Science Method B.ed

Sem-1

Unit-1.

1.1explain meaning and definition of science.

Human daily life touchs knowedge is called science.

1.Science is a discipline or a from of knowledge.

2.Science has a body of knowledge or content

3.Science has processes which are used in searching new concepts.

4.Science is an interactive force with society.

5.Science has its own values and ethics.

Science & the Scientific Method: A Definition

By Alina Bradford, Live Science Contributor | March 30, 2015 07:49pm ET

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Science is a systematic and logical approach to discovering how things in the universe work. It is also the body of knowledge accumulated through the discoveries about all the things in the universe.

The word "science" is derived from the Latin word *scientia*, which is knowledge based on demonstrable and reproducible data, according to the Merriam-Webster Dictionary. True to this definition, science aims for measurable results through testing and analysis. Science is based on fact, not opinion or preferences. The process of science is designed to challenge ideas through research. One important aspect of the scientific process is that it is focuses only on the natural world, according to the University of California. Anything that is considered supernatural does not fit into the definition of science.

The scientific method

When conducting research, scientists use the scientific method to collect measurable, empirical evidence in an experiment related to a hypothesis (often in the form of an if/then statement), the results aiming to support or contradict a theory.

A scientific theory is a specific type of theory used in the scientific method. The term "theory" can mean something different, depending on whom you ask.

"The way that scientists use the word 'theory' is a little different than how it is commonly used in the lay public," said Jaime Tanner, a professor of biology at Marlboro College. "Most people use the word 'theory' to mean an idea or hunch that someone has, but in science the word 'theory' refers to the way that we interpret facts."

The process of becoming a scientific theory

Every scientific theory starts as a hypothesis. According to the Merriam-Webster Dictionary, a hypothesis is an idea that hasn't been proven yet. If enough evidence accumulates to support a hypothesis, it moves to the next step — known as a theory — in the scientific method and becomes accepted as a valid explanation of a phenomenon.

Tanner further explained that a scientific theory is the framework for observations and facts. Theories may change, or the way that they are interpreted may change, but the facts themselves don't change. Tanner likens theories to a basket in which scientists keep facts and observations that they find. The shape of that basket may change as the scientists learn more and include more facts. "For example, we have ample evidence of traits in populations becoming more or less common over time (evolution), so evolution is a fact but the overarching theories about evolution, the way that we think all of the facts go together might change as new observations of evolution are made," Tanner told Live Science.

Theory basics

The University of California, Berkley defines a theory as "a broad, natural explanation for a wide range of phenomena. Theories are concise, coherent, systematic, predictive, and broadly applicable, often integrating and generalizing many hypotheses."

Any scientific theory must be based on a careful and rational examination of the facts. Facts and theories are two different things. In the scientific method, there is a clear distinction between facts, which can be observed and/or measured, and theories, which are scientists' explanations and interpretations of the facts.

An important part of scientific theory includes statements that have observational consequences. A good theory, like Newton's theory of gravity, has unity, which means it consists of a limited number of problem-solving strategies that can be applied to a wide range of scientific

circumstances. Another feature of a good theory is that it formed from a number of hypotheses that can be tested independently.

1.2.give the importance of science with reference to human being's life.

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Jorje Velar's statement say as go to time so saplimatry prove is in science education as developments proceed.

=That time is science time and Human life is related this time.

=The science education is necessary for the human life.

=The without science education is impossible human life on the earth.

=The without sciences knowledge is all knowledge is uneasiness.

=The science is connect human life.

=The human life is impossible without science.

=The science is connect of the humans life intercourse.

=This technology is necessary the science education.

=The science is not knowledge but knowledge from specific knowledge .

=The humans intercourse has every application to have which reason is responsible. So the Science is understanding us.

=You have gas all science instrument is closed like them Train, dispensary ,any vehicle, computer, phone, electricity, so which our condition ? that thoughts is make human's mind uneasiness.

=To day humans life is comfortable because science technology.

=The science technology use every fileds.

=The mordent human life I avoided to science technology so humans life is original human life is then more miserable condition.

= The science technology is more useful and importance humans life.

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-the physical and human's instrument make to morden

-with science knowedge man is less idle.

1.3.give the skills of science teachers

1.Education

THE VISION OF SCIENCE EDUCATION DESCRIBED BY THE STANDARDS REQUIRES CHANGES THROUGHOUT THE ENTIRE SYSTEM. The educational system must act to sustain effective teaching. The routines, rewards, structures, and expectations of the system must endorse the vision of science teaching portrayed by the *Standards*. Teachers must be provided with resources, time, and opportunities to make change as described in the program and system standards. They must work within a framework that encourages their efforts.

The changes required in the educational system to support quality science teaching are major ones. Each component of the system will change at a different pace, and most changes will be incremental. Nonetheless, changes in teaching must begin before all of the systemic problems are solved.

WHAT STUDENTS LEARN IS GREATLY INFLUENCED BY HOW THEY ARE TAUGHT. The decisions about content and activities that teachers make, their interactions with students, the selection of assessments, the habits of mind that teacher

Teachers must have theoretical and practical knowledge and abilities about science, learning, and science teaching.

demonstrate and nurture among their students, and the attitudes conveyed wittingly and unwittingly all affect the knowledge, understanding, abilities, and attitudes that students develop.

[See Professional Development Standard A]

THE ACTIONS OF TEACHERS ARE DEEPLY INFLUENCED BY THEIR PERCEPTIONS OF SCIENCE AS AN ENTERPRISE AND AS A SUBJECT TO BE TAUGHT AND LEARNED. All teachers of science have implicit and explicit beliefs about science, learning, and teaching. Teachers can be effective guides for students learning science only if they have the opportunity to examine their own

beliefs, as well as to develop an understanding of the tenets on which the *Standards* are based.

1.they have science graduate and he take science method in bed course with traing.

2.he has interest in science subject.he has deeply knowldge in science.he has fresh to his knowledge and make to update.he is activated and study and practically.and he has clearly science definition.

2.opucatin

1.the science teacher has interested,know education method and

1.4.describe the contribution of in science

Dr.vikramsarabhai,

Born: August 12, 1919
Died: December 31,1971
Achievements: Considered the Father of the Indian space program; instrumental in establishing the Physical Research Laboratory (PRL) in Ahmedabad in November 1947; was Chairman of the Atomic Energy Commission. He along with other Ahmedabad-based industrialists played a major role in the creation of the Indian Institute of Management, Ahmedabad.

Vikram Sarabhai was one of the greatest scientists of India. He is considered as the Father of the Indian space program. Apart from being a scientist, he was a rare combination of an innovator, industrialist and visionary.

Vikram Ambalal Sarabhai was born on August 12, 1919 at Ahmedabad in an affluent family of progressive industrialists. He was one of eight children of Ambalal and Sarla Devi. He had his early education in a private school, “Retreat” run by his parents on Montessori lines. Some of the great men of India such as Gurudev Rabindranath, J. Krishna Murthi, Motilal Nehru, V. S. Shrinivasa Shastri, Jawaharlal Nehru, Sarojini Naidu, Maulana Azad, C. F. Andrews, C. V. Raman et al. used to stay with the Sarabhai family when they visited Ahmedabad. Mahatma Gandhi also once stayed at their house while recovering from an illness. Visits by such great men greatly influenced Vikram Sarabhai.

After his matriculation, Vikram Sarabhai proceeded to Cambridge for his college education and took the tripos in Natural Sciences from St. John's college in 1940. When World War II began, he returned home and joined as a research scholar under Sir C. V. Raman at the Indian Institute of Science, Bangalore His interest in solar physics and cosmic ray led him to set up many observation stations around the country. He built the necessary equipment with

which he took measurements at Bangalore, Poona and the Himalayas. He returned to Cambridge in 1945 and completed his Ph.D in 1947.

Vikram Sarabhai was instrumental in establishing the Physical Research Laboratory (PRL) in Ahmedabad in November 1947. The laboratory was established in a few rooms in M.G. Science Institute of the Ahmedabad Education Society, which was founded by his parents. Subsequently, it got support from the Council of Scientific and Industrial Research (CSIR) and the Department of Atomic Energy.

Vikram Sarabhai did research on the time variations of cosmic rays and concluded that meteorological effects could not entirely affect the observed daily variations of cosmic rays; further, the residual variations were wide and global and these were related to variations in solar activity. Vikram Sarabhai visualized a new field of research opening up in solar and interplanetary Physics.

The year 1957-1958 was designated as International Geo-physical year (IGY). The Indian program for the IGY had been one of the most significant ventures of Sarabhai. It exposed him to the new vistas of space science with the launching in 1957 of Sputnik-I. Subsequently, the Indian National Committee for Space Research was created, of which Vikram Sarabhai became Chairman.

With active support from Homi Bhabha, Vikram Sarabhai, set up the first Rocket Launching station (TERLS) in the country at Thumba near Thiruvananthapuram on the Arabian Coast, as Thumba is very close to the Equator. The first rocket with sodium vapour payload was launched on November 21, 1963. In 1965, the UN General Assembly gave recognition to TERLS as an international facility.

After the sudden death of Homi Bhabha in an air crash, Vikram Sarabhai was appointed Chairman, Atomic Energy Commission in May 1966. He wanted the practical application of science to reach the common man. He decided to acquire competence in advance technology for the solution of country's problems based on technical and economic evaluation of its real resources. He initiated India's space programme, which today is renowned all over the world.

Dr. Vikram Sarabhai was awarded with Shanti Swarup Bhatnagar Medal in 1962 and Padma Bhushan in 1966. Vikram Sarabhai passed away in his sleep on December 31,1971.

Dr.albart einstein.

Albert Einstein was born at Ulm, in Württemberg, Germany, on March 14, 1879. Six weeks later the family moved to Munich, where he later on began his schooling at the Luitpold Gymnasium. Later, they moved to Italy and Albert continued his education at Aarau, Switzerland and in 1896 he entered the Swiss Federal Polytechnic School in Zurich to be trained as a teacher in physics and mathematics. In 1901, the year he gained his diploma, he acquired Swiss citizenship and, as he was unable to find a teaching post, he accepted a position as technical assistant in the Swiss Patent Office. In 1905 he obtained his doctor's degree.

During his stay at the Patent Office, and in his spare time, he produced much of his remarkable work and in 1908 he was appointed Privatdozent in Berne. In 1909 he became Professor Extraordinary at Zurich, in 1911 Professor of Theoretical Physics at Prague, returning to Zurich in the following year to fill a similar post. In 1914 he was appointed Director of the Kaiser Wilhelm Physical Institute and Professor in the University of Berlin. He became a German citizen in 1914 and remained in Berlin until 1933 when he renounced his citizenship for political reasons and emigrated to America to take the position of Professor of Theoretical Physics at

Princeton*. He became a United States citizen in 1940 and retired from his post in 1945.

After World War II, Einstein was a leading figure in the World Government Movement, he was offered the Presidency of the State of Israel, which he declined, and he collaborated with Dr. Chaim Weizmann in establishing the Hebrew University of Jerusalem.

Einstein always appeared to have a clear view of the problems of physics and the determination to solve them. He had a strategy of his own and was able to visualize the main stages on the way to his goal. He regarded his major achievements as mere stepping-stones for the next advance.

At the start of his scientific work, Einstein realized the inadequacies of Newtonian mechanics and his special theory of relativity stemmed from an attempt to reconcile the laws of mechanics with the laws of the electromagnetic field. He dealt with classical problems of statistical mechanics and problems in which they were merged with quantum theory: this led to an explanation of the Brownian movement of molecules. He investigated the thermal properties of light with a low radiation density and his observations laid the foundation of the photon theory of light.

In his early days in Berlin, Einstein postulated that the correct interpretation of the special theory of relativity must also furnish a theory of gravitation and in 1916 he published his paper on the general theory of relativity. During this time he also contributed to the problems of the theory of radiation and statistical mechanics.

In the 1920's, Einstein embarked on the construction of unified field theories, although he continued to work on the probabilistic interpretation of quantum theory, and he persevered with this work in America. He contributed to statistical mechanics by his development of the quantum theory of a monatomic gas and he has also accomplished valuable work in connection with atomic transition probabilities and relativistic cosmology.

After his retirement he continued to work towards the unification of the basic concepts of physics, taking the opposite approach, geometrisation, to the majority of physicists.

Einstein's researches are, of course, well chronicled and his more important works include *Special Theory of Relativity* (1905), *Relativity* (English translations, 1920 and 1950), *General Theory of Relativity* (1916), *Investigations on Theory of Brownian Movement* (1926), and *The Evolution of Physics* (1938). Among his non-scientific works, *About Zionism* (1930), *Why War?* (1933), *My Philosophy*(1934), and *Out of My Later Years* (1950) are perhaps the most important.

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 academies throughout the world. He gained numerous awards in recognition of his work, including the Copley Medal of the Royal Society of London in 1925, and the Franklin Medal of the Franklin Institute in 1935.

Einstein's gifts inevitably resulted in his dwelling much in intellectual solitude and, for relaxation, music played an important part in his life. He married Mileva Maric in 1903 and they had a daughter and two sons; their marriage was dissolved in 1919 and in the same year he married his cousin, Elsa Löwenthal, who died in 1936. He died on April 18, 1955 at Princeton, New Jersey.

From **Nobel Lectures**, *Physics 1901-1921*, Elsevier Publishing Company, Amsterdam, 1967

This autobiography/biography was written at the time of the award and first published in the book series **Les Prix Nobel**. It was later edited and republished in **Nobel Lectures**. To cite this document, always state the source as shown above.

* Albert Einstein was formally associated with the Institute for Advanced Study located in Princeton, New Jersey.

Jagadish Chandra Bose

Sir Jagadish Chandra Bose is one of the most prominent first Indian scientists who proved by experimentation that both animals and plants share much in common. He demonstrated that plants are also sensitive to heat, cold, light, noise and various other external stimuli. Bose contrived a very sophisticated instrument called Crescograph which could record and observe the minute responses because of external stimulants. It was capable of magnifying the motion of plant tissues to about 10,000 times of their actual size, which found many similarities between plants and other living organisms.

Contributions and Early Life:

The central hall of the Royal Society in London was jam-packed with famous scientists on May 10, 1901. Everyone seemed to be curious to know how Bose's experiment will demonstrate that plants have feelings like other living beings and humans. Bose chose a plant whose mots were cautiously dipped up to its stem in a vessel holding the bromide solution. The salts of hydrobromic acid are considered a poison. He plugged in the instrument with the plant and viewed the lighted spot on a screen showing the movements of the plant, as its pulse beat, and the spot began to and fro movement similar to a pendulum. Within minutes, the spot vibrated in a violent manner and finally came to an abrupt stop. The whole thing was almost like a poisoned rat fighting against death. The plant had died due to the exposure to the poisonous bromide solution.

The event was greeted with much appreciation, however some physiologists were not content, and considered Bose as an intruder. They harshly knocked the experiment but Bose did not give up and was quite confident about his findings.

Using the Crescograph, he further researched the response of the plants to fertilizers, light rays and wireless waves. The instrument received widespread acclaim, particularly from the Path Congress of Science in 1900. Many physiologists also supported his findings later on, using more advanced instruments.

Jagadish Chandra Bose was born on 30 November, 1858 at Mymensingh, now in Bangladesh. He was raised in a home committed to pure Indian traditions and culture. He got his elementary education from a vernacular school, because his father thought that Bose should learn his own mother tongue, Bengali, before studying a foreign language like English. Bose attended Cambridge after studying physics at Calcutta University. He returned to India in 1884 after completing a B.Sc. degree from Cambridge University.

Later Life and Death:

Bose authored two illustrious books; 'Response in the Living and Non-living' (1902) and 'The Nervous Mechanism of Plants' (1926). He also extensively researched the behaviour of radiowaves. Mostly known as a plant physiologist, he was actually a physicist. Bose devised another instrument called 'Coherer', for detecting the radiowaves.

Prior to his death in 1937, Bose set up the Bose Institute at Calcutta. He was elected the Fellow of the Royal Society in 1920 for his amazing contributions and achievements.

Jagdish Chandra Bose Biography

image: http://www.iloveindia.com/indian-heroes/pics/j-c-bose.jpg

Born: November 30, 1858
Died: November 23, 1937
Achievements: He was the first to prove that plants too have feelings. He invented wireless telegraphy a year before Marconi patented his invention.

Jagdish Chandra Bose was an eminent Indian scientist. He was the first to prove that plants and metals too have feelings.

Jagdish Chandra Bose was born on November 30, 1858 in Mymensingh (now in Bangladesh). His father Bhagabanchandra Bose was a Deputy Magistrate. Jagadish Chandra Bose had his early education in village school in Bengal medium. In 1869, Jagadish Chandra Bose was sent to Calcutta to learn English and was educated at St.Xavier's School and College. He was a brilliant student. He passed the B.A. in physical sciences in 1879.

In 1880, Jagdishchandra Bose went to England. He studied medicine at London University, England, for a year but gave it up because of his own ill health. Within a year he moved to Cambridge to take up a scholarship to study Natural Science at Christ's College Cambridge. In 1885, he returned from abroad with a B.Sc. degree and Natural Science Tripos (a special course of study at Cambridge).

After his return Jagadish Chandra Bose, was offered lectureship at Presidency College, Calcutta on a salary half that of his English colleagues. He accepted the job but refused to draw his salary in protest. After three years the college ultimately conceded his demand and Jagdish Chandra Bose was paid full salary from the date he joined the college. As a teacher Jagdish Chandra Bose was very popular and engaged the interest of his students by making extensive use of scientific demonstrations. Many of his students at the Presidency College were destined to become famous in their own right. These included

Satyendra Nath Bose and Meghnad Saha.

In 1894, Jagadish Chandra Bose decided to devote himself to pure research. He converted a small enclosure adjoining a bathroom in the Presidency College into a laboratory. He carried out experiments involving refraction, diffraction and polarization. It would not be wrong to call him as the inventor of wireless telegraphy. In 1895, a year before Guglielmo Marconi patented this invention, he had demonstrated its functioning in public.

Jagdish Chandra Bose later switched from physics to the study of metals and then plants. He fabricated a highly sensitive "coherer", the device that detects radio waves. He found that the sensitivity of the coherer decreased when it was used continuously for a long period and it regained its sensitivity when he gave the device some rest. He thus concluded that metals have feelings and memory.

Jagdish Chandra Bose showed experimentally plants too have life. He invented an instrument to record the pulse of plants and connected it to a plant. The plant, with its roots, was carefully picked up and dipped up to its stem in a vessel containing bromide, a poison. The plant's pulse beat, which the instrument recorded as a steady to-and-fro movement like the pendulum of a clock, began to grow unsteady. Soon, the spot vibrated violently and then came to a sudden stop. The plant had died because of poison.

Although Jagdish Chandra Bose did invaluable work in Science, his work was recognized in the country only when the Western world recognized its importance. He founded the Bose Institute at Calcutta, devoted mainly to the study of plants. Today, the Institute carries research on other fields too.

Jagdish Chandra Bose died on November 23, 1937.

Read more at http://www.iloveindia.com/indian-heroes/jagadish-chandra-bose.html#Az9AWrE7XXDaE9iT.99

ˈsaɪəns/

noun

1.

the systematic study of the nature and behaviour of the material and physical universe, based on observation, experiment, and measurement, and the formulation of laws to describe these facts in general terms

2.

the knowledge so obtained or the practice of obtaining it

3.

any particular branch of this knowledge: the pure and applied sciences

4.

any body of knowledge organized in a systematic manner

5.

skill or technique

6.

(archaic) knowledge

Word Origin

C14: via Old French from Latin scientia knowledge, from sc̄ire to know

Word Origin and History for science

n.

mid-14c., "what is known, knowledge (of something) acquired by study; information;" also "assurance of knowledge, certitude, certainty," from Old French science "knowledge, learning, application; corpus of human knowledge" (12c.), from Latin scientia "knowledge, a knowing; expertness," from sciens (genitive scientis) "intelligent, skilled," present participle of scire "to know," probably originally "to separate one thing from another, to distinguish," related to scindere "to cut, divide," from PIE root *skei- "to cut, to split" (cf. Greek skhizein "to split, rend, cleave," Gothic skaidan, Old English sceadan "to divide, separate;" see shed (v.)).

From late 14c. in English as "book-learning," also "a particular branch of knowledge or of learning;" also "skillfulness, cleverness; craftiness." From c.1400 as "experiential knowledge;" also "a skill, handicraft; a trade." From late 14c. as "collective human knowledge" (especially "that gained by systematic observation, experiment, and reasoning). Modern (restricted) sense of "body of regular or methodical observations or propositions concerning a particular subject or speculation" is attested from 1725; in 17c.-18c. this concept commonly was called philosophy. Sense of "non-arts studies" is attested from 1670s.

Science, since people must do it, is a socially embedded activity. It progresses by hunch, vision, and intuition. Much of its change through time does not record a closer approach to absolute truth, but the alteration of cultural contexts that influence it so strongly. Facts are not pure and unsullied bits of information; culture also influences what we see and how we see it. Theories, moreover, are not inexorable inductions from facts. The most creative theories are often imaginative visions imposed upon facts; the source of imagination is also strongly cultural. [Stephen Jay Gould, introduction to "The Mismeasure of Man," 1981]

In science you must not talk before you know. In art you must not talk before you do. In literature you must not talk before you think. [John Ruskin, "The Eagle's Nest," 1872]

The distinction is commonly understood as between theoretical truth (Greek episteme) and methods for effecting practical results (tekhne), but science sometimes is used for practical applications and art for applications of skill. To blind (someone) with science "confuse by the use of big words or complex explanations" is attested from 1937, originally noted as a phrase from Australia and New Zealand.

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science in Medicine

science sci·ence (sī'əns)
n.

1. The observation, identification, description, experimental investigation, and theoretical explanation of phenomena.
2. Such activities restricted to explaining a limitied class of natural phenomena.
3. Such activities applied to an object of inquiry or study.
4. Knowledge, especially that gained through experience.

science in Science

science

(sī'əns)
The investigation of natural phenomena through observation, theoretical explanation, and experimentation, or the knowledge produced by such investigation. ◇ Science makes use of the scientific method, which includes the careful observation of natural phenomena, the formulation of a hypothesis, the conducting of one or more experiments to test the hypothesis, and the drawing of a conclusion that confirms or modifies the hypothesis. See Note at hypothesis.

thomasalva adition

Early Life:

Edison was born on February 11, 1847 in the historic city of Milan (Ohio). His father was a versatile person and a man-of-all-work, while his mother was a teacher. Edison was mostly homeschooled by his mother. Edison became a salesman of fruit, paper and other goods on the Grand Trunk Railroad at a tender age of 12. With the help of his tiny handpress in a trash car, he wrote and published the *Grand Trunk Herald* in 1862, which was sent to 400 railroad employees. The same year Edison worked as a telegraph operator, trained by the father of a kid whose life he had saved. Edison was a tramp telegrapher, as he was exempted from military service due to his deafness. He was recruited in 1868 by Western Union Telegraph Company in Boston.

Early Conceptions:

Perhaps the first invention of Edison was a telegraph repeater in 1864 which worked automatically, while his earliest patent was registered for an electric vote recorder. He acquired partnership in a New York electrical company in 1869, where he honed the stock ticker and sold it. With all his money, Edison paid for his own factory in Newark, N.J., where he hired technicians to help him with the inventions. His dream was to create an “invention factory.” Almost 80 “earnest men,” including physicists, mathematicians and chemists, were among his collaborators. “Invention to order” made him good money at this place.

From 1870 to 1875 Edison devised many telegraphic advances including receivers, transmitters, the duplex, tape and automatic printers. He also collaborated in 1871 with Christopher Sholes, also known as “father of the typewriter,” to ameliorate the typing machine. Edison claimed to have made twelve typewriters at Newark in 1870. As a result, the Remington Company purchased his interests.

Edison’s carbon telegraph transmitter for Western Union brought a breakthrough for the creation of the Bell telephone. The money he got from Western Union for the transmitter was spent to establish a factory in Menlo Park, N.J. One more time, he used scientific talent to register over 300 patents in only 6 years. His electric pen (1877) developed stencils to produce copies.

Other Inventions and Contributions:

Probably his most impressive invention, the phonograph, was patented in 1877. By 1890 Edison had about 80 patents under his name, and that was pretty much the reason The Victor Company came into being.

To explore incandescence, Edison and his fellows, among them J. P. Morgan, developed the Edison Electric Light Company in 1878. Years later, the company became the General Electric Company. Edison invented the first practical incandescent lamp in 1879. With months of hard work researching metal filaments, Edison and his staff analyzed 6,000 organic fibers around the world and determined that the Japanese bamboo was ideal for mass production. Large scale production of these cheap lamps turned out to be profitable, hence the first fluorescent lamp was patented in 1896.

Edison made an amazing discovery in pure science, termed as the Edison Effect. He discovered in 1883 that electrons flowed from incandescent filaments. The lamp could function as a valve using a metal-plate insert, while taking only negative electricity. A method to transmit telegraphic “aerial” signals over short distances was patented by Edison in 1885. The “wireless” patent was later sold to Guglielmo Marconi.

The huge West Orange, N.J., factory was supervised from 1887 to 1931 by Edison. This was probably the world's most cutting-edge research laboratory, and a forerunner to modern research and development laboratories, with experts systematically investigating and researching for the solution of problems.

The Edison battery, made perfect in 1910, used an alkaline electrolyte, and proved to be a superb storage device. The copper oxide battery, strikingly similar to modern dry cells, was modified in 1902.

The kinetograph, his motion picture camera, was able to photograph action on 50-foot strips of film, and produced about sixteen images per foot. A young assistant of Edison built a small laboratory in 1893 called the "Black Maria," which was substantial in making the first Edison movies. The kinetoscope projector of 1893 finally displayed the films. The earliest commercial movie theater, a peepshow, was established in New York in 1884. After developing and modifying the projector of Thomas Armat in 1895, Edison commercialized it as the "Vitascope".

The Edison Company created over 1,700 movies. Edison set the benchmark for talking pictures in 1904 by synchronizing movies with the phonograph. His cinemaphone adjusted the film speed to phonograph speed. The kinetophone projected talking pictures in 1913. The phonograph, behind the screen, was synchronized by pulleys and ropes with the projector. Edison brought forth many "talkies."

The universal motor, which utilized alternating or direct current, appeared in 1907. The electric safety lantern, patented in 1914, significantly reduced casualties among miners. The same year Edison devised the telescribe, which unified characteristics of the telephone and dictating phonograph.

Services for the Government:

Edison presided the U.S. Navy Consulting Board throughout World War I and made 45 more inventions. These inventions included substitutes for antecedently imported chemicals (such as carbolic acid), a ship-telephone system, an underwater searchlight, defensive instruments against U-boats, among others. Later on, Edison launched the Naval Research Laboratory, the eminent American institution for research involving organized weapons.

Death:

This multi-genius died on Oct. 18, 1931 in West Orange, N.J. The laboratory buildings and equipment affiliated with Edison were upheld in Greenfield Village, Detroit, Michigan by Henry Ford, a friend and admirer.

Unit.2

2.1.concept of microteaching and importance.

MICRO-TEACHING

DEFINITIONS OF MICRO- TEACHING

Micro-teaching has been defined in a number of ways. Some selected definitions are given below:

- Micro-teaching is a scaled down teaching encounter in class size and class time.

- Micro-teaching is defined as a system of controlled practice that makes it possible to concentrate on specified teaching behaviour and to practices teaching under controlled conditions.

- Micro-teaching is a teacher education technique which allows teachers to apply clearly defined teaching skills to carefully prepared lessons in a planned series of 5-10 minutes encounter with a small group of real students, often with an opportunity to observe the result on video-tape.

- Micro-teaching is a scaled down teaching encounter in which a teacher teaches a small unit to a group of five pupils for a small period of 5-20 minutes. Such a situation offers a helpful setting for an experienced or inexperienced teacher to acquire new teaching skills and to refine old ones.

THE BEGGININGS OF MICRO- TEACHING

Stanford University developed Microteaching in 1963 as a part of an experimental program. It was viewed as feasible in making student- teachers aware of the realities of teaching. It also served as a measurable tool in identifying teaching skills prior to actual teaching

PURPOSES OF MICRO- TEACHING

There are two purposes of Microteaching: (a) for student- teachers to develop teaching skills under controlled conditions without risking the learning of the pupils, and (b) for experienced teachers to examine and refine their techniques.

PHASES OF MICRO- TEACHING:

According to J.C. Clift and others, micro-teaching procedure has three phases:

1. Knowledge acquisition phase: In this phase, the student teacher attempt to acquire knowledge about the skill- it's rational, its role in class room and its component behaviours. For this he reads relevant literature. He also observes demonstration lesson-mode of presentation of the skill. The student teacher gets theoretical as well as practical knowledge of the skill.

2. Skill acquisition phase: On the basis of the model presented to the student-teacher, he prepares a micro-lesson and practices the skill and carries out the micro-teaching cycle. There are two components of this phase:

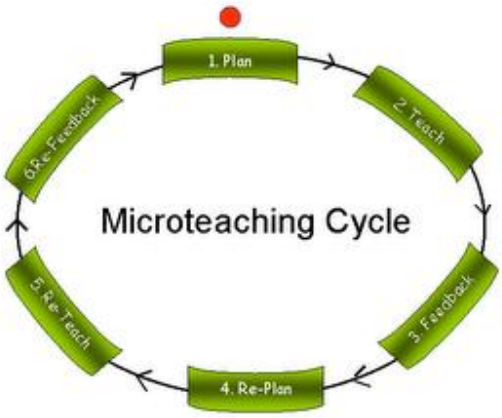
(a) feedback

(b) micro-teaching settings.

Micro-teaching settings include conditions like the size of the micro-class, duration of the micro-lesson, supervisor, types of students etc.

3. Transfer phase: Here the student-teacher integrates the different skills. In place of artificial situation, he teaches in the real classroom and tries to integrate all the skills.

MICROTEACHING CYCLE



The above diagram gives us an outlook about Micro teaching process. The cycle continues up to the extent when a trainee will able to master a specific skill.

COMPARISONS BETWEEN MICROTEACHING AND TRADITIONAL TEACHING

	MICRO- TEACHING	TRADITIONAL TEACHING
	1. Objectives are specified in behavioural terms.	1. Objectives are general and not specified in behavioural terms.
	2. Class consists of small group of 5-10 students.	2. Class consists of 40-60 students.
	3. The teacher takes up one skill at a time.	3. The teacher practices several skills at a time.
	4. Duration time for teaching is 5-10 minutes.	4. The duration is 40-50 minutes.
	5. There is immediate feed-back.	5.Immediate feed-back is not available
	6. Teaching is carried on under controlled situation.	6. There is no control over situation.
	7. Teaching is relatively simple.	7. Teaching become complex.
	8. The role of supervisor is specific and well defined to improve teaching.	8. The role of the supervisor is vague.
	9. Patterns of class room interaction can be studied objectively.	9. Patterns of classroom interactions cannot be studied objectively.

Microteaching

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1. Introduction

Why microteaching?

Medical teachers most often do not receive a special training in pedagogic techniques, as it is usually not considered necessary for their recruitment or for an efficient continued performance. Their ability to teach therefore largely depends on self training, either by trial and error while teaching or by observation of colleagues, who may or may not be helpful examples.
Getting in front of students is a trying experience for a budding teacher. One may earnestly try to prepare him or herself: read books about teaching methods, attend lectures and take courses on didactics. Yet, in theory everything seems much simpler than in practice. The complexity of a teaching situation can be overwhelming. To deal effectively with it, teachers must not only have a good knowledge of the subject in hand, but also some communication skills such as ability to observe, supervise, lead a discussion and pose questions. Furthermore, a teacher should be aware of how students perceive him or her. This perception is sometimes quite different from the teacher's self-image. It is difficult to self assess one's own abilities and we benefit from colleagues' feed back to recognize our strength and identify areas for possible improvement. Evaluation of teaching by students is becoming a common practice, and a constructive feedback could be an effective way to improve one's rating as a teacher. Even the experienced educators may sometimes reflect about strengths and weaknesses of their teaching style.

What is microteaching?

Microteaching is an excellent way to build up skills and confidence, to experience a range of lecturing/tutoring styles and to learn and practice giving constructive feedback. Microteaching gives instructors an opportunity to safely put themselves "under the microscope" of a small group audience, but also to observe and comment on other people's performances. As a tool for teacher preparation, microteaching trains teaching behaviors and skills in small group settings aided by video-recordings. In a protected environment of friends and colleagues, teachers can try out a short piece of what they usually do with their students, and receive a well-intended collegial feedback. A microteaching session is a chance to adopt new teaching and learning strategies and, through assuming the student role, to get an insight into students' needs and expectations. It is a good time to learn from others and enrich one's own repertoire of teaching methods.
A microteaching session is much more comfortable than real classroom situations, because it eliminates pressure resulting from the length of the lecture, the scope and content of the matter to be conveyed, and the need to face large numbers of students, some of whom may be inattentive or even hostile. Another advantage of microteaching is that it provides skilled supervisors who can give support, lead the session in a proper direction and share some insights from the pedagogic sciences.

Historic context

The history of microteaching goes back to the early and mid 1960's, when Dwight Allen and his colleagues from the Stanford University developed a training program aimed to improve verbal and nonverbal aspects of teacher's speech and general performance. The Stanford model consisted of a three-step (teach, review and reflect, re-teach) approach using actual students as an authentic audience. The model was first applied to teaching science, but later it was introduced to language teaching. A very similar model called Instructional Skills Workshop (ISW) was developed in Canada during the early 1970's as a training support program for college and institute faculty. Both models were designed to enhance teaching and promote open collegial discussion about teaching performance.

In the last few years, microteaching as a professional development tool is increasingly spreading in the field of medical education.

2. Planning a Microteaching Session

The duration of a Microteaching session depends on the number of participants. Microteaching should take place in two separate classrooms where the second room is required for videotape viewing. It is helpful to organize professional videotaping, although this can also be done (taken over) by the participants upon instruction.

Equipment for Microteaching session:

- TV/Computer set
- video recorder/camcorder
- camera
- tapes for camera
- black- or whiteboard, flipchart, pin board, markers with different colors

One-day plan for Microteaching (an example):

- 09:00-09:30 Introduction to microteaching given by a professional supervisor
- 09:30-10:00 Preparation of the micro lessons
- 10:00-... Microteaching session (each segment about 20-30 min)

3. Steps in Microteaching and Rotating Peer Supervision

I. Preparation

Each participant of the session prepares a teaching segment. The presenter gives a brief statement of the general objectives of his/her presentation to be addressed. The group may be asked to focus their attention to particular elements of the lesson or of the teaching style. This may include pace, clarity of explanation, use of media, voice and body language, level of group interaction.

II. Presentation and Observation

Each participant presents his/her 10-minute teaching segment. He/she is allowed to use the media available. During the presentation, other participants serve as members of a supervisory team and take notes for the group feedback. Special assessment forms (Tables 1 and 2) may be helpful in standardizing the observation and feedback process. Each lesson is videotaped. Although the lesson is short, objective and procedures should be clear to generate useful discussions.

III. Videotape Viewing

The presenter watches the tape of his/her presentation and decides whether or not the objectives were accomplished. He/she also makes a list of strengths and suggestions for personal improvement. Then he/she again joins the supervisory team. In the meantime the supervisory team discussed and made conclusions about the teacher's lecturing.

IV. Discussion and Analysis

While the presenter goes to another room to view the videotape, the supervisory team discusses and analyses the presentation. Patterns of teaching with evidence to support them are presented. The discussion should focus on the identification of recurrent behaviors of the presenter in the act of teaching. A few patterns are chosen for further discussions with the presenter. Only those patterns are selected which seem possible to alter and those which through emphasis or omission would greatly improve the teacher's presentation. Objectives of the lesson plan are also examined to determine if they were met. It is understood that flexible teaching sometimes includes the modification and omission of objectives. Suggestions for improvement and alternative methods for presenting the lesson are formulated. Finally, a member of the supervisory team volunteers to be the speaker in giving the collected group feedback.

4. Appendices

Characteristic	Aim	Observed
Duration of presentation	Approx. 10 minutes	Start time..... Finish time..... Total duration.....minutes
Comprehensibility	The presentation should be given in comprehensible language.	The presentation is sufficiently comprehensible. Comprehensibility should be improved.
Visualization	The presentation should be accompanied by selected elements of visualization.	The following forms of visualization have been used: • slides • handouts for the participants • pin board • flipchart • white/black board The visual elements assist the understanding. The visual elements should be improved.
Density of information	Density of information should be high. However, it must not overtax the learner.	The density of information seems to demand too much of the learner. Density of information is rather high. Density of information is rather low. The density of information seems to demand too little of

		the learner.
Further observations	-	-

Table 2. Characteristics of a good quality presentation. (Tick Yes or No when assessing)

Is the presentation comprehensible?	- speaks freely	yes	no
	- short sentences	yes	no
	- terminology is comprehensible	yes	no
	- presentation is well-structured	yes	no
	- conciseness	yes	no
	- use of examples	yes	no
Is the presentation stimulating?	- eye contact	yes	no
	- speaker varies his position	yes	no
	- participants are encouraged to contribute	yes	no
	- use of humor to create a relaxed atmosphere	yes	no

	- presented with commitment	yes	no
	- friendly/respectful behavior	yes	no
Is the visualization helpful?	- visualization is clear and well-structured	yes	no
	- includes graphic elements and optical stimuli	yes	no
	- easily legible writing	yes	no
	- colors help to focus on the important aspects	yes	no
	- comprehensible visualization	yes	no
	- affectionate layout	yes	no

2.2.introduction of skill,introducation,questionnaire,blackboard work,example,reinforcement skill

SKILL OF EXPLAINING AND ILLUSTRATING

WITH EXAMPLE

Explanation is a key skill. Generally, the skill of explanation is complex. Explanation is a term, which, through daily use, has acquired several meanings.

For example, it can be functional, causal or sequential; and inductive or deductive.

What is explanation? Explanation is to explain or to give understanding to another person. It leads from the known to the unknown, it bridges the gap between a person's knowledge or experience and new phenomena, and it may also aim to show the interdependence of phenomena in a general sable manner. It assists the learner to assimilate and accommodate new data or experience.

b) Using Examples

Inductive approach

It starts with examples, and infers generalization from them. The major claims are:

i. It helps students acquire skills for looking for order in an apparently pattern

less set of data.

ii. Encourages divergent and creative thinking.

Deductive approach

It states the generalization first, and applies it to a number of examples. The initial statement, even if not fully understood by students, helps to focus their attention on those aspects of examples on which teacher wishes them to concentrate. Classroom observation suggests that effective explanation often occurs when first statement of aural is followed by examples and then by a second statement of the rule, for example, clarity in establishing relationship between general rule and specific examples.

In all cases, it is essential for the teacher to use examples which are relevant to student's experience and interests, and their present level of understanding.

SKILL OF REINFORCEMENT

Every responding pupil of the class needs social approval of his behavior. To satisfy this need, he is always eager to answer each question known to him. If the teacher is encouraging the pupils by statements like, "good", that is very good and certain non-verbal expressions, as smiling, nodding the head and paying attention to the responding pupil, the pupil participation in the class is maximized. The main theme of the skill is that encouraging remarks of the teacher increases and discouraging remarks decreases the pupil-participation in the development of the learning process. Teachers are right if their ways are in accordance with the following components of the skill.

The components of skill involved are:

i. Positive Verbal Reinforcement

ii. Positive Non-Verbal Reinforcement

iii. Negative Verbal Reinforcement

iv. Negative Non-Verbal Reinforcement

v. Wrong use of Reinforcement

vi. Inappropriate use of Reinforcement

Positive -Verbal Reinforcement These are the positive comments given by the teacher on the correct response of the pupil. They are:

(i) Using words and phrases like, "good", "very good" and "excellent".

(ii) Repeating and rephrasing pupil's response.

(iii) Using pupil's idea in the development of the lesson.

(iv) Using extra-verbal cues, like "um", "um", "aha" to encourage pupils.

(v) Using prompts like carry on think again, to help the pupil give correct response.

This questionnaire allows you to self-assess a range of skills to identify those that you may need to develop. It
focuses on various skills needed for practice (e.g., communication, interpersonal, self-management and career
management skills) and skills that assist in learning. Once skills needing development are identified you can create
an action plan to gain those skills.
Complete this questionnaire by circling the appropriate numbers according to:
A
How important you think it is that you should possess/acquire the following skills:
6 very important
5 important
4 slightly important
3 slightly unimportant
2 unimportant
1 very unimportant
B
The extent to which you think you already possess the following skills (i.e., your self-assessment of you present skill level):
3 slightly poor at this
2 poor at this
1 very poor at this
6 very good at this
5 good at this
4 slightly good at this
C
Write in the score for question A minus the score for question B

These are the positive comments given by the teacher on the correct response of the pupil. They are:
(i)Using words and phrases like, "good", "very good" and "excellent".(ii)Repeating and rephrasing pupil's response.
(iii)Using pupil's idea in the development of the lesson.(iv)Using extra-verbal cues, like "um", "um", "aha" to encourage pupils.
(v)Using prompts like carry on think again, to help the pupil give correct response.

Positive Non -Verbal Reinforcement

The teacher gives comments to pupils on their correct response without using words. For example, this he does by nodding the head, smiling, patting, looking attentively at the responding pupil, and writing pupil's answer on the black boards. The teacher encourages the pupils to participate maximally in the development of the lesson.

Negative Verbal Reinforcement

The teacher gives comments on the incorrect or partially incorrect response by telling thatthe pupil's response is incorrect or making sarcastic remarks like "idiots", "stupid" and others.Such behavior of the teacher discourages pupil-participation and should not be used.

Negative Non -Verbal Reinforcement

The teacher shows his disapproval without using words. This involves, frowning, staring,and looking angrily at the responding pupil, when he gives wrong response. This type of behavior of the teacher creates fear in the minds of the pupil and decreases pupil-participation.

Wrong use of Reinforcement

This is the situation, where the teacher does not give reinforcement when the situation isdemanding encouragement.

Inappropriate use of Reinforcement

This is the situation when the teacher does not encourage the pupil with respect to qualityof his response. He uses same type of comment for every response.

2.7SKILL OF USING AUDIO VISUAL AIDS, LEARNING RESOURCES ANDLEARNING TECHNOLOGY (SUCH AS RADIO, TV, POWERPOINT SLIDES, MULTIMEDIA, HANDOUTS)2.8SKILL OF USING BLACKBOARD/WHITEBOARD2.9 SKILL OF CLASSROOM MANAGEMENT2.10 SKILL OF CLOSURE3.0CONCLUSION

Microteaching has several advantages. It focuses on sharpening and developing specificteaching skills and eliminating errors. It enables understanding of behaviors important inclassroom teaching. It increases the

confidence of the learner teacher. It is a vehicle of continuous training applicable at all stages not only to teachers at the beginning of their career but also for more senior teachers. It enables projection of model instructional skills. It providesexpert supervision and a constructive feedback and above all if provides for repeated practicewithout adverse consequences to the teacher or his students.

2.3.state the meaning of aims and objective of science education

Aims

The aims of the teaching and study of sciences are to encourage and enable students to:

- develop inquiring minds and curiosity about science and the natural world
- acquire knowledge, conceptual understanding and skills to solve problems and make informed decisions in scientific and other contexts
- develop skills of scientific inquiry to design and carry out scientific investigations and evaluate scientific evidence to draw conclusions
- communicate scientific ideas, arguments and practical experiences accurately in a variety of ways
- think analytically, critically and creatively to solve problems, judge arguments and make decisions in scientific and other contexts
- appreciate the benefits and limitations of science and its application in technological developments
- understand the international nature of science and the interdependence of science, technology and society, including the benefits, limitations and implications imposed by social, economic, political, environmental, cultural and ethical factors
- demonstrate attitudes and develop values of honesty and respect for themselves, others, and their shared environment.

Objectives

The objectives of sciences listed below are final objectives and they describe what students should be able to do by the end of the course. These objectives have a direct correspondence with the final assessment criteria, A–F (see "Sciences assessment criteria").

A One world

This objective refers to enabling students to understand the interdependence between science and society. Students should be aware of the global dimension of science, as a universal activity with consequences for our lives and subject to social, economic, political, environmental, cultural and ethical factors.

At the end of the course, and within local and global contexts, students should be able to:

- describe and discuss ways in which science is applied and used to solve local and global problems
- describe and evaluate the benefits and limitations of science and scientific applications as well as their effect on life and society

- discuss how science and technology are interdependent and assist each other in the development of knowledge and technological applications
- discuss how science and its applications interact with social, economic, political, environmental, cultural and ethical factors.

2.4.aims structure

1.State the concept of general objective.

An example of a general objective is, "To make the student of information science capable of identifying the needs of users of a particular documentation system." A specific objective derived from this general objective is, "The student must be able to identify different types of documentary information networks." From these examples, it is evident that specific objectives are usually derived from general objectives.

2.state the concept of specific objectives

Specific objective are usually expressed in terms of the student, and they are unequivocal, which means that they are expressed clearly and have only one interpretation. They also only describe behaviors that can be observed in the subject. UNESCO also indicates that specific objectives detail the unique

Unit.3

3.1.clarify the concept of bridge lesson and importance

The bridge lesson is connect of micro lesson and stray lesson. there for to bridge between both them. There are use two or three skills in of this lesson. There is not revision of education in bridge lesson. Bridge lesson is mini teaching so called bridge lesson. There is trainer use all skills in bridge lesson and teaching the student in the classroom. There is 12 to15 minutes in bridge lesson. The bridge lesson is increase the trainers confidence.

Importance.

1.bridge lesson is connected of micro lesson and stray lesson.
2. There are use many skills in the bridge lesson.
3.The trainer's really teaching method put to wait in classroom training .

4.The student gets real experience in teaching work.
5.The trainer is increase his confidence .
6.There are increase the students in this lesson.

3.2.bridge lesson planning.

1.It is 15 to 20 minutes lesson plan
2. It works like bridge between stray lesson and micro lesson.
3.Each skill has been fully developed in this lesson.
4.The teacher can use the different teaching aids.
5.By this lesson, teacher gets confidence in teaching.

3.3.approaches..inductive-Deductive ,problem solving,

Inductive approach.

One of the important part of searching new knowledge in science is to formulate and test hypotheses. Hypotheses are simply tentative explanations put forth to account for observed phenomena. Formulating testable hypotheses draws heavily on the scientist's creativity and imagination. One of the general pattern to formulate hypotheses is inductive logic or induction.

If a person tastes a green apple he finds it sour. if he repeats such experience he related the characteristics of green apple to the other characteristics of the apple. namely sour. thus he draws a generalization all green apples are sour. this is known as inductive method. it has four characteristics.

It begins with observations
It leads to hypothesis development.
It proceeds from specific to general.
It is a method of discovery.

Procedure of inductive Method.

=observation of the particular instances.

Various instances are provided for study to the learners in this stage .The more the instances the surer in results.

=Analysis of the instances

In this stage all the instances are stuied analytically. Their natures with references to the aim are studied.

=Finding out the points of difference and similarity.

In the third stage the points of difference and similarity are discovered and noted.

=Classification.

Now it the proper stage to classify the differences and similarities to build up the final solution of problem.

=Generalization.

When all the points of differences and similarities have been classified the generalization is started.

Merits of inductive Method.

1.learning effective and enduring
2.Learning meaningful.
3.learning motivated.
4.Learning learn self dependence.
5.Useful for practical life
6.It encourages creative thinking
7.The method is psychological.
8.A natural method.
9.no problems of discipline, inattention and so on.
10.Promotes teacher –pupil relation
11.promotes co-operation

Limitations of inductive Method.

1.Not complete in itself
2.Very slow and lengthy.
3.Not possible to learn all.
4.not suitable for small children.
5.learners may go astray.

6.not applicable in all subjects.

Deductive Method.

How do experiments test hypothesis? Experiments test hypothesis by testing the correctness of prediction that can be derived from them. This process involves the deductive logic deduction.

Deduction reasoning is the heart and soul of mathematics. Mathematics generally deal with symbols where deduction approach is helpful.

Some of the charateritics of deduction logic as follow:

*Deduction approach begins with hypothesis which lead to prediction.

*It proceeds from general to specific.

*It is a method of verification.

Ausbel believes that structured concepts can be taught to student. He regards the human mind as a system for receiving, processing, and storing information. Ausubel advocate learning new ideas relating them to available concepts or anchoring ideas. Ausubel s Advance Organizers helps learner's link new ideas with existing concepts. Advance organisers fit well in a direct instruction method called deduction teaching, the opposite of Bruner s inductive teaching.

The figure shows Advance Organisers and Deductive Teaching: Teach from general to specific. (Martin Jr., Allen, Bacon, p.43) An organizer helps to provide a foundation before the teacher presents the abstraction or generality of a lesson (1), then proceed to clarify terms (2), provide example (3), and students work with specific example.(4)

Step 4.Students work with specific examples.

Step 3.Teacher provides examples.

Step 2.Teacher clarifies key terms.

Step 1.Teacher presents abstraction or generality of lesson.

The differences between inductive and deductive approaches are as follows.

No.	Inductive approach	No	Deductive approach
1	The teaching pattern moves from specific to general e. g. data, examples	1	In deductive approach it is from general to specific e.g. rules, principles.

	etc.		
2	Inferences and generalizations are drawn from specifics.	2	Specific learning experiences are presented to apply generalizations.
3	It involves discovery learning and is student centered and autonomous.	3	It involves verification skills. it is mostly teacher centered
4	It encourages motivation and students learn how to learn.	4	Self-learning is minimal
5	This approach consumes more time, consequently syllabus coverage is difficult.	5	It is less time consuming. Hence, syllabus coverage is easy.

Problem solving method.

There are many difficult and puzzling events that appear in all most any environment. but background reading and discussion with people suggest problems that are worthy of study. Problem solving, is a goal of teaching science and it is equated to inquiry learning concept formation. problem solving is an important approach which has its own place in science teaching.

Meaning of problem solving Method.

Risk has mentioned that problem solving may be defined as a planned attack up on a difficulty or penplexity for the purpose of finding a satisfactory solution. This involves the process of reflective thinking not merely the accumulation of facts or the blind acceptance of ideas which someone in authority gives us.

Risk has further Elaborated this point. He says that problem solving teaching procedure is defined as a process of raising a problem in the minds of students in such a way to stimulate purposeful, reflective thinking in arriving at a rational solution.

In this definition three elements are involved these are.

1. A situation which presents some difficulty or a doubt which requires solution.
2. A goal involving some aspect of the situation for which no ready answer is given.

3. A desire or motive that stimulates an attempt to find the answer.

Procedure problem solving.

The methods of searching scientific knowledge are equally important.The successful teacher allow the students to behave as scientists by letting them confront problems and solve these problems through the use of problem solving skill. The most useful method of solving problems is the age old method of critical thinking .problem solving steps are as follows.

1.Identifying and defining the problem.

Student come across a difficulty, a questions, a problem, the answer to which they do not know. This questions or problems can be identified from daily life situations or from the background literature on some topic; or from the area where the student is working. it is evident that good problems stem from the clear understanding of the theoretical and practical aspects of the subject. before of the problem.

2.formulating hypothesis:

In order to focus on the problem, students should identify the purpose for which the problem has been under taken. The investigator should hypothesize the problem the relationship between two or more variables or difference between two or more treatments. A review of previous research in this area may suggest several possible causes of problem. these possible causes may be stated as hypotheses. these hypotheses are possible solutions.

3.Teasting hypotheses or collecting evidences on problem:

The investigator should conduct the experiment or should try to study the observations made or should gather data based on his experiment. The science teacher should guide the students to conduct experiments with proper procedure.

4.Interpreting results:

Interpretation of data should be based on proper use of technique and it can be recorded trough charts, graphs, tables and diagrams.

5.Drawing conclusions:

Conclusions of the results drawn on the basis of data should be accurately reported after proper interpretation. such conclusions will be considered valid and useful. Findings should be reported concisely and suggestions for further work should be mentioned.

Or

Problem solving Method.

There is not much difference between project method and problem method. Both attempt to bring in real life situations to the school.

The children pick up a problem of educational value which is interesting and worth while to them,get full understanding of it background ,define and state it and find out the solution of the same after active discussion. They have to make exhaustive study individually as well as collectively to reach the conclusion, when they have reached the conclusion they define and state the same in clear terms.

Steps in the solution.

= selection
= Statement of the problem
=Selection of material
= Preparation of the solution
= Discussions and deliberation.
=Statement of the conclusion.
=Summarizing.
= Evaluation.

Merits of the problem solving Method.

1.Problem method follows the laws of learning
2.problem method correlates the studies with the life of the children and with the community
3.problem method stimulates intellectual pursuits.
4.Problem method trains the young ones in solving the problem of life.
5.Problem method useful for social development.
6.Problem method trains the children for democratic way of life.

7.Problem method develops the power of critical judgment.
8.Problem method develops traits of initiative and self dependence.
9.Problem method gives opportunities of self expression.
10.Problem Method improves teacher – pupil relation.

Drawbacks in this Method.

1.The problem method is purely literary.
2.This method is not practicable for small and backward children.
3.upsets time table and syllabus.
4.paucity of suitable material
5.Enough background for all problems does not exist.

3.4.concept of model and give example.

A model can be developed where teacher provides opportunities for children to explore and be directly involved in manipulating objects ask questions and encourage children to ask useful and productive questions themselves help, children to construct best explanations from their experiences.

Unit.4

4.1.audio aids. Chart, model

4.2.projective aids .ohp, lcd

Give the importance and uses of over head projector and data projecter.

4.3.audio –visual aids.t.v.,coputer,

Unit.4

4.1.audio aids. Chart, model

CHART.

Chart are the handy teaching aids ,the teacher can prepare the chart to present different structures, drilling material, etc. it can be written or drawn on thick colored papers and can be hanged or displayed by using any of the board .

MODEL.

The teacher can use different models while teaching in the classroom suppose the teacher wants to present the vocabulary on wild animals, she can take toys as models to the classroom presenting vocabulary with the help of models

provides primary experiences to the learners. Some times some models are working models , they can be easily found in science lab. They are also usefull while teaching in the classroom

4.2.projective aids.ohp, lcd

Give the importance and uses of over head projector and data projecter.

O.H.P.

OHP. Is the hardware use to project the transparency, the transparency is a plastic sheet on which teacher can develop his on material to be presented, The teacher can draw sketches ,matchstick drawing or prepare the chart on it.

L.C.D

The L.E.D is the instrument through which one can view educational progrmmes are also aired from respective L.C.D programs production centre, they are a good as radio programs which teacher cannot select.

4.3.audio –visual aids.t.v.,coputer,

T.V.

though the t.v.is a new corner in the field of science teaching but it hasbecome key audio visual aid to day.for the teaching of science. Though the service of good teacher can be available to large number of student at same time,video recording of good lessons.can be put Of effective use in educational institutions through t.v.sets.fitted with video cassette projectors, national and regional telecasts of science lessons can be attended by the students, film based on literary classes can be seen and practice in listening comprehension can be gained.

Computer.

The computer is electronic instrument the computer technology has brought multimedia presentation, text, graphics, audio and video are simultaneously available. The teacher can use this aid instead of all resources available prior to it the computer is V.C.D, VCR, slide of film projector the learning with the help of computer.

The evolution of a scientific theory

A scientific theory is not the end result of the scientific method; theories can be proven or rejected, just like hypotheses. Theories can be improved or modified as more information is gathered so that the accuracy of the prediction becomes greater over time.

Theories are foundations for furthering scientific knowledge and for putting the information gathered to practical use. Scientists use theories to develop inventions or find a cure for a disease.

Some believe that theories become laws, but theories and laws have separate and distinct roles in the scientific method. A law is a description of an observed phenomenon that hold true every time it is tested. It doesn't explain why something is true; it just states that it is true. A theory, on the other hand, explains observations that are gathered during the scientific process. So, while law and theory are part of the scientific process, they are two very different aspects, according to the National Science Teachers Association.

SKY IS THE LIMIT
SHREE SYAMJI SHUKLA GROUP OF COLLEGES