

Swamy Vivekananda Vidya Samsthe(R) Trust, Shikaripur
KUMADVATHI COLLEGE OF EDUCATION
Shivamogga Road, SHIKARIPUR, Shivamogga District
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II Semester
PSS- PHYSICS
Unit –Meaning, nature of Physics

By

NAGENDRAPPA S
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Kumdvathi College of Education
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II Semester Introductory Class

By

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BACHELOR OF EDUCATION DEGREE COURSE

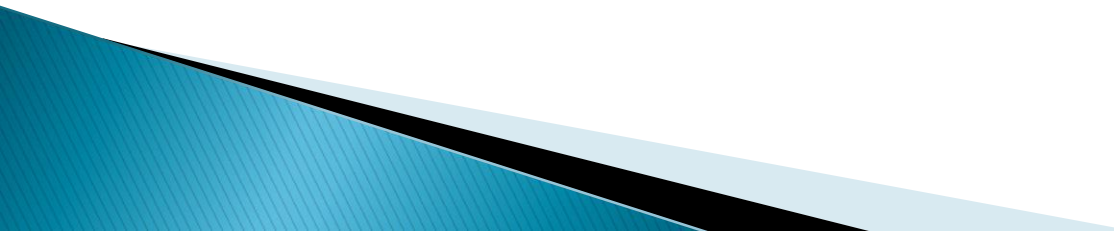
SEMESTER-2

PEDAGOGY OF SCHOOL SUBJECT (PSS1A/2A)

PHYSICS

Marks: $75+25=100$

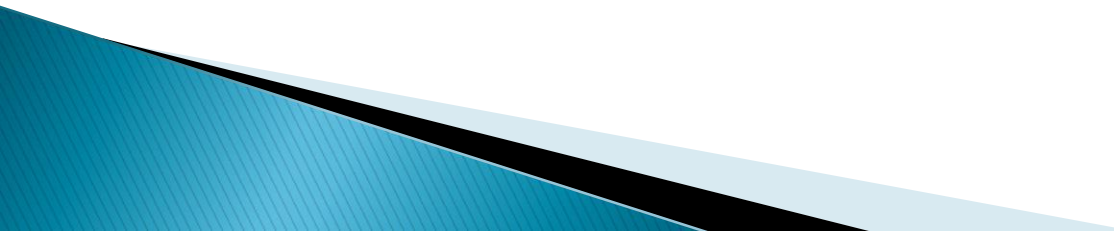
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- ▶ Objectives
 - ▶ Unit-1: Nature and scope of teaching
 - ▶ Unit 2- Aims and objectives of teaching physics
 - ▶ Unit 3- Planning and organization of lesson to teach physics
 - ▶ Unit 4- Approaches and methods of teaching physics
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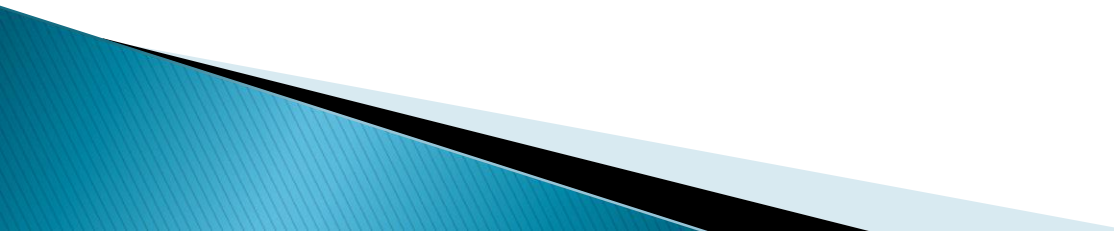
Objectives:

On completion of course the student teacher will be able to

—

- ▶ Understand the nature and, scope of physics
 - ▶ Understand the values of teaching Physics
 - ▶ Understand the skill of writing instructional objectives.
 - ▶ Prepare objectives , ICT , and CCE based lesson plan,
- 

Continued,,,,

- ▶ Prepare unit plan and Resource unit
 - ▶ Understand the selection of various methods and models of teaching to teach
 - ▶ different topics of physics.
 - ▶ Identify different curricula in Physics
- 

UNIT-I: NATURE AND SCOPE OF TEACHING

1.1 Meaning , Nature and Scope of Physics

1.2 Physics as process and product , and verifiable body of knowledge

1.3 Scientific method – meaning – steps.

1.4 Scientific attitude – meaning – characteristics of an individual with scientific attitude–role of teacher in developing scientific attitude among the students.

1.5 Contribution of scientists to the field of physics.



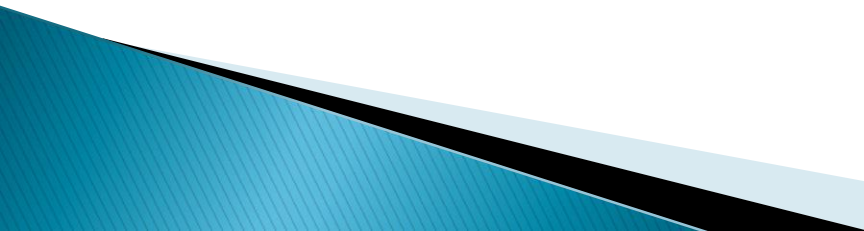
UNIT II- AIMS AND OBJECTIVES OF TEACHING PHYSICS

2.1 Values of teaching physics


2.2 Educational objectives of teaching physics:
Meaning classification of objectives based on NCERT version

2.3 Instructional Objectives: Meaning -categorizing the objectives in terms of Behavioral terms Under the category of knowledge, understanding, Application, skill, attitude, interest & appreciation etc.

UNIT III - PLANNING AND ORGANIZATION OF LESSON TO TEACH PHYSICS

- 3.1 Lesson plan: meaning, importance and steps and format of macro lesson plans.
 - 3.2 ICT and CCE based lesson plan: Importance and format of plan
 - 3.3 Unit Plan: meaning, importance, steps and format.
 - 3.4 Resource Unit: meaning and importance, steps and format
- 

UNIT IV - APPROACHES AND METHODS OF TEACHING PHYSICS

- 4.1 Teacher centered and learner centered approach.
 - 4.2 Teacher centered approach: Lecture method, Lecture cum Demonstration.
 - 4.3 Learner centered approach: Project methods heuristic method, inductive method and Deductive method, programmed instruction
- 

Continued,,,,,,,,,,,,,

4.4 Laboratory method

(All the methods to be dealt with reference to characteristics, steps merits and demerits).

4.5 Models of teaching: Schumann's inquiry training model and Bruner's concept attainment model

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II Semester

PEDAGOGY OF SCHOOL SUBJECT

PHYSICS (PSS1A/2A)

Topic :Meaning of Science

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Etymological Meaning of Science

“The word Science is derived from the Latin **scientia**, meaning „knowledge“ or „knowing“. It is the effort to discover, and increase human understanding of how the physical world works.”

Definition of Science

from Wikipedia

“Any system of knowledge that is concerned with the physical world and its phenomena and that entails unbiased observations and systematic experimentation.”

from Encyclopaedia Britannica

“Science is the knowledge gained from using observations and experiments to describe and explain the world around us.”

Fredric frize patric

Science is cumulative and endless series of empirical observations which results in the formation of concepts and theories :with concepts and theories being subject to modification in light of further empirical observations. Science is both a body of Knowledge \and process of acquiring and refining it.

From above definitions, The three basic principles of Science can be identified.

- An accumulated and systemized body of knowledge
- The Scientific Method of Inquiry
- The Scientific attitude

The first point indicates the PRODUCT of Science and Second and Third point indicates the PROCESSES of Science. In other words, science is both a product as well as process of Knowledge

Science actually attempts to disprove ideas

(hypotheses).

Science can prove anything, solve any problem or answer any question.?

False

Science is limited strictly to solving problems about the physical and natural world.

Explanations based on supernatural forces, values or ethics can never be disproved and thus do not fall under the realm of science.

Science must follow certain rules.

The rules of science make the scientific process as

Any study done carefully and based on observation is scientific
objective as is possible.
False

Objective = Not influenced by feelings, interests
and prejudices; UNBIASED

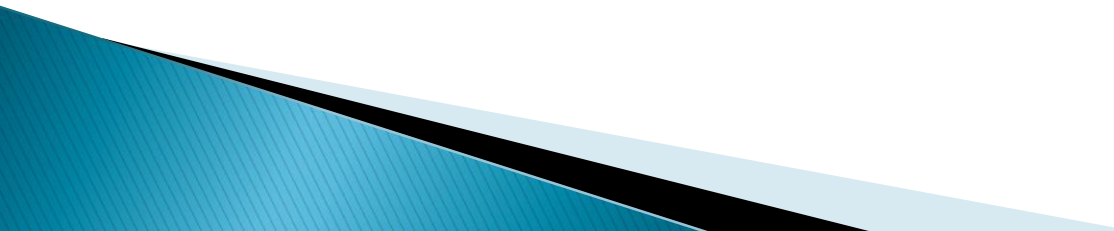
Subjective = Influenced by feelings, interests and
prejudices; BIASED

Different scientists may get different solutions to the same problem.

True

Results can be influenced by the race, gender, nationality, religion, politics or economic interests of the scientist.

Sampling or measurement bias can result in different solutions to the same problem.



What is good science?

- Objectivity is the key to good science.
- To be objective, experiments need to be designed and conducted in a way that does not introduce bias into the study.

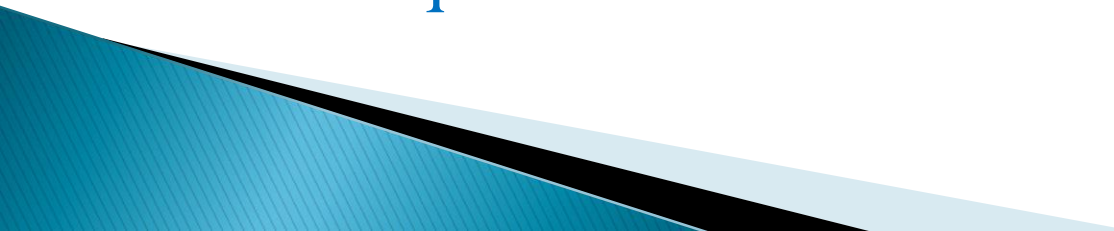
Bias

A prejudiced presentation of material

A consistent error in estimating a value

- ▶ Two main types of bias:
 - ▶ 1. Sampling bias
 - ▶ 2. Measurement Bias

Sampling Bias

- ▶ Sample = A group of units selected to be “measured” from a larger group (the population)
 - ▶ Sampling bias is introduced when the sample used is not representative of the population or inappropriate for the question asked.
- 

Etymological Meaning of Physics

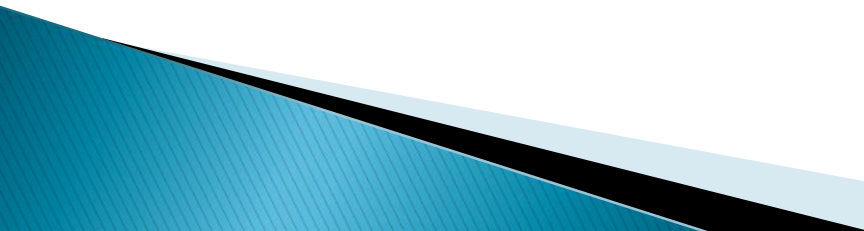
The word Physics is derived from the latin word **Physica** or Greek word **Phusika** or **Fusis** means that **Naturalthing** or **Natural**. Therefore earlier Physics is also called as the **Natural philosophy**

▶ General meaning of Physics

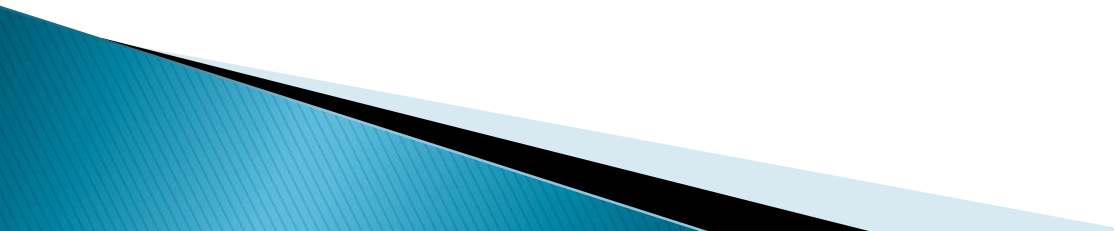
The branch of science concerned with the properties of matter and energy and relationships between them.

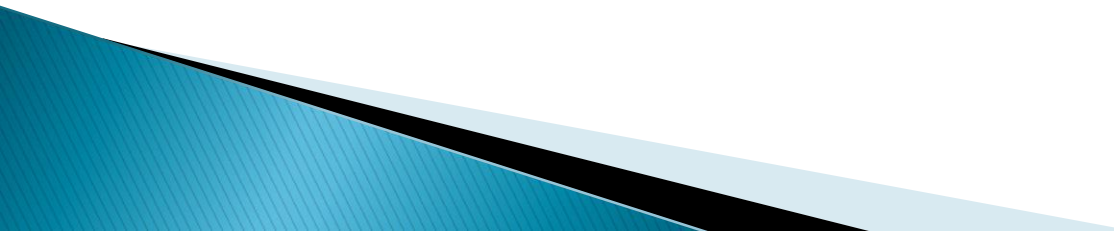
◦ Webster dictionary

Physics that branch of Science which treats the laws, properties and Interactions of Matter, motion and Energy.

- ▶ The scientific study of matter, energy, space and time and of the relationship between them
 - ▶ Physics examine the behaviors of all kinds of matter from the smallest particles to gigantic galaxies that is. Related with microscopic and macroscopic state of Matter
 - ▶ Physics deals with the physical entities
- 

Nature of Science(Physics)

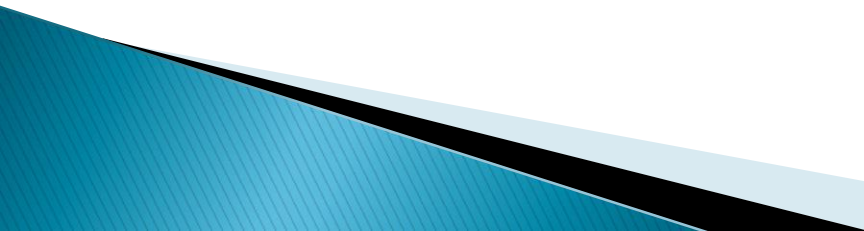
- The nature of science is basically standing on three principles . These are
 - Science is accumulated body of Knowledge
 - The scientific Method of inquiry
 - The Scientific attitude
- 

- Science is a process as well as product of that process, In process form it suggest that ways and means of exploring truth and in its product form it presents a systematic and organized body of Knowledge.
- 

- ❑ Systematic and understandable
 - ❑ Accuracy
 - ❑ Validity
 - ❑ Subject to change

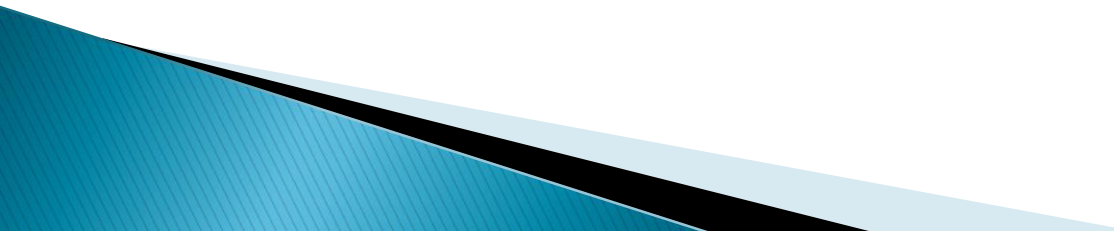
 - ❑ Durability

 - ❑ Unable to provide Complete answer to all the questions

 - ❑ Mixture of logic and Imagination
- 

- ❑ Science is a human endeavor.
- ❑ Science is based on Observation, Experimentation and Testing.
- ❑ Science relies on evidences.
- ❑ Science is a way of studying our natural environment.
- ❑ Science provides us with away to present ideas that can be tested, repeated and verified.
- ❑ Science is Non dogmatic, Science never requires ideas to be Accepted on belief or Faith alone

Home work

1. What is the Meaning of Science?
(Explain the meaning, at least with five definitions)
 2. Discuss the nature of Science in detail.
- 



Thank you

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II Semester
PEDAGOGY OF SCHOOL SUBJECT
PHYSICS (PSS1A/2A)

Topic :
Role of teacher in developing Scientific
attitude and Scientific Method

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Kumdvathi College of Education
Shikaripura

INDEX

- ❑ Role of teacher in developing Scientific attitude
 - ❑ Meaning and Steps of Scientific method
- 

Scientific Attitude

INTRODUCTION

Science and Technology is an important part of this universe. And without science we cannot imagine our life. Science is a miracle which brought about a lot of changes in the human life. Television, artificial satellites, robot, different medicines and machines are the innovations of science because of which human life become very easy and comfortable. Science is a subject which inculcate scientific attitude in students. Science is a subject that is helpful for the every person for logical and critical thinking, problem solving, objectivity, aversion to superstition etc. Science is a not a list of facts, it is a functional understanding of concepts, principles, skills, set of attitudes and interest.

Scientific Attitude is the most important outcome of science teaching, through some educationalist view that scientific attitude as a byproduct of teaching science, yet a majority of educationalists consider it to be major product or the aim of science teaching.

Thurston has used the concept of attitude as the sum total of man's inclinations and feelings, prejudice or bias, pre-conceived notions, ideas threats and convictions about any specific topic.

Attitudes are developed, they are not inborn. They can be changed or modified over the time. These modifications of attitudes are based on some of the determinants like culture, tensions, needs, emotions, experiences, provisions etc,. Such an attitude is also noticed in the field of science, which we consider as Scientific attitude,

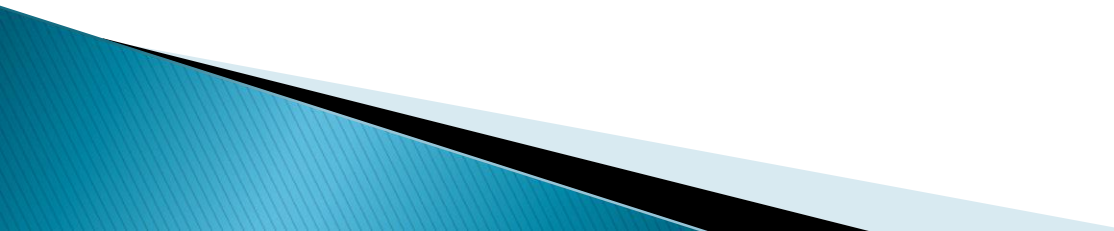
National society of the study of education(nsse, 1947) defines

Scientific attitude as open mindedness, desire for accurate knowledge, confidence in procedures for seeking knowledge and the expectations that the solution of the problem will come through the use of verified knowledge

Tripathi S., 2005

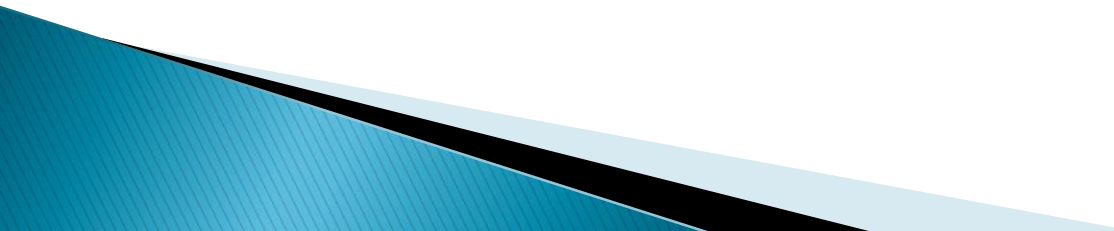
Scientific attitude is the combination of many qualities and virtues which is reflected through the behavior and action of the person. These persons are open minded, experiment oriented, systematic in approach, possess love for knowledge, intellectually honest, unbiased, truthful and possess scientific temper.

From above definitions in present study
Components of scientific attitude are identified as:

1. Curiosity
 2. Open-mindedness
 3. Faith in scientific method
 4. Cause and effect relationship
 5. Critical mindedness
 6. Seeks evidence
 7. Objectivity
 8. Suspended judgment
- 

According to (Krisnamacharyulu, V.2011)
components of scientific attitude are as given
below:

1. Scepticism
2. Faith in the possibility of solving problem
3. Desire for experimental verification
4. Willingness to change opinion
5. Humility
6. Precision
7. A liking for new things
8. Loyalty to truth
9. Aversion to superstition
10. Liking for scientific explanation

11. Desire for completeness of knowledge
 12. An objective attitude
 13. Suspended judgement
 14. Awareness of assumptions
 15. Distinction between hypothesis and solution
 16. Respect for theoretical statement
 17. Respect for qualifications
 18. Judgement of what is fundamental and of general significance
 19. Acceptance of probabilities
 20. acceptance of warranted generalisation
- 

Curiosity

Always try to seek,
inquire, discover.



Determination

Determination

- Be persistent in your endeavors. Be firm and self-confident.

Open mindedness

- Open yourself to new ideas. Do not be one sided.
- 

Continued...

Humility

- Being modest and unassuming.

Skepticism

Do not accept things blindly without questioning.
develop the doubting attitude unless presented with
reliable data.

Patience

Wait calmly for the result of the investigation since most scientific study takes time.

Reflection

Being able to monitor and assess one's behavior/action.

Empathy for human condition Putting oneself in the position of another person

Intellectual Honesty

- Be truthful with the all result. Manipulating results may cause misinterpretation of your work.
- Do not claim scientific discoveries of others.

Perseverance

- A good Scientist should not give up.

Self- Confidence


- A scientist is confident and ready to depend his work, especially if he knows that he is right.

Aptitude for Serendipity

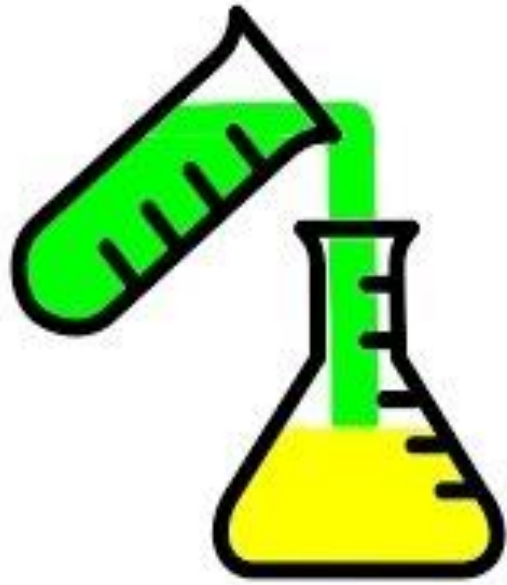
- Most scientific breakthroughs came out of serendipity. Serendipity means unexpectedly discovering or finding things.

Role of teacher in developing Scientific attitude

Teacher can use one or more ways for developing Scientific attitude among his pupils

- ❑ Making use of Planned exercises
 - ❑ Wide reading
 - ❑ Proper utilization of practical work
 - ❑ Personnel example of the Teacher
 - ❑ Study of superstitions, False and blind belief
 - ❑ Co-curricular activities in Science
 - ❑ Democratic atmosphere in the class
- 

The attitude once developed in the students proves useful in later life of the child. Apart from this the teaching of science is based on sound psychological footing. The principle of activity is the main basis of the teaching of science and satisfies the instincts of curiosity, creativeness, self-assertion, and self-expression etc. of the pupils. Scientific attitude refers to an individual's outlook towards life. It means a willingness to adopt scientific approaches and procedures for resolving issues, condition, and a stabilized mental set, which expresses itself in a tendency to react to any member of a class of stimuli in the same general way. Scientific attitude predisposes a person to engage in responsible action after weighing the possible consequences of alternative options, using rational arguments based on evidence.



The Scientific Method

Meaning and steps of Scientific method

- ▶ Scientific method. **A way to solve a problem.** Make an observation Develop an idea about why it happens Modify ideas if predictions were wrong Observe what actually happens Think of experiments to test the ideas Predict what will happen in the experiments
- ▶ All scientists observe things, try to explain their observations and then conduct experiments to test their ideas. This **process is known as the scientific method.**

make an observation



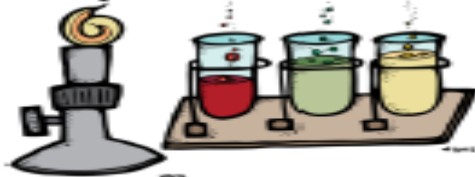
ask a question



make a hypothesis



conduct your experiment



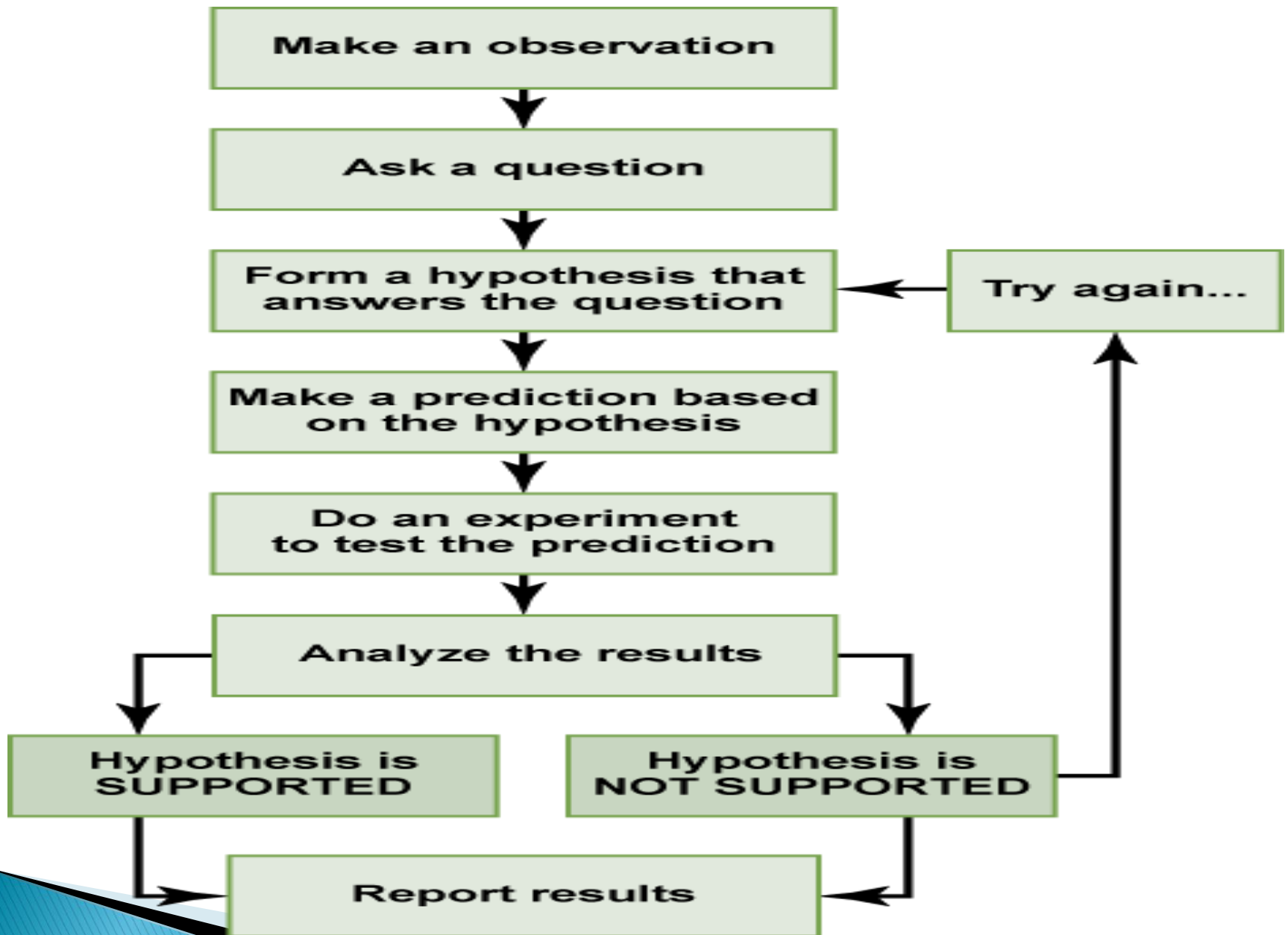
draw conclusions



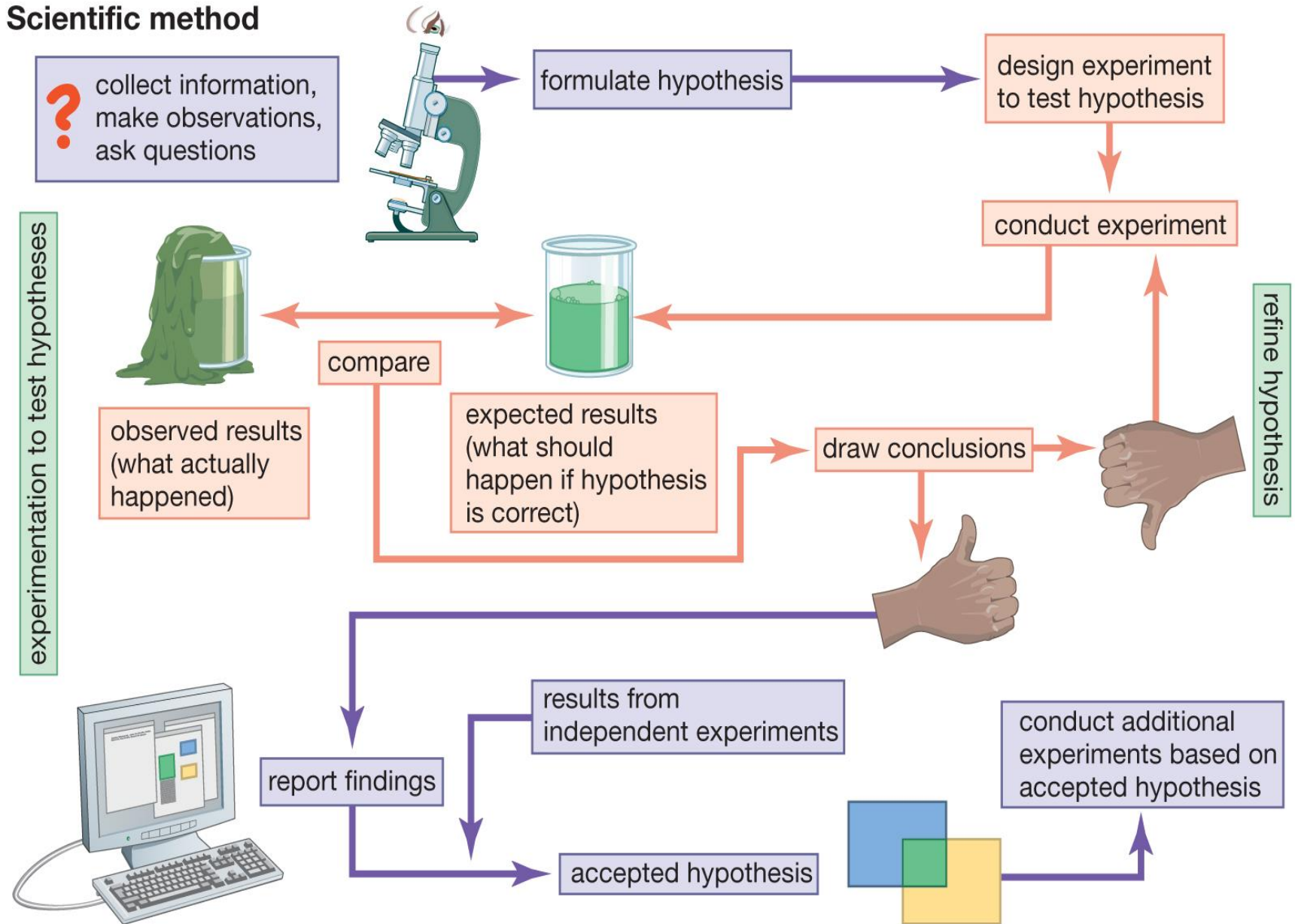
I learned that...

report your results





Scientific method



Steps of the Scientific Method

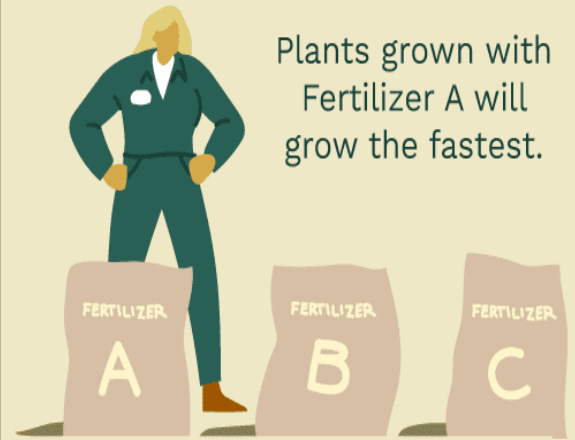


Observation

Which type of fertilizer works the best?

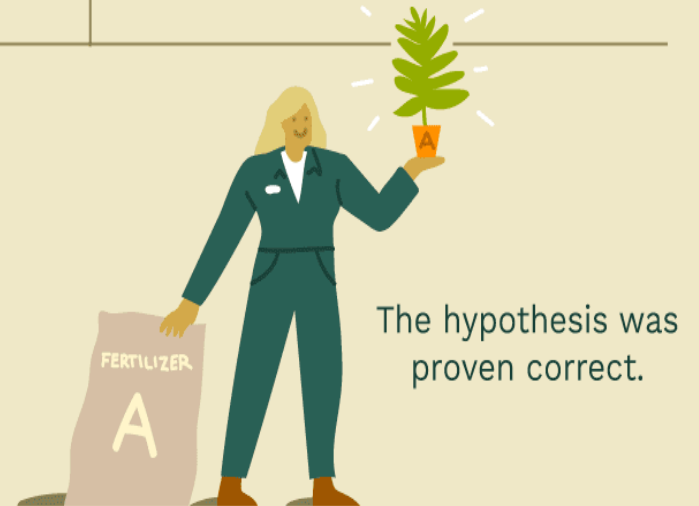
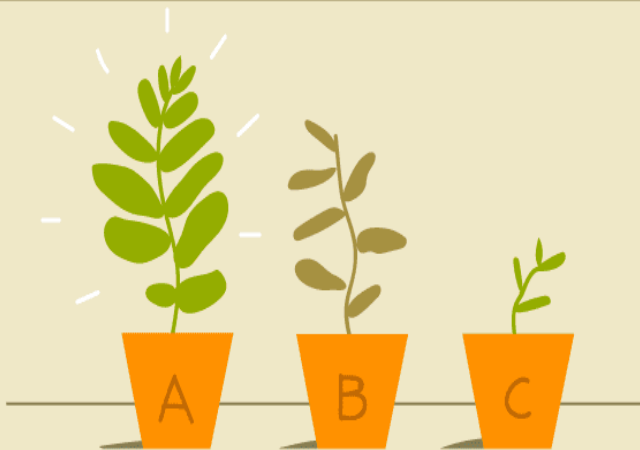


Question



Plants grown with Fertilizer A will grow the fastest.

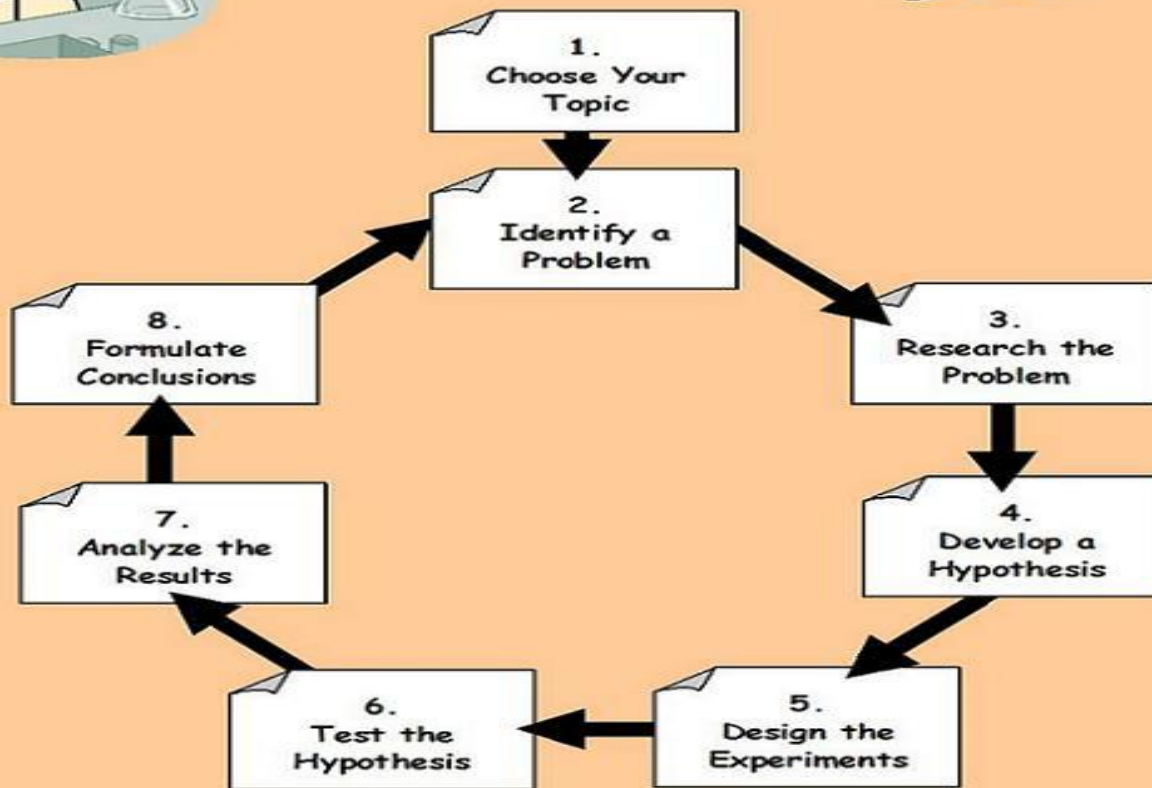
Hypothesis



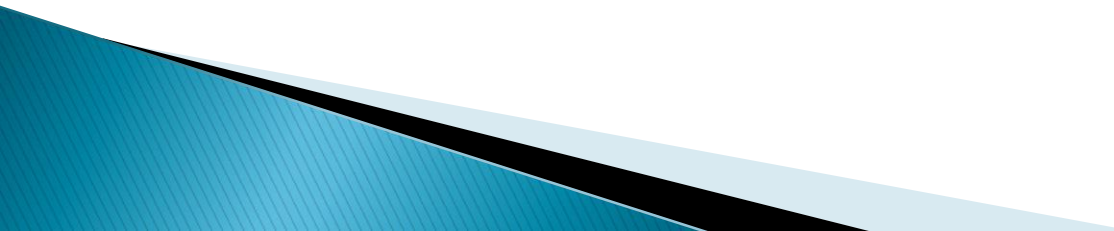
The hypothesis was proven correct.



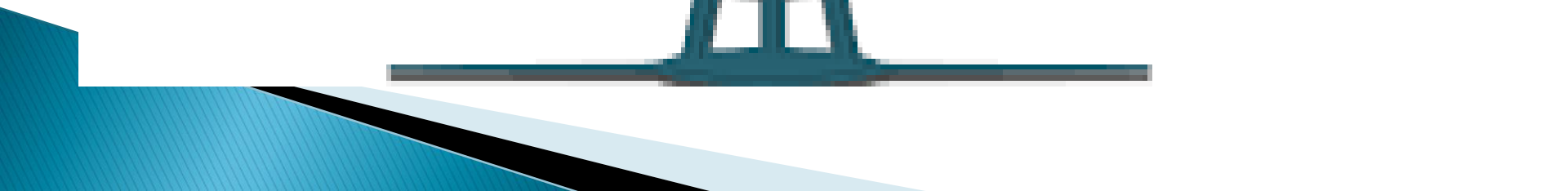
The Scientific Project Flow Chart



Home work

1. Explain the Meaning of Scientific Attitude And Characteristics of Scientific Attitude person?
 2. Explain the Role of teacher in developing Scientific attitude?
 3. What is Scientific Method? Explain the steps of scientific method with suitable examples?
- 

Thank you





Thank
YOU