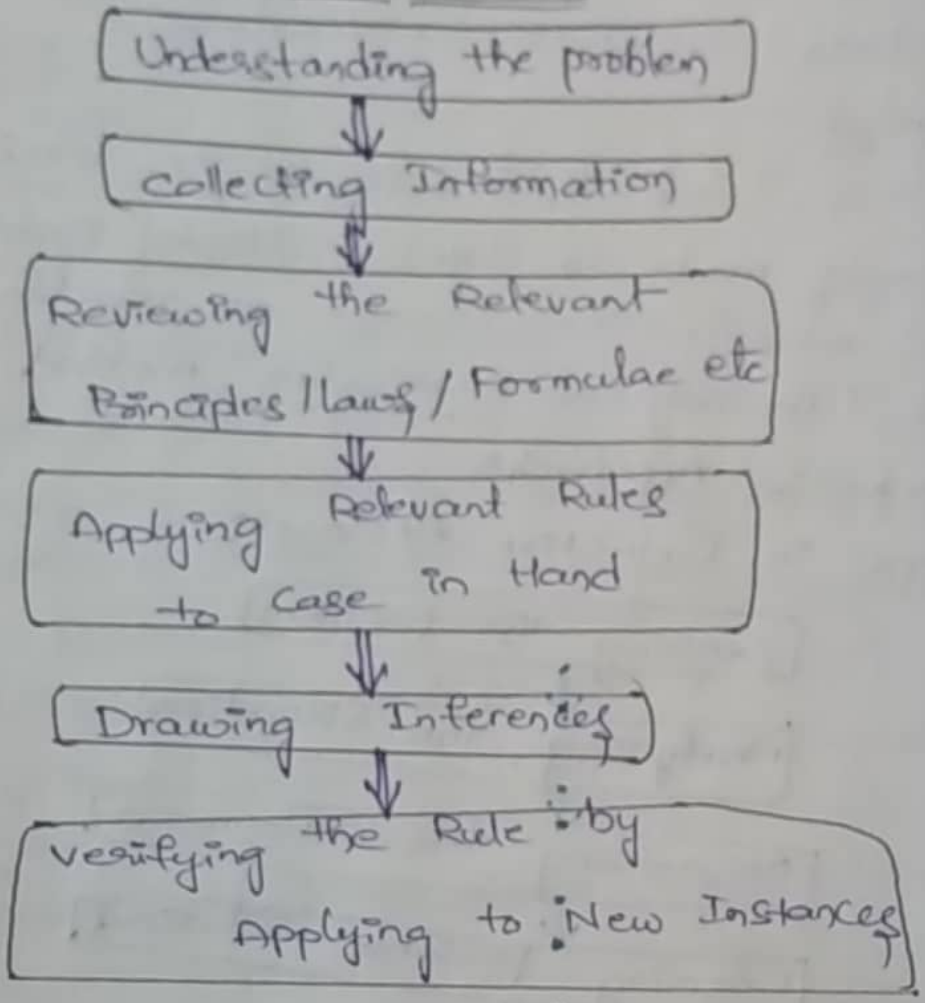
*Inductive Approach:

Steps in Inductive Approach:



*Deductive Approach:

Steps in Deductive Approach:



*Types of Methods:

Methods are classified into two types. They are i) Teacher centred Methods
ii) Child centred Methods.

i) Teacher Centred Methods:

Teacher centred methods are three types. They are

1) Lecture method
2) lecture cum Demonstration method.
3) Historical method.

ii) Child/pupil centred Methods:
Child/pupil Centred methods are four types. They are
1) Heuristic method
2) Project method
3) Laboratory method
4) Scientific (or) problem solving method.

X^th class:

Unit-I:
Unit Name: Heat
Topic Name:
i) Temperature and Kinetic Energy (Lecture method)
ii) Specific Heat (Lecture cum Demonstration method)

Unit-II:
Unit Name: Acids, Bases and Salts
Topic Name:
i) Reaction of Acids and Bases with Metals (Lecture cum Demonstration method)
ii) PH Scale (Lecture cum Demonstration method)

Unit-III:

Unit-Name: Refraction of light at plane Surfaces.

Topic Name:

i) Total Internal Reflection (Heuristic Method)

ii) Refraction (Lecture method)

Unit-IV:

Unit-Name: Refraction of light at curved Surfaces.

Topic Name:

i) Image formation (Lecture method)

ii) Types of lenses (Lecture cum Demonstration method)

Unit-V:

Unit-Name: Human Eye and Colourful World

Topic-Name:

i) Structure of human eye (lecture cum Demonstration method)

ii) Dispersion and Scattering (lecture method) of light

Unit-VI:

Unit-Name: Structure of Atom

Topic Name:

i) Electromagnetic Spectrum (Lecture method)

ii) Quantum numbers (Lecture method)

Unit - VII :

Unit - Name : Classification of Elements- The periodic table.

Topic Name :

i) Mendeleev's periodic Table (Lecture cum Demonstration method)

Unit - VIII :

Unit - Name : Chemical Bonding

Topic Name:

i) Formation of Ionic Bond (Lecture method)

Unit - IX :

Unit - Name : Electric current

Topic - Name:

i) Electric current (Lecture method)

ii) ohm's law (Lecture cum Demonstration method)

*Conclusion:

From the above observations it seems to be Lecture cum demonstration method is the appropriate method for most of the topic it has the following Advantages:

1. Psychological Method:
It is a psychological method as it proceeds from the Concrete to the abstract.

2. Economical:
It is an economical method when the apparatus are not sufficient for the students to do practicals individually, the teacher may perform the experiment for the whole class.

3. Time-Saving:
It is a time-saving method compared to heuristic and project method, it saves much time.

4. Activity-Method:
Students are engaged in various activities like observing, taking notes, answering questions, drawing etc.

5. Useful to all Students:
This method is suitable to all types of students i.e., average, below average and above average students.

6. Promotes Discussion:
This method helps to promote useful and relevant discussion in the classroom.

7. Safe Method:
If the experiments are dangerous, or if the apparatus are costly, this method is considered as safe.

8. Develops skills:
This method can be used to impart manual and manipulative skills to the students.

9. Brings together theory and practice:
It aids in bringing about a relationship between theory and practicals.

10. Fosters thinking:
It fosters good thinking in groups and individuals.

11. Quick Method:
Quick revision of some principle or project is possible by this method.

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Activity-5

Identify the most abstract concepts (different topics) from any class physical science textbook suggest ways and means to make it easy to understand and concrete

Class: IX th class

Unit-I:

Unit-Name: Motion

Concept: Distance and Displacement

I will make it easy to understand this concept by conducting small experiments with the children in the classroom.

Unit-II:

Unit-Name: Laws of Motion

Concept: Newton's third law of Motion

I will make it easy and interesting to understand this concept by giving so many daily life examples to the students.

Unit-III:

Unit-Name: Is Matter Pure?

Concept: Types of Solutions

I will make it easy and effective to understand this concept by Conducting simple experiments in the classroom by students

Unit-III :

Unit-Name : Atoms and Molecules

Concept : What is an Ion?

I will make it easy to comprehend by giving so many examples to the Students and doing Activities.

Unit-IV :

Unit-Name : What is Inside the Atom?

Concept : Thomson's model of the Atom

I will make this concept easy to understand to the children by bringing a watermelon into the classroom and showing the seeds and pulp to make this concept clear.

Unit-VI :

Unit-Name : Chemical Reactions And Equations

Concept : Types of chemical Reactions

I will make this concept easy and Interesting in understanding by conducting group discussion among student by making groups.

Unit - VII :

Unit - Name : Reflection of light at curved Surfaces

Concept : Ray diagrams for Concave Mirror

I will make it easy to understand this concept by using charts and then doing and Conducting experiments by the Students using Concave Mirrors.

Unit - VIII :

Unit - Name : Gravitation

Concept : Locating Centre of Gravity

I will make it easy to understand this Concept by conducting experiments.

Unit - IX :

Unit - Name : floating Bodies

Concept : Archimedes principle

I will make it easy to understand by Conducting experiments and giving examples.

Unit - X :

Unit - Name : Sound

Concept : Reflection of Sound

I will make it easy to understand by taking Students to different places as field trips like museums.