



CONSTRUCTION OF AN ACHIEVEMENT TEST IN GENERAL SCIENCE FOR CLASS IX BASED ON NCERT SYLLABUS

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Abstract

Achievement test is of very important assessment tool to evaluate the student's current level of knowledge and skill acquired from classroom instruction. This test is designed to evaluate the student's level of achievement in a particular subject for a particular class prescribed under the board or the university. In other words, to assess how much the pupils have achieved the educational objectives in teaching learning process at the end of the course and if achieved then to what extent, it has been achieved. Achievement tests are proved to be very helpful in various ways to the people who are involved in the field of education such as the teachers, the administrators, the planners, to the parents as well as for the students. The teacher very carefully develops and conduct achievement test in the class which enable the teacher to get an overall idea of the progress or the level of achievement of his students in the subject area. The teacher can determine the pupil's strength and weakness in the subject area. So, based on this the teacher can take necessary remedial instructional strategies for the betterment of the pupil's progress. In the same time, it also provides feedback for the teaching efficiency of the teacher. As with the time changes there have been many educational reforms taken place and in between syllabus had also been changed under different Boards of Studies. In order to maintain uniform standard of education the Government has formulated a policy to implement NCERT syllabus common to all School Boards throughout the country and accordingly the State Board of Secondary Education, Assam (SEBA) follow NCERT syllabus and to evaluate students' achievement in terms of the policy formulated by the Board. Till now, no any standardized achievement test has been conducted for the secondary school students of Assam. Therefore, the investigators felt to construct and standardize an achievement test in the subject General Science which will definitely help in educational research.



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INTRODUCTION: Standardization of an achievement tests are the achievement test conducted under a standard conditions. In the standardized test of achievement, the same test can be given to all the pupils to appear under the same conditions. The test has same number of questions in all the papers, the same administration and instructional rule, time limit and the same pattern of scoring or grading system. This test is considered to be fairer as the difficulty level for all the test items are found out by the process of item analysis.

The standardization test includes broad coverage of the course content. The test is initially conducted as try out on the small group of pupils of the representative sample. The Copyright © 2017, Scholarly Research Journal for Interdisciplinary Studies

scores are recorded and analyzed. This help in determining the difficulty level and discriminating power of the test items. Then the selected test items are very carefully drafted for the final tryout in an order of the items difficulty level. The final tryout of the test items are then administered on the selected sample with prior administrative guidelines and supervision. Therefore, the test can be standardized for all the pupils appearing to answer the test items. Standardization is necessary to assess the level of achievement of the educational objectives stated and prescribed, common to all the schools under the studies of board the respective school come and follow the syllabus.

1.06 OBJECTIVES OF THE STUDY

The main objectives of the present study are as follows:

- I. To construct and standardize an achievement test on General Science syllabus based on NCERT syllabus for class IX.
 - a. To plan a test
 - b. To prepare the design.
 - c. To prepare a blue print of the test
 - d. To prepare the test
- II. Try out the test
 - a. Preliminary tryout
 - b. Item analysis
 - c. Administration of the final test
- III. To standardise the achievement test by proper procedure.

3.02 CONSTRUCTION OF ACHIEVEMENT TEST

To construct achievement test in present study with regard to a set of predetermined objectives, the researcher had carefully and strictly followed the steps. The major steps involved in the construction of achievement test are as follows:

3.02.01 Planning of a test:

According to Gronlund, N.E. (1988) the planning of an achievement test involves –

- (i) Determining the purpose of the test,
- (ii) Identifying and defining the intended learning outcomes,
- (iii) Preparing the test specification and
- (iv) Writing of relevant test items.

The planning of a test is very important because it involves the preparation of outlines for selection of types of questions to be used in accordance with the objective to be fulfilled specified in the study.

3.02.02 Preparation of a design for the test:

In the present study preparation of a design for the test is concern with weightage to objective and weightage to content.

- a. Weightage to objective:** This indicates objectives that were to be tested. The weightage given to each objective were shown in the Table 3.2.
- b. Weightage to content:** This indicates the various aspects of the content to be tested and the weightage given to each unit were shown in the Table 3.2.

Table 3.2. Table of specifications in designing stage

Sl. No	Content	Knowledge	Understanding	Application	Total
1	Matter in Our surrounding	1 (3)	1(2)	1(1)	6
2	Is Matter Around us Pure	1 (3)	1(1)	1(3)	7
3	Atoms and Molecules	1(3)	1(2)	1(2)	7
4	Structure of the Atom	1(1)	1(2)	1(3)	6
5	The Fundamental Unit of	1(3)	1(3)	-	6
6	Tissues	1(3)	1(2)	1(2)	7
7	Diversity in living organisms	1(3)	1(3)	-	6
8	Motion	1(2)	1(2)	1(3)	7
9	Force and Laws of Motion	1(2)	1(1)	1(4)	7
10	Gravitation	1(2)	1(3)	1(2)	7
11	Work and Energy	1(3)	1(3)	1(2)	8
12	Sound	1(3)	1(2)	1(2)	7
13	Why do we fall ill	1(3)	1(2)	1(1)	6
14	Natural Resources	1(3)	-	1(3)	6
15	Improvement in Food Resources	1(3)	1(2)	1(2)	7
	Total	40	30	30	100

3.03 PREPARATION OF TEST ITEMS

The researcher once had finalised the draft made the decision regarding the selection of the types of the items to be included in the test. Keeping in view the objectives of the course the researcher used the ‘multiple- choice’ form of objective type test. The main

advantage of using this test form is of its easy scoring. The scoring becomes rapid and objective. Therefore, the researcher decided to use this test.

The researcher herself constructed the test items from the content of General Science textbook of class IX. The numbers of items prepared were more than the required number, i.e., 160 number of items. The items were then carefully screened and discussed with the guide and other experts and subject teacher of General Science. The draft was again discussed and revised in the light of experts and guide advice and based on the suggestions certain items were redrafted, some were modified and certain get cancelled, finally 150 items were included in the first draft of the test.

3.03.01 Determining the length of the test

It was decided that the length of the test should be sufficient enough so that it could be administered within a usual length of two class periods. This was also fixed by keeping in view the element of fatigue, to be avoided during administering the test. Therefore, it was intended to retain 100 test items in the final form of the standardized achievement test. Each correct response of the test items would carry a score of one on the other hand for unattended or wrong response of the items there's no score given. Thus, the full weight of the test would be of 100 marks.

3.03.02 Arrangement of test items

The selected test items were arranged in the order of estimated difficulty level. Hence, while arrangement the test items the following points were kept into considerations:

- i. Overlapping of the items was avoided.
- ii. Selected items were arranged in order of estimated difficulty level.

Thus, the tests were arranged in according to the difficulty of the items.

3.04 WEIGHT TO DIFFERENT UNITS

The syllabus of General Science of class IX consists of total of 15 units. The weightage to different units are given accordance to their relative importance.

3.05 PREPARING THE BLUE-PRINT

Finally after the necessary testing of any possible ambiguity in test items were corrected, modified, or removed. Finally there were 100 items than selected for the preliminary draft of the achievement test. Then keeping in view the objectives, content and types of items, a blue print was prepared. This is the stage of preparation of the table of

specification. It is prepared so that it can represent the entire course content and all the specific learning outcomes such as, Knowledge, Understanding, and Application.

Table 3.3 : Table of Specifications

Sl. No	Content	Knowledge	Understanding	Application	Total
1	Matter in Our Surrounding	6 (3,18,33,63, 108,137)	3(30,60,93)	3(45,48,122)	12
2	Is Matter Around us Pure	2(15,75)	1(134)	2(90,120)	5
3	Atoms and Molecules	3(10,25,55)	2(100,129)	1(71)	6
4	Structure of the Atom	2(11,26)	2(41,56)	5(12,101,145,146,148)	9
5	The Fundamental Unit of Life	3(32,133,77)	3(121,136,138)	-	6
6	Tissues	1(31)	2(16,17)	1(46)	4
7	Diversity in living organisms	3(24,99,128)	2(84,143)	-	5
8	Motion	1(27,124)	3(69,87,135)	4(102,117,130,131)	9
9	Force and Laws of Motion	2(5,35)	2(20,65)	4(50,57,95, 110)	8
10	Gravitation	1(66)	2(36,111)	1(125)	4
11	Work and Energy	3(28,62,103)	1(132)	1(88)	5
12	Sound	3(6,14,29)	2(89,104)	2(44,105)	7
13	Why do we fall ill	4(7,37,52,82)	1(97)	1(116)	6
14	Natural Resources	3(8,53,83)	-	2(68,98)	5
15	Improvement in Food Resources	5(4,19,34, 39, 109)	2(38,123)	2(94,127)	9
	Total	42	28	30	100

* (bracketed figures denotes serial numbers of items in the final form of the test)

3.06 PREPARATORY STAGE

3.06.01 Writing the test items

Keeping in view the objectives, expected behavioural outcomes, and course content, 160 number of objective type items were constructed. The test was objective type hence, multiple choice items were framed. Each item was consisted of problem which was stated in either as a direct question or an incomplete statement. Each item was provided with four alternatives or distracters. Among the list of alternatives only one is the correct answer, whereas, the others are the effective plausible distracters.

The investigator had been written the test items several weeks before after careful analysis of the content of the book. About 160 test items were constructed to ensure the retention of the adequate 100 items in the final draft.

3.06.02 Reviewing and Editing Test Items

The test items were given for review to the subject experts and teachers from the field of General Science and to the supervisor of the study. The experts had with due care analyses and provide further significant suggestions for the improvement in the light of content to be covered, scoring key, distracters of multiple choice, instructions given for the construction for an achievement test on General Science. After the careful review and criticism the ambiguity, inappropriate vocabulary, irrelevant sentence structures and alternatives were corrected, modified, and removed. The care was also taken to see that the items were free from overlapping so that the information of one item does not provide a clue to the answer of another.

Table : 3.4. Number of Experts Consulted for Checking of Tool for Investigation

Subject Experts	Number
Subject Teachers of General Science	4
Supervisor	1
Total	5

3.06.03 Arranging the items in the test

At this stage the items were arranged in the ascending order of difficulty.

3.07 PREPARING INSTRUCTIONS FOR THE TEST

After construction and arrangement of test items, the instructions to be given to the testees were framed by the investigator. It was mentioned in the cover page of both the tests and in the answer sheet. The test instructions are the information related to the test such as, the nature of the test, weightage of each item, number of alternatives, and the time allotted for answering the test.

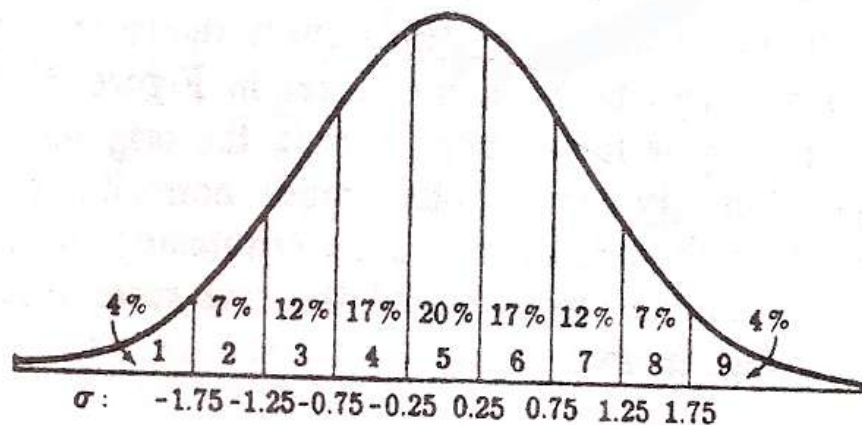
The instructions which were given to the testees during the administration of the try outs of the test along with the procedure to be followed while recording the correct answers in the answer script was given. These instructions were in written and oral form for the convenience of the testees. The oral instructions prepared by the investigator were as mentioned below:

1. Please write your names, roll number, name of the school and section in the space on the script before you start.
2. Please go through the written instructions carefully before you start answering the items of the test.

3. Please see that no item is left unanswered. You have to answer all the items.
4. Your sincere and honest effort will help me a lot in my endeavour.
5. Do not make unnecessary haste to finish the test.
6. Do not discuss anything with your neighbours.

3.08 RECORDING OF THE ANSWERS

For the purpose of recording of correct answer, a scoring key was developed. The scoring key consists of the correct answer for each item. Each correct answer will be given a score of 1 whereas for each wrong answer 0 marking will be recorded. The scoring key is attached in the Appendix II.



5.06 Findings of the Study

The reliability coefficient of the present test was found to be 0.76. Here, the scores of test and retest were computed to find the coefficient correlation between the scores. The test was found conformity with the reliability coefficients of achievement tests in other subjects conducted by other Investigators like Bhagat & Baliya (2016), Kumar (2016), Kumar (2013), etc. where the reliability score was found to be between 0.73 to 0.95. Thus, this figure shows that the test is reliable.

In the present study, the validity of the test was established against criteria of content validity. To ensure validity, the test was given for analysis, to four General Science teacher of secondary school and to the supervisor of the study. With all necessary detail each test items were evaluated and significant suggestions were provided for modification, addition of adequate and removal of inadequate test items. Afterword it was allowed to administer and thus ensures the validation of the test. Norms for the test were established by Percentile norm, T score and Stanine norm.

5.06.01 Findings in percentile scale were:

- 10 % of the 190 students scored below 33.05.
- 20 % of the 190 students scored below 39.17.
- 30 % of the 190 students scored below 44.5.
- 40 % of the 190 students scored below 49.8.
- 50 % of the 190 students scored below 55.56
- 60 % of the 190 students scored below 61.2
- 70 % of the 190 students scored below 66.64.
- 80 % of the 190 students scored below 71.93.
- 90 % of the 190 students scored below 77.06.
- 100 % of the 190 students scored below 99.5.

5.06.02 Findings in T Score scale were:

- For 99.47 % of the scores lie below 90-100. Thus for 99.47% the T score is 76.
- For 96.84 % of the scores lie below 80-90. Thus for 96.84 % the T score is 69.
- For 85 % of the scores lie below 70-80. Thus for 85 % the T score is 61.
- For 66 % of the scores lie below 60-70. Thus for 66 % the T score is 55.
- For 48 % of the scores lie below 50-60. Thus for 48 % the T score is 50.
- For 30 % of the scores lie below 40-50. Thus for 30 % the T score is 40.
- For 12.98 % of the scores lie below 30-40. Thus for 12.98 % the T score is 39.
- For 2.4 % of the scores lie below 20-30. Thus for 2.4% the T score is 30.
- For 0.3 % of the scores lie below 10-20. Thus for 0.3 % the T score is 23.

5.06.03 Findings in Stanine were:

- The Achievement score 10 – 29 is scored 1 stanine.
- The Achievement score 29 – 34 is scored 2 stanine.
- The Achievement score 34 – 41 is scored 3 stanine
- The Achievement score 41 - 50 is scored 4 stanine.
- The Achievement score 50 – 61 is scored 5 stanine.
- The Achievement score 61.2 - 70.4 is scored 6 stanine.
- The Achievement score 70.4 – 77 is scored 7 stanine.
- The Achievement score 77 – 83 is scored 8 stanine.
- The Achievement score 83 - 99.5 is scored 9 stanine.

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