

EVALUATION IN SCIENCE

Evaluation is the overall assessment of educational outcomes brought about as a result of teaching learning process. Therefore, evaluation in science will mean that, it is the assessment of social learning outcomes brought about as a result of teaching the science subject.

1. Viva - Voice or Oral Tests:

Such tests are based on oral communication between the examiner and examinees. Oral questions are put to the students for being responded by them in oral form.

Besides question - answer, the other verbal communication and dialogue techniques like interviews, quizzes, group discussion, panel discussion, debates and declamation contests, symposiums, extempore, etc. may also be used for evaluating students' abilities and learning potential in oral form.

2. Practical Tests:

Students are required to demonstrate their learning performance by engaging themselves in experimental and work activities.

They have to create or produce something, report their observations of a relevant phenomenon, demonstrate the applicability of theoretical information in a concrete form and perform some motor behaviour or skilled activity as asked to be done for testing their behavioural outcomes related to cognitive and affective domains.

3. Written Tests:

Such tests require the use of writing material like paper and pencil from the examiner and examinees. Students receive test questions through written media known as question paper and are required to give their responses on the supplied answer sheet or the question paper itself in the written form.

- It is done to assess students understanding about the subject
- taught and grade them accordingly.
- The scoring and interpretation of these answer sheets or
- Written responses thus become a basis for the evaluation to the teaching - learning outcomes, performance and abilities of the students.
- Written tests are the most frequently and popularly used evaluation tools used in teaching - learning process.
- The questions framed in the written test are usually of the following three types



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A. Essay Type Questions:

It is characterized with their demand from the students to respond by providing quite lengthy, descriptive, detailed and elaborate answers. Students are at liberty to respond to the presented questions in a way they like.

The questions like following may be cited as illustrations for the setting of such essay type questions in science:

- What are the Newton's three laws of motion? Discuss them carefully, citing suitable examples.
- What are electrons? How are they distributed in different cells? Explain with examples.

B. Short Answer Type Questions:

In a written paper represent those questions which need a short and pinpointed reply either limited to fixed number of words say 100 or 200 words or restricted in its scope by delimitation and specification like list, define, give three examples, provide a most suitable reason, etc. For the illustration purpose, we may cite the following questions

- Name the three modes of transmission of heat.
- Point out the precautions to be kept while preparing oxygen gas in the laboratory.

C. Objective Type (Multiple Choice Questions):

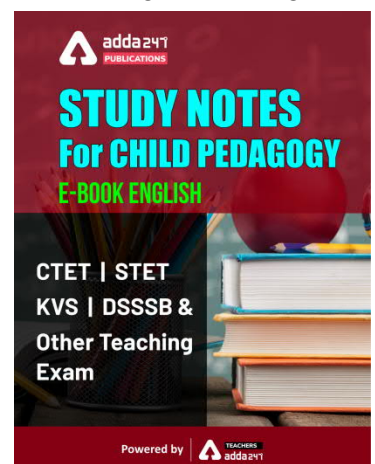
These types of questions which can be responded by just writing one or two words or numerals, filling up the blank or choosing one out of the multiple given.

4. Observation:

Observation as an evaluation technique consists of observing and taking note of the observed behaviour by the examiner or group of examiners. Observation may be performed in many ways.

It is to have controlled formal observation like observing the students while engaging in practical work, doing sums in the class or having discussions and conversation, etc. The decision about adopting a particular evaluation instrument or combination of instruments depends upon so many factors like

- Objective or objectives of the teaching - learning. Contents or the learning experiences provided to the learner.
- The methodology and strategies adopted for carrying out the process of teaching - learning. The behavioural domain, cognitive, conative or affective in which behavioural changes are to be measured or assessed.
- The purposes like diagnostic, formative or summative or providing information, feedback, incentive, etc. served by the evaluation.
- Emphasis on mastery learning, acquisition of required level of performance or reliable comparability and grading, etc. The level - memory, understanding and reflective of the organisation of teaching - learning.
- The nature of the evaluation instrument or instrument suitable for serving some particular or required purposes.



5. Questionnaire:

As an evaluation technique consists of a sufficient number of questions relate to the evaluation of a particular performance or behavior. The questions may take the form of a simple check list (multiple alternatives) or responded as yes or no (two alternatives) or yes? or no. These may also be open ended questions providing greater scope and freedom for the student responses. As illustration, we may have the following types of examples

- The laboratory work in Chemistry/Physics makes me to feel
(a) bored (b) confident (c) anxious (d) interested
- I like to draw essential diagrams for the preparation of gases in laboratory. Yes/No
- After asking to verify a fact through laboratory work by my teacher. I feel.....

6. Interview:

Interview as an evaluation technique consists of a face - to - face dialogue and interaction between the examiner and examinee. The student facing interview is required to answer or demonstrate his performance as asked by the interviewer or panel of interview board. Here little time or almost no time is given for responding to the enquiry type questions asked by the interviewers.

2. Types of Evaluation:

While teaching science, teachers may resort to three major kinds of evaluation - (i) diagnostic, (ii) formative and (iii) summative, in order to help themselves for taking wise decisions at the three stages of the teaching - learning process, i.e. pre-active, interactive and post - active.

I. Diagnostic Evaluation:

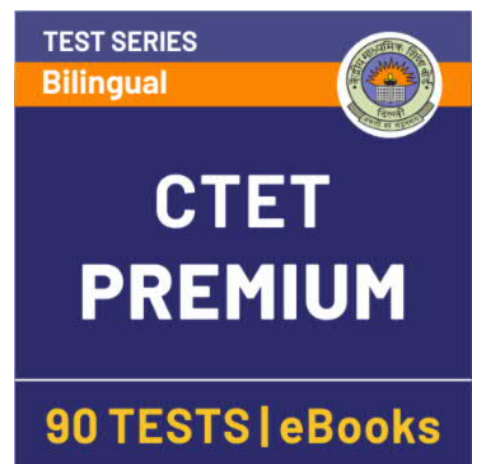
It helps the teacher to plan his instructional programme suiting the needs, interest and abilities of the students. Strategies used for such evaluation may be both informal (like observations and discussions) and formal (like pre - test, inquiry, questionnaire).

- One can make of its use throughout his delivered lesson or unit of teaching for diagnosing his students understanding and interest.
- The main objective of diagnostic evaluation in science is to find out the nature and causes of the persistent learning problems and to formulate a plan for seeking suitable remedial actions for the problems related to day to day life.

II. Formative Evaluation:

This type of evaluation is conducted during the teaching learning process. When a teacher has taught some content or some unit or provided some learning experiences, he has a need to determine the outcome.

Teacher may plan and engage for the mid-course corrections in pace or content and methodology of instruction. The formative evaluation may be carried out both in formal (like checklists, quizzes, question answer, assignments and tests) as well as informal (like observations, listening to students comments and conversations) way.



The essential characteristics of formative evaluation are:

- It is administered during the lesson taught or instruction imparted. It is diagnostic in nature.
- It helps in informing the students about their progress chiefly about the amount they have yet to learn before achieving the set objectives.
- It is useful to extent it remains informative, closely related to the things being taught, timely and frequently.
- It helps the teacher by providing him qualitative and quantitative data for bringing necessary modification in his teaching.
- It proves very useful in guiding the students, planning remedial instruction and prompting them to ask for necessary help.
- It should in no way be used by the teacher against the students, just as for making comparison among the students or making a certifying judgement.

III. Summative Evaluation:

Such type of evaluation is carried out at the end of a piece of instruction lesson or unit. Actually, it represents a final test or measure of the student's progress or gains made by him as a result of a course of learning.

Both formal as well as informal techniques may be used for conducting such evaluations. The formal techniques may include test.

Standardized as well as teacher made, questionnaire, interviews, rating scale, work assignments, project, etc. In the informal techniques, we may include observations, discussions, comments and feedback given by the students, etc.

Summative evaluation is characterized as following:

- It summarizes the final progress of the students as a result of a course of learning unit or lesson.
- It is carried out less frequently than formative evaluation, usually at the end of a unit or course of instruction.

