

## METHODS OF TEACHING GENERAL SCIENCE

### METHODS OF TEACHING GENERAL SCIENCE:

All the methods of teaching science can be classified into two types:-

(i) **Teacher-Centered** and (ii) **Pupil-Centered**

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

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

### A. LECTURE-CUM-DISCUSSION METHOD:-

This method is a combination of lecture method and discussion method. This is very helpful in building an active verbal interaction between the teachers and students.

#### i. Role of teacher:

1. Encourage students to participate in discussion and ensure, student's attention span is maintained.
2. Pre plan and prepare properly for discussion and support ideas with factual evidence and examples.
3. If possible give time before hand so that, the discussion becomes productive.
4. Do not dominate rather get the discussion started set goals, summarize, mediate and clarify.

#### ii. Merits of Lecture-cum-Discussion Method:

1. It creates democratic environment in the class.
2. Develops and improves communication skills of students.
3. It brings about attitudinal change among students.
4. It helps in assessing the factual knowledge of the students.



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### iii. Limitations of Lecture-cum-Discussion Method:

1. It is helpful for mature students.
2. If it is not properly used, then the principle of “learning by participating” is not achieved.
3. If teacher does not handle students effectively then the students may be in disciplined rather than participation.
4. If not managed properly, it will not help all types of students in the class.

### B. LABORATORY METHOD:-

This method is commonly thought of as a hands on and minds on approach to teach science where in students have the opportunity to gain some experience with phenomena associated with their course of study. In this method either student participates alone or in small groups.

#### i. Role of Teachers:

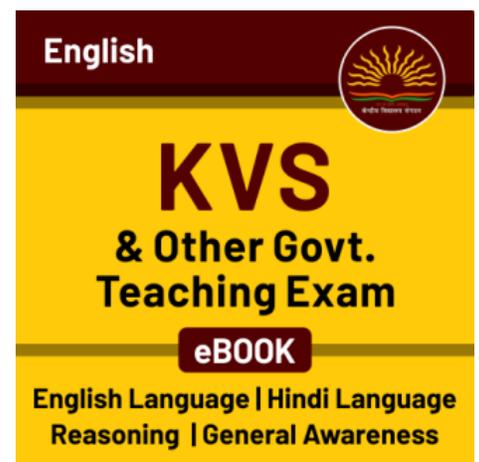
1. Teacher must be a facilitator of the process of doing experiments by students.
2. Teacher must check the apparatus previously, so that it goes on smoothly.
3. The practical work must be Pre-organized and Pre-selected.
4. The skills of handling apparatus, drawing, diagrams, careful observations taking necessary precautions, must be developed among students.
5. The teacher must be that, the student is doing experiment properly by following proper procedure.

#### ii. Merits of Laboratory Method:

1. This method follows child-centered approach.
2. It makes students active and alert.
3. It gives scope for learning by doing and students do a lot of thinking themselves.
4. Different skills are developed.
5. It paves way for exploration experimentation and verification of scientific facts and principles.
6. It inculcates good virtues like, honesty, truthfulness, dignity of labor etc.
7. It helps in developing spirit of enquiring and developing higher order thinking capacities like reasoning, analyzing, synthesizing etc.

#### iii. Limitations of Laboratory Method:

1. It is expensive and uneconomical.
2. It is time consuming as it takes much time in some experiments to come to conclusion.
3. It expects a lot from students and teacher.
4. It does not guarantee that, students would be equally efficient in solving problems outside laboratory.
5. All students cannot be expected to be skilled workers.



**C. OBSERVATION METHOD:** In this method, the student observes and acquires knowledge. The result of this process information of a concept of nature which is permanent in mind. The training of pupils in observation is really strong his mind with suitable experiences all thoroughly classified and digested.

**i. Role of Teacher:**

1. He must be man of knowledge and give adequate references for further observation.
2. He should possess curiosity, scientific attitude, interest, spirit of investigation so as to inculcate such qualities among students who in turn observe and discover many things.
3. He must provide an atmosphere for freedom in the classroom in order to encourage students to make observations.
4. He must be a guide, a working partner and friend of the students.
5. He should devise and plan different activities according to the age, ability and interests of the students.

**ii. Merit of Observation Method:**

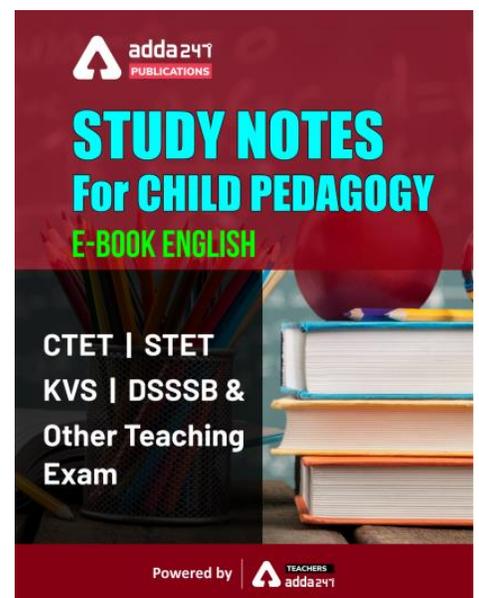
1. The work of the teacher becomes interesting.
2. The students see think give logic and thoughtful answers.
3. The students learn the similarities and dissimilarities of objects clearly and easily.
4. The knowledge acquired is permanent.
5. Students develop interest in subject.
6. Students become self-dependent, self-reliant and self-confident.
7. The problem of home-work is solved.
8. The relation between teacher and taught becomes intimate and healthy.

**iii. Limitation of Observation Method:**

1. It is too much to expect children observe and retain knowledge. The students are in nature sometimes and their knowledge and thinking power is limited.
2. It is not suitable for all the topics of science.
3. This method is information. The practical part of it remains underdeveloped.
4. It is not economical from time point of view.
5. This method is also not economical as it requires a lot of preparation and maintenance from school point of view. Where students can observe many things.

**D. PROJECT METHOD:**

This method was propounded by W.H Kilpatrick. The base of this method lies in the philosophy of pragmatism. This method emphasizes on building a comprehensive unit around an activity which may be carried out in school or outside. This implies the students undertake the activity in a group or individually over a period of time.



### **i. Types of Project:**

- a) **Producer Project:** Here the emphasis is on actual construction of a material object or article.
- b) **Consumer Project:** Here the emphasis is gain on obtaining either direct or vicarious experience, such as reading and learning stories, listening to a musical delectation etc.
- c) **Problem Project:** The main purpose is to solve a problem using intellectual process, such as determining the density of a certain liquid.
- d) **Drill Project:** This type of project emphasizes on attaining a certain degree of skill in a reaction as learning a vocabulary.

### **ii. Role of Teachers:**

1. Teacher must be a friend, guide and working partner.
2. Teacher must have through knowledge of individual student and allot work accordingly.
3. He should learn with students and should not claim to know everything.
4. He must be inexperienced, initiative and process tact for creating positive ambience.

### **iii. Merits Of Project Method:**

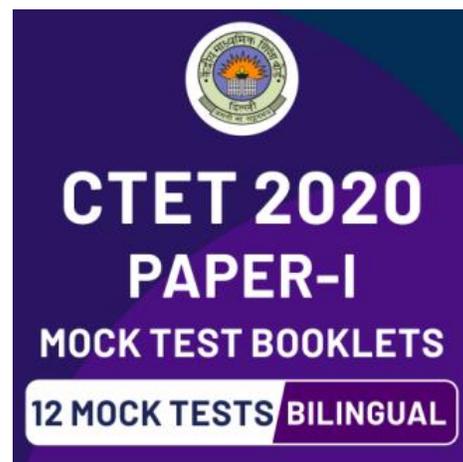
1. It promotes Co-operative activity and arouses and maintains interest of students.
2. It keeps the students on freedom of thought and action while doing the work.
3. It develops scientific attitude and widens the mental horizon of student.
4. It develops dignity of labor and the students learn by self-activity.
5. It supports all the laws of learning i.e., law of readiness, law of exercise, law of effect.
6. The correlation of subjects is best followed in this method.

### **iv. Demerits of Project Method:**

1. The knowledge is not acquired in a sequential manner.
2. If not planned and executed properly them, it may not be completed in time.
3. It is a time consuming process.
4. It may be a costly affair where in same items/things may not be available at times.
5. It gives to students a superficial knowledge of great many things. Therefore it is not suitable for all types of students.

### **E. PROBLEM SOLVING METHOD:**

In a problem solving method, children learn by working on problems. This enables the students to learn new knowledge by facing the problems to be solved. The students are expected to observe, understand, analyze, interpret find solutions, and perform applications that lead to a holistic understanding of the concept. This method develops scientific process skills. This method helps in developing brainstorming approach to learning concepts.



**i. Role of Teacher:**

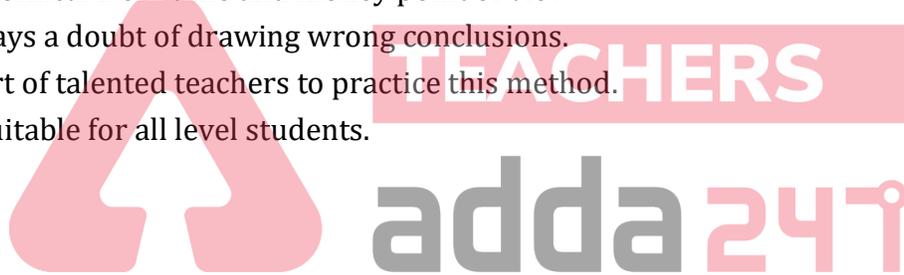
1. Teacher must work as a facilitator.
2. Teacher must keep in mind that if in a child-directed learning not teacher-directed.
3. Teacher must provide situation for all students to come formed and contribute towards the success of the activity.
4. He must be alert and active to arouse interest among students.
5. He must be initializing, tactful and we experienced.

**ii. Merits of Problem Solving Method:**

1. Students develop democratic feting.
2. This method follows the principle of learning by doing.
3. They learn to use old facts in new references.
4. They become capable to generalize.
5. Students learn to find solution to their problem.

**iii. Demerits of Problem Solving Method:**

1. It is not economical from time and money point of view.
2. There is always a doubt of drawing wrong conclusions.
3. There is short of talented teachers to practice this method.
4. This is not suitable for all level students.



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