

DEVELOPMENT OF SCIENCE ACHIEVEMENT TEST (PHYSICS) FOR SECONDARY CLASS

Bageshwari Tripathi, Research Scholar, Integral University, Lucknow.
A.K Lodi HOD, Department of Education, Integral University, Lucknow.

ABSTRACT: “Any test that measures the attainments and accomplishments of an individual after a period of training or learning” is an Achievement test. Science achievement test for secondary class was generally designed to measure knowledge, comprehension and application skill in science. It is an important tool to measure students’ progress. It also helps to planning curriculum, programme evaluation and instructions. Considering the role of physics achievement test in various aspect of student’s life, it is needed to be realized.

Key word: Achievement Test

INTRODUCTION:

Some mechanism has always existed for assessing the worth of an individual in accordance with the needs of society. Achievement means one’s learning attainments, accomplishments, proficiencies, etc. It is directly related to the pupil’s growth and development in educational situations.

Definition:

“Any test that measures the attainments and accomplishments of an individual after a period of training or learning”.

NM Downie

“A systematic procedure for determining the amount a student has learned through instructions”

–Groulund

The achievement tests can be broadly classified into two categories:

- (i) Standardized achievement test
- (ii) Specially constructed achievement test

Standardized tests published group of tests that are based that are based on general educational content common to a large number of educational system ,while as especially constructed tests are teacher made tests devised by teachers to measure specific and limited achievements. Such tests are also constructed by educational researchers for measuring limited areas of achievement or proficiency.

PLANNING OF THE SCIENCE ACHIEVEMENT TEST(PHYSICS) FOR SECONDARY CLASS:

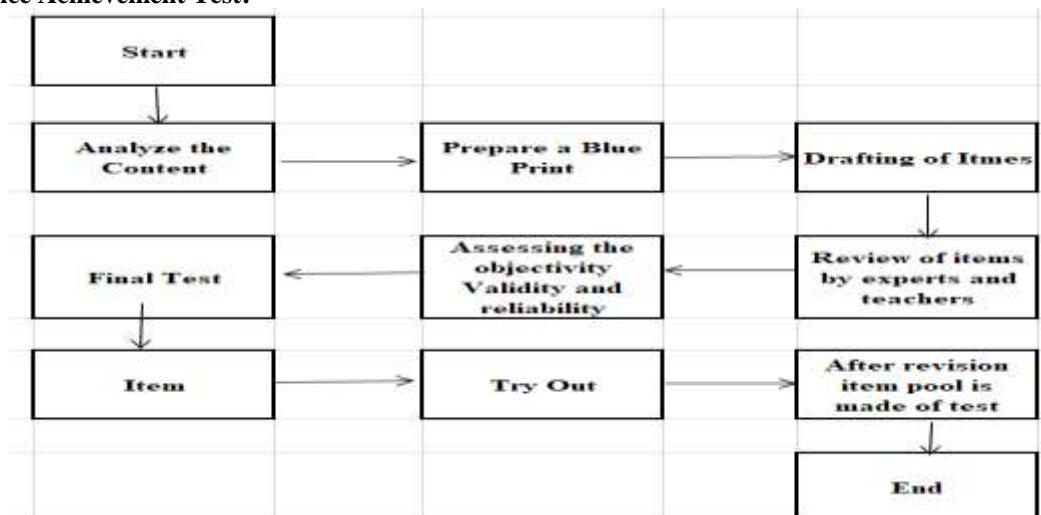
Keeping in view the importance of analysis of subject in the construction of science achievement test, the investigator first reviewed the text books of science for class of VIII prescribed by NCERT and ICSC board.

The investigator decides to construct multiple choice objective type questions. Murray (1938) regarded multiple type question one of the best measure of test judgement that is available. Cronbach & Murwin (1960) observed that multiple choice items have deserved popularity as an aid in assessing achievement ability and personality.

CONTENT OF THE TESTS:

Keeping in view of importance of analysis of subject in the construction of science achievement test the investigator first reviewed the text book of science for class VIII prescribed by the NCERT and ICSC board. And has chosen two chapter from text books ..one is FRICTION and another one is LIGHT.It was presumed that student entering into any class have the clear concept of content learned in previous class, therefore student of secondary classes are expected to have sufficient knowledge and understanding of science subject they have studied in class VIII.

Flow Chart of Science Achievement Test:



FORM OF ITEMS/QUESTIONS:

The science achievement test consists multiple choice items only. Every item was followed by four alternatives or choices, only one was correct rest three choices were distractors.

From the initially 88 items for science (physics) were drafted and discussed with subject teachers. These were also shown to experts in science. Based on their constructive instruction improvement was made in science. The language was also checked by three experts. Similarly the objectives of the science achievement test were to test the knowledge, comprehension and application of learning material. A blue print of science achievement was prepared.in the light of the blue print item was constructed.

The draft form thus prepared was released for expert's opinions that were requested to judge the worth of each question against the following criteria.

- Appropriateness of the content
- Accuracy of the scoring key
- Consistency of the text items
- Avoiding undesirable over lapping
- Accuracy of Language

As a result of expert comments some of the questions were modified and some omitted. The revised version of the initial science achievement test contained 70 items.

DURATION OF THE TEST:

The time allotted for attempting 70 items was 1 hr. 20 minutes

TRY OUT:

The initial forms of science achievement test were administrated on 30 students randomly sampled from secondary school in Lucknow. Thus the sample collected from try-out of the science achievement test constituted secondary school students, after termination was obtained from principal of the school the sheet were distributed to the student of this school with 100% response rate.

SCORING OF THE TEST PAPER:

The investigator scored the answer booklets according to the scoring key prepared advance for the question booklet. Science all the items on the test are multiple choice the scoring process seemed quite easy and done comfortably and objectively. The items on the test were assigned equal mark i.e. 'one' mark for each correct response. In case of a wrong response 'zero' marks was given. Negative marking procedure had not been adopted in the marking system. When all the 300 answer sheets were scored, they were arranged in descending order of scores for analysis. The science achievement score was the sum total of scores on all the 200 items of the test. Theoretically the range of scores on this scale extended from 0 to 100.

Correct	wrong
0	1

ITEM ANALYSIS:

Item analysis is a technique which evaluates the effectiveness of items in tests.

Difficulty index $DI = (U+L) / 2N$

Discriminating Power $DP = (U-L)N$

Where,

U=Number of correct responses in the upper group.

L=Number of correct responses in the lower group

N=Number of subjects in each group.

ITEM DIFFICULTY: The difficulty of an item a question in a test is the percentage of the sample taking the test that answers that question correctly. High values indicate that the item is easy, while low values indicate that the item is difficult.

ITEM DISCRIMINATION is a measure of how well an item a question distinguishes between those with more skill from those with less skill.

REJECTION OF ITEMS: Those items with DP greater than 0.40 and DI between 0.40 and 0.60 were selected to the final test after the item analysis and rest are rejected.

After item analysis 20 items are eliminated. Ultimately the final test format got reduced to 50 items.

Item no.	N		U	L	DI	DP	REMARKS
1	54	27	25	8	0.61	0.63	Selected
2	54	27	24	6	0.56	0.67	Selected
3	54	27	21	5	0.48	0.59	Selected
4	54	27	22	5	0.50	0.63	Selected
5	54	27	20	5	0.46	0.56	Selected
6	54	27	19	8	0.50	0.41	Selected
7	54	27	24	8	0.59	0.59	Selected

8	54	27	12	4	0.30	0.30	Rejected
9	54	27	11	3	0.26	0.30	Rejected
10	54	27	16	3	0.35	0.48	Rejected
11	54	27	16	9	0.46	0.26	Rejected
12	54	27	12	5	0.31	0.26	Rejected
13	54	27	16	3	0.35	0.48	Rejected
14	54	27	21	6	0.50	0.56	Selected
15	54	27	19	5	0.44	0.52	Selected
16	54	27	12	4	0.30	0.30	Rejected
17	54	27	13	9	0.41	0.15	Rejected
18	54	27	11	4	0.28	0.26	Rejected
19	54	27	22	6	0.52	0.59	Selected
20	54	27	19	6	0.46	0.48	Selected
21	54	27	19	6	0.46	0.48	Selected
22	54	27	24	9	0.61	0.56	Selected
23	54	27	22	5	0.50	0.63	Selected
24	54	27	21	9	0.56	0.44	Selected
25	54	27	17	6	0.43	0.41	Selected
26	54	27	22	5	0.50	0.63	Selected
27	54	27	18	7	0.46	0.41	Selected
28	54	27	18	4	0.41	0.52	Selected
29	54	27	26	4	0.56	0.81	Selected
30	54	27	24	9	0.61	0.56	Selected
31	54	27	20	5	0.46	0.56	Selected
32	54	27	12	4	0.30	0.30	Rejected
33	54	27	14	3	0.31	0.41	Rejected
34	54	27	21	7	0.52	0.52	Selected
35	54	27	23	7	0.56	0.59	Selected
36	54	27	17	5	0.41	0.44	Selected
37	54	27	14	9	0.43	0.19	Rejected
38	54	27	15	9	0.44	0.22	Rejected
39	54	27	18	9	0.50	0.33	Rejected
40	54	27	11	4	0.28	0.26	Rejected
41	54	27	14	8	0.41	0.22	Rejected
42	54	27	15	9	0.44	0.22	Rejected
43	54	27	16	6	0.41	0.37	Rejected
44	54	27	19	3	0.41	0.59	Selected
45	54	27	17	6	0.43	0.41	Selected
46	54	27	21	8	0.54	0.48	Selected
47	54	27	18	5	0.43	0.48	Selected
48	54	27	17	5	0.41	0.44	Selected
49	54	27	19	3	0.41	0.59	Selected
50	54	27	21	6	0.50	0.56	Selected
51	54	27	22	9	0.57	0.48	Selected
52	54	27	22	5	0.50	0.63	Selected
53	54	27	17	5	0.41	0.44	Selected
54	54	27	22	4	0.48	0.67	Selected
55	54	27	23	6	0.54	0.63	Selected
56	54	27	18	5	0.43	0.48	Selected

57	54	27	24	5	0.54	0.70	Selected
58	54	27	25	5	0.56	0.74	Selected
59	54	27	20	9	0.54	0.41	Selected
60	54	27	18	6	0.44	0.44	Selected
61	54	27	19	9	0.52	0.37	Rejected
62	54	27	20	7	0.50	0.48	Selected
63	54	27	22	9	0.57	0.48	Selected
64	54	27	18	5	0.43	0.48	Selected
65	54	27	17	5	0.41	0.44	Selected
66	54	27	17	6	0.43	0.41	Selected
67	54	27	22	3	0.46	0.70	Selected
68	54	27	19	4	0.43	0.56	Selected
69	54	27	21	4	0.46	0.63	Selected
70	54	27	14	6	0.37	0.30	Rejected

Distribution of items included in the final test according to the educational objectives

Topic	Sub topic	knowledge	Comprehension	Application	total
1.FRICTION	Force of friction	2	3	2	7
	Factors affecting frictions	1	3	0	4
	Friction a necessary evil	0	1	1	2
	Increasing and reducing frictions	2	1	2	5
	Wheels reducing frictions	1	2	2	5
	Fluid frictions	1	0	0	1
2.LIGHT	Law of reflection	2	2	2	6
	Regular and diffused reflections	2	3	2	7
	Reflected light can be reflected again	1	2	2	5
	Multiple reflection	1	2	0	3
	Kaleidoscope	1	2	0	3
	What is inside our eyes	1	0	1	2
Total		15	21	14	50

RELIABILITY:

The reliability of the science achievement test was decided by test – retest method. The science Achievement Test was administrated on a sample of 200 students and this sample was again tested after a gap of 25 days. The coefficient of the correlation found was +0.87.

VALIDITY:

The major type of validity are content validity and construct validity .Content validity is based on a careful comparison of the items to the definition of the domain being measured .content validity of the science achievement test items was ensured through rational logical analysis of the science teachers and experts in test construction and the item analysis.

USE OF THE SCALE:

The investigator hopes that the importance and significance may be made use of by the students, teachers and institutions for evaluation and to measure progress of the students in the subject area.

DISCUSSION:

Science Achievement test (physics) developed by investigator contain 50 items which belong to class eight of chapter friction and light. Achievement test scores are often used in an educational system to determine what level of instruction for which a student is prepared. From the initially 88 items for science (physics) were drafted and discussed with subject experts. The reliability of the science achievement test was decided by test – retest method. The science Achievement Test was administrated on a sample of 200 students and this sample was again tested after a gap of 25 days. The coefficient of the correlation found was +0.87 that indicates it is reliable tool to measure skills and knowledge.

REFERENCES:

1. SEEJA, K.R (2016) "A study of influence of active strategies on critical thinking styles and achievements in physical among secondary school students." Ph.D (EDU) thesis. Aligarh muslim university.
2. MANOJ PRAVEEN, G (2014) "effect of mastery learning strategy on Problem solving ability in physics of secondary school students". Ph.D. (edu) thesis University of Calicut
3. JOSHI, SARITA (2014) " effectiveness of mastery learning model concept attainment model and traditional Methods in teaching science in context self-efficacy persistence and study habits" Ph.D. (edu) thesis Kumaun University.
4. SARASWATHI R (2013) "learning of environmental education concepts by secondary school students through specific instructional strategies." Ph.D(edu) thesis, Avinashilingam Deemed University for Women"
5. MANOJ, T I (2013) "a study on the effectiveness of selected learning strategies on achievement in biological Science at secondary level in relation with certain variables" Ph.D. (edu) thesis, Bharathidasan University

